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(ICRDSTHM-17)

28-29 April, 2017
Kuala Lumpur, Malaysia

Editors
Rajendra Kumar
Rohit Khokher
R.C. Singh

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The proceedings of International Conference

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Organized by

The Society for Research Development (SRD)

After long deliberations, it was decided by a group of academicians and philanthropists to establish the Society for Research Development in 2015. A draft of the constitution was framed in consultation with the founder members, to enroll members and to get the Society registered. During the first meeting Dr. R C Singh was elected unanimously as President of the Society and it was decided that the Society would organize an International Conference on Science, Technology, Humanities and Business Management (ICSTHBM-16) in Bangkok, Thailand on 29-30 July 2016. The Proceedings of this Conference was published with McGraw Hill Education, India.

As next event the Society is organizing International Conference in Kuala Lumpur entitled International Conference on Recent Developments in Science, Technology, Humanities and Management (ICRDSTHM-17) on 28-29 April 2017.

The objective of the Society is Scientific, Technical, Managerial, Literary, and Educational in nature. The Society strives to advance the theory, practice, and application of Science, Technology, Social Sciences, Humanities, Education and Management and maintains a high professional standing among its members.

The basic purpose of the Society is to bring together academicians and experts from different parts of the country and abroad to exchange the knowledge and ideas at a common platform by organizing National and International Conferences, Seminars and Workshops that unite the Science, Social Sciences, Language, Emerging Technologies, Management, Financial Engineering, Humanities, Literary, Cultural, Education and topics which are not mentioned here for the empowerment of research and development. The Society promotes the original, innovative ideas for betterment of the world and seeks to propagate the results of the interdisciplinary field across research communities and to the general public.

To know more about the activities and forthcoming events of the Society, the readers are advised to visit the official home page of the Society (http://socrd.org).

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PREFACE

We are very pleased to introduce the proceedings of the International Conference on Recent Developments in Science, Technology, Humanities and Management (ICRDSTHM-17), held in Kuala Lumpur during 28-29 April 2017.This volume of proceedings from the conference provides an opportunity for readers to engage with a selection of refereed papers that were presented during ICRDSTHM-17.

Out of 72 papers submitted for publication, 30 have been selected in this proceeding after peer review. The conference received a huge response and the researchers from USA, Hong Kong, Nigeria, Bangladesh, Germany, Iran, Oman, India, Indonesia, Malaysia, China, Korea, Thailand, Australia, Japan, etc. submitted and presented their papers in the conference. Based on the subject matter of the selected papers, we have divided them into three parts: Part A contains the papers related to Science and Technology by national and international experts who have made valuable contributions in their fields of research; Part B comprises of the papers related to Management and Operation Research by scholars actively engaged in the study of related areas at national and international level; Part C includes papers related to Humanities by the researchers who have made significant contribution in their area of research interest.

One of the unique and valuable dimensions to the ICRDSTHM-17 was the way the conference brought educators together from around the world to discuss ways to serve learners better. All in all, the ICRDSTHM-17 was very successful. The deliberations provided a better understanding of the development in science, technology, management and humanities, making it possible for non-experts in a given area to gain insight into new areas. Also, included among the speakers were several young scientists, namely, postdocs and students, who brought new perspectives to their fields.

We would like to thank all participants for their contributions to the Conference and for their contributions to this proceeding. We take this opportunity to thank the efforts of all the reviewers whose efforts enabled us to achieve a high scientific standard in this proceeding. We also thank the members of the Technical Committee for extending their help and co-operation from time to time in organizing this conference. The success of this conference means that planning can now proceed with confidence for the next event. We would also like to thank all the members of technical committee for their support and suggestions to make this conference a huge success.

Rajendra Kumar
Rohit Khokher
R. C. Singh

Keynote Address

What Profession Expects and What Moral Behavior Tells: Ethical Intelligence as an Emerging Catalytic Converter

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ABSTRACT
It is often opaque where ethics ends and where professionalism begins. It is not unlikely when business practitioners grapple between what the profession expects and what moral behavior dictates. Notwithstanding that, code of professional ethics is of central importance in any business sphere, the business practitioners may not be capable of coping with ethical dilemmas. This study seeks to uncover the underlying factors affecting business participants' behaviors in professional ethics, to diagnose the consequence of deficient ethics on any sort of business sphere, and to suggest ways to enhance professional ethics. An in-depth review of ethical literature was performed and the conceptology of "ethical intelligence" with its often used interpretations are discussed. This study may provoke a debate about being equipped with other ethical tools, which can be substantially beneficial to both individuals and organizations.

Keywords
Ethics and professionalism; decision making; professional development, Ethical Intelligence

1. INTRODUCTION
Nowadays, living and working with consideration of values and behaviors, according to integrity and principles has become tough and tougher (Corvellec and Macheridis 2010). Business professionals do not always act accordingly, and the situations are scarcely unequivocal (McDowell 2000). Though they may attempt to do right, grey areas still do potentially exist (Vee and Skitmore 2003, Bruhn 2009). Frequent reports about an ethical misconduct in all industry sectors, especially engineering areas have provoked a heated debate in the media. So, there is a little doubt that the professionals must admit there is a need for finer professional engineering ethics (Harris Jr, Pritchard et al. 2013). There is a general consensus among scholars and practitioners that factors such as (1) violation of environmental regulations, (2) negligence, (3) bribery, (4) conflict of interest, (5) breaches of confidentiality, (6) unfair conduct, and (7) fraud are occurring unethical behaviors in the construction industry context (Collins 2011). Performing with accountability and responsibility on top of practical knowledge of personal-driven ethics and professionalism are of utmost important (Vee and Skitmore 2003, Gustafson and McCaul 2006, Smyth, Gustafsson et al. 2010, Man-Fong Ho 2011, MacDougall, Bagdasarov et al. 2015), in balancing the clients' requirements during the decision-making processes (Robinson 2007, Man-Fong Ho 2011, Ralf Müller, Walker et al. 2014). Apparently, professionals do believe that their commitments to the customers to be greater than their obligations to the society (Donaldson, Werhane et al. 1983).

A code of ethics along with some well-defined standards should be featured in reflecting values of a profession which guides individual response to the ethical dilemmas (Fisher 2008). Demonstration of such competency has often been neglected within all business industry spheres (Donaldson, Werhane et al. 1983, O'Fallon and Butterfield 2005). Therefore, tacit ethical knowledge could be made clear through developing professional ethics (Eraut 1994, Lin 2010, Oladinrin and Ho 2016). Doubtfully, the professional can on all occasions bank on their own morality working with varied cultures, expectations, personal and religious beliefs as well as values. There is no collective guidance and catalytic converter to ethical dilemmas offered by either scholars or practitioners so far. Poor ethical conduct not only jeopardizes the public safety but also leads to defective and poor quality work and ultimately loss of the financial investment to irresponsible parties (Petrick and Quinn 1997, Lawrence and Weber 2008). Though organizations have adopted the code of ethics and professional conduct, the curbing of unethical conduct is difficult. It was in this context that this study undertaken to uncover the underlying factors affecting behaviors in professional ethics. This study scrutinizes what crucial barriers restrain ethical and professional behavior, and what preventative or proactive measures could be done to clear these away. To do so, the concept of "Ethical Intelligence" has been well articulated as well as incorporated as one might hope to understand.

2. ETHICS AND PROFESSIONALISM: WHAT

We Know Ethics and professionalism have been well articulated as someone might hope as time goes on. However, it is often vague where professionalism begins and where ethics ends (Worthington 2015). The term "Ethics" is the science of moral, known as the branch of philosophy considering human character and conduct (Hogan 1973, Bunge 2012). In addition, ethics may also mean the canons, which govern an individual's conduct in a particular profession (Martin 2000, Adams, Tashchian et al. 2001, Williams 2010, Worthington 2015). Ethics refers to the systematic mechanism of attempt to be practical in a wide range of spheres covering individual, group, social, professional, market and global moral experiences in such way as to determine; the desired, prioritized, and worth pursuing ends; the right and most ought to set of obligations and rules; the character traits and virtuous intention to act accordingly, deserving development in life (Petrick and Quinn 1997). This definition seems to be a useful interpretation for the purpose of this paper as it is difficult to define ethics accurately and accordingly other than by the mention of its application. While earlier research endeavors on project management hardly specified the role of leadership (Lock 1998, Gido and Clements 1999), newer research studies focus on the significance of being capable of skillfully managing individuals. Recently, the researchers have been interested in ethical issues and how this concept is made manifest itself within the project management concept (Gido and Clements 2006, Lock 2007, Meredith and Mantel Jr 2011).

Ethical failures are made manifest themselves in every sphere of society encompassing entertainment, social service, business, environmental, education, military, religious, and government (Johnson 2007, Niebuhr 2013). There are shining examples of unethical companies such as Enron, WorldCom, and Tayco which can be considered as a crucial reminder to individuals and companies in business spheres to practice ethical behavior (Doran 2003, Krawiec 2003). These organizations have incurred a high cost for their moral shortcomings which resulted in downsizing and bankruptcy, damaged reputations, civil lawsuits and criminal charges, bribery, declining profits, revenue and share prices (Johnson 2007). An empirical survey in 2003 has uncovered the underlying perceptions of respondents as 93 percent of them believed that business ethics and personal ethics are mutually related to one another, however, 84 percent of respondents stated that there should be a maintained and sustained balance between both the requirements of the client and the impact on the public (Vee and Skitmore 2003).

Generally speaking, Ethics is a code of conduct (Ladd 1980, Mathews 1987, Doran 2003, Collins 2011) and unquestionably represent an ideology of "there is never a right way when it comes to doing wrong things" (Mackie 1990). The fundamentals of ethics must be morals (Brennan 1973, Jones 1986). Morality is perceived to be a behavior based on accepted moral standards (Hogan 1973, Harsanyi 1977) which are concerned about distinguishing between moral relativism and morally relevant consideration (i.e., distinguishing between right and wrong, or good and bad traits) - even though, there is a slight difference. Morality as the first order set of beliefs and practices about what is right and wrong, which impacts one's decisions and actions, while ethics refers to the second order considering a conscious reflective consideration of morality (Miller 2002, Hinman 2012). Indeed, ethics and professionalism seem to be two sides of the same coin within the business context.

There are various interpretations of professionalism concept; first, it is stated that professionalism should be limited to moral conduct; second, professionalism should not be constrained to the professions themselves, but as a behavioral construct. In addition, it has been characterized as behaving with integrity.

The project management literature has been focused on not only identifying, but also seeking for novel and better methods in order to fulfill project management's primary objectives encompassing; to meet the projects' performance target on time and within cost (Meredith and Mantel Jr 2011). Even though these particular issues are still of central importance in project management research spheres, there is a convergent evolution in terms of who competent project manager is and what is considered, of the utmost importance for project managers. There is little doubt that, incorporating ethics theories and principles can lead to a better healthy ethical environment where profession expects something and moral behavior dictates something else.

3. ETHICS THEORIES AND PRINCIPLES

Central to debate about the term "ethics", there are questions of how ethics and often related concepts is interpreted and what are the ethics components (Árnason and Hjörleifsson 2007). For the purpose of clarity, ethics can be seen as encompassing four components. Firstly, there are typical rules, which dictate the wrong and right conduct. Secondly, it is value-centered and preliminary concerned concerning what is most significant in life. Thirdly, there is the study of vices and virtues along with how one makes a choice to live his/her life. The last but not least component includes of obligations, autonomy and rights. The foundations of ethical analysis are tied to comprehending ethical theories and principles because they can put the spotlight on the vantage point that, which guidance can be gained and aligned along the pathway toward a decision per se. Indeed, each theory emphasizes different vantage points in order to obtain an ethically correct decision. However, the theory must be directed towards a collective set of goals. Therefore, the ethical principles can be seen as the collective set of goals that each theory tries to gain with the aim of increasing the odds of success. These collectively common goals encompass respect for justice and autonomy, beneficence, and least harm in all (Penslar 1995, Ridley 1998, Edgar 2002). Table 1 exhibits the ethical principles with a brief illustration.

Table 1: The ethical principles with brief illustrations

Justice	The justice ethical principle states that an ethical decision which contains justice within, it includes a consistent logical basis, so that, the decision itself is firmly supported (Penslar 1995, Ridley 1998, Edgar 2002). This means ethical theories contribute fairly to those who involved in certain actions.
Autonomy	In essence, a respect for autonomy ethical principle is an extension of the ethical principle of beneficence due to the fact that an individual who is independent usually wants to not only have control over his/her life experience but also prefers to obtain the lifestyle that he/she enjoys (Penslar 1995, Edgar 2002).
Beneficence	This principle is seemingly related to the principle of utility. It means human should make a great stride to generate the largest ratio of good over evil possible all around the world (Ridley 1998). Moreover, a shining example of "doing good" is more specifically found in the practice of medicine as it deals with human health, so that, the health of an individual must be treated by a physician (Penslar 1995, Ridley 1998, Edgar 2002).
Least Harm	This ethical principle can be highlighted by shining examples precisely. For instance, in the Hippocratic oath, physicians' first commitment is accepting the responsibility to "do no harm" to the patients since the physicians' primary duty is to provide helpful treatment rather than inflict more suffering upon the patients (Ridley 1998, Edgar 2002). This is more like to beneficence, but it regards to the situation in which neither choice is beneficial.

In addition, ethical theories are tied to the aforementioned ethical principles. These ethical theories each emphasize diverse aspects of the ethical dilemma. Indeed, these theories lead to the most ethically correct resolution considering the guidelines within the ethical theory itself. To illustrate, individuals' experiences are based upon their choice of ethical theory (Penslar 1995, Edgar 2002). Table 2 exhibits the ethical theories (Loo 2002, Loo 2004, Helgadóttir 2008, Helgadottir 2014).

Table 2: A Brief Illustration of the Ethical Theories.

Deontology	This refers to a person that who will follow his or her obligations to another one or society due to the fact that upholding one's duty is known as ethically correct (Penslar 1995, Edgar 2002). This theory highlights the fact that people should adhere to their obligations and duties when the ethical dilemma are analyzed or recognized (Rainbow 2002). This theory also appreciates those deontologists who exceed their obligations and duties, so-called "supererogation" (Penslar 1995). Since deontology does not consider the context of each circumstance, it does not expose any guidance when one is being involved in chaotic and complex situations in which there are obvious conflicting obligations (Penslar 1995, Ridley 1998).
Utilitarianism	This theory is capable of predicting the consequences of an action (Rainbow 2002). Moreover, it provides a logical and rationale argument considering each decision as well as allows an individual to apply it on a case-by-case context (Penslar 1995, Ridley 1998). There are two types of utilitarianism encompassing act and rule utilitarianism (Rainbow 2002). More specifically, the act utilitarianism adheres to the definition of this theory as described above. This means that an act utilitarianism could be preferable, and nice to 6 someone one moment and then dislike someone the next moment because of the changeable variables, so that, the one cannot be longer beneficial to the most people at all (Penslar 1995). On the other hand, rule utilitarianism, however, considers the law and pays more attention to faimess. However, it seems that there is the possibility of conflicting rules because of it has a source of instability (Penslar 1995). But, its added value is that it has both justice and beneficence values at the same time (Penslar 1995, Ridley 1998)
Rights	Rights are known as to be ethically correct and valid. Additionally, individuals, may also bestow rights upon others if they have the capability and resources to do so (Penslar 1995). Therefore, this theory must be used in conjunction with the other theories which are robustly tied with society and its goals (Penslar 1995). All in all, the rights here set forth by a society, are protected and also given the highest priority (Rainbow 2002).
Casuist	This theory works as it compares a current ethical dilemma with examples of similar dilemmas and their related outcomes (Rainbow 2002). However, one drawback of this ethical theory is that there might not be a similar example at all. In regard to, this issue would substantially hinder the effectiveness of applying this theory (Ridley 1998).
Virtue	This theory judges a person by his/her character than by an action. It takes the individual's morals, reputation and motivation into account when there is an unusual and irregular behavior that is perceived unethical (Rainbow 2002)l. In an opposite way, an individual who has a reputation for academic/scientific misconduct is more likely to be judged critically and harshly for plagiarizing due to his background in terms of his/her unethical behavior (Ridley 1998).

4. ETHICS AND PROJECT MANAGEMENT: A RETROSPECTIVE

Exhibit One reason why project management continues to be sustained as a profession is that it sets standards of conduct and technical expertise that almost every industry sphere can reasonably expect to be displayed by a certified and ethical project manager. However, not all countries have a fully functional mechanism to pace or act with the same standards in order to uphold them appropriately. It cannot simply be presumed, thereby, that sets of standards of conduct are uniform or that they will perform in an equal manner in all diverse settings. Even though one could assert that professionalism and ethics are higher-level values in which that are immune from cultural difference. The guide to the Project Management Body of Knowledge (PMBOK) (Guide 2001) does not precisely mention ethics in related to competency within a project management context, but the American-based Project Management Institute responsible for PMBOK has had a code of ethics (Sun 2004, Dinsmore and Cabanis-Brewin 2006). Although such codes address personal and general professional conduct in the wider context of project spheres, they don't provide a forum considering addressing specific and precise kinds of situations encountered by project managers (Helgadottir 2014).

In regard to, the ethics training becomes relevant here and are made manifest themselves comprehensively. Accordingly, the new IPMA (International Project Management Association) competence baseline defines three

interconnected aspects of project management competencies encompassing; behavioral, contextual and technical (Helgadóttir 2008). Ethics is known as one of the behavioral competencies, although it has been discussed briefly and generally (IPMA 2006). There are various interrelated competencies, for example, the National Competence Baseline (NBC) for Scandinavia are of central importance in leadership behavior, experience applications, and method applications (Fangel 2005). However, the NCB provides a method for assessing personal integrity, but it does not address ethics at all. On the other hand, the latest edition of the APM (Association for Project Management) Body of Knowledge (UK based association) puts the spotlight on ethics in project management as a cannon considering the conduct and moral principles highlighted as appropriate within project management profession context per se (Morris, Jamieson et al. 2006).

The project management has roots in engineering science (Helgadottir 2014), thereby, it has been argued that the significance of teaching ethics is intended to be more advanced in engineering that it is in project management (Humphreys 1999, Goddard 2001, Bucciarelli 2008). One of the reasons for this may be that the project management is known as a much younger profession compared to engineering, thereby, it has not matured enough to reach a consensus on the ethical issues which are specific to the project management context (Wang 2002). Accordingly, some valuable endeavors toward this end have been conducted recently. More specifically, one research study indicates that each project's life cycle stage demands that the project team exhibit specific virtues encompassing intellectual, social, moral, emotional and political which are appropriately applicable to the particular activities and closure documents of that typical stage comprising system improving, controlling and evaluating, implementing, process organizing, and conceptual planning (Kloppenborg and Petrick 1999). Another endeavor has been stated as the Total Ethical-Risk Analysis method (TERA), with especial regard to multimedia considering seeking to quantify the ethical risks, pertinent to such projects with consideration of ethical risks for project users (i.e., to clarify potential harms to users, negative feedbacks from users and subsequent risks which impeded project development) (Nicolò 1996).

In regard to, an engineering graduate option in system engineering has been described that it was designed with the aim of overcoming and in the further stage eradicating some of the specialization issues considering linking between technical and ethical training (Gorman, Hertz et al. 2000). In this case, the students have been encouraged to engaged case studies considering ethical issues in the design process. Latterly, it has been recommended that this approach can be highly appropriate in terms of integrating engineering and ethics in order to fulfill the engineering's goal; "to create and to make the world better place" (Helgadóttir 2008, Helgadottir 2014).

In an another effort, the use of vignettes/ethical dilemmas and the use of Reidenbach's and Robin's (Reidenbach and Robin 1990) multidimensional ethics scale which have been developed for business ethics, has been combined together in purpose of stimulating students' debate forum about ethical issues in project management context (Loo 2002). To elaborate it precisely, the aforementioned ethics scale is applicable into five normative ethics theories encompassing deontology, justice, egoism, relativist, and utilitarianism (Loo 2002, Helgadóttir 2008, Helgadottir 2014). Therefore, it seems certain that, there is no single right approach to ethical decision making. It means the collective behavior and approach is needed. Afterward, Loo (Loo 2004) provided Support for Reidenbach and Robin's (1990) eight-item multidimensional ethics scale in 2004 considering adding three constructs, Moral Equity, Relativism, and Contractualism. Notably, scores were independent of social desirability scores. He has indicated that this short ethics scale, comprising three construct scores and a total score, can be recommended when administration time is limited. However, this short scale does not encompass any items from the egoism and utilitarianism ethics theories reflected in the full scale. Following conclusion has been drawn by him as a recommendation baseline in which the trainers and managers should consider the use of brief vignettes in order to promote both ethical decision-making skills and ethical awareness as well as that additional vignettes should be enhanced (Loo 2002, Loo 2004).

5. BARRIERS TO ETHICAL BEHAVIOR

Any enhancement in professional ethical behavior is tied to changing the minds rather than changing the law (Todres 1991). Ethical behavior is directly associated with the nature of the circumstances, thereby, as the issue and situation become more chaotic and complicated, then ethical behavior shall be tested (Thomrnn 1991). The major deficiencies in the professional ethics have roots in the professions' structure rather than the

professionals' character (Kultgen 1988). Any ethical failure occurs in organizations due to organizational culture deficit as well as lack of encouragement to practice ethics, and leadership failure to implement (Brien 1998, Park and Blenkinsopp 2013, Guerci, Radaelli et al. 2017). Indeed, values, which are reflected by an organization, are likely to influence its employee's intention toward ethical conduct (Jones 1991, Mason 2009, MacDougall, Bagdasarov et al. 2015, Mulder, Jordan et al. 2015).

There is empirical evidence that internal ethical control within the organization will reduce any tensions pertinent to ethical misconduct (Treviño, Weaver et al. 2006, Bowen, Pearl et al. 2007, Ferrell and Fraedrich 2015, Radtke and Widener 2016). Although the ethical code is of utmost, but it alone will not guarantee ethical behavior among professionals (Doran 2003, Vee and Skitmore 2003, Bowen, Pearl et al. 2007, Williams 2010, Ho, Ho et al. 2016). Despite ethical code, practice standards, and regulatory statutes must be incorporated (Hosmer 1995). Therefore, the existence of the code of ethics in project-related organizations, such as construction, does not seem to have decreased unethical behavior because of lacking effective ethics management such as embeddedness of ethical codes (Oladinrin and Ho 2016). So, there are factors that need to be incorporated in order to integrate codes of ethics within construction organization such as process of code internalization, identification and remover of barriers; process of enacting value; process of accountability; process of coding; and process of monitoring (Oladinrin and Ho 2016). Where money buys not just goods and services, there is a risk that money rewards skewed decision making of individuals (Bennis and Rhode 2006). Whenever construction practitioners are caught in a compromising situation, the temptation to be unethical will increasingly go up, especially at the contractor levels (Mason 2009, Adnan, Hashim et al. 2012, Oladinrin and Ho 2016). Therefore, it can be asserted that being ethically quotient can be a proper prescription as playing a role as a catalytic converter to polish ethical pollutants.

6. ETHICAL INTELLIGENCE: EMERGING CATALYTIC CONVERTER

Ethical decision-making competency is at a pivotal point in its history concerning wide aspects of concepts such as ethical sensitivity and perception (Weaver, Morse et al. 2008), ethical ideology (Simon 1978), ethical judgment (Ponemon 1990), and moral intensity (Frey 2000). One concept of particular interest is "ethical quotient" which has been interpreted as "ethical maturity" (Shaw and Carroll 2012). There are some constituents, which collectively shape the professionals' ethical maturity level encompassing level of morality, emotional stability that can be obtained through integrating emotional intelligence, business intelligence, and cultural intelligence. Moreover, age and experience can be seen as control variables. Emotional intelligence/quotient has manifested itself within almost the context of every industry, which revolutionized intra-organizational structure through redirecting the term "ethical maturity" to the central core of the organization per se. The ethically intelligent project manager's attributes can be highlighted as cultural intelligence (Earley and Mosakowski 2004), social intelligence (Cantor and Kihlstrom 1987), cognitive intelligence (Cote and Miners 2006), emotional intelligence (Barrett, Miguel et al. 2001), multiple intelligence (Brualdi 1996, Gardner 2006) and ethical maturity (Duffield and McCuen 2000). Figure 1 exhibits the schematic ontology of ethical intelligence.

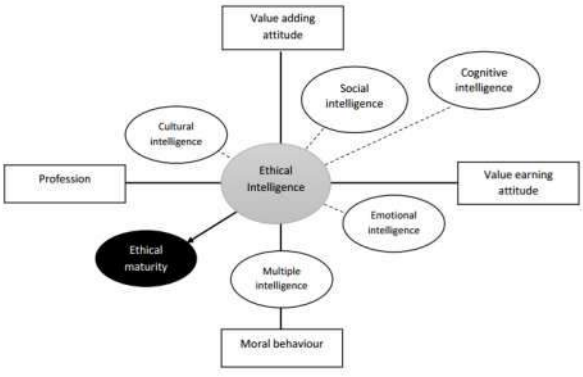

Fig 1: The schematic ontology of ethical intelligence (Authors)

In relation to an ethically intelligent project manager, we have sketched out the schematic ontology of what are attributes of the ethically intelligent manger. However, there is a need to conceptualize the concept itself substantially.

7. AUTHORS' RECOMMENDATION

We tend to see the organization from two different perspectives: (1) organization level and (2) employee level. Adding value and earning value attitude can directly contribute to employee level, in which ethical intelligence in employee level can be obtained by incorporating social intelligence, emotional intelligence, cognitive intelligence, and multiple intelligence. It can be asserted that employee and organization are two sides of the same coin. In order to obtain ethical intelligence in the employee level following concepts need to be pinpointed:

- There is a need to obtain, maintain and sustain effective interpersonal relationships, which have roots in being socially intelligence. This can be gained through interpersonal skills within social sphere contexts (i.e. increasing the understandability of social interactions, roles, and norms).
- There is a need to exchange value through being emotionally intelligent in order to build mutual interactions in which the others' emotions can be understood and be functionalized.
- There is a need to be individually structuralized when it comes to personal intellectual capacity. This means providing a seed be to be cognitively intelligent through processing, interpreting, and systemizing the information into systematic and rational behavior with aim of adapting effectively to our surrounding.
- There is a need to harmonize and convergence of all intelligence modes. This means differentiating intelligence into particular modalities lead to reach the level of critical problem solving within individual level. Therefore, the employee can upgrade his/her **"Nine Types of Intelligence"**.
- Employees can be easily affected by cultural diversity, which can be sustained through being culturally intelligent. To do so, there is a need to provide an awareness about cultural quotient-drive (i.e. extrinsic/intrinsic interest and self-efficacy); cultural quotient-knowledge (i.e. business, interpersonal, and socio-linguistics); cultural quotient-strategy (i.e. awareness, checking and planning); and cultural quotient-action (verbal/non-verbal action).

Another perspective is at the organization level; the question is how to get to the ethical maturity within organization, so we will have an ethically intelligent organization. As it is discussed, always there is a challenging struggle between what our professions expect from us and the situation where our moral behavior being put in a test! There are some attributes, which need to be obtained, maintained and sustained, and then the organization will be ethically intelligent.

- There is a need for a new revolutionized organization infrastructure (i.e. ethically and intellectually diffused and infused infrastructure). This constructive change needs to occur at all levels and across all functions. In order to implement, we need to ensure the current readiness level along with setting preventative/proactive measures layer by layer.
- There is a need to spread the essence of corporate social responsibility along with reconstructing Human Resource Management strategies. This approach will bridge the gap as it can provide an ethical atmosphere. However, this should not be considered as any threat to individual level and any judgment must be based on right behavior (i.e. understand the issue, weight the issue, and then express any judgmental comments).

To conclude, ethically intelligent atmosphere within both employee and organization levels will not only generate an ethically intelligent infrastructure but also ethically matured employee.

8. CONCLUSIONS

It is argued that ethical intelligence has made manifest itself within organizations as a catalyst for ethical maturity under certain circumstances where there is struggle between profession expectations and moral behavior perceptions. Sometimes profession expects just to keep moving forward and being result-oriented, however, on the other hand the moral behavior dictates to be ethically moral. This schizophrenic divide which lead do indecisive circumstances. In order to overcome, this study claims that being equipped with various intelligence are going to be completed and moderated by "ethical intelligence" and its often interpretations.

Although the concept of "ethical intelligence" was incorporated appropriately, but there is a substantial need to both conceptualize and in further stage operationalize the concept within various industry spheres. This study also provides some implications:

- To be an ethically intelligent is all about interactive interaction between the environment (internal/external environment in organization) and the personal functional.
- The emotional intelligence plays role as a catalytic converter through channeling ones cognitive intelligence and a perception of achieving objectives, which mirrors the sense of identity and self-assertion.
- Organization with the philosophy of earning value, adding value and exchanging value may enjoy the sense of professionalism through upwards leveling and group synergy.

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Variation of Carbon Dioxide Over SAARC Countries During the 1971-2010

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Abstract
Several factor responsible for climate change according to IPCC report factor mainly include burning fossil fuel, change land use and, deforestation ,industrial activity, volcanic eruption, agriculture. The carbon dioxide and other green house gases are cause the climate change. In the present the variations of the Carbon dioxide (CO_2) emission over South Asian Association for Regional Cooperation (SAARC) countries during the period of 1971-2010 has been carried out. Out of eight developing SAARC countries emits more amount of CO_2. The Maldives have higher emission of CO_2 whereas Afghanistan is lowest.

KEYWORDS
SAARC, CO_2, IPCC, Climate Change.

1. INTRODUCTION
The earth atmosphere sysem has been changed during last century due to the increase in anthropogenic activity. After the industrial revolution, the most significantly changes by anthropogenic activity is increase in the Carbon dioxide (CO_2) and other green house gases concentration in atmosphere. The industrial revolution marks of a strong increasing use of fossil fuels and emission of CO_2. Carbon dioxide emissions depend on the type and amount of energy consumed, and energy consumption is directly or indirectly linked to the socio-economic development of a country. So the projection of CO_2 emissions from the energy sector is based mainly on projections of the population and economic growth of a country over a specific period in the future. Besides, other greenhouse gases are also emitted from a number of activities that uses energy such as residential and commercial cooking, space heating, industrial processes, transportation and, so on.

According to IPCC reports defined equilibrium climate sensitivity refers to the equilibrium change in the annual mean global surface temperature following a doubling of the atmospheric equivalent carbon dioxide concentration. In last twelve years (1995-2006) record the instrumental record of global surface temperature (since 1850) among the twelve warmest years. According to the Third Assessment Report (TAR) the temperature increase is widespread over the globe and is greater at higher northern latitudes in the 100-years linear trend (1906-2005) of 0.74 [0.56 to 0.92]°C1 is larger than the corresponding trend of 0.6 [0.4 to 0.8]°C (1901-2000). Land regions have warmed faster than the oceans. The international convention of Kyoto Protocol to the United Nations Framework Convention on Climate Change (UNFCCC) was adopted in 1997 in Kyoto, Japan, at the Third Session of the Conference of the Parties (COP) to the UNFCCC. This protocol agreed to reduce their anthropogenic greenhouse gas emissions (carbon dioxide, methane, nitrous oxide, hydrofluorocarbons, perfluorocarbons, and sulphur hexafluoride) by at least 5% below 1990 levels in the commitment period 2008 to 2012. The Kyoto Protocol entered into force on 16 February 2005. Rising sea level is consistent with warming. Global average sea level has risen since 1961 at an average rate of 1.8 [1.3 to 2.3] mm/yr and since 1993 at 3.1 [2.4 to 3.8] mm/yr, with contributions from thermal expansion, melting glaciers and ice caps, and the polar ice sheets. Whether the faster rate for 1993 to 2003 reflects decadal variation or an increase in the longer-term trend is unclear.

Marland et al [5] described as, global emission from burning of fossil fuel and cement production account 76.3% in 2007. Now, 4.5% global CO_2 release from fossil fuel burning and cement production. In present time atmospheric atmosphere CO_2 emission contribute 80%. Michael et al [6] described as the atmosphere CO_2 emission contribute 63% for climate change. The increase mean global atmospheric CO_2 concentration has increased from 280 ppm in the 1700s to 380 ppm in 2005, at a progressively faster rate each decade. This growth is governed by the global budget of atmospheric CO_2, which includes two major anthropogenic forcing fluxes: (a) CO_2 emissions from fossil fuel combustion and industrial processes, and (b) the CO_2 flux from land use change, mainly land clearing. Manable and Wetherald (1979) described as, Generaly the increase CO_2 emission lead to warming and increasing of moisture content of air, contributes to the large reduction of meridional temperature gradient in the lower troposphere because of poleward highly reflective snow cover and increase transportation in poleward. In the CO_2 rich warm climate where moisture

penetrates into higher latitudes is cause of greater increase of the rate of precipitation and runoff in high latitudes. The CO_2 emission increase they affects the many factor more Important on climate by increasing atmosphere CO_2[Plass (1956) ,Kondrattev and Nilisk (1960), Kaplan (1960), Moller (1963), Hansen (1981)]. Kcholia and Reck (1997) described as, on doubling of CO_2 concentration quantitative impact on global climate change, global surface air temperature. The CO_2 emission shows that in develop country shows emissions have been higher as compared to developed nations since 2004, though developing countries release significantly lower levels of emissions per capita than developed countries [1].

The present study includes the variations of the CO_2 emission over SAARC countries during the period of 1971-2010. The variations of mean annual temperature over India and its relation with CO_2 emission has also been studied.

2. DATA AND METHODOLOGY

The CO_2 emission data for the period 1971-2010 was taken from the website (www.data.worldbank.org). The variations of CO_2 have been studied for SAARC countries viz. Maldives, India, Pakistan, Bhutan, Sri Lanka, Bangladesh, Afghanistan, and Nepal. Further, the CO_2 emission variation has also been analyzed for the four decadesviz 1971-1980, 1981-1990, 1991-2000 and 2001-2010.

3. RESULTS AND ANALYSIS

The total and decadewise variation in CO_2 emission (in metric tons per capita) over SAARC countries is listed in Table 1. In recent decade 2001-10, the highest amount of CO_2 emission (859 metric tons per capita) is seen over Afganistan and lowest amount of CO_2 emission is seen over Nepal (-4 metric tons per capita) and Bhutan (-0.6 metric tons per capita). Thus, there is decline in CO_2 emission over Nepal and Bhutan in recent decades. However, the results shows highest amount of CO_2 emission over Maldives (10485 metric tons per capita) and lowest amount of CO_2 emission over Afganistan (73 metric tons per capita for the total period 1971-2010.

3.1. Variations of CO_2 emission over Maldives:

Figure 1a shows the variation of the CO_2 emission (metric tons per capita) over Maldivesduring the period 1971-2010. The CO_2 emission during the period 1971-2010 shows the increasing trend with maximum increase in the year 2009. There is decline in CO_2 emission in recent year 2010. The minimum CO_2 emission is seen in the initialyears 1971-78.Figure 1(b to e) shows the decadal variation in the CO_2 emission. The results suggest increase in CO_2 emission during all the four decades (*i.e.*, 1971-1980, 1981-1990, 1991-2000 and 2001-2010). However, the recent decade 2001-10 shows highest variation and initial decade 1971-80 shows lowest variationof CO_2emission.The variance in CO_2 emission is least in recent decades and highest in initial decades 1971-80.

The growth rate of CO_2 emission is found to be 0.086 per year for the overall period 1971-2010. The growth rate of CO_2 emission is observed to be 0.026/year for the initial decades 1971-1980 (Figure 1b). The growth rate of CO_2 emissions found to be 0.042/year during 1981-90 and the growth rate of CO_2 emission is observed to be 0.104/year during 1991-2000. The growth rate of CO_2 emission is found to be 0.148/year during the period 2001-2010. Table 1 shows CO_2 emission over Maldives abruptly increases by 10485% for the total period1971-2010.The CO_2 emission shows maximum increase by 814.98% during the decade of 1971-80. The CO_2 emissions show increase by 138.66%, 64.66% and 59.19% during the decades 1981-1990, 1991-2000 and 2001-2010 respectively. The increase in CO_2 emission overMaldives is abrupt for the two decades 1971-80 and 1981-90. While, in last two decade show successively low emission as compared to the above two decades.

3.2. Variations of CO_2 emission over India

The variation in the CO_2 emission (metric tons per capita) over India for the period 1971-2010 (Figure 2a). The biggest absolute emission come from India after China and United states but in terms of CO_2 emission per capita, China is ranked 127th at 1.7 metric tones per capita. During 1971-2010 three times increasing CO_2 emission. The CO_2 emission during the period 1971-2010 shows the increasing trend with maximum increase in the year 2009. There is decline in CO_2 emission in recent year 2010. Figure 2 (b to e) show the decadal variation in the CO_2 emission over India. The increase in CO_2 emission is evident during all the four decades. However, the increase in CO_2 emission is highest in the decade 2001-10 as compared to the CO_2 emission in the rest three decades. There is least CO_2 emission during the decade 1971-80. The rate of CO_2 emission is found to be 0.031/year during period of 1971-2010. There is almost no variance from the mean value of CO_2emission over India for the total period. The growth rate of CO_2 emission is observe to be 0.017/year during the decade 1971-80 and the growth rate of CO_2 emissions is found to be 0.031/year during the decade 1981-90. The growth rate of CO_2 emission is noted to be 0.035/year during the decade 1991-2000 and the growth rate of CO_2 emission is found to be 0.066/year during the recent decade 2001-10. Table 1 shows increase in CO_2 emission over India is found to be 359.55% for the period1971-2010.The CO_2 emission show maximum increase by 51.63% during the decade 1981-90 and least increase in CO_2 emission by 36.77% during the decade 1991-2000 . The CO_2 emission increase by 37.54%, 36.76% and 46.64%

during the decades 1971-1980, 1991-2000 and 2001-2010 respectively.

3.3. Variations of CO_2 emission over Pakistan:

Figure 3a shows the variation in the CO_2 emission (metric tons per capita) over Pakistan for the period 1971-2010. The CO_2 emission during the period 1971-2010 shows the increasing trend with maximum increase in the year2007. There is decline in CO_2emission over Pakistan after the year 2007. Figure 3 (b to e) shows the decadal variation in the CO_2 emission over Pakistan . The increase in CO_2 emission is evident during all the four decades. The increase in CO_2 mission is highest in the recent decade 2001-10 but less as compared to increase in CO_2 mission over Maldives and India. The variance in CO_2 mission is least during the decade 1981-90 and the variance is maximum during the decade 1971-80. While, the variance in CO_2 emission during the decades 1991-2000 and 2001-10 is almost equal.

The CO_2 growth rate emission is found to be 0.017/year for the study period 1971-2010.The growth rate of CO_2 emission is observed to be 0.005/year for the decade 1971-80 and the growth rate of CO_2 emissions found to be 0.020/year for the decade1981-90. The growth rate of CO_2 emission is noted to be 0.014 /year during 1991-2000 and the growth rate of CO_2 emission is found to be 0.025/year during the decade 2001-10. Table 1 shows increaseof CO_2 emission by146% during the study period. The CO_2 emission show maximum increase by 48.43% during the decade 1981-90 and least increase in CO_2 emission during the decade 1971-80. The CO_2 emission increases by 5.70%, 23.88% and 26.41% during the decade 1971-80, 1991-2000 and 2001-10 respectively.

3.4. Variations of CO_2 emission over Bhutan:

Figure 4a depicts the variation in the CO_2 emission over Bhutan.The emission of CO_2 is fifty times more over Bhutan as compared to that over other SAARC countries for the study period 1971-2010. The CO_2 emission is highly variable over Bhutan as compared to rest SAARC countries . The CO_2 emission over Bhutan shows increasing trend with maximum increase in the year1997. There is increase in CO_2 emission in the recent year 2010. The maximum decline in CO_2 emission is noticable in the years 1989 and 2004. The CO_2 emission is constant for the intial years 1971-78. Figure 4(b to e) shows the decadal variation in the CO_2 emission over Bhutan. The increase in CO_2 emission is found during in the decade 1971-1980, 1981-1990 and 1991-2000. However, the increase in CO_2 emission is greater in the decade 1991-2000 as compared to the CO_2 emission in the decade. While the slow decrease in CO_2 emission during the decade 2001-2010.

The growth rate of CO_2 emission is found to be 0.021/year for the period 1971-2010. The growth rate of CO_2 emission is observed to be 0.005/year during the decade 1971-80 and the growth rate of CO_2 emissions is found to be 0.017/year during the decade 1981-90. The growth rate of CO_2 emission is found to be 0.049/year during the decade 1991-2000 and the decay rate of CO_2 emission is found to be 0.005/year during the period 2001-10. The CO_2 emission abruptly increases over Bhutan by 5371.67% for the study period 1971-2010 (Table 1). However, a noticeable increase of 338.66, 295.79% and 102.57% is found during the decade 1971-80, 1981-90, and 1991-2000 respectively. The contrasting feature is seen in the recent decade 2001-10. There is decline in CO_2 emission by 0.63% in the recent decade.

3.5. Variations of CO_2 emission over Sri Lanka:

The variation of CO_2 emission over Sri Lanka is shown in Figure 5a. The variance in CO_2emission is more compared to above SAARC countries. The CO_2 emission overSri Lanka increases for the period 1971-2010 with maximum increase in the year 2004. The turning point in CO_2 emission is seen in the year 1980 and 1998. Figure 5 (b to e) shows the decadal variation in the CO_2 emission over Sri Lanka. There is decrease in CO_2 emission during last two decades 1971-80 (Figure 5b) and 1981-90 (Figure 5c) and there is increase in CO_2 emission over Sri Lanka during recent two decades 1991-2000 (Figure 5d) and 2001-10 (Figure 5d). However, the increase is highest in the decade 1991-2000 and the decrease is highest in the decade 1981-90. The growth rate of CO_2 emission is found to be 0.011 metric ton per capita /year for the period of 1971-2010. The decay rate of CO_2 emission is observed to be 0.003 metric ton per capita /year for the decade 1971-80 and the decay rate of CO_2 emissions is found to be 0.009 metric ton per capita /year for the period 1981-90. The growth rate of CO_2 emission is noted to be 0.029 metric ton per capita/ year for the decade 1991-2000 and the growth rate of CO_2 emission is found to be 0.006 metric ton per capita / year for the decade 2001-10. Table 1 shows CO_2 emission is increased by 145.63% for the period 1971-2010. The CO_2 emission is maximum by 126.07% in the decade 1991-2000 and minimum by 17.17% in the decade 1981-90. However, a noticeable increase of 12.90% is found in the recent decade 1981-90.

3.6. Variations of CO_2 emission over Bangladesh:

The variation in the CO_2 emission over Bangladesh during the study period 1971-2010 is shown in Figure 6a. The emission increase by six times over Bangladesh during 1971-2010. The CO_2 emission during the period 1971-2010 shows the increasing trend with maximum increase in the year 2010 and maximum decrease in the CO_2 emission in the year 1971. Figure 12 (b to e) shows the decadal variation in the CO_2 emission. The increase in CO_2 emission is found during four decade that is

1971-1980, 1981-1990, 1991-2000 and 2001-2010. While, the maximum increase in CO_2 emission is in the decade 2001-2010 as compared to the CO_2 emission in the decade 1971-1980, 1981-1990 and 1991-2000. However the slow increase in CO_2 emission during the decade 1971-1980.

The CO_2 growth rate emission is found to be 0.007 per year during period of 1971-2010. The growth rate of CO_2 emission is observed to be 0.004 per year during period 1971-1980. The growth rate of CO_2 emissions noteds to be 0.005 per year during 1981-1990. The growth rate of CO_2 emission is found to be 0.007 per year during 1991-2000. The growth rate of CO_2 emission is noted to be 0.015per year during the period 2001-2010. It is also clear from Table 1that variation of CO_2 emission is increase by 629.34% during period 1971-2010. The CO_2 emission is maximum increase by 81.74% during period of 1971-1980. The CO_2 emission is increase 54.58%, 45.19% and 54.24% is found during 1981-1990, 1991-2000 and 2001-2010 respectively.

3.7. Variations of CO_2 emission over Afghanistan:

Figure 7a represents the variation of CO_2 emission (metric tons per capita) during the period 1971-2010. The CO_2 emission during the period 1971-2010 shows the decreasing trend with maximum decrease in the year 2002 and maximum increase in the CO_2 emission in the year 2010. Figure 13 (b to e) shows the decadal variation in the CO_2 emission. The increase in CO_2 emission is found during the decade 1971-1980, 1981-1990 and 2001-2010. While, the increase in CO_2 emission is more in the decade 1991-2000 as compared to the CO_2 emission in the decade 1971-1980, 1981-1990. While the rapidly decrease in CO_2 emission during the decade 1971-1980.

The decay rate of CO_2 emission is found to be 0.002 per year during period of 1971-2010 over Afghanistan. The growth rate of CO_2 emission is observed to be 0.001 per decade during period 1971-1980. The growth rate of CO_2 emissions found to be 0.009 per year during 1981-1990. The decay rate of CO_2 emission is noted to be 0.012 per year during 1991-2000. The growth rate of CO_2 emission is found to be 0.028 per year during the period 2001-2010. Table 1 shows variation in emission of CO_2 is found to be 73% increases, these is very less emission among the SAARC country during 1971-2010. The CO_2 emission maximum increase by 859.32% is found during 2001-2010. While, noticeable increase in 49.11% during period 1981-1990. The CO_2emission is major decreases 80.81% .While noticeable decreases by 20.23% is found during 1971-1980.

3.8. Variations of CO_2 emission over Nepal:

Figure 8a depicts the variation in the CO_2 emission (metric tons per capita) during the period 1971-2010. From 1971-2010 the emission of CO_2 is seven times increases. The CO_2 emission during the period 1971-2010 shows the increasing trend with maximum increase in the year 2010 and maximum decrease in the CO_2 emission in the year 1971. Figure 14 (b to e) shows the decadal variation in the CO_2 emission. The increase in CO_2 emission is found the decade 1971-1980, 1981-1990, 1991- 2000. However, the increase in CO_2 emission is greater in the decade 1991-2000 as compared to the CO_2 emission in the decade 1971-1980, 1981-1990. While, in decade 2001-2010 there is decrease of CO_2 emission.The growth rate of CO_2 emission is found to be 0.003 per year during period of 1971-2010 over Nepal. The growth rate of CO_2 emission is noted to be 0.001 per decade during period 1971-1980. The growth rate of CO_2 emissions found to be 0.009 per decade during 1981-1990. The growth rate of CO_2 emission is observed to be 0.009 per decade during 1991-2000. The decay rate of CO_2 emission is found to be in exponential form during the period 2001-2010.Table 1 shows variation in CO_2 emission increases by 733.95% are found during period 1971-2010.The CO_2 emission maximum increase by 169.63% is found during period 1991-2000. The CO_2 emission major decrease by 4.22% during decade 2001-2010. The CO_2 emission increase by 124.94% and 13.38% is found during period 1971-1980 and 1981-1990.

4. CONCLUSIONS

The following conclusions drawn from the study of CO_2 emission over different SAARC countries (Figure 9) are as follows:

- SAARC countries which include eight developing countries emit more amount of CO_2. The Maldives seems to be highest CO_2 emission in the SAARC countries whereas, Afghanistan is lowest.
- In India, increase in temperature is reinforced by increase in CO_2 emission during the period 1971-2007.
- In the decade 2001-2010, there is abrupt increase in CO_2 emission in the developing countries such as Maldives, India, Pakistan, Bangladesh and Afghanistan.
- The CO_2 emission over Bhutan, Sri Lanka and Nepal show increasing trend during the decade 1991-2000.
- On the basis of result the CO_2 emission (metric ton per capita) comparison of India with over different countries. The countries which are more emission of CO_2 such as Maldives than India.
- The countries those are less CO_2 emission such as Pakistan, Bhutan, Sri Lanka, Bangladesh, Afghanistan, and Nepal than India.

The world has experienced climate change on regional and global scale. The unpredicted rainfall event during April 2015 which was enough to destroy the harvesting of agricultural products and thereby has affected the life of a farmer. Also, the recent earthquake in Nepal is an indirect consequence of human efforts to disturb the natural cycle. In the present scenario of increase in extreme events due to global warming, there is an argent need to cut the CO2 emission by developed countries. The developing countries are heavily populated, so they are forced to increase their economy by increasing industrial production to overcome the demand. Therefore, developing countries cannot cut the CO_2 emission under certain limits.

5. ACKNOWLEDGEMENTS

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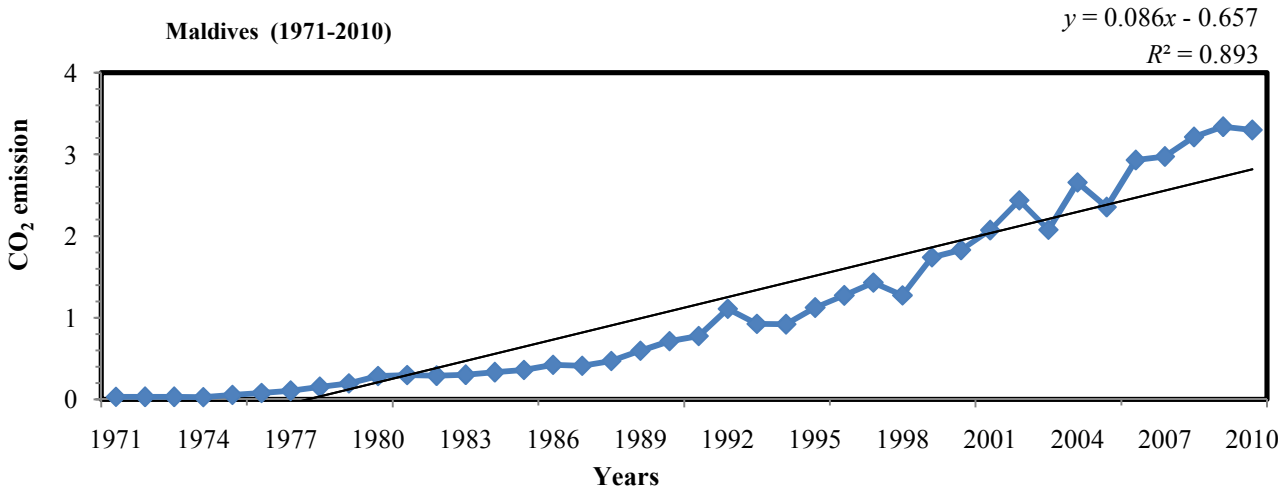
Appendix

Table 1: Variation in CO_2 emission (in percent) over SAARC countries

Duration	Maldives	India	Pakistan	Bhutan	Sri Lanka	Bangladesh	Afghanistan	Nepal
1971-2010	**10485.26**	**359.5553**	**145.751**	**5371.671**	**145.6337**	**629.3432**	**73.22595**	**733.95**
1971-1980	814.9848	37.54873	5.703707	338.6602	-10.0778	81.74098	-20.2373	124.9448
1981-1990	138.6628	51.63211	48.43859	295.7923	-17.169	54.58401	49.11294	13.37902
1991-2000	64.6671	36.76853	23.8817	102.5743	126.0658	45.18616	-80.8183	169.6339
2001-2010	59.19504	46.64288	26.41726	-0.63174	12.90354	54.23856	859.3232	-4.2157



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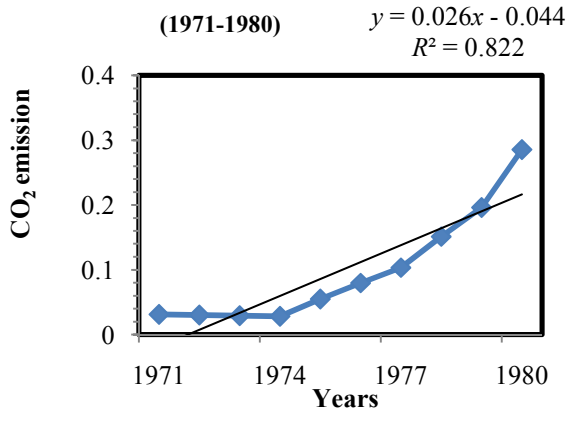

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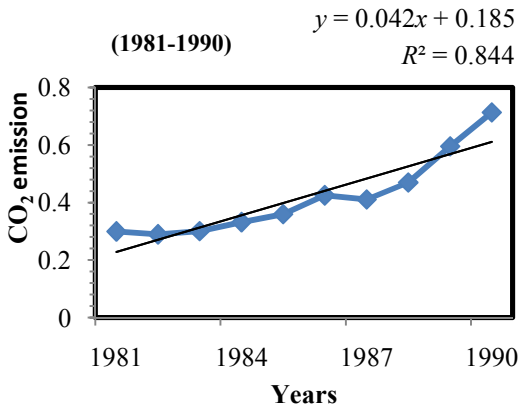

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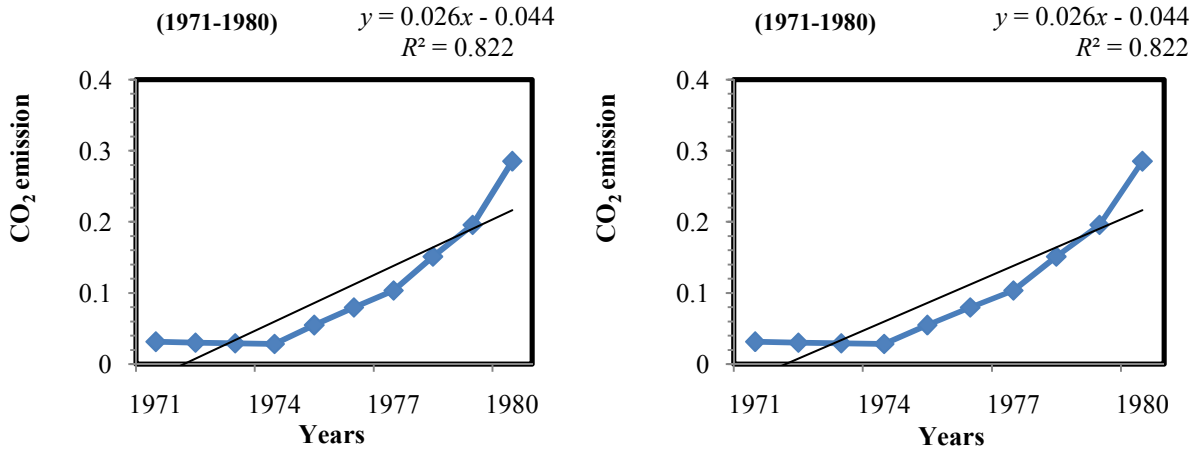

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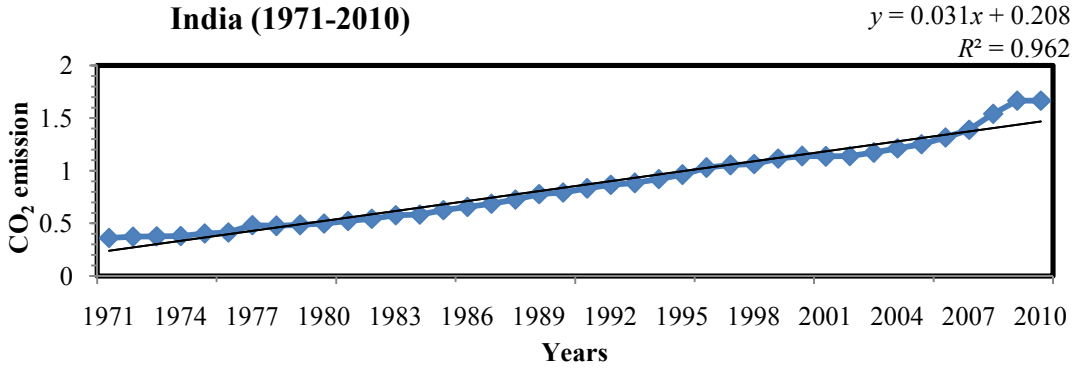
Fig 1: Variation of CO_2 emission (in metric ton per capita) over Maldives for the period (a) 1971-2010; (b) 1971-1980; (c) 1981- 1990 (d) 1991-2000 ; (e) 2001-2010.



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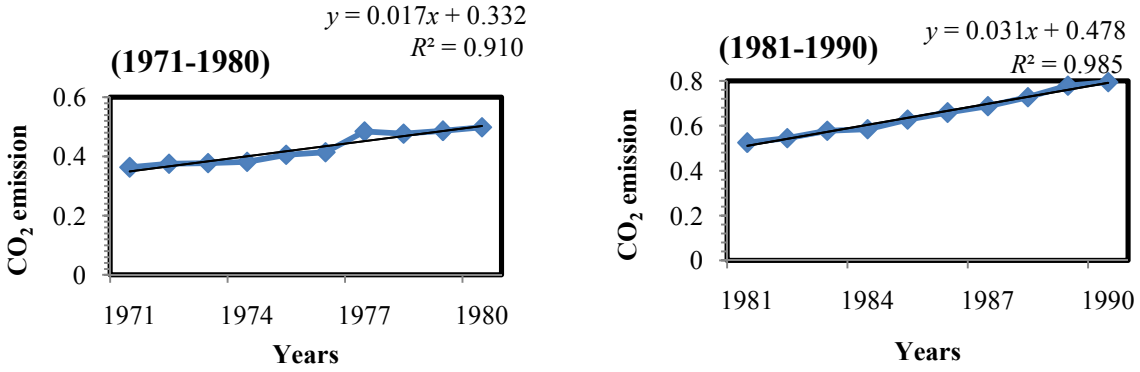

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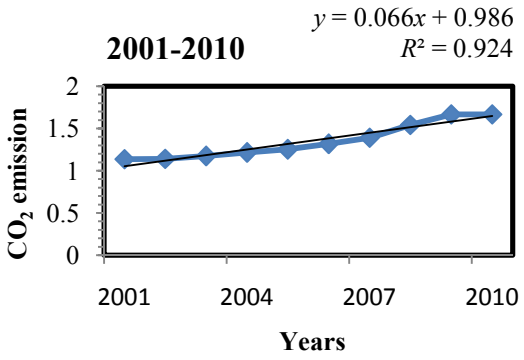

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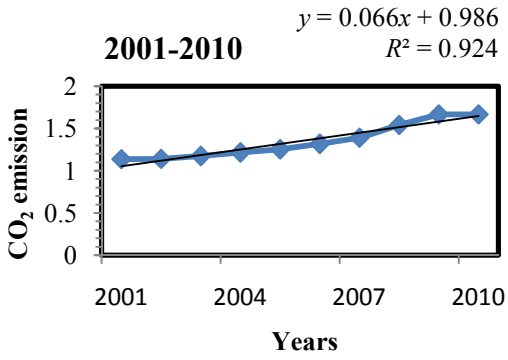
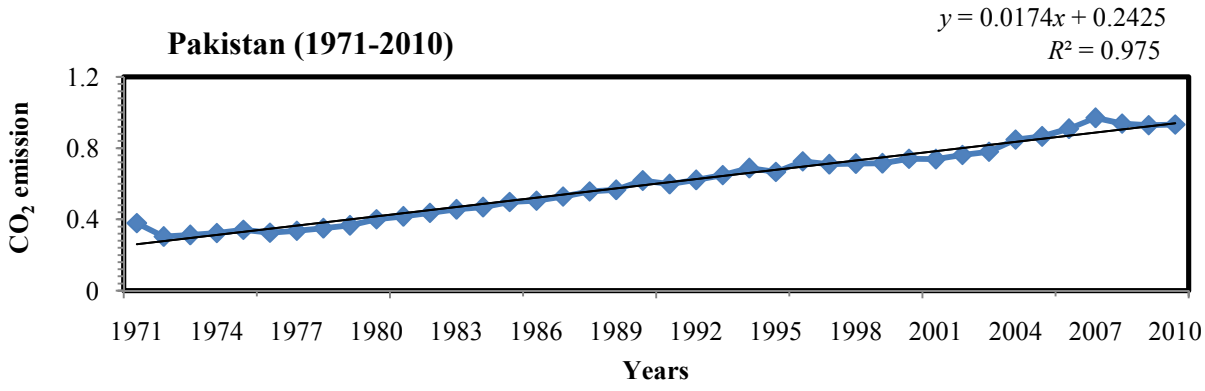


(e)

Fig. 2: Variation of CO_2emission (in metric ton per capita) over India for the period (a) 1971-2010; (b) 1971-1980; (c) 1981-1990 (d) 1991-2000 ; (e) 2001-2010.



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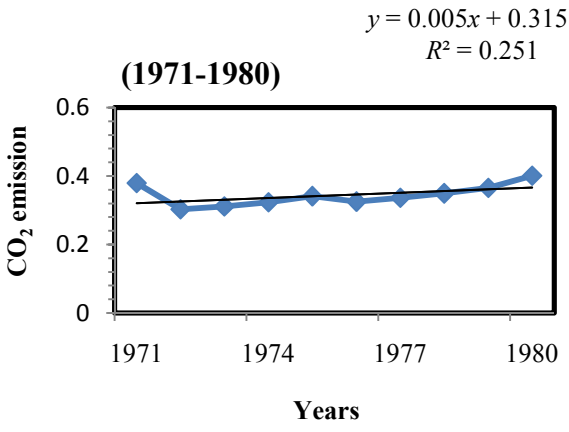

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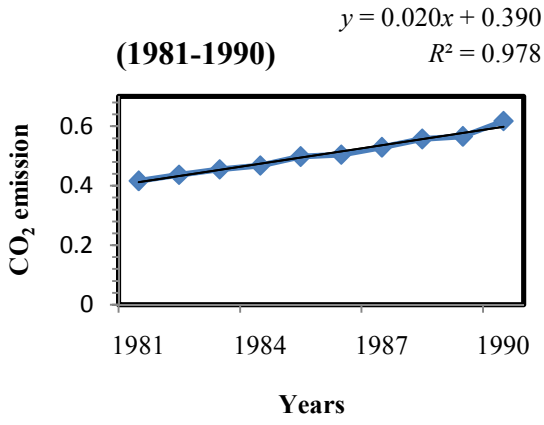

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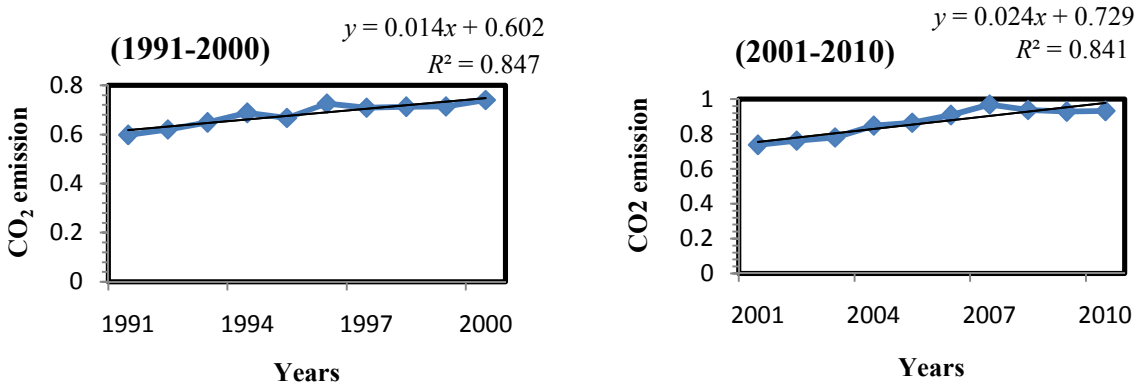

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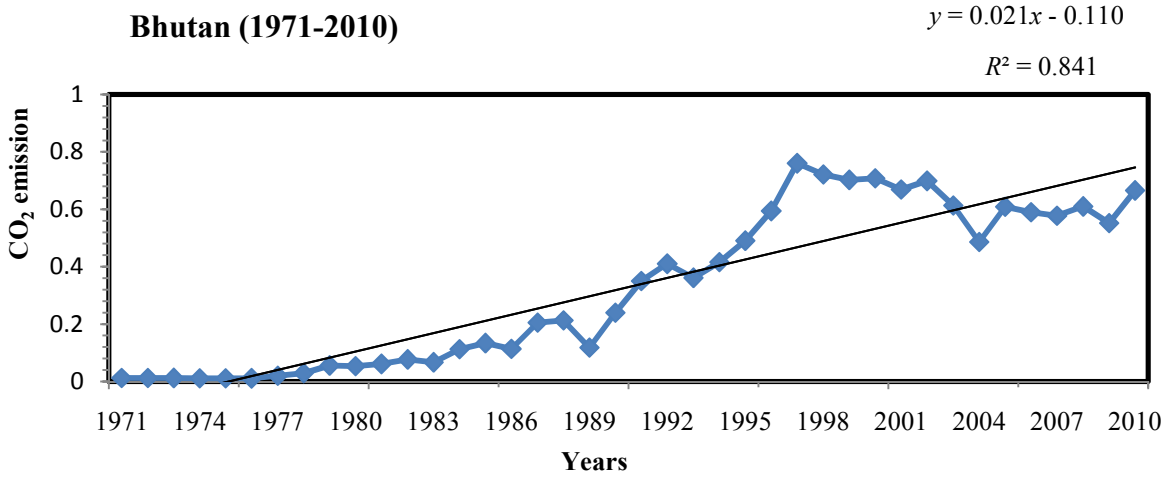
Fig 3: Variation of CO_2emission (in metric ton per capita) over Pakistan for (a) 1971-2010; (b) 1971-1980; (c) 1981-1990; (d) 1991-2000 ; (e) 2001-2010.



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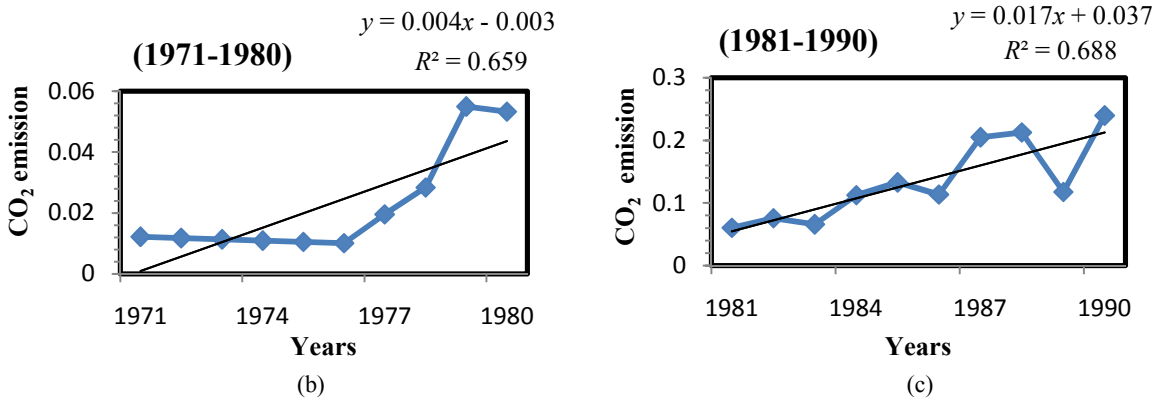

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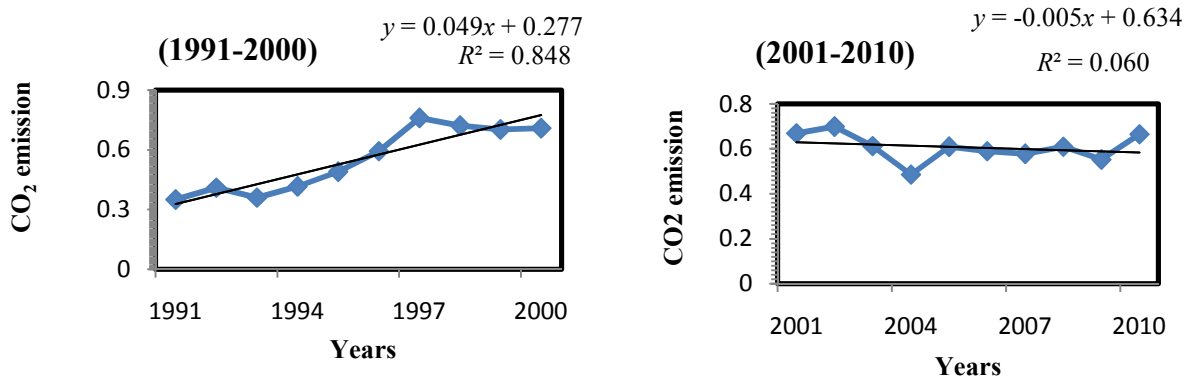

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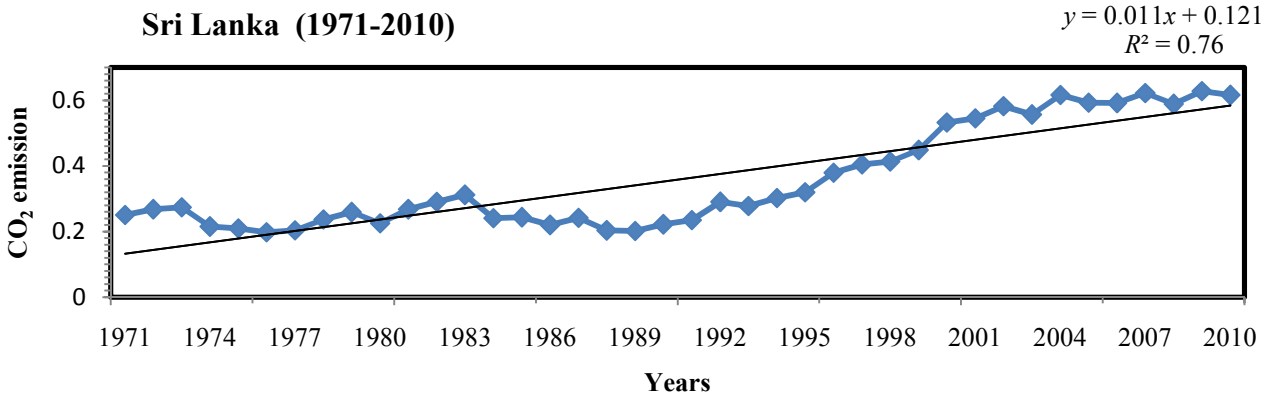
Fig 4: Variation of CO_2 emission(in metric ton per capita) over Bhutan for (a) 1971-2010; (b) 1971-1980; (c) 1981-1990; (d) 1991-2000 ; (e) 2001-2010.



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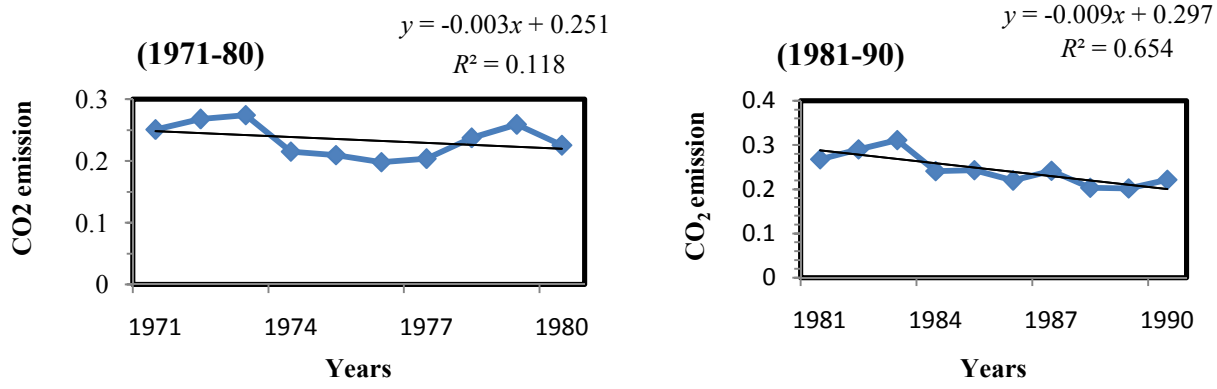

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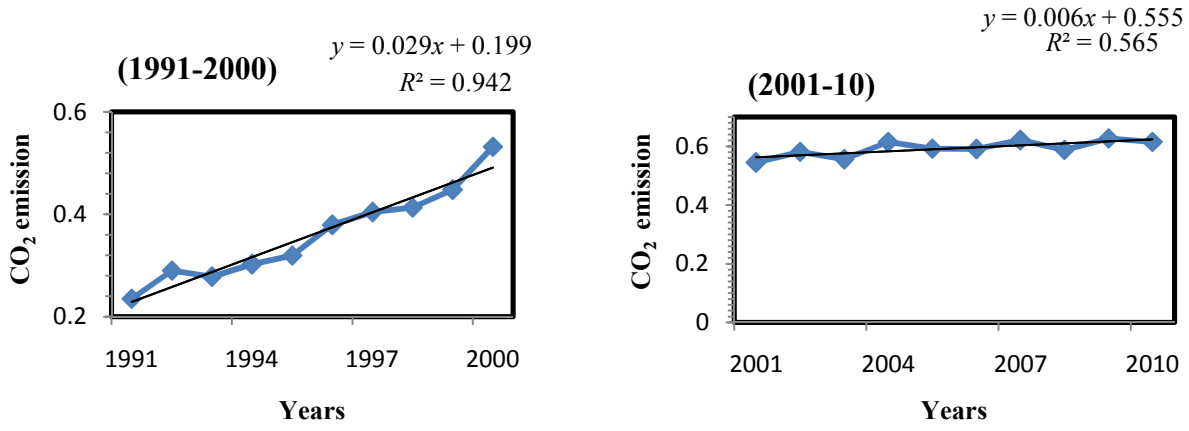

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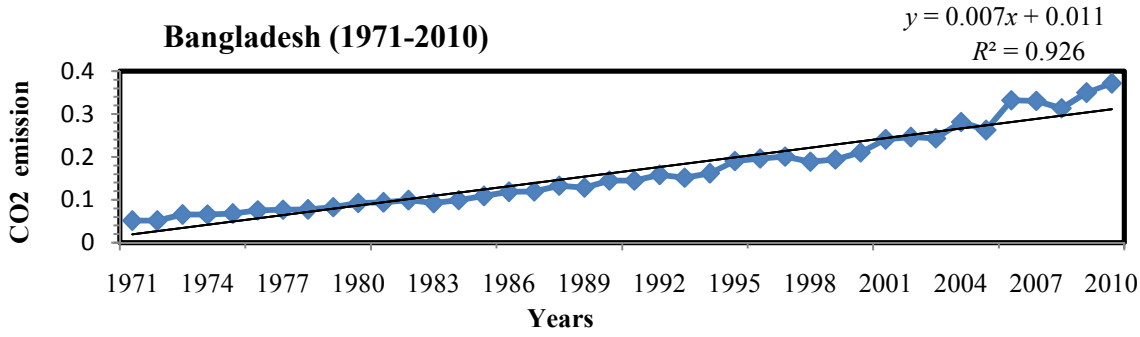
Fig 5: Variation of CO_2emission (in metric ton per capita) over Sri Lanka for the period (a) 1971-2010; (b) 1971-1980; (c) 1981-1990; (d) 1991-2000 ; (e) 2001-2010.



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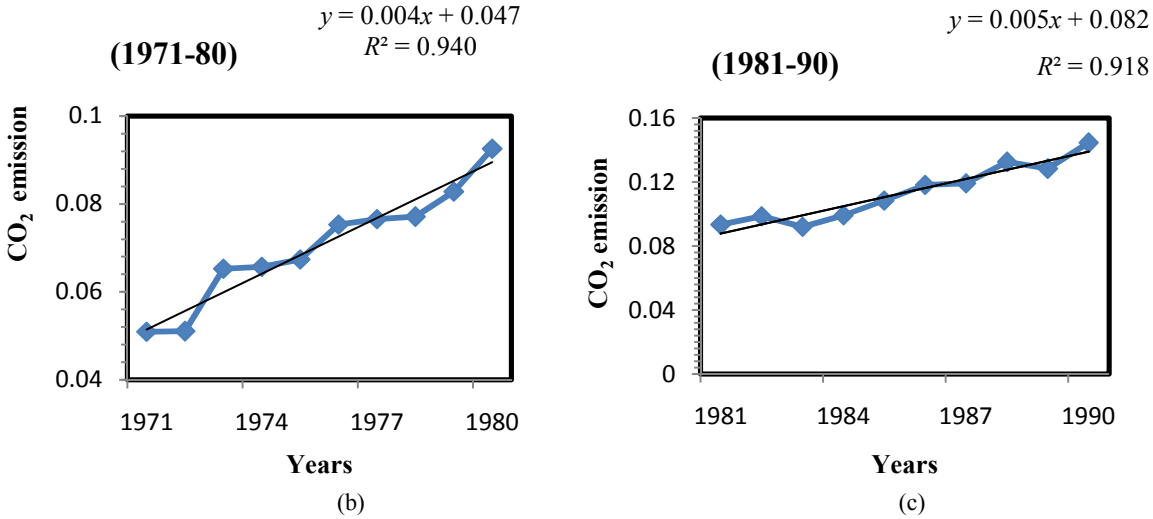

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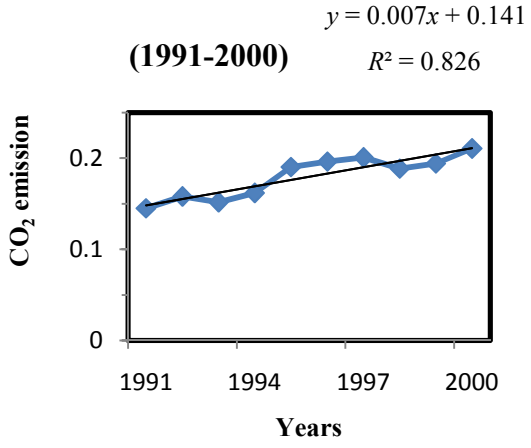

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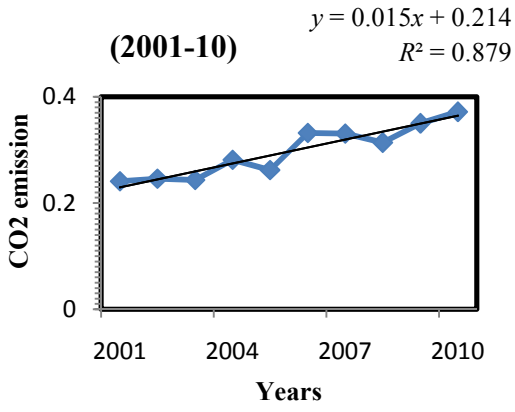

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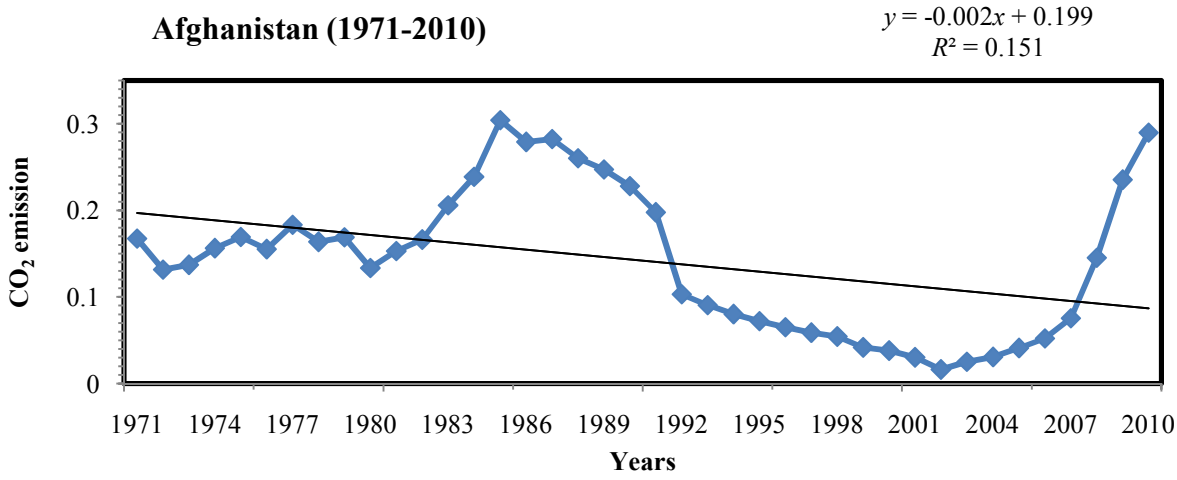
Fig 6: Variation of CO_2emission (in metric ton per capita) over Bangladesh for (a) 1971-2010; (b) 1971-80; (c) 1981-90; (d) 1991-2000 ; (e) 2001-10.



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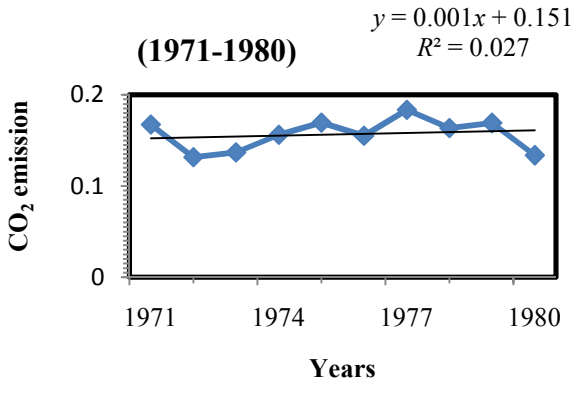

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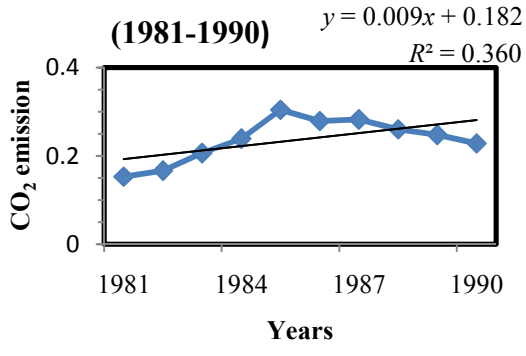

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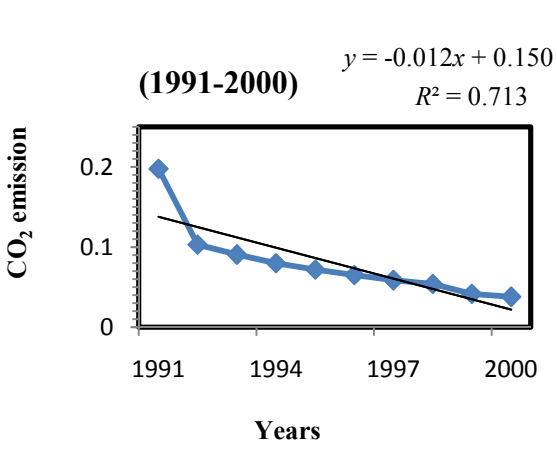

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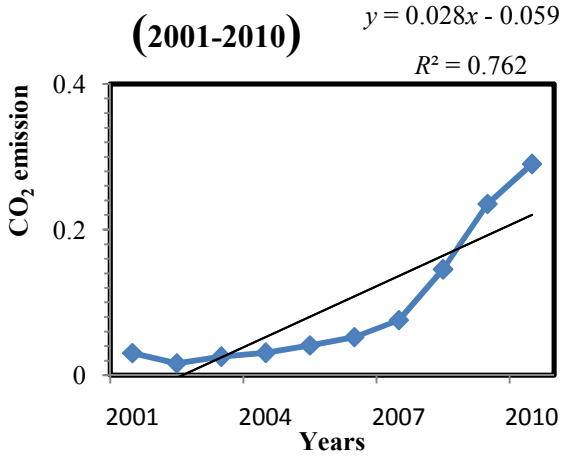
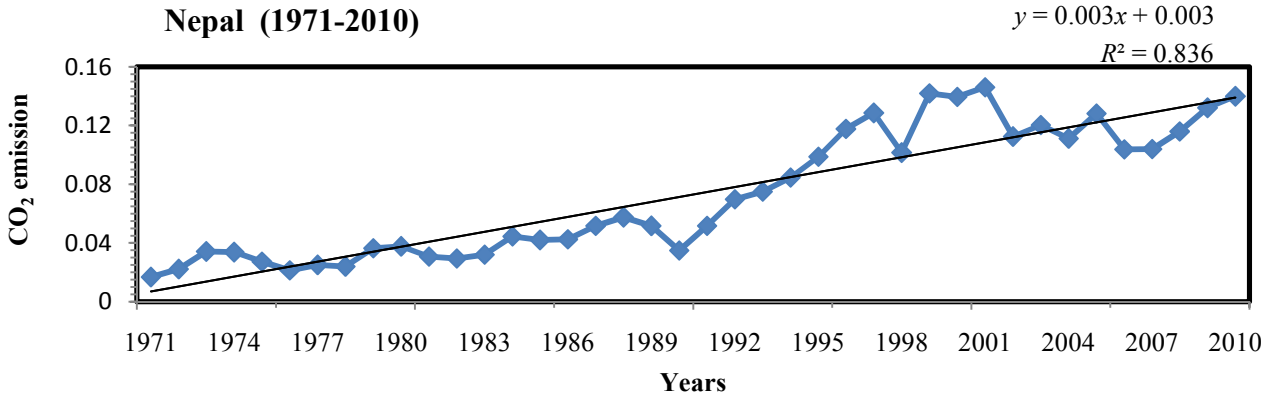
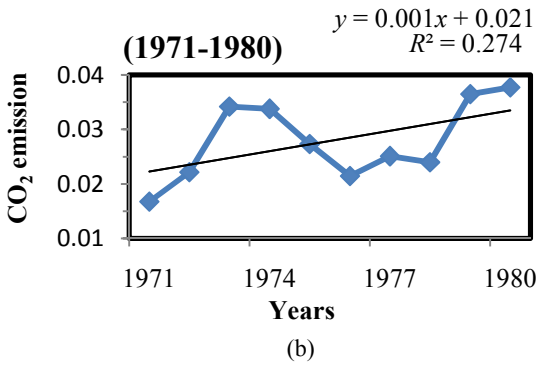


(e)

Fig 7: Variation of CO_2emission (in metric ton per capita) over Afghanistan for (a) 1971-2010; (b) 1971-1980; (c) 1981-1990; (d) 1991-2000 ; (e) 2001-2010.



(a)



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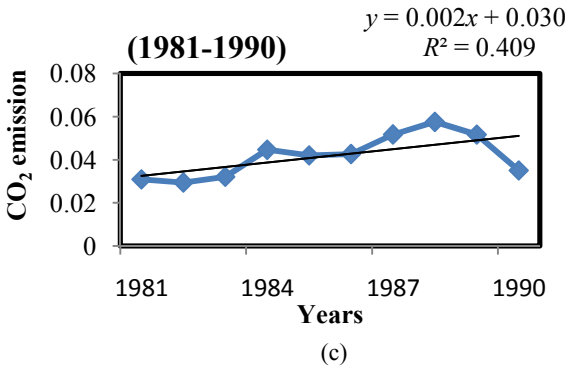
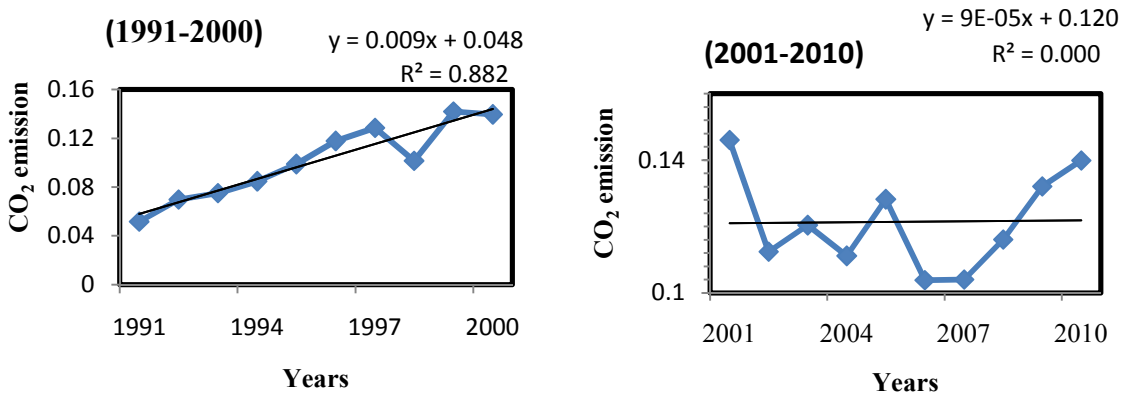


(c)



(d) (e)

Fig 8: Variation of CO_2emission (in metric ton per capita) over Nepal for (a) 1971-2010; (b) 1971-1980; (c) 1981- 1990 ; (d) 1991-2000 ; (e) 2001-2010.

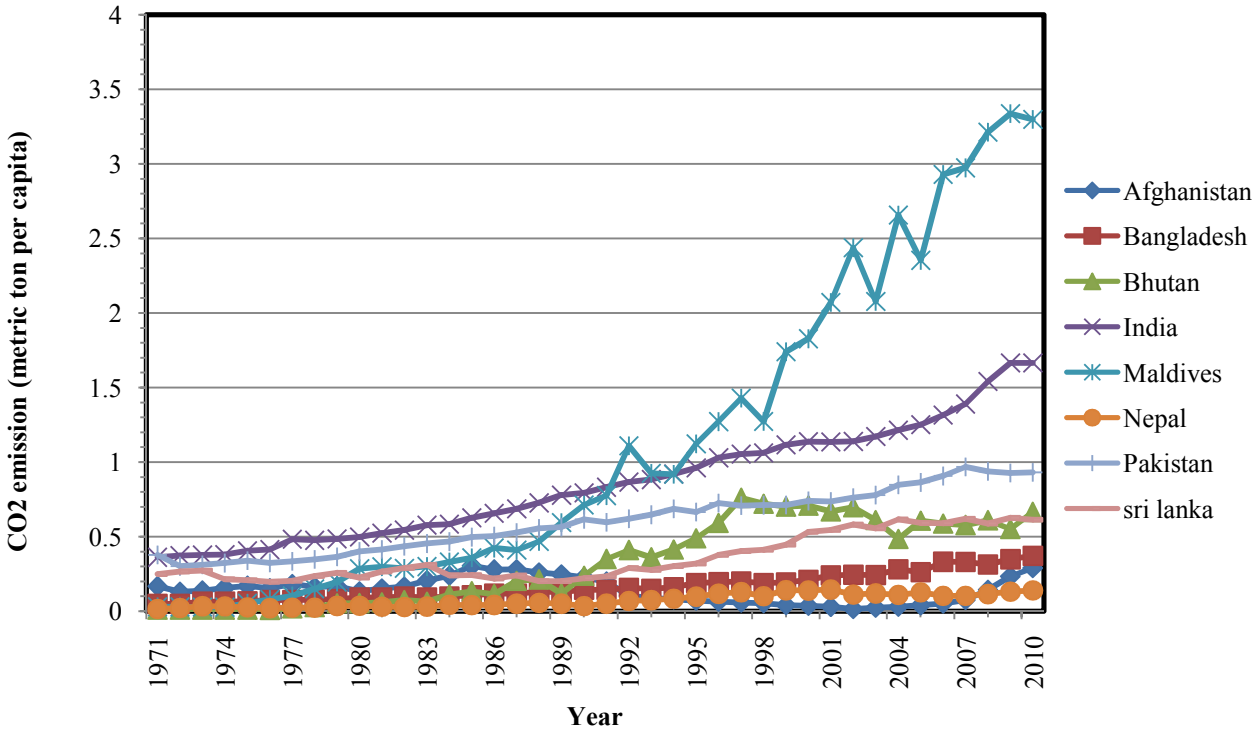


Fig 9: Variation of CO2 emission (in metric tons per capita) over SAARC countries

Flow Imaging in a Vertical Gravity Flow Rig Using Optical Tomography

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Abstract
Process industries need a system that can image flow so that they can monitor the effectiveness of their process plant as well as detect any possible leakage or damages that might occur. This paper presents an optical tomography system which made use of infrared sensors to monitor the concentration profiles of solid flow in air conveyed by a vertical gravity flow rig. Several tests were conducted involving single pixel flow, multiple pixels flow, half flow and full flow. The results showed that the system is capable of providing vital information on the flow inside the rig in the form of concentration profiles.

KEYWORDS
Tomography, fiber optics, sensors

1. INTRODUCTION
Tomography is the combination of two words *i.e.*, tomo which means slice and graph which means picture. Flow imaging based on tomography provides a means of monitoring flow without interrupting the flow itself. This is because in tomography the sensors are placed around and near the object or flow of interest without touching the object or flow. Tomography has been widely used in the field of medicine in the form of x-ray system and has proved to be a powerful and effective system in providing useful information on the condition of patients. However for process, tomographic instrumentation has to be faster and robust. Optical tomography is an imaging system which is based on optical sensors that have the advantages of being straightforward and inexpensive [1].

Due to strong competition among the players in the process industries, there are strong demands for them to produce products economically and of high quality [2]. They also need state-of-the art technology which enable them to fulfill the market demand as well as comply with the regulation set by the government [3]. As such process industries must continuously monitor that the process plants are being operated smoothly and that any leakages are detected as early as possible. They also are trying to maximize profit, enhance quality and reduce wastages. This is where tomography can play a vital role. Data such as the concentration profiles of the flow obtained from tomography can be used to assess the quality of a process as well as utilized for design and control of processes.

This paper presents an investigation on the use of a tomography system which utilized optical sensors in the form of infrared sensors to visualize the flow of solid particles in a gravity flow rig. The optical tomography system is placed around the rig and data from the sensors are processed by suitable circuitry and data processing algorithm before being displayed on the computer.

2. MEASUREMENT SYSTEM
The infra-red tomography system (Figure 1) can be divided into four parts: sensor, signal conditioning, data acquisition system, and a computer. The circuit comprises four parts namely infra-red light projection circuit, signal conditioning for light reception, sample and hold circuit and digital timing controller. The infrared sensors which were used as transmitters and receivers were connected to the measurement section using fiber optics. Ibrahim et al.[2] has shown that the utilization of fiber optics can improve the resolution of the flow images when they conducted an investigation on a water column containing bubbles flowing in water. In order to get as much information as possible on the flow, a total of 64 sensors were installed around the pipe. The infra-red light projection circuit comprises a group of infra-red LED triggers which can produce a high current source and acts as a current variable for each infra-red LED. The signal conditioning circuit change the signal received from the photodiode into a corresponding voltage. Output from the infrared sensors output are conveyed to signal conditioning circuits which filter and amplify the signals. The digitization process was performed on the analog signals a KPCI-

1802HC data acquisition board having 64 channels. The overall system operation is controlled utilizing a PIC programmable controller. The signal is subsequently processed by the hybrid linear back projection algorithm before images were displayed on the computer. To reconstruct the concentration profile images, the pipe in the rig was mapped onto a map with a resolution of 32x32 pixels. The sensors were configured orthogonally and diagonally on top of each other so as to enable as much sensors as possible to be placed around the measurement section. There are 16x16 sensors for every orthogonal and diagonal projections.

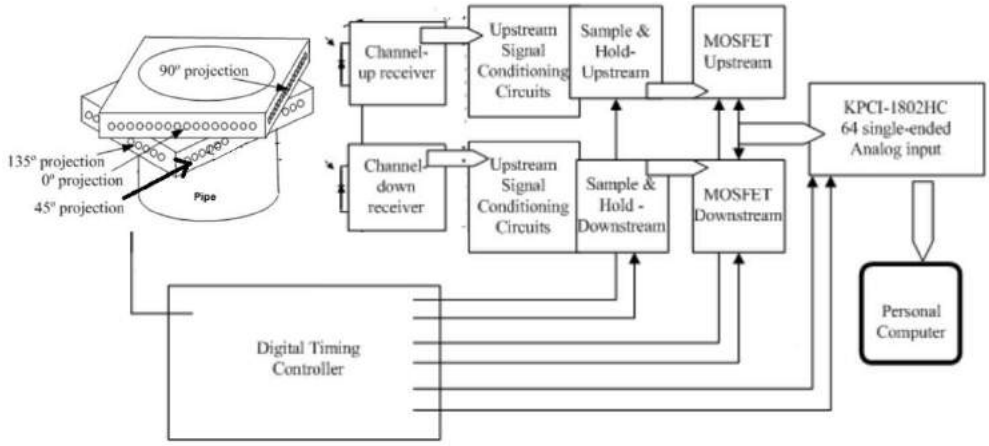

Fig 1: Tomography measurement system

Each infra-red light transmitter and receiver was inserted into a specially-made rod in order to collimate light and prevent the light transmitter/receiver from being exposed to external light such as lamp. Light from each receiver is collimated by the rod towards the flow using fiber optic. Both ends of fiber optic transmitter and receiver are configured to form lenses using heat from a candle light. The steps in forming the lenses is as follows:

I. Carefully remove a section at the end of the fiber optic cladding using a knife, as shown in figure 2(a).
II. Ensure that 2 mm of the fiber optic is exposed without the cladding as in figure 2(b).
III. The end of the fiber optic is exposed to candle heat for several seconds until a convex surface is formed at the end of the fiber optic as in figure 2(c).

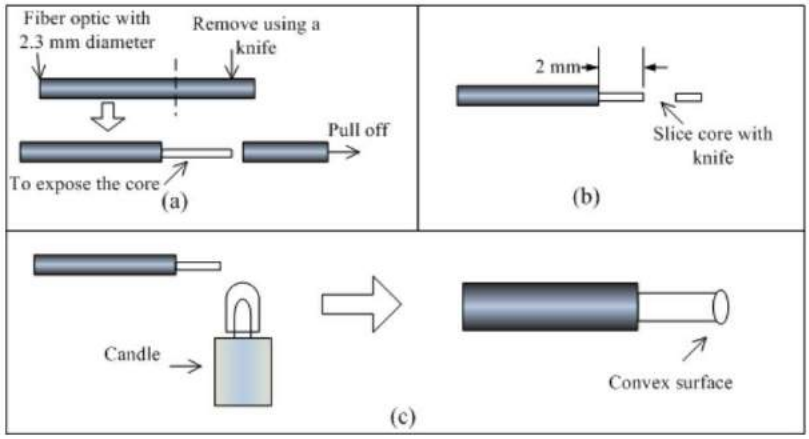

Fig 2: Preparation of fiber optic

The gravity flow rig is shown in figure 3. The rig contains a vertical pipe having an outer diameter of 0.082m and an inner diameter of 0.078m. Plastic beads each having a diameter of 3.3mm were dropped from the top of the rig. An automatic loader is utilized to convey the material from the tank via a vane and will be stopped when the hopper is full. Then the beads were dropped from the hopper into the pipe via the measurement system. The flow rate of the beads was controlled by a rotary valve linked to an AC motor. The speed of the rotation is set by the control unit. A three-phase motor driver controlled the AC motor. This controller has 33 programmable functions which can change the AC motor functions such as base frequency, acceleration time, and torque boost.

Several experiments were conducted to test the capability of the system in measuring the concentration profiles of the beads. The tests involved four categories: Single pixel flow in the form of a static phantom having a diameter of 5mm, multiple pixels flow in which four objects placed at four different locations in the form of four static phantoms, half flow in which half of the rig is blocked and the beads were dropped in the other half of the rig and full flow in which the rig were fully opened and the beads were dropped as much as possible from the rig.

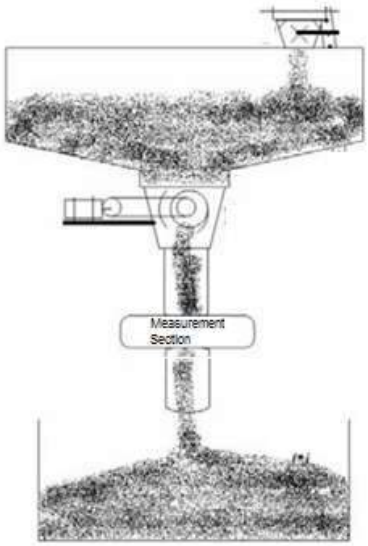

Fig 3: Gravity flow rig

In the single pixel case it is difficult to know the exact location where the bead was dropped if a bead was dropped randomly and as such a static phantom was used. Similarly in the case of the multiple pixels flow, four static phantom were used as it is difficult to drop four objects simultaneously and know the exact location of those objects.

In order to display the concentration profiles on the computer, the Hybrid Reconstruction (HR) algorithm was used [4]. This algorithm determines the condition of projection data and enhanced the reconstruction by setting the empty area or the pixel where no object exist as zero when reconstructing the images. By doing this the smearing effect which is due to the limitation of the back projection technique is minimized. The projection data obtained by Ibrahim [5] is based on the sensor value.The hybrid reconstruction algorithm can be expressed mathematically as:

$$\hat{f}(x,y)=\sum_{m=0}^{M-1}\left[\sum_{n=0}^{N-1} Vs_{Tx,Rx}(x'_n,\phi_m)\cdot\overline{S_{\phi_m}(x,y)}\cdot B(x'_n,\phi_m)\Delta x'\right]\Delta\phi \quad (1)$$

where,

$\hat{f}(x,y)$ = an approximation of the objection function in volts

$Vs_{Tx,Rx}(x'_n,\phi_m)$ = amplitude of signal loss for receiver from transmitter to receiver view which is equal to the projection data

$\overline{S_{\phi_m}(x,y)}$ = normalized sensitivity map for each projection

$B(x',\phi)$ = hybrid reconstruction algorithm constant value for each receiver

V_{Th} = threshold voltage

ϕ_m = the m-thprojection angle

x'_n = receiver n^{th} position

Δ_ϕ = angular distance between the projection and the summation comprising all the M-th projection

N= total number of receivers

M = total number of projections

3. RESULTS AND DISCUSSION

Figure 4 shows some of the results in the form of concentration profiles when the solid beads were dropped vertically downwards in the flow rig. The single pixel concentration profile was obtained when the phantom was in static condition. Similarly the multiple pixels concentration profile was obtained when the phantoms were placed in a static manner. In the case of the half flow, the experiment was conducted by closing half of the rig and the plastic beads were dropped in the half of the opening. In the case of the full flow the rig was fully opened and the plastic beads were allowed to drop freely from the top of the rig.

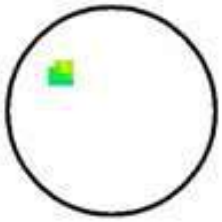

Fig 4: (a) Single pixel flow

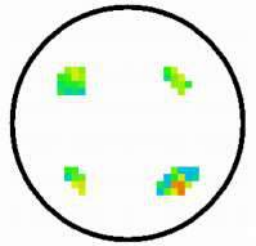

Fig 4: (b) Multiple pixels flow

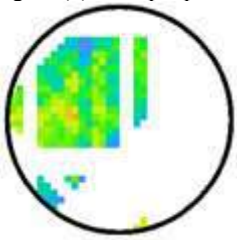

Fig 4: (c) Half flow at 93g/s

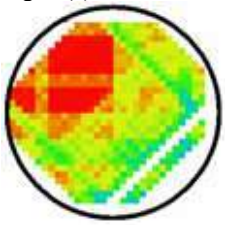

Fig 4: (d) Full flow at 93g/s

The concentration profile of the single pixel as in figure 4(a) represented a single circular rod placed in the rod which occupied four pixels when the resolution was set at 32x32 pixels. However due to the smearing effect caused by the limitation of the reconstruction algorithm, a few other pixels are also occupied. The multiple pixels flow shown in figure 4 (b) shows four different locations in the pipe being occupied representing four different solid circular rods placed at four different locations in the pipe. Noise caused slight smearing on the images. The concentration profile of the half flow in figure 4 (c) at a flow rate of 93g/s shows that almost half of the pipe is occupied. It can be expected that when the solid beads are dropped from the top of the rig, the bead will flow downwards and some it will be slighly dispersed towards the other half of the pipe and some will hit the sides of the pipe. The full flow concentration profile image representing the flow rate at 93g/s in figure 4 (d) shows a majority of the pipe is occupied. As the beads are dropped randomly from the top of the pipe, it cannot be expected that the image will show all pixels being occupied.

4. CONCLUSION

An optical tomography system employing infrared sensors have been developed and has been tested. Several tests conducted shows that it is capable of providing information on the concentration profile of static phantoms as well as dynamic flow. It is capable of accurately showing the location of the objects in the flow rig. The use of hybrid back projection algorithm has successfully minimized noise caused by the back projection algorithm. Further tests can be conducted on other types of flow as well as other phases involving liquid.

5. ACKNOWLEDGMENT

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Medical Data Analytics for Sophisticated Health Infrastructure: A Critical Analysis of Curriculum Components of International Universities

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Abstract
Health Data Science is an interdisciplinary practicing domain these days and combines with both Health Science and Data Science. It is a systematic and scientific processing activity with data, knowledge of health and medical systems with the use of intelligent systems. Health Data Science may be considered as a Medical Informatics in some context, though gradually the advancement of science has been revealed that the Health Data Analytics is a part of Health Informatics and importantly it becomes common name in modern healthcare system. There are many reasons for introducing Health Informatics and Big Data introduction in academic community. In many international universities Big Data Management and allied programs become integral part of emerging program. The present study is dedicated to exploring Big Data and Data Science related education, training and research in International Universities. The paper is highlighting the core areas of Health Data Analytics including components in Masters program in International selected universities. A brief overview on Health Data Analytics is also provided in this paper.

KEYWORDS
Data Science, Analytics, Big Data, Computing, Information Technology, Health Systems, Telemedicine, E-Data

1. INTRODUCTION
Big Data integrates healthy and smart solution in information management in healthcare segment. It also helps in enhanced and better planning. Some of the reputed organizations in the world *i.e.*, PwC, IBM, Accenture, Infosys etc are offering various Health Data Analytics related services to its clients. Among the important areas of Big Data Management healthcare segment is most emerging. Health Data Science programs are available in different platforms in different areas viz. Management, Science, Technology, Commerce etc. Role and aim of the health data scientist is emerging day by day due to need of technologies into Medicine [3, 5]. It is important that Health Data Analytics professionals should learn how they fit into the broader healthcare scenery. The values of patient centric systems and solution from the Data Analytics and Healthcare Data Sciences are in fact an important fact initially it is treated as a training field and gradually it becomes an important field of applied science. Most of the universities offer programs in this field with Bachelors, Masters and Doctoral level [5, 7].

2. MISSION OF THIS WORK
This paper discusses several issues in conceptual nature and knowledge survey related to the Medical Data Analytics, Health Big Data programs in international context. Moreover, paper is also planned to deal with the following:

- To know about the Principles and main functionalities of Data Science in relation to Medical Sciences, or simply Health Data Science.
- To dig out the potentialities of the Health Data Science in contemporary context. Moreover it is responsible to learn about the Healthcare in Big Data Management.
- To learn about the emerging educational systems specially higher education in the areas of Health Science related with the Big Data and Data Sciences around the world.
- To find out the main and core educational degrees and programs available in international universities in the areas of Big Data Science and Big Data Management.
- To learn about the main challenges and training programs in the areas of Health Data Science in developed nations including in developing countries, if opted by the selected sample.

3. BIG DATA & DATA SCIENCE
Health Data Science, is a combination of Health Science with Data Science and it also handles unstructured and textual data and is responsible for the healthy Data Science practicum. Big Data Management is measured and may be dealt by as an expert, who is called Data Scientist. A Data Science principle mainly deals with the Data Management. However, here Mathematical and Statistical facets play a wonderful role with ability to analyze data and similar content. Health Data Science adopts emerging and crucial vital methods for more specialized study in Data Management. Health Data Science is related with the Data Analytics and Big Data Management related with the Health and Medical Sciences [1, 6]. It also develops the in-depth knowledge

with considerate and investigative for health data successfully for better and sound healthcare delivery using intelligent systems. The Big Data becomes an important knowledge domain gradually and field of interdisciplinary studies.

4. METHOD ADOPTED

As it is a conceptual work and thus is responsible to deal with several aspects of Health Data Science. The work is theoretical and here several research methodologies play a valuable role. For designing and preparing this research work various primary and secondary sources of knowledge play a vital role and thus several components and facets are being employed which include journals, handbook, encyclopedia etc. Regarding the domains apart from traditional Big Data and Data Sciences areas of Health Data Science, Big Data, Health Informatics, Tele–Medicine etc played a vital role. To learn about the current areas and educational situation Health Informatics association website have played a valuable and important role. For better designing of research simple search strategies have been used and fifteen pages with tage 'MSc-Health Data Science' 'MSc-Health Big Data' have been also used and best result has been selected. Here 15 pages have been treated as main source to learn the latest programs on Health Data Science and Medical Big Data [2, 8]. The web based curriculum have been analyzed and reported in the text with specific heading.

5. HEALTH INFORMATICS & DATA ANALYTICS

As a discipline, Medical Informatics has been originated few decades back with the process of systematic and scientific processing of data, information, knowledge. Both Health Informatics and Medical Informatics treated as a domain of Applied Science but Health Informatics is big one than Medical Informatics. Health Big Data Management and Medical Data Analytics become important and valuable part of emerging Health Informatics for managing and dissemination of the information for health and medical segment with fastest growth. Health Data Science is a combination of the domains of Information Science, IT, Computing, Medical Science, Management Science along with Statistical and Mathematical Sciences. Health Data Analytics has no doubt power to boost the medical systems of the nation and most of the developed nations have adopted the same. Health data science is geared with Big Management due to bellow mentioned following—

- Health Big Data Management is helpful for improved and sound healthcare system building with the treatment of individuals to the larger sector.
- Health Data Analytics helps in creation of good governance system as it is responsible for development of smart frameworks with health data in the healthcare sector as well as area.
- Medical Data Analytics is responsible for analyzing, manipulating of health data for better and enhanced healthcare systems towards prosperity.
- To get the breadth and also depth of application methods and systems for its potential utilization of health related data and content.

Data Science is a kind of approach for quantitative analysis of data and thus various statistical methods are being engaged basically required for blending classical statistical methods. Emerging and recent advances in computational systems have rejuvenated Health Data Science. Now it becomes more advance with proper practicum due to its Big Data Management tools and systems. In this system are data basically analyzed as well as dealt by the Big Data Tools like Hadoop for improved medical systems, decision making and patient safety [5, 9].

6. EDUCATION IN HEALTH ANALYTICS

Health Data Science is the analytical method based on datasets. Latest methods of Statistics, Management and Database Systems etc have been employed in using Data Management for the healthcare systems. The advancement of knowledge i.e. science, technology and education have results Health Big Data and Health Analytics as a full-fledged domain. Data preparation, processing with databases (structured) formatted data and information etc are the core course of action required by the Healthcare Analytics. Today many universities have started programs on Health Data Science and allied fields with different nomenclature [6, 10]. Surprisingly most of these are offered by the developed countries. And among the developed countries United Kingdom ranks No. 1. The details of sample programs with offered titles, university, duration and mode of studies are listed bellow in table (Table 1). The list of selected universities and program output is based on the selected methodology adopted.

Table 1: Few Health Data Science and Analytics program

Programs	University	Duration	Mode
MSc Health-Data Science	Swansea University	1 to 3 Years	Full Time or Flexible Education but On-Campus (it takes higher time)
MSc Health-Data Science	The University of Manchester London	1 to 2 Years (Or up to 5 years)	Full Time or Flexible Education but On-Campus (it takes higher time)
MSc-Data Science for Research in Health and Biomedicine	University College London, London	1 Year to 2 Year	Full Time or Flexible Education but On-Campus (it takes higher time)
MS- Health Data Science	Saint Louis University, Spain	2 Year or More	Full Time or Flexible Education but On-Campus (it takes higher time)
MSc- Health Data Science	Harvard University, US	2 Years or More	Full Time or Flexible Education but On-Campus (it takes higher time)
MSc-Data Science (Health)	Lancaster University, UK	1 Year to 2 Year	Full Time or Flexible Education but On-Campus (it takes higher time)

7. CURRICULUM ANALYSIS OF MEDICAL DATA ANALYTICS

Regarding the curriculum and components of the program it is noticed that most of the universities offer some of the common programs which include (but not limited to) the following—

- Health Data Manipulation
- Health Information Systems
- Public Health
- Basics of Statistics
- Health Data Management
- AI/ES for Medical Data Analytics etc

It is important to note that most of the universities have adopted the computing, informatics and health science gradients in general. However gradients on Management Science, Mathematical Sciences etc are also most common in Health Data Science curriculum. Sometimes the nature of curriculum also depends on the entry level qualification. As per the research in adopted and selected methodology (mentioned in the section of Methods adopted), the core curriculum of the Health Data Science programs are listed in Table 2.

Table 2: Few Health Data Science and Analytics program

Programs	Core Structures
MSc Health-Data Science, Swansea University	Health Data Science and Scientific Computing in Healthcare, Health Data Manipulation, Analysis of Linked Health Data, Machine Learning Applications in Health Data, Health Data Visualization, Advanced Analysis of Linked Health Data, Heath Data Analysis-Dissertation
MSc Health-Data Science, The University of Manchester London	Principle of Digital Biology, Introduction to Health Informatics, Fundamentals of Epidemiology, Health Information Systems and Technologies, Tutorial in Health Data Science, Understanding Data and Decision Making, Fundamentals of Mathematics and Statistics for Health Data, Biomedical Modeling for Health Data,
MSc-Data Science for Research in Health and Biomedicine, University College London, London	Principle of Applied Epidemiology Applied to Electronic Health Records, Data Management for Health Research, Statistics for Epidemiology and Public Health, Statistical Methods in Epidemiology, Health Data Science Topics, DMBS, IR & Data Mining, Principle of Health Informatics, ML in Healthcare etc
MS- Health Data Science, Saint Louis University, Spain	Programming for Data Scientist, Foundations for Outcomes Research I, Analytics and Statistical Programming, Analytics and Statistical Programming, Foundation of Medical Diagnosis and Treatment, Inferential Modeling of Health Outcomes, Health Data Management and Standard, High Performance Computing in Healthcare Industry, Communication and Leadership in the Healthcare Industry, Predictive Modeling and Machine Learning, Capstone
MSc- Health Data Science, Harvard University, US	Introduction to Data Science, Data Science-II, Basic Statistical Inference, Applied Regression and Machine Learning, Introduction to Epidemiology Methods, Computing for Big Data and any 5 Computing Courses-Data Structure, Computational Statistics for Biomedical Science, Privacy and Technology, Software Engineering, Data Systems, Machine Learning, Computational Linguistics, Project
MSc-Data Science (Health), Lancaster University, UK	Data Science- Fundamentals, Programming for Data Science, Data Mining, Liner Models, Likelihood Inference, Clinical Trials, Principles of Epidemiology, Environmental Epidemiology, Longitudinal Data Analysis

It is an important fact that still availability of Health Data Science and allied programs is very much limited. But there are many programs available on Information Technology and allied fields including Computing etc. Apart from these programs Health Informatics is also available in many universities worldwide, In India and other developing countries. Hence programs may be offered on Health Data Sciences in these subjects with specialization or major [5]. The following tables (Table 3, 4 and 5) depict few programs on Health Data Science and or Medical Analytics.

Table 3: Health Data Science related program in Science platform

Possible Masters Degrees in Science Platform
MS/MSc (Research)- Heath Data Science
MS/MSc -Medical Big data
MSc- Information Technology (Health Data Analytics)
MSc-Computing (Health Data Analytics & Management)
MSc-Information Science/Systems (Health Data Management)
MSc-Computer Application (Data Systems and Telemedicine)

Table 4: Health Data Science and allied programs in Engineering and Technology platform

Possible Masters Degrees in Engineering Platform
M.Tech/ME- Health Data Sciences
M.Tech/ME–Health Data Science & Informatics
MTech/ME-Health Analytics & Cloud
MTech/ME-Computer Science (Medical Big Data Analytics)

Table 5: Health Data Science and allied programs in Engineering and Technology platform

Possible Masters Degrees Management & Commerce Platform
MBA (Health Data Analytics & Management)
MBA (Medical Big Data Management)
MBM (Informatics with Health Big Data)
M.Com (Health Management using Data Analytics)

The universities have to take potential planning and educational strategies to offer Medical Big Data and analytics programs in collaboration with other related and allied departments.

8. SUGGESTIONS AND POTENTIALITIES

There are huge potentiality waiting for developing and offering Medical Analytics and Health related programs in universities and other institutes of higher learning. Few possible measures may be undertaken—

- Universities should take proper steps for initiation of programs in the areas of Health Informatics and Big Data Analytics.
- Proper collaboration needs to establish with other universities and allied departments such as Medical Science with Computing/IT for offering the program.
- Governments need to take proper planning to start program and polices to improve public health and in this regard Medical Data analytics may be treated as important and valuable.
- Proper research initiatives may be taken with other research centers for conducting research based degrees and industrial training etc.

9. CONCLUSION

Health Data Science is the analytical methods based on datasets and thus it combines with the several interdisciplinary facets. All modern institutes are moving towards real implementation of the curriculum hence for practical solutions universities have to put importance on industrial tie-ups and collaborations. Public health now-a-day's an important facet and here huge potentialities are waiting for the development of intelligent medical systems powered by big data analytics. Governments and other foundations need to take proper steps for solid implementation of curriculum. For a solid and interdisciplinary curriculum all the related and allied departments need to work together for better and healthy result.

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A Review of Hazard Analysis and Critical Control Point

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Abstract
Food safety is one of the fundamental requirements in food hygiene. How to improve the safety and hygiene of food in catering industry has long been a research topic attracting food practitioners. In recent years, food safety and hygiene has been seen a social problem. How to control the safety and hygiene of food and beverage is a promising area where new challenges occur as the new kind of food is manufactured. This paper proposes to establish need of HACCP (Hazard Analysis and Critical Control Point) control to ensure food safety and hygiene in the food and beverage industry. There are lot of factors and challenges in practical implementation of HACCP. The implementation, control and review ensure food safety and hygiene if all are combined with proper balance.

KEYWORDS
HACCP, HAZOP, Food, Biological Agents, Food Safety

1. INTRODUCTION
HACCP (abbreviation of Hazard Analysis Critical Control Point) [1] was developed by the Natick Army Laboratory of the National Aeronautics and Space Administration of USA in collaboration with a private operating food company Pillsbury for establishing a food producing administration system in order to ensure the food safety of astronauts. The concept was acknowledged and recommended among experts in food safety on its proposal in 1960. Form 1960s, HACCP had become the gold standard in estimating food safeties. HACCP system features strict control from farm to table. There are three advantages in carrying out the HACCP system: (1) To make a precaution that will effectively prevent food from contaminations and other hazards. (2) To realize an effective use of man force, materials so as to reach a more economical production mode. (3) To obtain a proper safety and quality of food to elevate the hygiene managing level of practitioners.

As consumers, we have several expectations of the food supply, including that it must be nutritious, wholesome, pure and safe. We also expect that it should be plentiful, offer wide choices and be a reasonable value. In recent years consumers have placed increased emphasis on food safety and expect that food should not contribute to chronic disease such as cancer and heart diseases. In order to understand what "food safety" means, we must first know the terms SAFE, HAZARD and RISK. Safe means nothing harmful happens when we consuming a food. But this is not a very satisfactory viewpoint when considering foods. Exposure to certain toxicants [2]can harm us years after the exposure; cancers induced by tobacco are paradigms of this. Food scientists and technologists think of food in terms of hazards and risks. Here, "Hazard" refers to any biological, chemical or physical agent, or condition of food with the potential to cause an adverse health effect.

Some important terms related to food safety are:
Biological agents– bacterial, fungal, viral and parasitic organisms and their toxins.
Chemical agents- Pesticides, insecticides, antibiotics, excess of flavor enhancers and other food additives.
Physical agents– stones, seeds, glass fragments, wood etc.

2. RELATED WORK
Among the important contributions on adapting HACCP for the processing industry are those of Knowlton [3], Nolan [4], Kletz [5–8], Lees [9], Wells [10], EPSC [11], and Macdonald [13]. This surplus of publications illustrates the evolution of Hazard Analysis as a vital technique applied worldwide that is recognized by legislation, and has demonstrated its effectiveness in identifying environmental, safety, and health-hazards. Knowlton [3] focused only on Hazard Analysis applications, giving valuable information on the creative process to generate deviations; Nolan [4] shared his practical experience discussing specific topics both for Hazard Analysis and What If techniques. Nolan also introduced tools for Hazard Analysis time and costs estimation. The document was intended as a typical guideline and standard reference to be applied at petroleum, petrochemical and chemical facilities by describing the nature, responsibilities, methods and documentation required in the performance of such reviews. Kletz [5–8] are considered most influential contributors on several process-safety topics, like Hazard Analysis.

Lees [9] and Wells [10] contributed their concepts of Hazard Analysis development, and extended their focus to a wide-range of aspects of hazard identification and loss prevention. In 2000, EPSC [11] formulated new Hazard Analysis guidelines adapting the methodology to the emergence of new technologies and sharing their considerable experience in using the technique most

effectively. Finally, a British Standard [12] published in 2001, established and defined new requirements for carrying out a HAZOP (Hazard and Operability) study thereby clearly pointing to its continuing importance as the most widely used technique in process plants and other types of facilities. In 2004, Macdonald [13] updated his work with the latest data on the characteristics of HAZOP, documenting how to carry out a Hazard Analysis and connect it with future studies focused on Safety Integrity Level (SIL) assignments. The document concentrates on the application of hazard study methods and the actions that follow from them for providing protection against hazards. Additionally, this work provides guidelines in three basic steps (*i.e.*, identifying hazards, evaluating risks, and specifying risk reduction measures) that form part of the overall risk management framework for process facilities.

3. HACCP

Several testing techniques for food safety have been developed so far. As shown in figure 1, there are various factors on which the success/failure of hazard analysis depends. Right design is the key of success of hazard analysis. Whether the design is good or poor is decided after testing. If the test results are satisfactory it leads to quality assurance (QA) [13]. Quality is the parameter which requires continuous up-gradation which is paved by quality training of the manpower handling the hazard analysis. Different principles of hazard analysis require well defined operations. A timely maintenance and proper management are the essential factors without those qualities cannot be expected in long run.

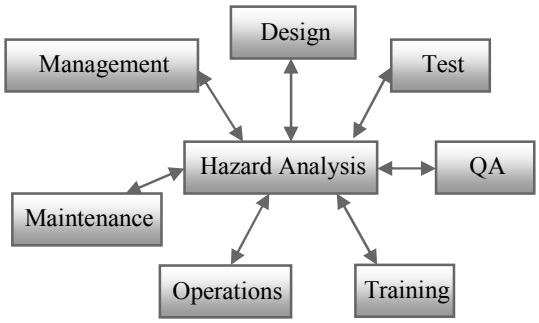

Fig 1: Parameters in Hazard Analysis

Plan Do Check Act (PDCA) is the key for success of HACCP [14]. The schematic process cyclic in nature, is also known as Deming Cycle as shown in figure 2.

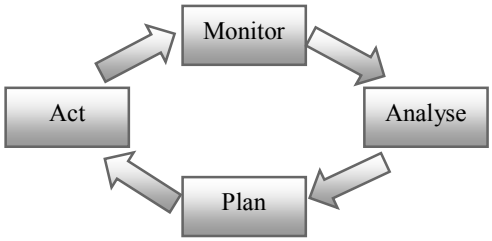

Fig 2: Deming Cycle for Quality Control

Microbial testing of foods is an important tool to ensure safety, such testing has the disadvantages that it normally requires time and it often detects problems only after they occur. Preventing Food-borne disease is more a matter of understanding where food borne diseases originates and how food manufacturing and storage can increase the risk of disease. Once these factors are understood, steps can be taken to ensure that such risks are minimized. Prevention is the preferred way to reduce microbial risks in foods [15].

Precautionary we need to observe what undesirable events can happen with food. It can be ensured by setting suitable scenarios about all possibilities. It is also important to observe how frequently some short of event can happen and what are their consequences and whether these consequences are acceptable operations? If these are not acceptable then what are the corrective actions to eliminate/reduce these risks. If these risks are not acceptable then we need to identify the frequency of such risks and repeat the whole process after reevaluation using mitigation.

The best and most effective method of assuring food safety is to establish a systematic approach to raw material screening, identifying the food manufacturing and handling procedures which result in the lowest possible risk. HACCP is one of the major tool for achieving a high degree reliability and safety. Following are the main points regarding HACCP:

- HACCP is a systematic approach to the identification, evaluation and control of those steps in food manufacturing that is critical to food safety.
- It is an analytical tool that enables management to introduce and maintain a cost-effective, ongoing food safety programme.
- The basic objective of the HACCP concept is assuring production of safe food products by prevention instead of by quality inspection.
- The basis for the HACCP system originated from the need for safe food supply for the manned space flights by NASA (National Aeronautics and Space Administration). It was conceived in the 1960s when the NASA asked Pillsbury to design and manufacture the first foods for space flights. Since then, HACCP has been recognized internationally as a logical tool for adapting traditional inspection methods to a modern, science-based, food safety system.
- A system that controlled raw materials, the process, the environments, storage and distribution, beginning as early in the system as possible.
- This way of control combined with records keeping had to ensure that the final packaged product did not require any other testing for monitoring purposes.
- It enhances food safety besides better use of resources and timely response to problems.
- The primary objective of a HACCP programme is to produce reliably a safe food *i.e.*, a product which is free of microbiological, chemical or physical hazards.

4. HACCP PRINCIPLES

The HACCP system consists of the following seven principles:

Principle 1: Conduct a hazard analysis.
Principle 2: Identify the Critical Control Points (CCPs)
Principle 3: Establish critical limits.
Principle 4: Establish a system to monitor control of the CCP.
Principle 5: Establish are corrective action to be taken when monitoring indicates that a particular CCP is not under control.
Principle 6: Establish procedures for verifications to confirm that the HACCP system is working efficiently.
Principle 7: Establish documentation concerning all procedures and records appropriate to these principles and their applications.

Principle 1: Conduct a hazard analysis: Plants determine the food safety hazards and identify the preventive measures the plant can apply to control these hazards. Hazards associated with growing, harvesting, raw materials, ingredients, processing, manufacturing, distribution, and marketing. Preparation and consumption of a given food are each assessed in details. Areas of potential microbiological, chemical or physical contaminations are determined. This includes both incoming ingredients as well as finished products.

Principle 2: Identify the Critical Control Points (CCPs): In critical control points for controlling each hazard identified above are identified. Those steps in the process in which loss of control could result in an unacceptable health risk are considered to be critical control points. Control of these points must be maintained in order to ensure the safety of the product. Careful control of temperature after processing a product might be one such critical control point.

Principle 3: Establish critical limits: After each critical control point is identified, the limits on that point must be defined. This may be minimum or maximum temperature or the addition of a minimum amount of acid or salt, for example.

Principle 4: Establish a system to monitor control of the CCP: Specific procedures for monitoring the critical control point(s) must be established next. It is of little value to have a maximum temperature for a control point unless there is specific procedure for collecting data on the critical control point. If a product depends on the addition of acid for safety, then the limits on the pHor the acid content must be defined and monitored.

Principle 5: Establish corrective actions: The next step is establishing an action plan for taking corrective action when monitoring indicates that the critical control point's limits have been exceeded. Corrective actions are intended to ensure that no product injurious to health or otherwise adulterated as a result of the deviation enters commerce.

Principle 6: Establish procedures for verifying the HACCP system is working as intended: Validation ensures that the plans do what they were designed to do; that they are successful in ensuring the production of safe product. Plants will be required to validate their own HACCP plans. FSIS will not approve HACCP plans in advance, but will review them for conformance with the final rule. It is important that the entire HACCP plans be thoroughly documented. This includes not only the plan itself but also keeping of rewards of measurements for all critical control points.

Principle 7: Establish record keeping procedures: The HACCP regulation requires that all plants maintain certain documents, including its hazard analysis and written HACCP plan, and records documentation the monitoring of critical control points, critical limits, verification activities.

Finally, it is very important to have procedures for verifying that the HACCP plan is being followed and that it working according the plan.

5. FOOD SAFETY AND STANDARDS

In India, BIS offers two certification schemes in the food industry: (1) HACCP Stand-alone Certification against IS 15000:1998; and (2) HACCP based Quality System Certification provides for two Certification through one audit certification of Quality System against IS/ISO 9000 and Certification of HACCP against IS 15000:1998.

Apart from BIS standard another food safety standard is FSSAI (Food Safety and Standard Authority of India). It was established under Ministry of Health and Family Welfare in 2008 under the Food Safety and Standard Act 2006. At international level HACCP standards include ISO 22000 FSMS 2005. This standard is complete food safety standard and MIS incorporating the prerequisite programmes.

Many countries all around the world have adopted the HACCP system and make it legitimated have obtained satisfactory effects in food safety administration. HACCP system had also been introduced into China early in 1990, however mainly found its way in some larger food companies. For catering enterprises side, either the practices were poorly given or its effect is not sufficiently satisfying [16]. There are enormous amount of food industry in China, the majority of them are of smaller-scale and did not very well in the overall hygiene. Based on this reality, endless problems in food hygiene were emerging. Hence it is of fundamental importance to get the effective food safety control system HACCP introduce into food industry.

6. CONCLUSION

In this paper we presented food safety and standards and their impact. A higher public standard increases prices set by constrained and unconstrained firms, but the effect on firms' output is generally ambiguous for both types of firms. The most productive firms raise their private standard and enjoy higher profits at the

expense of less productive firms. A public standard can increase welfare, especially when there is a high concentration of low productivity domestic firms because of a better allocation of resources. Our paper focussed how to determine barriers for HACCP and food safety programs in food businesses. A lack of understanding of HACCP is identified as one of the main barriers to its implementation As a conclusion, lack of knowledge about HACCP and other food safety programs were identified as the main barriers for food safety in food businesses. Lack of prerequisite programs and inadequate physical condition of the facility were also identified as other barriers.

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An optimized WRED to Improve Quality of Service in Cloud-MANET

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Abstract
Weighted Random Early detection (WRED) is a mechanism that is responsible to avoid congestion in a network, by sensing the movement of nodes, on the basis of analyzed value for multiple queues of data packets. Numbers of devices always try to transmit data packets for certain time span, there would be an issue of consumed bandwidth, delay, media access delay, load in a network; and these factors can conclude to an increased queuing delay, decreased throughput, long queues, increased number of retransmissions for particular device in a network. So an optimized WRED is one of the improved mechanisms that can contribute to an increased performance of devices in a network for any communication established. To attain a comparative analysis of performance OPNET IT GURU EDUCATIONAL VERSION 14.5 Modeler is used.

KEYWORDS
Cloud Computing, Ad-hoc Network, MANET, PPP, Digital Signal, TORA, Quality of Service, RED, WRED

1. INTRODUCTION
Cloud computing [1, 2] is one the emerging technology in present and coming era. This technology can be attained in an ease that can provide numbers of user to make use of their applications and resources in an 'anywhere and anytime' basis. Cloud computing is hence known as 'on-demand' or 'on-line' computing methodology.

This technology is adapted globally exponentially as it allows its users to access their all the resources which are shared globally, using a pool configuration. It facilitates its users with functionality that it is not necessary to keep all the database and resources with each individual user, but to make an access on on-demand basis.

Cloud computing up-fronts for numbers of enterprises and users for the following factors included: low infrastructure cost, adaptation to virtual hardware, high performance, and accessibility globally to shared resources, services at cheap cost, high computing power, scalability, and availability of resources in a pool architecture, reliability, security, and increased performance to devices, less maintenance needed, enhanced manageability, is capable enough to meet the merging fluctuating demands of numbers of enterprises.

Due to above briefed factors, cloud computing has led to an increment and implementation of such computing technology presently. Cloud computing can be maintained under two subsequent i.e. either in centralized manner, or in decentralized manner. Ad hoc network [2, 3] is one of the types of decentralized cloud computing infrastructure. Ad hoc network is a wireless network that works under a decentralized manner of operation. The network is said to be as ad hoc when it need not to maintain or manage any kind of pre-specified infrastructure to establish communication in between the connected devices.

The usefulness of ad hoc network is generally maintained by implementing Access Points (AP) [4, 5] in every autonomous segment for each grouped numbers of device. APs are responsible to make an initiative to enable or disable communication in-between the proposed scenario of devices. It is assumed that in an ad hoc network no individual station can be treated as an AP, and cannot act or permit devices to communicate at certain time span. Implementing an ad hoc network will permit every device in a network to communicate without any restrictions. Hence each and every communicating device is allowed to transmit or flood numbers of packet at anywhere-anytime functionality, and so ad hoc is formerly recognized as 'on-the fly' network.

Since every device can transfer or flood data packets in a network freely, then decision is to be taken regarding the data packet transmission to avoid unnecessary congestion in particular transmission. To accomplish this, a dynamic process is encouraged that will be responsible to take decisions that which device should communicate at which time span while communication is established. Unless, the traditional use of switches, routers, and hubs in a network, ad hoc networking stands off-clear in all the aspects.

Mobile Ad Hoc Network (MANET) [6] is one the aspect that includes a factor of mobility in all the devices that were intended to communicate in an ad hoc network primarily, along with the fact that mobility does not make any effect onto performance of the network or any of the communicating devices. Devices in MANET are able to move along a network while communicating or making access to resources and services. Unlikely to existing ad hoc network, MANET also concludes to be an infrastructure less, and self-configuring network and in a continuous manner.

Further, bifurcation of paper can include the following sections. Section 2 covers signaling scheme, ad hoc routing protocol [7], Quality of Service (QoS) [4], [6] and its schemes, Internet Protocol (IP) [2], [4], [8] compression mechanism, congestion avoidance mechanism [8], [9], routing protocols in Internet Protocol version-6 (IPv6) [2], [4], [9] environment. Section 3 underlines the proposed scenario(s), configurations to the scenario(s), proposed algorithm. Section 4 represents analysis for proposed scenario and performance of devices in a network under particular circumstances. Section 5 underlines conclusion and the resultant factors that improve the working of existing congestion avoidance mechanism; and references of the proposed work in all the sections above along with future scope.

2. USEFUL WORK

It is said that while operating in a MANET environment, each and every station is meant to communicate freely in a network, this is because every work station is allowed to set their routes for data possible data transmission. Before stations made or begin transferring data packets, certain message packets need to be exchanged. Before any communication is established, the communicating devices will be sending presence-listen acknowledgment messages so that any collision is prevented. This continuous process of exchanging the presence-listen messages along with acknowledgment messages, every device can configure the topological structure of the particular autonomous network to which the station belongs. Since, no topological structure is set or fixed for MANET, every station will be allowed to build-up their topology individually and can know their neighbour in this sense. Hence, this process helps every other station to find best routes in delivering data packet to an appropriate destined device.

In a cloud network, reliability is one of the factors that has concerned at a greater scale. When it is talked about reliability in a network, it is intended that such protocols must be used that provides reliability when a connection is established. Point-to-Point Protocol (PPP) [2], [4], [8], [10] is one of the protocols that provide some aspects of reliability in a cloud-based network.

PPP, an end-to-end protocol, is generally stacked up to the data link layer (OSI model Layer 2). PPP protocol facilitates a physical communication link to provide reliability to all the connected devices. Along with reliability [8] factor, PPP provides other factors such as: compression mechanism [2], [11], [12] for data packets, encryption of data packets travelling along the network, and authentication for every access that has made for data packet. When PPP is implemented in a cloud-based ad hoc network, it is generalised as T-carrier system [8], [13].

The system is said as T-carrier as it is intended to operate on digital signals. Digital Signal 3 (DS3) [8], [13] or 3 T-carrier is one of the types of T-carrier system. DS3 is a signalling scheme consisting 28 Digital Signal 1 (DS1) [8], [13] scheme, and a speed of 44.736 Mbps. It is made available for both wired and unwired environments.

To establish securely in any network using Internet, it is encouraged that to establish a secure communication and to provide integrity, some set of protocols need to be followed. While working in an ad hoc-based network or in MANET, certain set of protocols are provided so that an efficient communication is achieved every time. Ad hoc routing protocols are the standards set priory so that proper control can be attained while any communication or packet transfer need to be done, and stations can better take decision in maintaining topological structure, finds the best route.

Temporally Ordered Routing Algorithm (TORA) [14] is one of the algorithms that accomplish a mechanism that can help devices to route data packets along a network. With the help of TORA, every station can make their topological structure and get to know about

their neighbours, best route is found out in this manner.

Out of all these factors, one factor is also encouraged to be accomplished in every communication performed in any network, i.e. QoS. QoS provides us a metrics that defines a performance analysis for a particular network. The QoS of a network is generally measured by certain factors, such as, delay while transmission, availability of bandwidth [4], [11], [15], [16] throughput, transmission speed or bit rate, and error rates or packet loss in a particular network.

Besides all these, QoS can be firmly described as a metrics that comes under resource reservation & control, prioritization of users, flows of data, prioritization of data packets, etc. When QoS need to be taken into consideration, several factors or aspects are chosen onto which the performance for any network rather than a particular device depends.

When two connected devices need to communicate in an ad hoc network, the two devices will set their topological structure using TORA algorithm. Afterwards, there might be a scenario when numbers of devices are communication in a particular time span, in this situation collisions, congestion may occur, as queues are maintained every time multiple devices try to transmit data packets using single data line or communication link. There exists a queuing mechanism under this scenario, which treats the traffic or data packets so waiting in queues to get deliver at set destined devices.

There exist several queuing schemes, out of which some can be as: First in First out (FIFO) [17], Fair Queuing (FQ) [18], Priority Queuing (PQ) [19], Weighted Fair Queuing (WFQ) [20], Weighted Round Robin (WRR) [21], Deficit WRR (DWRR) [22], Priority-based DWRR (PB-DWRR) [23].

PB-DWRR is one of the reliable and most interesting queuing schemes that can be implemented in any network. Priority based queuing can be beneficial in number of aspects, it can control the rate of data packet transmission, can set priorities to data packets to deliver in a fair time, eradicates starvation situation to occur for every engaged device in communication, and higher transmission speed can also be accomplished along with this queuing mechanism.

PB-DWRR puts both the benefits of PQ and DWRR. Every workstation is provided a fixed time slot to establish reliable communication, through this mechanism every device in a network is given an appropriate fixed time at regular intervals. In this manner, all devices communicate in a much better way following a Round Robin mechanism. Different levels are set to provide different levels of priority to each of the data packets and in that basis a continuous rotation takes place, hence making full utilization of bandwidth and isolating the congestion part in some sense.

Since, bandwidth is finite and faster communication strategy works on number of factors, such as data packet size, error rate or dropping of data packets, etc. To tackle up with the issue related to length of data packets, a compression technique need to be yet introduced. TCP/IP Header Compression [24] is a formally known compression technique that is responsible to reduce the size of data packet up-to a relevant and appropriate length. TCP/IP header compression technique is capable enough that it can precise the data packet length from 40 bytes to a level of 3-4 byte. Hence contributes towards QoS with higher transmission rate to data packets.

3. SIMULATION

This section is an experimental section that includes simulation [2], [4], [15], [25] environment under which scenarios need to be implemented to measure the performance metrics for numbers of station operating in any segment of the network. In the proposed simulation environment, cloud computing is encouraged along with ad hoc network methodology, *i.e.*, work stations operating in this environment are allowed to move freely in a network and are allowed to communicate while moving along the network.

In the proposed simulation, MANET is also introduced, so that ad hoc networking is performed by the stations that are set to mobile, i.e. includes some factors associated with moveable character. Numbers of autonomous segments each consisting of MANET methodology are inter-connected to every other autonomous segment through cloud network.

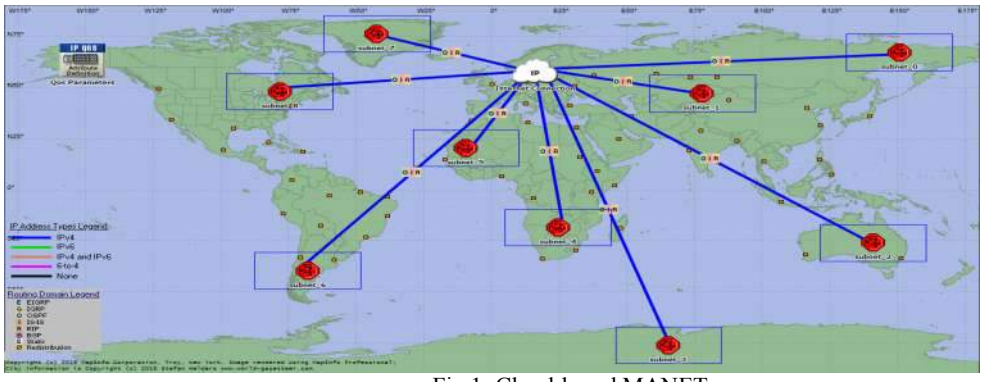

Fig 1: Cloud-based MANET

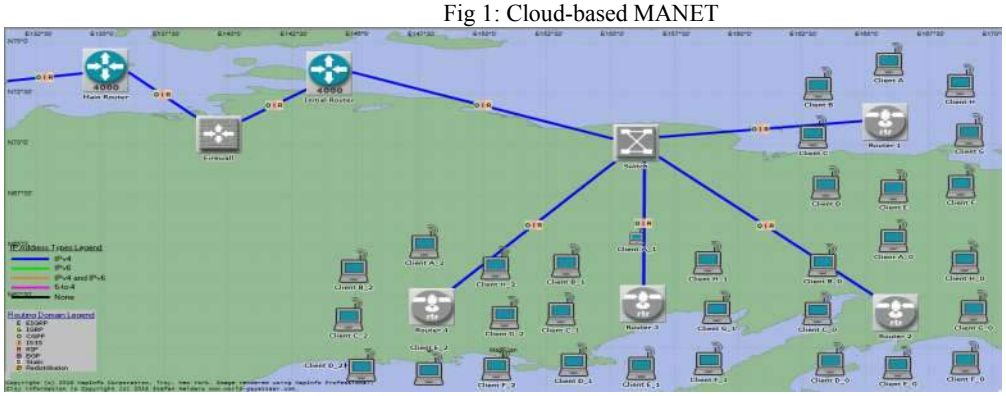

Fig 2: Simple Autonomous MANET scenario

A) A scenario with WRED: Under this scenario, routers are enabled with QoS parametric values, along with the mechanism enabled for congestion avoidance in a network. Simple WRED is enabled on all the routers.

B) An improved WRED algorithm with compression: This scenario will underline the concept of WRED in a more optimized manner. The working for basic WRED and an optimized WRED can include the numbers of factors.

Since, WRED is a mechanism that follows a queuing discipline. Multiple queues are maintained and basis for queues are maintained in accordance with the traffic classes. WRED basically works under an environment where TCP/IP is followed. Because under WRED, precedence factor is included, for that it is necessary to fulfil the criteria for possible communication in such environment.

Performance factor for WRED can consists, such as threshold of each data packet, bit rate [2], [4], buffer capacity [15], length of data packet, router's memory management [26]. QoS can be barely depend on the factors that depicts performance of WRED in a particular environment. Mathematically, relation in between these factors can ve justified as, steps would include:

1. Let '*t*' be the time factor for any data packet to travel along the network, '*exp_w*' be the exponential weight to be assigned to every data packet, '*avg_Q_size*' be the factor that depicts average queue size to be accepted for successful transmission.
2. Out of theses parametric values, following equation can be made:

$$o_avg = avg_Q_size(t\text{-}1) \quad (1)$$

$$c_avg = avg_Q_size \quad (2)$$

$$avg_Q_size\ (t) = o_avg * (1\text{-}(1/2)^{exp_w}) + c_avg * (1/2)^{exp_w} \quad (3)$$

$$Optimized_avg_Q_size\ (t) = o_avg * (1\text{-}(1/2)^{exp_w}) + c_avg * (1/2)^{exp_w} - (b/k) \quad (4)$$

Where *o_avg* is the old average queue size, *avg_Q_size*(*t*-1) is the average queue size at time *t*-1; *c_avg* is current average queue size; b is the possible bit rate to transfer a data packet; and k is the threshold value.

Equation 3 depicts the basic or traditional way of analysing the average queue size for the particular communication to be established. With the traditional WRED [27], [28] and its process of analysing queue size results in number of data losses or multiple retransmissions. But when a rational value of both threshold and bit rate are adjoined with traditional WRED, results are improved in some manner. Equation 4 denotes an optimized version of WRED mechanism.

Both the scenarios consist of a common configuration. The configuration [2], [4], [8], [29] would probably include: an ip_cloud; 9 subnets or autonomous segments each consisting of 4 sub-autonomous segments, 36 workstations, 4 normal routers, 2 CISCO 4000 series router, firewall, switch to connect all sub-autonomous segments of connect with other networks. Every work station is enabled as MANET station, and is intended to operate in an IPv6 environment, i.e. IPv6 address format will be used to identify every workstation. All the subnets are connected to every other subnet via cloud computing using DS3 communication link along with routing protocol set consisting of RIP, IGRP, OSPF, IS-IS, and EIGRP; and ad hoc routing protocol set consisting of TORA. PB-DWRR queuing scheme is implemented to better enhances performance metrics for both the scenarios.

4. ANALYSING SIMULATION

This section concentrates on the analysis for the comparison in between the existing and optimized algorithm so proposed in MANET. The performance is measured on the basis of QoS that has accomplished with each of the scenario proposed. The analysis is to be taken into consideration regarding internet connection and firewall for subnet 0 and subnet 5, by measuring queuing delay, retransmission attempts, throughput, load, multicast traffic sent/received, and traffic sent/received.

A. *Media Access Delay:* Media access delay [15] is the amount of time span that has been spent while accessing the workstation particularly in a network. This delay has been encountered for shorter time spans.

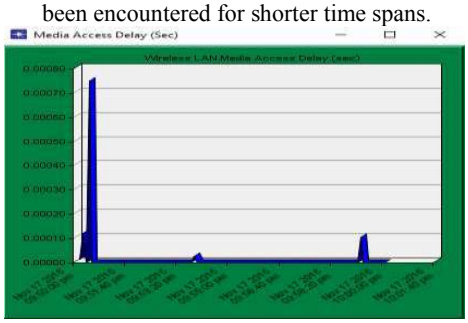

Fig 3: Media Access Delay

Figure 3 represents the media access delay that has been observed in a network, while all accesses are made by individual devices in a Wireless Local Area Network (WLAN) environment. There would be an increase in such kind of delay at the beginning of communication, but would decrease as router got to know about stations associated in a network.

B. *Multicast Traffic Received/Sent:* Multicasting [30] is a concept in which a message, or data packet is sent to a defined numbers of stations in a network, and not to all the stations. The multicast parameter can be analysed both for traffic or data packet sent, or received by an individual station.

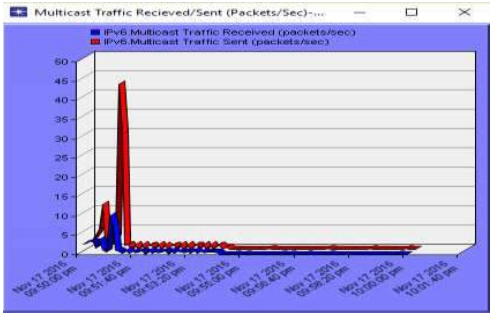

Fig 4: Internet Connection: Multicast Traffic Received/Sent

Figure 4 implies multicast traffic by the stations to other stations in Internet Connection. It is observed clearly in a graph that large numbers of data packets are multicast by the station and very few are received successfully.

C. Queuing Delay Received/Sent: Queuing Delay [2], [4], [8] is an amount of time spent by the data packet in a queue to reach to its destination. The time span spent by the data packet to reach its destination before time out has occurred, is referred as queuing delay.

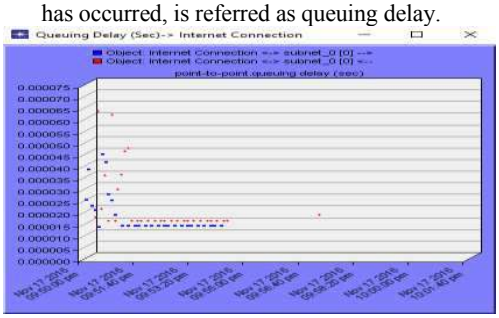

Fig 5: Internet Connection (Subnet 0): Queuing Delay Received/Sent

Figure 5 represents queuing delay occurred while traffic or data packet is either received, or sent to other devices in a network. It can be seen that delay has occurred as time passes. It can be clearly observed by the graph that at initial when communication established, delay has increased, then decreased gradually to constant.

D. Throughput Received/Sent: The rate at which it can be said that the data packet has been successfully delivered at the destined device respectively in a network. The rate at which successful transmissions can be attained, is formally known as throughput [2], [4], [5], [8], [15]. This parametric value can be attained for both traffic sent or received in a network.

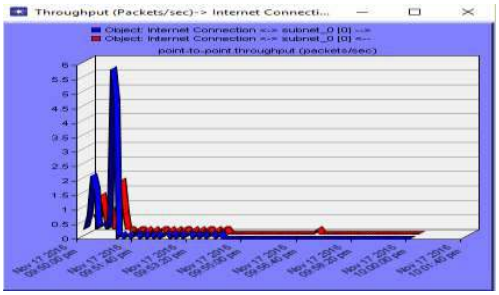

Fig 6: Internet Connection (Subnet 0): Throughput Received/Sent

Figure 6 represents the rate of successful transmission while communication is established. The graph depicts throughput rate in subnet 0 for the internet connection. It can be seen that large number of packets are sent by very few are received by the routers at subnets respectively.

E. Retransmission Attempts: There exists one scenario where numbers of packets are not delivered successfully by the devices. For this particular scenario, the source devices probably send data packets to their destined devices for successful delivery of data packets in a provided time span. This concept is treated as retransmission attempts [11], [31].

Figure 7 depicts retransmission attempts performed by one of the device, *i.e.*, Client A for two subnets, subnet 0 and subnet 5 in a network. For client in both the subnets, retransmissions attempted are constant in manner.

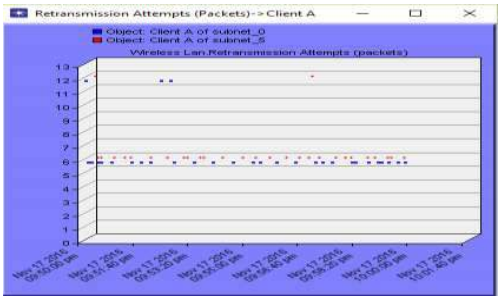

Fig 7: Client A (Subnet 0 and Subnet 5): Retransmission Attempts

F. Load: The parameter load [5], [15], [31] can be said in a simpler word as an obstacle that has occurred to a network. The traffic or unnecessary data packets that travel along the network, consumes bandwidth are treated as load for a particular routing path.

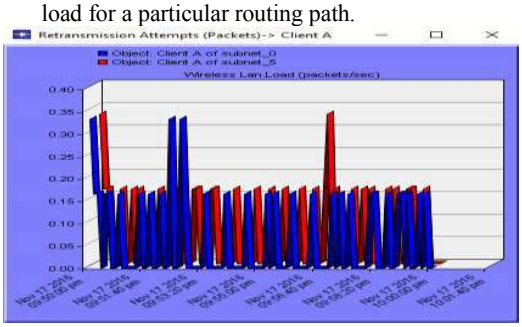

Fig 8: Client A (Subnet 0 and Subnet 5): Load

Figure 8 depicts the load factor in a network for Client A in two subnets, i.e., subnet 0 and subnet 5. At an initial level of communication, load has reached to a milestone, but hen decreases gradually to a constant segment, with not very frequent fluctuations while transmission was taking place.

5. CONCLUSION

WRED is one of the congestion avoidance mechanism that works on TCP/IP model and data packets that are TCP/IP enabled. In the paper, an analysis for traditional WRED and its performance factors are analysed. Threshold, bit rate, length of data packet, buffer size can be the possible factors which effects performance of any network. To improve existing WRED, an optimized WRED is established which proves that two factors, *i.e.*, threshold value and bit rate of each data packet. These contributes a lot to any network, and can facilitates an improved performance if are related in some way. It can be concluded that WRED can be performed more in an optimized manner by relating the queue size as in shown equation 4.

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Applicability of Cloud Computing in Education: A Contemporary Overview in Indian Perspectives

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Abstract
The advancement of our coeval society, information and technology of our knowledgeable society depends on technology advancement that has long been based on the increasing performance of different devices concurrently. The intention of modern computing technology solutions miniaturized is the segregation of its entire computing power in a single device and it must be an external source, which allowed the uprising of cloud computing. This abstract introduces the objective and intended contribution of the research. The technology involves a number of benefits to its users, evidenced by its adoption by institutions that have succeeded to reduce their equipment costs and maintenance. The outsourcing all facilities that a computer can offer complement the idea of reducing costs and not accidentally is useful in education. The cloud solutions allow the teaching, research and development to be more efficient and sustainable which makes as the educational institutions to consider adopting these solutions.

KEYWORDS
Cloud computing, cloud based e-learning, platform, Infrastructure, security, trackability, collaboration.

1. INTRODUCTION
With the rapid advancement of technology and the development of emerging technologies such as cloud computing, the issues of reach and quality are addressed by enabling low cost implementation of IT tools. Remote classrooms enabled by the cloud will help us in running multiple classrooms through a small group of teachers and will help conquer the problem of lack of skilled teachers. In addition, it will also direct to standardisation of course contents and education offering methods. The India Vision 2020 document, by the Planning Commission of India, lays large characteristics on higher education. Cloud can play a burdensome role in offering higher education by being an innovative platform for classroom lectures, using streaming on the web. Provided that cloud-enabled technologies can conquer students' data privacy-related concerns and if the network bandwidth becomes available at every portal, cloud can lay down a solid foundation for a transformational journey of the education system in India. The cloud computing technology should be obtained in all areas of society and in education. The e-learning solutions based on the cloud promote a new age of learning, in which the lectures and labs are based on cloud platform through virtualization.

A variety of knowledge can be made available to all teachers and students through cloud-based services and these services can be accessed anytime, anywhere and also on any device. On the other hand, providing educational services through cloud computing technology enables them to gain the skills needed in the global information society. Many institutions have begun to agree to this initiative and there is precedent of a significant reducing in costs as a result of implementing cloud solutions. For education, the approach of cloud computing technology is based on the services they offer, their implementation and architecture. Thus, from this point of view of these services, can be mentioned:

- Platform as a service (PaaS) that provides a range of software for the development of programs;
- Software as a service (SaaS), so users access cloud software provided by cloud administrators who supervise them;
- Infrastructure as a Service (IaaS) that is the base model in Cloud Computing.

After the method of implementation, the cloud can be public, private or hybrid. Microsoft Company already works in the area of Cloud Computing using Windows Azure, which is made available to users as PaaS and IaaS This service is implemented as a Public Cloud. From the point of view of learning technologies, web based learning offers several advantages over the conventional classroom learning. The biggest advantage is related to the low cost and use learning content anytime and anywhere. Learning material is easily maintained and updated; it may include multimedia content to facilitate understanding of concepts. Student-centered approach and the teacher creativity in making the learning material are encouraged. Uses of cloud in education some institutions use low-level cloud services for data storage but the use of cloud computing in education.

There was a time when, to use files like MS Word, Excel etc. on different computers, we needed to save our files on an external storage drive like Compact Disk. The disk then travelled with us so that we could load our information onto other computers while holding our breath until the document was actually

retrieved, not any longer. The safety, stability, and ease-of-use of cloud computing [18] in education is resulting in widespread adoption in educational institutions of all sizes and types. [15]

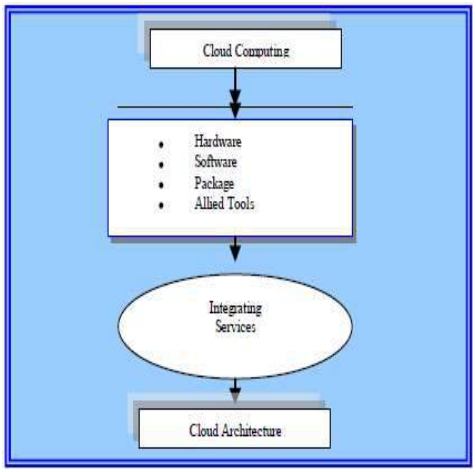

Fig. 1: Inside into the cloud environment [18]

Objectives of Cloud Computing in Education
Some of the objectives for which this effort is taken are the following:

- To learn the basics about cloud, not as a computing devices but as a service.
- To learn about cloud computing and architecture, its need and importance.
- To know the basic requirement of cloud architecture.
- To know the strength, weakness, opportunities and threats of contemporary cloud computing.
- To know about basic cloud computing problems and virtualization.
- To learn about its probable application areas.

Before going to discuss any advanced topic let us concentrate on some basic terms like computing and information which are deliberated as important facets of cloud computing

Information: Information as a concept has a variety of meanings, from everyday usage to technical settings. Generally speaking, the concept of information is closely related to conception of content, communication, control, data, form, instruction, knowledge, meaning, mental stimulus, pattern, perception, and representation.

Computing: Computing means designing and building hardware and software systems for a roomy range of purposes; processing, structuring, and managing several kinds of information; doing scientific studies using computers; making computer systems employ intelligently, creating and using communications and entertainment media, finding and collecting information relevant to any particular purposes.

2. CLOUD AND ITS TYPES

Cloud Computing is the use of computing resources both hardware and software, that are delivered as a service over the Internet. The name comes from the use of a cloud-shaped symbol as an abstraction for the complex infrastructure it contains in system diagrams [6]. Cloud computing has four types based on the deployment. These are:

- Private cloud which deals with the delivery of cloud services to a restricted set of consumers, usually within a single organization.
- Public cloud that is concerned with the delivery cloud services to a relatively unrestricted set of consumers.
- Community cloud which handles cloud infrastructure shared by several organizations and supporting a specific community that has shared concerns.
- Hybrid cloud that is a composition of two or more clouds (private, community, or public) that remain unique entities but are bound together by standardized or proprietary technology that enables data and application portability.

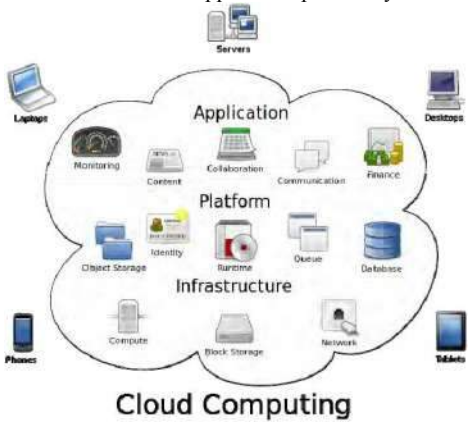

Fig 2: The Cloud Computing Architecture. [6]

3. WHY WE USE CLOUD FOR STORING INFORMATION?

Are there really any true advantages in education for storing information [3] off-site on a server that could be located anywhere? A recent conversation about cloud computing with several IT professionals of the educational field, there has some significant advantages for storing information in Cloud:

(i) **No carrying any devices:** Such as pen drives or CDs. We do not need to worry about losing and breaking these devices, or not having our information load properly.

(ii) **Easy access:** Notes, lesson plans, lab work– just about anything digital that we use in teaching is easily uploaded and accessed anytime.

(iii) **Stability:** cloud computing is now to the point of being a very stable technology that we can really on.

(iv) **Security:** Our data, content, information, images and any types of data, we store in the cloud usually requires authentication. For example, ID and password. So, it is not easily accessible by anyone.

(v) **Shareability:** Working on an instructional assignment with other teachers, we can share some or all of our files that we have stored in the cloud. No more obtaining any thumb drive or burning another CD or DVD. We just need to send a link to the file(s) for destination.

(vi) **Trackability:** Make changes to a lesson and want to change it back? No problem. Cloud computing will save multiple revisions and versions of a document so that we can chronologically trace back the evolution of an item.

(vii) **Collaboration:** We can set-up various student groups to work on projects and assignments in the cloud.

(viii) **Good-bye copier:** With cloud computing, the amount of photocopying is reduced significantly – even more so if each student has their own smart device (computer, laptop, tablet, etc.). Quizzes, tests, assignments all can be taken, scored, shared with student and parents, and stored.

(ix) **Good-bye file cabinets!** With cloud computing abundance, there is no longer the need to both save files digitally as well as in paper format. Cloud computing systems are regularly backed-up, so the chances harmfulness of contents are quite small. No more file cabinets means more classroom space for us and our students.

Fig 3: The Cloud Architecture for Education. [3, 4]

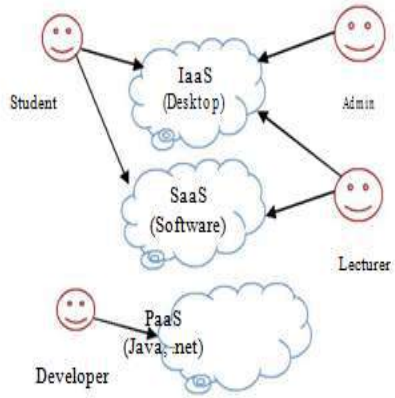

Fig 4: The Cloud Service Model used in education system. [3, 4]

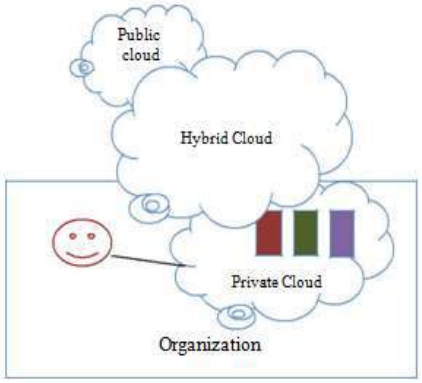

Fig 5: The Cloud Service Model used in education system. [3, 4]

4. CHALLENGES

- The course curriculum in most institutes is not updated regularly in line with global developments. Reach of quality education in remote villages has traditionally been low. Lack of internet presence in such areas has been a bottleneck [12-16].
- Inflating cost of education has led to layoffs of teaching staff and increasing class size thus increasing the student to teacher ratio to unimaginable levels. Additionally, there is dearth of qualified teachers in the country.
- Teachers and educational institutions have not been technology savvy traditionally; hence the adoption of new technologies has been slow.

5. BENEFITS OF CLOUD ADOPTION

- **Standardisation of content:** Courses delivered over cloud through a central location will guide to a standard content delivered to

multiple remote virtual classrooms of many Institutions.

- **Alliance:** Teachers and Students can alliances on their studies, projects etc [2].
- **Swiftness to rollout new courses:** Cloud-enabled technologies ensure rapid access to infrastructure services thereby provides swiftness in rolling out newer products.
- **Improved managerial efficiency of Institutions:** Teachers and the academic staffs can focus on the core functions of their institution instead of fruitless efforts on IT infrastructure and the applications set-up.
- **Superior quality of education delivered anytime, anywhere: U**pdated contents of Courses can be delivered customarily across all locations.
- **Measurability:** Measurable systems on cloud is provide big data platform for research and analysis.

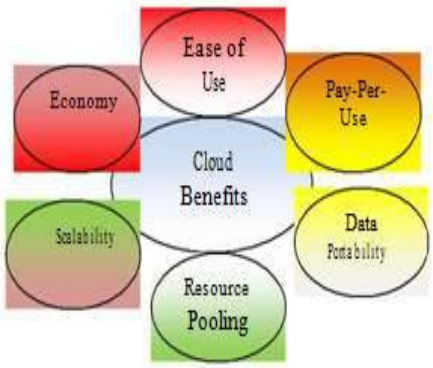

Fig.6: Benefits of Cloud Computing in Education [3, 4]

6. CLOUD COMPUTING IMPACT AREAS

The following table represents the different impact areas of cloud computing: [2]

Table1: Cloud Computing Areas

Classroom technologies	
Interactive engagement	Centralised faculty assisted by local teachers. Teachers interacted with students, delivering lectures, presentations or response their questions.
Alliance	Students and teachers Aliening on their projects by creating and sharing contents and communicate with each other by message or video.
Portability	Extend classrooms and labs with mobile devices like smart phones, tablets, virtual class room technologies facilitate remote access.
True-time assessment	Adapting lessons based observations of student interactions and class notes taken by them. Content should be highlighted, footnote or updated via electronic media
Managerial Technologies	
Customer Relationship Management	Student life-cycle management enables better management of admissions, recruitment, financial aid and billing, student records and performance, transfers and alumni relationship etc.
Enterprise Resource Planning	Educational institutions manage internal and external resources including physical assets, and resources like financial and human.
Business intelligence	Teachers and students use analysis and evaluating in classrooms; also establishing their curriculum.
Smart campus	The Chief Information Officer is responsible for public safety, transportation, energy and water management, building maintenance, student services.

7. THE INDIAN IAAS MARKET

At present, the Indian market does not have a mature ecosystem that supports cloud IaaS services. A few players from the service provider segment such as Tata Communications, Wipro and Net Magic have announced services that are likely to evolve into more stable cloud offerings [6]. Some of the challenges the market currently faces include:

- Ecosystem maturity
- Customer awareness of services
- Connectivity

8. SECURITY

In this digital world where users are getting benefits of services beside that they always worry about their security. User has a satisfaction from cloud services that security against back-up, power failure, hard-disk damage, system crash but the data leakage or data access to the third party is still a question in front of them. Thus Data Security is the main concern. End Users think that the access from remote server whose location is also not known to them, in spite of that data is more secure if it is hosted under them.

The more sensitive data includes exams papers, employees' accounts, research results, students' academic records and much more in the institutes, universities, schools pays an important attention to take the data security steps [4]. Education sector should follow the various steps that come under data security which are as follows as:

(i) There are several strict Data Protection laws and legal policy contract under which restriction of accessing data to third party are signed between the service provider and the end users. Law makers also started to mark the

legal issues that denote the privacy and data security protection.

(ii) Data encryption should be done against the unauthorized access in the cloud. Data may be encrypted after the request and before delivering it into the cloud environment.

(iii) Mask or de-identify the sensitive data to achieve the data security.

(iv) Should take care of the firewalls which are the main source of knowing the data location.

(v) Adoption of private cloud by the organization is a great source of data security. High sensitive data should be kept inside the institute and let other data to be externalize to achieve scalability and other benefits of cloud computing.

(vi) Technologies like HTML5 allow users to work offline when internet access is intermittent.

(vii) The contract should be read carefully by the institutes. They should seek legal advices before signing on the contract. Several issues should be examined such as initial term of contract, present and future costs, penalties, data access security; should be compensation restricted under the contract expansion.

9. CONCLUSION

Cloud computing is growing rapidly in terms of computing services, resource utilization (hardware and software) or in other words Cloud is floating with huge data inside it with virtualization over the internet. It has a wide scope in education sector. Where Students are looking more interested in electronic gadgets as a great source of communication, Cloud Computing will be a welcome step in their life. Instead of keeping textbooks and heavy bags with them, they will prefer a world without textbooks having much more efficient way to store and access the lectures, assignment, research paper and virtual class etc [12-16]. Let them give a chance to touch the sky limits via cloud for their future development in this competition era.

10. ACKNOWLEDGMENT

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Internet Society (ISOC): its Past, Present with reference to its Future Potentiality

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Abstract
In this work, the transformation of the Internet i.e. from its origin (military and academic) to its current status as a global network for digital media publishing and retrieval has been described. The Internet includes security, digital marketing, network computing, real-time programming (where data updates continuously) and the main part is the development of an integrated service platform for exchanging of real-time audio and video services all over the world. In the development of the internet, Internet Society played an important role. The 'Internet Society' is a non-governmental international organization for global co-operation and co-ordination for the web system and its internetworking technologies and applications. The Internet Society was established by Vint Cerf and Bob Kahn in 1992, both are known as 'Fathers of Internet'. The paper presented an overview and future potentialities in this regard.

KEYWORDS
Internet Society, Internet Development, Internet Standards, ISOC, Digital Community

1. INTRODUCTION
The Internet Society is an American, non-benefit association established in 1992 to give initiative in Internet-related principles, instruction, get to, and arrangement. It expresses that its central goal is "to advance the open improvement, development, and utilization of the Internet for the advantage surprisingly all through the world". The main mission of Internet Society is to assure open internet development by increasing and supporting uses of the internet to organizations and individual persons and it also provides leadership in internet-related standards, education, and policy. The ISOC has its headquarters in Reston, Virginia, United States (close Washington D.C.) and workplaces in Geneva, Switzerland. Now a day there are more than 140 associations have been related with the 'Internet Society' as a robotized number. Around the world, 'Internet Society' has more than 80000+ individual individuals. Universally 'Internet Society' has 110 parts. 'Internet Society' is firmly connected with numerous affiliations and associations, for example, IRTE, CNRI, ACM, IEEE, RIR. The Internet Society deals with the vast size of issues of the globe, but it is mainly dealt to maintain better internet available for all current users, for the next generation of users. It is commonly deals with the internet policies, technology, development, and governance (see Figure 1).

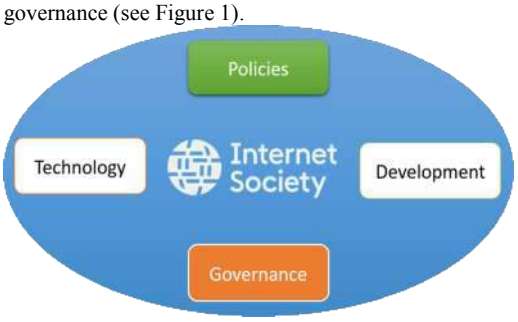

Fig 1: The stakeholder of Internet Society

2. OBJECTIVE
- The primary point and target of this study are included, yet not constrained to:
- To know about the Internet Society, its types and the attributes. In particular, to investigate historical foundation of the Internet Society and its changing patterns.
- To evaluate the online framework, online administration and development of Internet in today's context.
- To discover fundamental point and goal of Internet Society, including its challenges and opportunities.

3. METHODS & MATERIAL
For this study, the survey of work observed as the secondary source and in this way, a few narrative and non-narrative sources have been used. For the study of the Internet Society, some journal also referred.

4. INTERNET SOCIETY: A BASIC OVERVIEW

4.1 History
For over 20 years, the Internet Society has assumed an essential part in notifying and creating the history of the Internet. The Internet Society's introductory columns are Outreach, Technology, and Policy. The ISOC have discovered expression in activities that have associated the world, maintained the development of fundamental

Internet technology. It also encouraged transparency and a bottom-up approach intending to worldwide Internet administration issues. Trusting that "the Internet is for Everyone," the Internet Society has worked since its establishment to make that objective a reality. In below figures Figure 2 shown basis of the creation of the Internet. Figure 3 shows upgradations of the Internet. Figure 4 show born of ISOC and figure 5 and 6 shows the period of Internet Society.

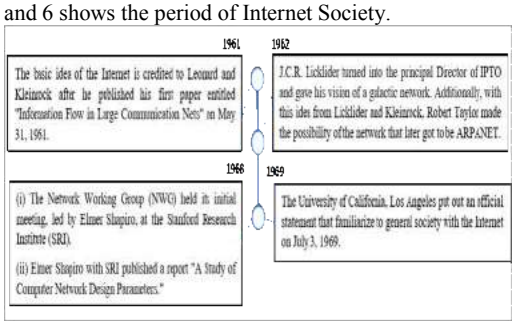

Fig 2: showing Idea (Basis of Creation)

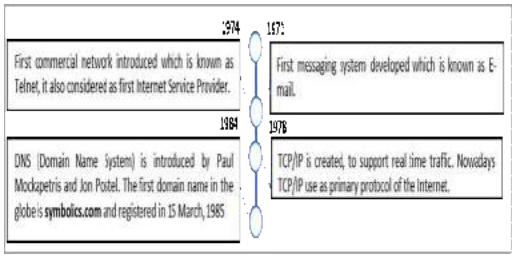

Fig 3: showing upgradations of the Internet.

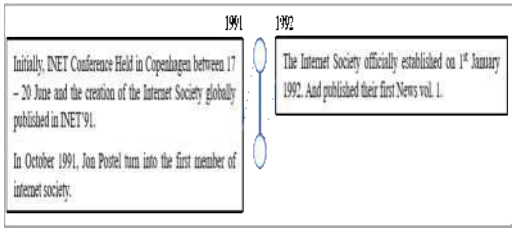

Fig 4: showing born of the Internet Society

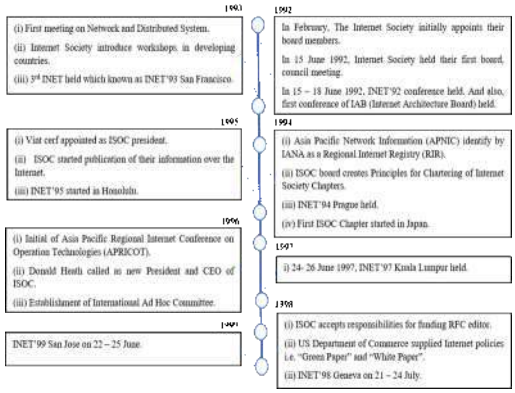

Fig 5: showing timeline of Internet Society

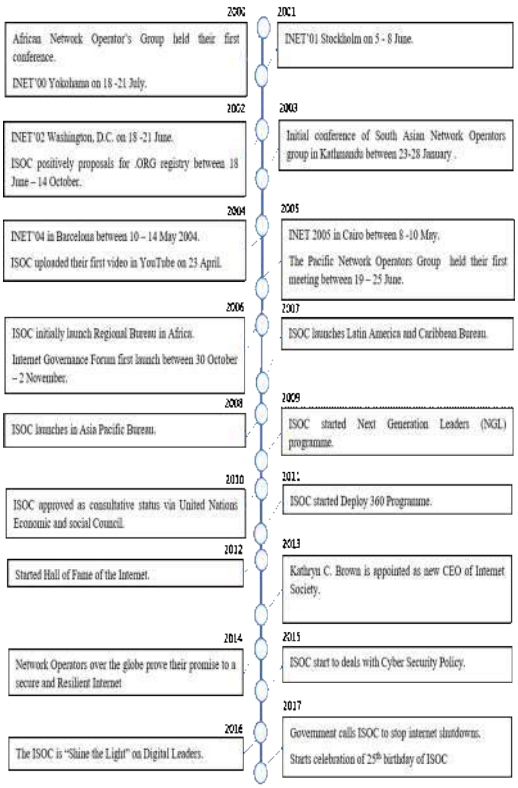

Fig 6: The timeline of Internet Society

4.2 Function of ISOC

Its primary object is to keep up and increase the improvement and accessibility of the Internet and its related technologies and applications - both as an end in itself, and as a method for empowering associations, professions, and people over the globe to more effectively work together, participate, and advance in their individual fields and interests. Its particular objectives and purposes as follows:

- Advancement, support, development, and spread of benchmarks for the Internet and its internetworking innovations and applications.
- Development and advancement of the Internet engineering.
- Maintenance and development of viable authoritative procedures which are essential for the operation of the worldwide Internet and web systems.
- Instruction and research identified with the Internet and internetworking.
- Management of activities and exercises at worldwide levels to encourage the improvement and accessibility of the Internet.
- Gathering and scattering of data identified with the Internet and internetworking, including histories and chronicles.

- Helping technically developing nations, areas, and people in representing and developing their Internet framework and proper utilizations.
- Contact with different associations, governments, and the overall population for coordination, joint effort, and instruction in affecting the above purposes.

By above functions of ISOC helps to create a Healthy Information Society (see Figure 7).

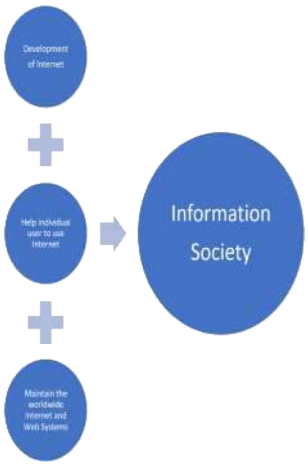

Fig 7: showing the function of ISOC helps to established Information Society

4.3 Role of ISOC

Development of the Internet for individuals. Shared knowledge and collective relationships are key drivers of successful Internet growth. The Internet Society goes to support development and access to innovation by carrying out data, preparing, and organizations to individuals and groups over the globe. It increases our efforts by focusing on building plans by concentrated on economical, specialized, and administration foundations. For the ordinary clients, the Internet is just there. They pay the obliged charges to the supplier and confirm that it works. The Internet is a critical piece of the foundation for the worldwide information society. The Internet is a financial and political variable whose further improvement and control will impact the life of everybody absolutely. The main role of the Internet Society as follows:

Technology and organizational: The standards for correspondence on the Internet are characterized in the Internet Engineering Task Force (IETF). More than 80 working gatherings in 8 fields of work are worried about particular specialized subjects. IETF does its work amid three major meetings of more than 1500 members for every year and by these methods for all the correspondence implies gave by the Internet.

In the interest of ISOC and the Federal Network Council (FNC) of the USA, the focal assets of the Internet, e.g. names, locations, and convention parameters have been managed by the Internet Assigned Numbers Authority (IANA) under the bearing of Ian Postel, who unfortunately passed on the previous summer. As of now, ISOC is seriously required in rebuilding the administration of these assets inside the new association ICANN (Internet Corporation for Assigned Names and Numbers).

Communication: ISOC completes its central goal to spread and boost the possibility of the Internet on different meetings which are the INET-Conference that is held alternatingly on various. Directing endeavours are advanced by particular workshops on these gatherings. The workshop for creating and edge nations, for instance, contributed conclusively to the way that there is not really any nation on the planet not having entry to the Internet. Also, key subjects of INET are issues of political control and social effects of innovation aside specialized advancements, new applications, and territories of utilization.

The Internet Society distinctly gives its individuals' view on the cryptography exchange, on the issue of conceded substance and on the free and secure stream of data on the Internet.

Human Infrastructure: Prepared, educated and connected with individuals who make, manage, and keep up systems at a neighborhood and territorial level. Individuals who associate with each other and frame "trusted human systems" that construct content and enhance the world. This is the thing that permits the Internet to develop and turn into a stage for monetary and group advancement.

Governance Infrastructure: The structures and rules are decided that advance Internet utilizes, advancement and extension are basic to permit the Internet to satisfy Its' potential as a channel for human expression and improvement. This can be as basic as consulted and sorted out individuals who deal with an IXP (Internet Exchange Point), to sincere partner responsibility to working out the Internet and examining.

4.4 Internet Society and Digital Divide: Potentiality

We are leaving in the 21st century where the digital divide is an economic and social inequality with regard to access to, use of or impact of information and communication technology. Digital Divide is basic issues for developing nations. There will be more than 3 billion non-Internet clients around the globe on the web. The regular perspective of this advanced partition is that it isolates the Internet "haves" from "have-nots" separating the peoples, who are online from the those who might want to get on the web. However, they are not able to get into it since accessibility or moderateness of access. Following are the Roles of Internet Society to remove Digital Divide:

- ISOC provides digital development of the Internet and proper maintains of the Internet.
- ISOC building Healthy Internet Systems.

- Provides Mobile Internet Access.
- Helps people to use the Internet easily.

5. FINDINGS

- ISOC Encourage worldwide, local, and nearby strategy conditions that empower the proceeding with development of an open Internet.
- ISOC helps in Increment of the worldwide importance and acknowledgment of joint, bottom-up, technical,
- ISOC provides agreement based on open guidelines advancement with a specific end goal to ensure permission less advancement for the accessibility of the open Internet for present and future clients and increment advancement and utilization of security and flexibility and best practices, shape the development of online character foundations, and enhance decision and assent in the treatment of client information.
- ISOC is providing approach to improvement of chances to all individuals by advancing the pertinence, organization, and selection of the open Internet.

6. SUGGESTION

- Government and ISOC members should take a proper step for held awareness camp.
- Proper planning, outline needs to take by the concerned ISOC members for the development of the Internet.
- Provides electronic services, an electronic product for accessibility to the Internet. And also provide high speed Internet which is also helps to remove Digital Divide in society.

7. CONCLUSION

Internet Society is very much important for the open development, evolution, and use of the Internet for the benefit of all people throughout the world. ISOC gives dependable data about the Internet. it also provides a discussion of issues that influence Internet advancement, improvement and use in specialized, business, societal, and different fields. Moreover ISOC gives administration and coordination to on-technique activities and outreach efforts in helpful, instructive, societal, and different settings.

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Comparative Analysis of Noise Removal Algorithms

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Abstract

This project shows Analysis of various Image Filtering Algorithms implemented over C language on bitmap image format. The Ultimate plan is to research the behavior of noisy image on application of various filtering algorithms to find the best output. Images will be processed or modified on an existing image in an exceedingly desired manner as they represent convertible data. The system shows the difference between the original image and the changed Image once the appliance of algorithms. We notice instances of image process occurring all the time in our daily lives by using Image Processors. The objective of the image processing is to boost visually or statistically enhance an aspect of image that is bettering it's quality that do not seem to be proper under the original image. The basic principle of the image processing operations over image data that builds a bigger perception, vision and clarity of the image but will not add any new info to the image. This objective is carried throughout the development and implementation of image processing system [1]. Image processing is nothing, but however manipulating an image knowledge to realize an clear and better the quality for higher pictures. However, image processing is nothing however a method of translation between of human visual senses and digital imaging gadgets[2]. The human visual senses does not perceive the globe within the same manner as digital image detectors, with present show technology devices imposing extra noise and information measure restrictions. Important variations between the human and digital sensors are some basic image knowledge manipulating steps for achieving higher transformation for clear pictures. Image processing System therefore ought to be achieved in a manner that with keeping with this scientific methodologies intact so others would possibly reproduce, and validate results. This includes recording and reporting and methodology actions, and applying similar methods to enhance photos.

KEYWORDS

Average filter, Median filter, Mean filter, Adaptive filter PSNR value, MSE value, SNR value.

1. INTRODUCTION

An Image may be a 2-dimensional structuring of varied finite set of digital values referred to as image components or pixels. Noises occur due to the rationale of the imperfect instruments, problem that square measure connected with the information assortment method, and considering natural and internal system problems that degrade the information.

Image Processing deals with manipulation of digital pictures keep in kind of constituent values through a computing machine. It is a uses concepts of signals however primarily specialize in pictures. DIP focuses on developing a computer system that's ready to perform do manipulations on image information [2].

The images taken for this research study is 24 bit BMP images. The BMP file structure is capable of storing two-dimensional digital images of random height, width and resolution, both monochrome and colored images too, in varying color depths, and optionally having a data compression that tells which data compression algorithm is used on image to decrease size and color profiles [3]. We have considered only BMP image format because this format easily stores 2-dimensional digital pictures of random height, width and resolution, color type with numerous color depths, and optionally with information about compression. These BMP pictures are of the many varieties {the images | the pictures | the photographs} taken for this analysis study is twenty four bit images. Bitmap images consists of two important parts the header and info-header [3].

The header file contains information about the image file. It also contains an identifier which determines the file type. The info-header file contains information about the image, it contains data like image height, image width, image size etc. Also the Bitmap images are used to store digital images data capable of working with any display device [1]. Noises we have considered for this study are only Additive Short Tail Noise also known as Gaussian Noise and Impulsive Noise known as Salt and Pepper Noise.

Noises are those unwanted effects that are created within the image. During image capture, many factors are liable for producing noise within the image. Depending on the sort of disturbances created, the noise will have an impact on the image to completely different results. Typically our focus is to get rid of certain type of noise. Therefore we are getting most kind of noises and implement completely different algorithms to get free of most of them [4]. Noises in the image are often divided as Impulsive noise (Salt-and-

pepper noise), Amplifier noise (Gaussian noise), Shot noises, and Periodic noise. Well they are still more noises however we have interest on removing with Impulsive and mathematician Noises.

A. Impulsive Noise (Salt and Pepper Noise)
The term impulsive noise is additionally used for this sort of noise. Different terms are also used to decision this like spike noise, independent noise or random noise. Black and white dots seem within the image due to this noise and thus it was named as salt and pepper noise. This noise arises within the image due to sudden and unprecedented changes in image signal. Dust particles within the image capture supply device or hot faulty parts will cause this sort of noise. Image gets corrupted to such a little extent because of this noise [5]. This can be achieved by adding white and black dots arbitrarily across the photographs. They can be removed.

B. Gaussian Noise (Amplifier Noise)
The term Abnormal noise model is that the word of Gaussian noise. This noise is more of associated degree additive in nature and follow Gaussian technique of distribution, which means that every element within the noisy image is a combination of the true component pixel value and a random pixel value generated by the Gaussian distributed noise value. The noise in here doesn't consider the intensity of pixel value at each and every point [6]. The implementation of Gaussian noise to an image is given by:

$$f_g(x) = \frac{1}{\sqrt{2\pi\sigma^2}} e^{\frac{-(x-a)^2}{2\sigma^2}}$$

Where: $f_g(x)$ is that the Gaussian distribution noise in image; a and σ is the mean and standard deviation respectively. Also for removing these noises the alternative of filter is calculated from the character of the task performed by the filter and behavior and sort of information. Thus filters square measure used to take away noise kind digital image by completely different ways:-
Filtering without Detection: We will take a window mask across the image for some value of *N i.e.,* is an integer and we will be moving from right to left and bottom to top of image and apply some arithmetic operation without leaving any pixel value.

Detection with Filtering: In this method we will first consider the noisy pixel and then filter them by moving across the image with a mask and perform specific arithmetic operation to detect the noisy pixels and then modifying and then keeping non-noisy pixels intact.

Linear and Non-Linear Filter: Basically consists of the models of median, mean, adaptive filters. Which are discussed in Proposed Method section [7].

We will concentrate in Filtering without using Detection, Linear and Non-Linear Filters in this paper.

2. LITERATURE REVIEW

Previous works on this field included analysis of quality of images and removing noise from images. Those works concentrated on a vast field of noise removal algorithms for different types of images and different types of noises. Also previous works were primarily were focused on identifying different noises and developing corresponding algorithms for the same. But Analysis on application of same algorithm on different noisy images was not considered and also from all the noise removal algorithms which one works the best is not taken into point.

Although the primary focus was to build an universal noise removal algorithm along with keeping in mind the time and space complexity for the images thus helping one get better results for a wide range of noisy test samples without much memory wastage and time, CPU consumption [8].

Through this we are able to provide a proper systematic procedure to secure which algorithm could work the best for any test sample thus can be used in the fields of medical and education sectors. Considering the problem of the image distortion of the images caused during the image transmission or conversion and thus main focus in on the denoising of the images [4].

As we all know Graphics and Image processing is a developing technology. So noise removal algorithms are needed to improve image quality and helps in returning noises to original style. Also provided some material for the use of some image processing processes used in most of the image processing systems. So this paper, along with other noisy images it helps us in modeling the various types of noises that can damage the image. Providing the pros and cons or using some filtering methods [7].

3. PROPOSED METHOD

Our primary focus is on the Comparison study of various Noise Removal Algorithms applied on an image and also to understand the effects of applying a wrong algorithm to a wrong noisy image. Along with that your major emphasis is on providing an friendly user interface for the user that acts faster just to make him understand which filter would work effectively on a particular noisy image and gives best results through a Statistics panel. Along with that we have worked on some filtering techniques like the mean, adaptive, Double-Window, Minimum Mean Square Error and median filters to remove noises from the images [9].

3.1 Arithmetic Filter

This algorithm works best for removing Gaussian type noise, but at the cost of the sharpness of the image, *i.e*, this algorithm removes noise but after the operation the image becomes blur. The method of operation of this algorithm works the same way as taking the arithmetic mean of N numbers. This filter takes the arithmetic average of all the pixel within a local enclosed region (Mask), in an image [6]. The size of the mask is an important factor which decides the quality of filtration. The larger the size of the filtering mask, more chances for the blurring it becomes, and less distortion for high spatial value frequency details will remain in the filtered image.

3.2 Adaptive Double Window Modified Trimmed Mean Filter

This filtering algorithm is used for impulsive noise removal and does better job than the MMSE filter. This key point in this algorithm is that it uses median estimator to estimate the local mean. A new local mean is then computed with the few pixels which fall under a small gray scale level around the median. This effectively removes outliers in the calculation of the mean estimate, hence improving the estimate of the effectiveness of the algorithm. It is described by creating median filter that is computed from the local region with double windowing concept and then a noise standard is derived for the same for keeping or the discarding of the pixel value for the mean [8].

3.3 Adaptive Minimum Mean Square Error Filter

The MMSE filter makes use of the formulas for the local variance to determine is the mean filter is that is to be applied to the local enclosed region of an image. The filter works best for the abnormal noise types. The output of the MMSE filter for a pixel located at (*x*, *y*) within an image is high and it basically uses adaptive technique for removing impulsive noises and for variance median too comes into the picture for varying filtering method [8] is

$$r(x, y) = (1 - \frac{\sigma_n^2}{\sigma_l^2}) \cdot g(x, y) + \frac{\sigma_n^2}{\sigma_l^2} \cdot K ,$$

Where σ_n^2 is the variance of the noise and σ_l^2 is the local variance and the parameter K is the output from the local mean filter which is given to the system.

3.4 Contra-Harmonic mean filter:

The contra-harmonic mean filter is a a part of nonlinear mean filter that helps in higher removal of Abnormal(Gaussian) style of noise and conserving edges than the mean value filter. The contra-harmonic mean filter is very sensible in removing positive values from negative values of *P* and negative values from the positive values of *P*. If all the pixels included in the calculation of the contra-harmonic mean filter square measure zero, then the output of the filter will additionally be zero [10],

$$Contra-HarmonicMean(A) = \frac{\sum_{(i,j)\in M} A(x+i, y+j)^{P+1}}{\sum_{(i,j)\in M} A(x+i, y+j)^{P}}$$

a. Alpha-Trimmed mean filter

This function can filter the image by mistreatment alpha-trimmed mean nonlinear methodology. This function works for solely monochromatic pictures as a result of color distortion happens to the ultimate output once colored image is passed. The alpha-trimmed mean filter is based on changes between a varying median and a averaged mean filter. The alpha-trimmed mean filter is based on variations between a median and a mean filter. It is used when an image contains every scientist and salt and pepper noise. To define the alpha-trimmed mean filter, all pixels covering the pixel at (*x*, *y*) in the image data A that unit given by an enclosed input value of N×N size enclosed mask of *A*(*i*) unit rearranged from minimum to most values supported that we'd like to produce these values before applying formula [11].

4. EXPERIMENTAL RESULTS

For the experimental results we have considered taking an image considering as noiseless and then applying noises to the image and then application of your noise removal algorithms on that noisy images resulted in some distorted and some better quality images because not all algorithms work perfectly for all kinds of images and so as we are focusing on providing Comparative Quantitative Analysis of different algorithms we need some parameters too and they are MSE (Minimum Square Error), PSNR (Peak Signal to Noise Ratio) and SNR(Signal to Noise Ratio) values has they are listed below. Lower the MSE much clear the image, Higher the PSNR and SNR much better the image.

5. CONCLUSION

In this paper we used "Image Processing System". It provides a method that would help in removing noises on Salt and Pepper Noise and Gaussian Noise Type and also along with that your system includes noises on to the images using algorithm and removes them with the max efficiency under certain sacrifices. Also providing a graphical platform that gives the user some statistical results about the efficiency of each algorithm under some parameters like the image quality and noise in it. Of Course, there are exceptions to this, Your System accepts 24 bit Bitmap image files and could only perform 5 Noise Removal Algorithm, as every great software needs a huge area for development in this sector. Also Analysis sector needs every algorithm to be deployed then only it could tell about which algorithm could work the best. Also this processing can be implemented on a computer, as the images needs to clean to understand better about the noise addition and removal techniques and Displaying each modification on them. Filtering the noises out of the images is important step for image processing software so noises always arises in unexpected ways. As Images are all

about integer values and applying arithmetic operations that could change the integer values results in a new image.

6. FUTURE APPLICATIONS AND DEVELOPMENT

This study of Noisy Image and Algorithm Comparison can be helpful in developing an automated image noise removal software system for the detection of which algorithm works the best and be applied to an image just after the picture is taken in any device that deals with images for better quality images. It could also serve as a starting point for developing Artificial Intelligence system for the machine to recognize surrounding objects with better contrast and detail to get an idea of what is around. Dependency on other third party noise removal applications can be removed if this system can be integrated into the camera software by default so that end output image will be much better with lesser or no noise. Development could be expected because there are many more noises that are present in the images and corresponding removal of noise can be done. Also better algorithms can be developed or included for the system to work much better. As there are number of image de-noising techniques used but still there is lot to happen. Further studies can be done in this field to provide more effective methodologies. Techniques that are already using may not be able to find the optimum result thus further studies may find the techniques that provide optimum solution to the noise.

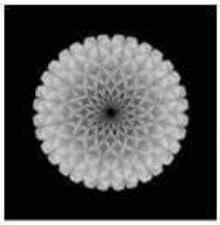
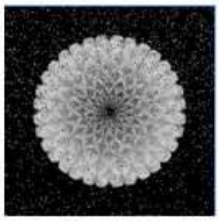
Original Image	Noisy Image		Alpha Trimmed Mean	Contra Harmonic	MMSE	Arithmetic Mean	MTM
	Salt and Pepper noise 	MSE	**75**	13824	3458	195	149
		PSNR	**29.380**	6.724	12.748	25.230	26.399
		SNR	**12.287**	0.396	4.293	9.432	11.712
	Gaussian noise	MSE	389	433	363	**351**	504
		PSNR	22.231	21.766	22.532	**22.678**	21.106
		SNR	5.594	5.395	5.633	**5.636**	5.380

Fig 1: Analysis of Test Image 1

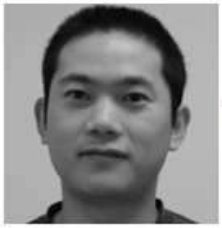
Original Image	Noisy Image		Alpha Trimmed Mean	Contra Harmonic	MMSE	Arithmetic Mean	MTM
	Salt and Pepper noise	MSE	**19**	64	4221	119	45
		PSNR	**35.343**	30.069	11.877	27.375	31.599
		SNR	**17.232**	14.195	5.522	12.992	16.505
	Gaussian noise	MSE	340	348	355	**336**	416
		PSNR	22.816	22.715	22.629	**22.867**	21.940
		SNR	8.620	8.590	8.523	**8.640**	8.427

Fig 2: Analysis of Test Image 2

Original Image	Noisy Image		Alpha Trimmed Mean	Contra Harmonic	MMSE	Arithmetic Mean	MTM
	Salt and Pepper noise	MSE	**241**	331	3086	262	292
		PSNR	**24.311**	22.933	13.237	23.948	23.477
		SNR	**8.329**	7.071	3.003	7.741	8.178
	Gaussian noise	MSE	566	582	**383**	456	674
		PSNR	20.603	20.482	**22.299**	21.541	19.844
		SNR	5.029	4.978	**5.416**	5.310	4.757

Fig 3: Analysis of Test Image 3

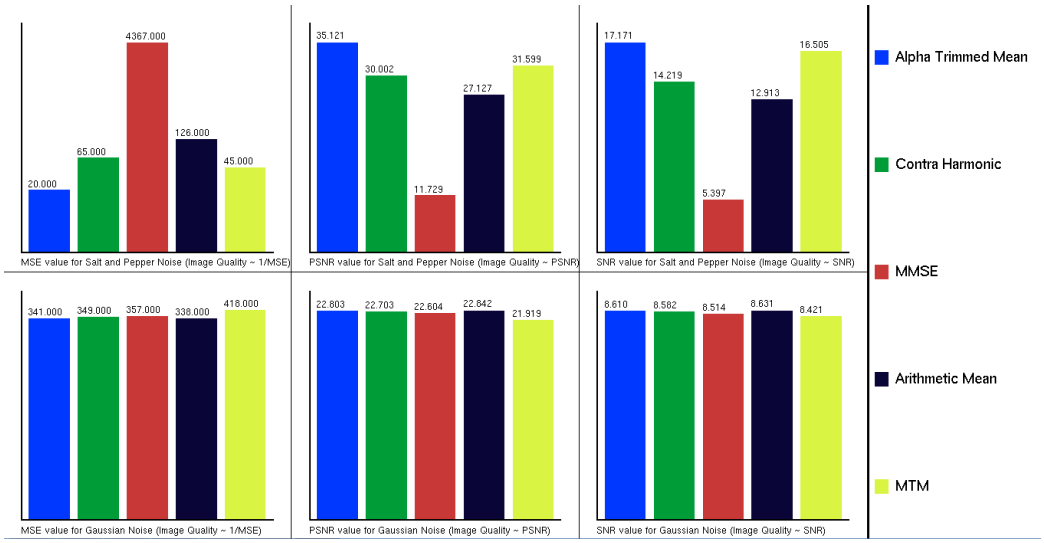


Fig 4: Statistics Graph for Test Image 2

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An effective model of effort estimation for Cleanroom software development approach

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Abstract
The integration of mathematical modelling, proof of correctness and statistical software quality assurance lead to extremely high-quality software. The integration was named as cleanroom software engineering. It proofs the correctness of the deliverables of each phase, instead of the classic analysis, design, code, test, and debug cycle, the cleanroom approach suggests a different point of view. Due to the evolution in development methodology there is a strong need of evolution in estimation models also. In this work we have proposed the new cost estimation model. The evolved model is proposed for the new development methodologies and includes some more factors for estimation used in these new approaches.

KEYWORDS
Cleanroom Software Engineering, COCOMO, Effort Estimation, Cost Drivers, SDLC.

1. INTRODUCTION
Effort estimation is one of the critical tasks in software project management. The estimation for a software projects is hard because of the uniqueness of each and every project. The unavailability of the past data cause for the inaccurate results in effort estimation. Getting 100% accurate estimation is the myth for these kinds of project. As you can see in the graph shown in Figure 1, it has found that there are 400% chances for wrong estimation at the very first stage of the project development. As we move to the next phases, the estimation will match with the actual efforts given to the project. As new approaches have been evolved in this decade for software development process, the estimated methods should also evolve. The traditional COCOMO need some extended feature for accurate calculation of efforts in these new approaches. To estimate the accurate efforts for a project B. Bohem proposed the COCOMO (Cost Constructive Model). He proposed some single variable and multi-variable equation to calculate the efforts for a project. The multi-variable model includes 15 cost drivers involved in traditional development approach. The clean room approach for the project development involves some more cost driver factors.

2. CLEANROOM SOFTWARE ENGINEERING
The cleanroom approach took the software engineering on another level. It mainly emphasizes on specification and design and rigorously test the design before move to the development phase. It uses various box structure specification for proof of correctness. The different phase of cleanroom process for each iteration is shown in figure 1. Once functionality has been assigned to the software element of the system, the continuous pipeline of cleanroom iteration or increment is started [1-5].

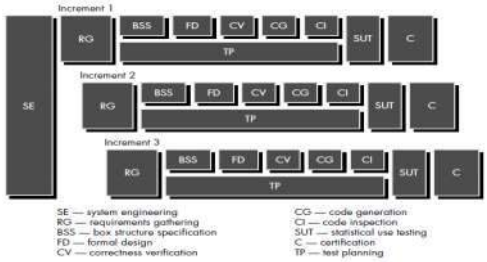

Fig 1: Cleanroom Development Model (Ref: Software Engg.: A practitioner Approach, Roger Pressman)

The following tasks occur:
Increment planning: In this phase the project plan for each increment is developed. The functionality, size and development schedule is created. Special attention is needed to take care that the increments are integrated in timely manner.
Requirements gathering: more detailed description is generated in this phase for each increment
Box structure specification: A box structure is used to specify the increment. It show the main functionality of each increment in connected boxes.

3. COST CONSTRUCTIVE MODEL (COCOMO)
The Cost Constructive Model is the most popular model used for effort and duration estimation. It was proposed in year 1981 by B. Bohem [6]. It was proposed in three different versions.

- Basic COCOMO
- Intermediate COCOMO
- Detailed COCOMO

3.1 COCOMO Basic
This is a single variable effort estimation method. It takes only the numbers of KLOC and results into the efforts in P-M (person month). The formula is given below the table. It also considers the range of the

project size in its calculation. As shown in the following tables (Table 1 and 2). The multiplier is changed for the different category of the project.

Table 1: Classes of Projects

Project Class	Project Size KLOC	Deadline	Development Environment
Organic (O)	2-50	Not tight	Simple/Familiar/In-house
Semi-Detached (S)	50-300	Medium	Medium
Embedded (E)	>300 KLOC	Tight	Complex

Table 2: Coefficients a_b, b_b, c_b and d_b values

Project	a_b	b_b	c_b	d_b
O	2.4	1.05	2.5	0.38
S	3.0	1.12	2.5	0.35
E	3.6	1.20	2.5	0.32

Where E is effort applied in Person-Months, and D is the development time in months. The coefficients a_b, b_b, c_b and d_b are given in table 2.The basic COCOMO does not include the other factors involved in developments process. It considers only the size of the project. Bohem evolve the new version of COCOMO in which he considered some more factors involved in effort estimation. This version is explained in the next section.

$$E = a_b (KLOC)^{b_b}$$

$$D = c_b (E)^{d_b}$$

3.2 Intermediate COCOMO

Intermediate COCOMO model uses the multivariable approach. It considers and effort adjustment factor (EAF) in calculation of actual effort. The EAF is the multiplication of the values of 15 cost drivers. The formula for calculation is given below.

Table 3: Coefficients a_i, b_i, c_i and d_i values

Project	a_i	b_i	c_i	d_i
O	3.2	1.05	2.5	0.38
S	3.0	1.12	2.5	0.35
E	2.8	1.20	2.5	0.32

There will be six levels for each cost drivers, which ranges from "very low" to "ultra-high". The value for each level has been defined in the table (Table 5). EAF (Effort Adj. Factor) is the multiplication of all efforts ranges from 0.9 to 1.4. The same E is used for calculation of time D**.**

Table 4: 15 Cost Drivers

S. No.	Attribute	Cost Driver
1	Product Related	RELY
		DATA
		CPLX
2	Hardware Related	TURN
		VIRT
		STOR
		TIME
3	Personal Related	ACAP
		LEXP
		VEXP
		PCAP
		AEXP
4	Project Related	MODP
		SCED
		TOOL

3.3 Detailed COCOMO

Detailed COCOMO focuses on phase wise effort calculation for different phases in SDLC. This model introduced two new constants. The values of these two constants given in table 5 and 6. The formula is:

$$E_p = \mu_p E$$

$$D_p = \tau_p D$$

$$E = a_i (KLOC)^{b_i} * EAF$$

$$D = c_i (E)^{d_i}$$

4. E-COCOMO (EXTENDED COST CONSTRUCTIVE MODEL)

As we have adapted new approaches in software development, there is a strong need of adding some more cost drivers in the list of 15 cost drivers. We have worked on two new approaches.

- Cleanroom Software Engineering
- Formal methods for specification

We have identified that there is a need of inclusion of the one cost driver *i.e*., **Formal Method Knowledge Capability (FMKC).** This cost driver should involve in intermediate COCOMO. The detailed COCOMO should also evolve with some updated phases. IPRG (Increment planning and Requirement gathering), BSSFD (Box structure specification and Formal Design), CVCG (Correctness verification and code generation), STPUT (Statistical Test planning and Use Testing). The tables (Table 5 and Table 6) is given below for the values of effort and time constants for these updated phases [7, 8].

Table 5: Table for E-COOCMO μ_p used for cleanroom engineering phases

Mode & code size	IRPG	BSSFD	CVCG	STPUT
Small Org	0.150	0.650	0.170	0.030
Medium org	0.150	0.640	0.170	0.040
Medium S	0.160	0.640	0.160	0.040
Large S	0160	0.630	0.150	0.060
Large E	0.180	0.620	0.140	0.060
Large extra	0.180	0.610	0.140	0.070

Table 6: Table for E-COOCMO τ_p used for cleanroom engineering phases

Mode & code size	IRPG	BSSFD	CVCG	STPUT
Small Org	0.140	0.660	0.170	0.030
Medium org	0.140	0.650	0.170	0.040
Mediun S	0.150	0.650	0.160	0.040
Large S	0.150	0.640	0.150	0.060
Large E	0.170	0.630	0.140	0.060
Large extra	0.170	0.620	0.140	0.070

5. ALGORITHMS TO IMPLEMENT E-COCOMO

5.1 Algorithm to Implement Basic COCOMO

Basic COCOMO follows one variable function as defined in equation 1. To implement these functions we have written two algorithms. Algorithm 5.1.1 to calculate the efforts in basic COCOMO.

5.1.1 Calculate_efforts (int, float[ ][ ])

This algorithm takes the input of KLOC and the basic COCOMO constant values array and returns the calculated efforts in P-M (person-month).

```
Calculate_efforts( int kloc, float basic[][])

            {
          double e = 0.0
          if (kloc > 2 && kloc < 50)
          {
             e = Math.Round(basic[0, 0] *
Math.Pow(kloc, basic[0, 1]), 2);
          }
          if (kloc > 50 && kloc < 300)
          {
             e = Math.Round(basic[1, 0] *
Math.Pow(kloc, basic[1, 1]), 2);
          }
          if (kloc > 300)
          {
             e = Math.Round(basic[2, 0] *
Math.Pow(kloc, basic[2, 1]), 2);
          }
          return e;
       }
```

```
public double calculate_duration(int kloc, float eff)
 {
          double d =0.0;
          if (kloc > 2 && kloc < 50)
          {
             d = Math.Round(basic[0, 2] *
Math.Pow(eff, basic[0, 3]), 2);
          }
          if (kloc > 50 && kloc < 300)
          {
             d = Math.Round(basic[1, 2] *
Math.Pow(eff, basic[1, 3]), 2);
          }
          if (kloc > 300)
          {
             d = Math.Round(basic[2, 2] *
Math.Pow(eff, basic[2, 3]), 2);
          }
           return d;
}
```

5.1.2 Calculate_duration (int, float)

This algorithm takes the input of KLOC and efforts from algorithm 5.1.1. and return the calculated duration in month.

5.2 Algorithm to Implement Basic COCOMO

E-COCOMO follows multi variable function as defined in equation 2. To implement these functions we have written three algorithms.

5.2.1 Calculate_efforts (int, float[ ][ ])

This algorithm takes the input of KLOC and the array of basic COCOMO constant values and return the calculated efforts in P-M (person-month).

```
Calculate_efforts( int kloc, float basic[][])
             {
          double e = 0.0
          if (kloc > 2 && kloc < 50)
          {
             e = Math.Round(inter[0, 0] *
Math.Pow(kloc, inter[0, 1]), 2);
          }
          if (kloc > 50 && kloc < 300)
          {
             e = Math.Round(inter[1, 0] *
Math.Pow(kloc, inter[1, 1]), 2);
}
          if (kloc > 300)
          {
             e = Math.Round(inter[2, 0] *
Math.Pow(kloc, inter[2, 1]), 2);
          }
         return e;
       }
```

5.2.2 Calculate_duration (int, float)

This algorithm takes the input of KLOC and efforts from algorithm 5.2.1 and return the calculated duration in month.

```
public double calculate_duration(int kloc, float eff)
      {
         double d =0.0;
         if (kloc > 2 && kloc < 50)
         {
            d = Math.Round(inter[0, 2] *
Math.Pow(eff, inter[0, 3]), 2);
         }
         if (kloc > 50 && kloc < 300)
         {
            d = Math.Round(inter[1, 2] *
Math.Pow(eff, inter[1, 3]), 2);
         }
         if (kloc > 300)
         {
            d = Math.Round(inter[2, 2] *
Math.Pow(eff, inter[2, 3]), 2);
         }
          return d;
            }
 public double Calculate_EAF()
          {
         double eaf=0.0;
         double c1,c2,c3,c4,c5,c6,c7,c8,c9,c10,c11,
                  c12,c13,c14,c15,c16;
         if (DATA.Equals("Very Low"))
         {
            c1 = .75;
         }
         if (DATA.SelectedItem.Equals("Low"))
         {
            c1 = .88;
         }
         if (DATA.SelectedItem.Equals("Nominal"))
         {
            c1 = 1.00;
         }
         if (DATA.SelectedItem.Equals("High"))
         {
            c1 = 1.15;
         }
         if (DATA.SelectedItem.Equals("Very High"))
         {
            c1 = 1.40;
         }
         if (DATA.SelectedItem.Equals("Ultra High"))
         {
            c1 = 1.00;
         }
    ///for Second Cost Driver
//////////////////////////////////////
         if (STOR.SelectedItem.Equals("Very Low"))
         {
            c2 = .75;
}
```

```
if (STOR.SelectedItem.Equals("Low"))
{
            c2 = .88;
         }
         if (STOR.SelectedItem.Equals("Nominal"))
         {
            c2 = 1.00;
         }
         if (STOR.SelectedItem.Equals("High"))
         {
            c2 = 1.15;
         }
         if (STOR.SelectedItem.Equals("Very High"))
         {
            c2 = 1.40;
         }
         if (STOR.SelectedItem.Equals("Ultra High"))
         {
            c2 = 1.00;
         }
         eaf = c1*c2*c3*c4*c5* c6*c7*c8*c9*c10
                  *c11*c12*c13*c14*c15*c16;
          return eaf;
}
```

5.2.3 Calculate_EAF ( )

This algorithm is used to calculate the EAF (Effort Adjustment Factor). It uses the values of 16 Cost drivers and returns the calculated value of EAF.

The values of the cost drivers are taken from a predefined array as defined in Table 4. The user only enters the level of the cost driver.

6. IMPLEMENTATION OF E-COCOMO

The implementation of E-COCOMO is done in .net framework using C# programming language. The tool is based on the algorithms defined in previous section. It has 7 Main panels from Figure 2 to Figure 7.

Fig 2: Login Panel

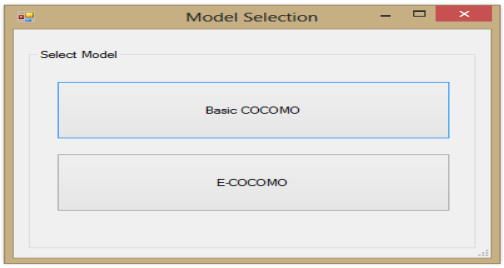

Fig 3: Model Selection Panel

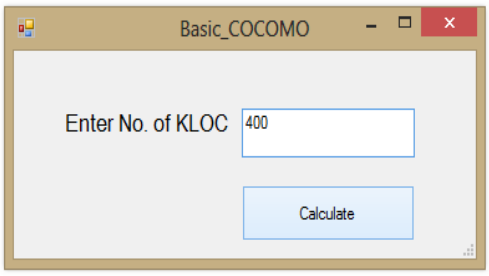

Fig 4: Basic COCOMO input Panel

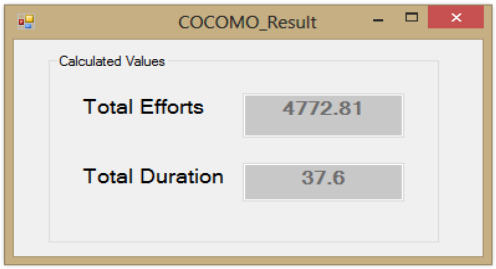

Fig 5: Basic COCOMO Result Panel

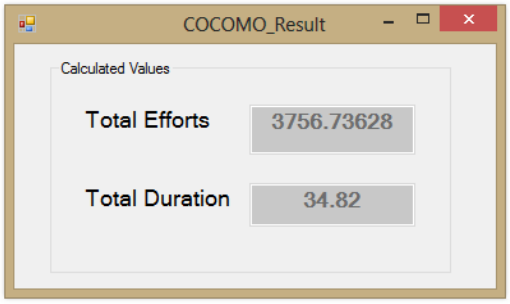

Fig 6: Basic COCOMO Result Panel

Fig 7: E-COCOMO Result Panel

The Login panel (Figure 2) is used to take the user login credentials. After entering the correct login credentials the user will be able to enter the tool and he/she will be switched to the model selection panel (Figure 3). This panel is used to choose any one model between Basic COCOMO and E-COCOMO. If the user chooses the Basic COCOCMO then he/she will switch to Basic COCOMO input panel (Figure 4) and the panel will asked for number of KLOC. After entering the KLOC and clicking on calculate button the user will get the result shown in Basic COCOMO result panel (Figure 5). In the same way if the user choose E-COCOMO from model selection panel (Figure 6) then he/she will be switched to E-COCOMO input panel (Figure 7). In this panel the user has to enter the value for KLOC and the level for different 16 cost drivers. In panel shown in figure 7, there are six possible levels for the different cost drivers has been given to the user. If the user chooses a level for a cost driver then it will pass the value as per the table 4. Otherwise it passes nominal level for rest of the cost drivers.

After entering the values of the various factors on E-COCOMO Input Panel and clicking on calculate button the user will get the required result on E-COCOMO result panel (Figure 7). The tool has been designed to solve the real-time problem of effort calculation of the software projects.

7. CONCLUSION

In this work we have implemented E-COCOMO using C# and developed a new tool (*i.e.*, OpenECOCOMO). This tool can be used to calculate the efforts and time for basic model and E-COCOCMO model both on a single click. In the future work the tool will be evolved with some new parameters for some new approaches like Agile Development, Component based design [9-10].

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Evolution of e-Governance in India and Comparative Study of its Various Policies

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Abstract
Information and Communication Technology(ICT) plays a vital role in economic growth and advancement of any developing country. ICT transmits information and knowledge to individual to widen their choices for economic and social empowerment. Most of the nations adopted ICT in their administration for providing immediate and effective services to its masses on time. Developing country like India fills the socio-economic demands by inculcating the rapid use of ICT in Governance(e-Governance). e-Governance emerged in the year (2000-2005) and its progressive growth brought in many initiatives like NeGP (2016-2011) and Digital India(2012-2017). These initiatives integrated nationwide departments, citizens to transform the country into a digitally empowered country. This paper highlights the role and potential of information and communication technologies (ICTs) in supporting the governance programs in India. This paper describes various initiatives, its related issues-challenges-future prospects in India by illustrating a comparative study with other developing countries.

KEYWORDS
Digital India, EGDI, OSI, CTL, HCI, 9 Pillar Concept

1. INTRODUCTION
Governance refers to that structures and processes that are designed to ensure accountability, transparency, responsiveness, rule of law, stability, equity and inclusiveness, empowerment, and broad-based participation. E-government is organizing public management in order to increase efficiency, transparency, accessibility and responsiveness to citizens through the intensive and strategic use of information and communication technologies in the inner management of the public sector (intra and inter-governmental relations) as well as in its daily relations with citizens and users of public services. E-governance is an ICT-enabled tool to achieve good governance [1], [3]. The following table highlights different initiatives have been taken by e-Governance [14, 15]:

Table 1: e-Governance Initiatives

Initiative	Services
G2C Model	This model of e-governance is to share info between government and citizens such as Payment of online bills such as electricity, water, telephone bills, Online registration of applications such as Copies of land records, Online filing of complaints, Availability of any kind of information
G2G Model	This is model of e-governance is to share info between the intra governments such as Sharing of info between police dept of various states, Government document exchange(preparation, approval, distribution and storage), Most of the finance and budget work done by e-governance
G2B Model	This model helps to share info between government and private sector such as Collection of taxes, Rejection and approval of patent of companies, Payment of all kind of bills and penalty, Sharing of all kind of info, rules and data
G2E Model	This model links the information between government and employees such as Employees can register all kind of working forms through online, all kind of data submission(employee record& attendance) from various govt. offices, all kind of rule-regulation and information for employees can be shared, Employee can file all kinds of complaints and dissatisfaction by this model

2. NATIONAL e-GOVERNANCE PLAN
Government formulated National E-Governance Plan (NeGP), with following vision: Make all Government services accessible to the common man in his locality, through common service delivery outlets and ensure efficiency, transparency & reliability of such services at affordable costs to realize the basic needs of common man.

For implementation of the NeGP, various Union Ministries/Departments and State Governments are involved [15]. It consists several components such as:

Common Support Infrastructure:NeGP implementation involves setting up of common IT infrastructure such as: State Wide Area Networks (SWANs), State Data Centers (SDCs), Common Services Centers (CSCs) and Electronic Service Delivery Gateways.

Governance:Suitable arrangements for monitoring and coordinating the implementation of NeGP under the direction of the competent authorities. The responsibilities include laying down standards and policy guidelines, providing technical support, undertaking capacity building, R&D, etc. DIT is required to adequately strengthen itself and various institutions like NIC, STQC, CDAC, NISG, etc., to play these roles effectively.DIT is the facilitator and catalyst for the implementation of NeGP by various Ministries and State Governments and also provides technical assistance. It serves as a secretariat to the Apex Committee

Centralized Initiative, Decentralized Implementation: e-Governance is being promoted through a centralized initiative to the extent necessary to ensure citizen-centric orientation, to realize the objective of inter-operability of various e-Governance applications and to ensure optimal utilization of ICT infrastructure and resources while allowing for a decentralized implementation model. It also aims at identifying successful projects and replicating them with required customization wherever needed.

***Integrative Elements*:** Adoption of unique identification codes for citizens, businesses and property is promoted to facilitate integration and avoid ambiguity.

***Ownership of Ministries*:** Under the NeGP, various MMPs are owned and spearheaded by the concerned line Ministries. In case there are any ongoing projects which fall in the MMP category, they would be suitably enhanced to align them with the objectives of NeGP. For major projects like *Bharat Nirman, Rural Employment Guarantee Schemes* etc., the line ministries concerned are advised to make use of e-Governance. States have been given the flexibility to identify a few additional state-specific projects, which are relevant for the economic development of the State.

2.1 Challenges in Implementation of NeGP

- Accelerating the implementation of MMPs
- Involving the State Governments proactively in delivery of G2C services
- Positioning of Professional resources in State & Central
- Operationalizing of National e-Governance Division

3. DIGITAL INDIA

Digital India is a program to transform India into a digitally empowered society and prepare India for a knowledge future [1] [16].

Methodology for Digital India Programme

- Ministries / Departments / States would fully leverage the Common and Support ICT Infrastructure established by Government of India. Deity would also evolve/ lay down standards and policy guidelines, provide technical and handholding support, undertake capacity building etc.
- The existing/ ongoing e-Governance initiatives would be suitably revamped to align them with the principles of Digital India. Scope enhancement, Process Reengineering, use of integrated & interoperable systems and deployment of emerging technologies like cloud & mobile would be undertaken to enhance the delivery of Government services to citizens.
- States would be given flexibility to identify for inclusion additional state-specific projects, which are relevant for their socio-economic needs.
- e-Governance would be promoted through a centralized initiative to the extent necessary, to ensure citizen centric service orientation, interoperability of various e-Governance applications and optimal utilization of ICT infrastructure/ resources, while adopting a decentralized implementation model.
- Successes would be identified and their replication promoted proactively with the required productization and customization wherever needed.
- Public Private Partnerships would be preferred wherever feasible to implement e-Governance projects with adequate management and strategic control.
- Adoption of Unique ID would be promoted to facilitate identification, authentication and delivery of benefits.
- Restructuring of NIC would be undertaken to strengthen the IT support to all government departments at Centre and State levels.
- The positions of Chief Information Officers (CIO) would be created in at least 10 key Ministries so that various e-Governance projects could be designed, developed and implemented faster. CIO positions will be at Additional Secretary/Joint Secretary level with over-riding powers on IT in the respective Ministry.

4. VISION OF DIGITAL INDIA

It highlights three area as Infrastructure as a utility to every citizen, Governance and services on demand and Digital empowerment of citizens [8][9].

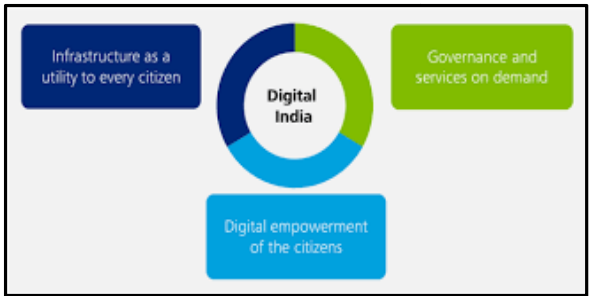

Fig 1: Vision of Digital India

4.1 Infrastructure as a utility to every citizen

The initiative is aimed at providing connectivity through fixed-line broadband, mobile connectivity or Wi-Fi hotspots. Every citizen would be provided with a unique identity with lifelong validity that can be tied up with mobile number and bank account to enable digital banking. Access to Common Service Centre (CSC) would be improved and shareable cloud space on public cloud servers would be provided [15] [17]:

- High speed internet as a core utility
- Cradle to grave digital identity -unique, lifelong, online, authenticable
- Mobile phone & Bank account enabling participation in digital & financial space
- Easy access to a Common Service Centre
- Shareable private space on a public cloud
- Safe and secure Cyber-space

4.2 Governance and services on demand

The initiative plans to create seamless integration across multiple government departments and jurisdictions, and make services available on online and mobile platforms. Financial transactions would be made cashless and electronic, and entitlements would be available on the cloud. The ease of doing business in India would be improved.

- Seamlessly integrated across departments or jurisdictions
- Services available in real time from online &mobile platform
- All citizen entitlements to be available on the cloud
- Services digitally transformed for improving Ease of Doing Business
- Making financial transactions electronic & cashless
- Leveraging GIS for decision support systems & development

4.3 Digital empowerment of citizens

The initiative would provide universal digital literacy to empower citizens to use digital platform/ devices. Universal access to digital resources would be provided, wherein all documents would be available in digital form on the cloud. Government services would be provided in local languages and a platform would be made available to citizens for participative governance.

- Universal Digital Literacy
- Universally accessible digital resources
- All documents/ certificates to be available on cloud
- Availability of digital resources / services in Indian languages
- Collaborative digital platforms for participative governance
- Portability of all entitlements through cloud

5. DIGITIZATION ELEMENTS:

***Ubiquity*:** It refers to the adoption of mobile and fixed broadband networks accounting for broadband accessibility and ownership of data devices such as PCs [6][7].

***Affordability*:** The existence of affordable network links, which are critical to launching new applications and services.

***Reliability*:** Faultless service would bind participants to the process of digitization.

***Speed*:** Signifies the status of country level international links and the capacity of the system to serve down the line.

***Usage*:** It is the measure of use of digitization infrastructure across economic, social and governmental environments.

***Skills*:** Richness of skills will quicken the establishment and stabilization of all other elements, including building up of capacities to take optimal advantage of the digital infrastructure.

6. COMPARISON EGDI OF INDIA WITH OTHER COUNTRIES

e-Governance capabilities of a nation are measured the world over by the UN e-government survey rankings. As of 2016, India's global rank was 107, out of 193, in these rankings. The top 10 nations in the UN global e-government survey are as below [2]:

Table 2: eGovernment Development Index (EGDI) global ranking

E–Government Development Index - Top 10 Countries		**E-Government India**
Country	Index	2012:
United Kingdom	0.9193	Rank 125 out of 193
Australia	0.9143	**EGDI: 0.3829**
Republic of Korea	0.8915	
Singapore	0.8828	2014:
Finland	0.8817	Rank 118 out of 193
Sweden	0.8704	**EGDI: 0.3834**
Netherlands	0.8659	
New Zealand	0.8653	2016:
Denmark	0.8510	Rank 107 out of 193
France	0.8456	**EGDI: 0.4638**

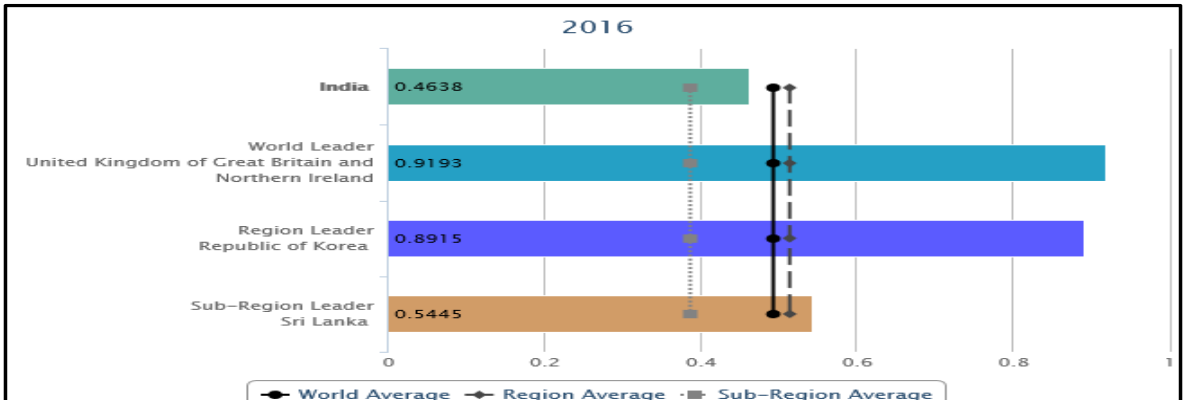

Fig 1: Comparison of EGDI of India with other Countries

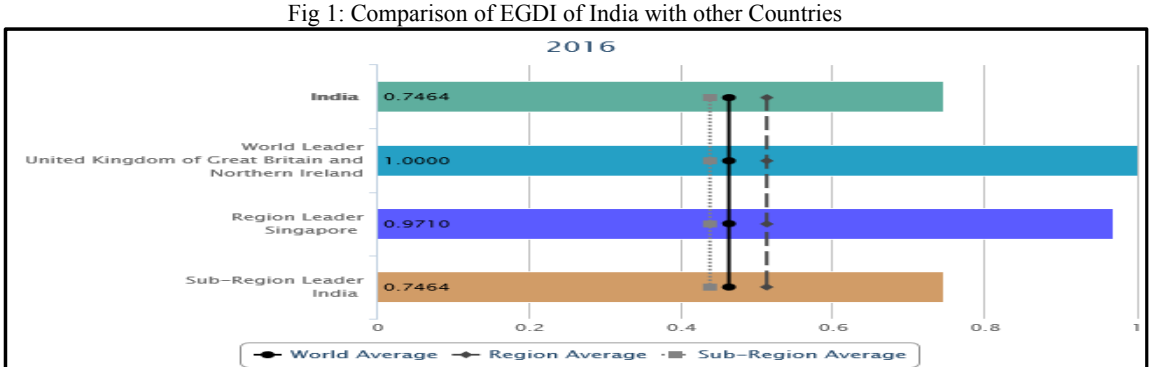

Fig 2: Comparison of Online Service Index(OSI) of India with other Countries

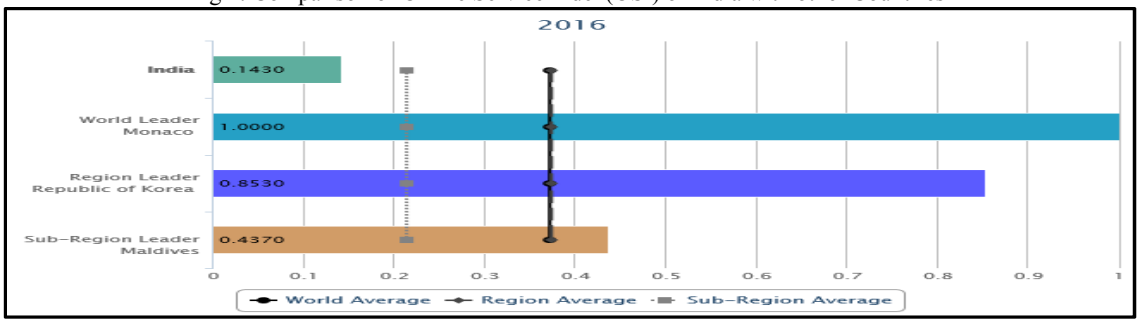

Fig 3: Comparison of Telecommunication Infrastructure Index(CTL) of India with other Countries

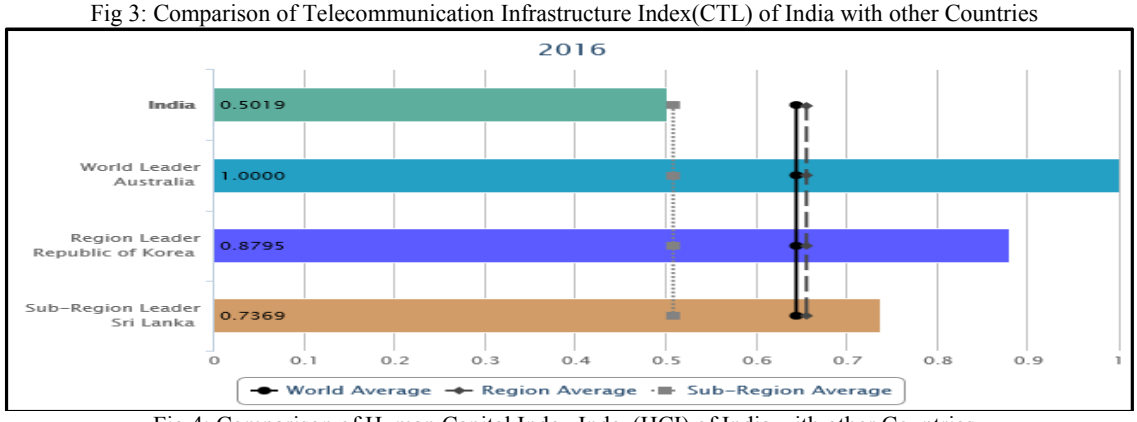

Fig 4: Comparison of Human Capital Index Index(HCI) of India with other Countries

7. NINE PILLARS OF DIGITAL INDIA

Table 3: 9 Pillar structure of Digital India [1][6][7]

Pillar	Operation	Summary
Broadband Highway	**Broadband for all Rural** Coverage: 250,000 GP Timeline: December 2016 CAPEX: Rs 32,000 Cr Nodal Dept: DoT **Broadband for all Urban** Virtual Network Operators for service delivery. Mandate communication infrastructure in new urban development and buildings. **National Information Infrastructure** Coverage: Nationwide Timeline: March 2017 Cost: Rs 15,686 Cr Nodal Dept: DeitY	To provide high-speed broadband coverage highways connecting about 250,000 villages, various government departments, universities, etc. To provide an integrated information infrastructure with integration of State Wide Area Network (SWAN), National Knowledge Network (NKN)and National Optical Fiber Network (NOFN)
Universal access to mobile	Timeline: FY 2014-18 Cost: Rs 16,000 Cr Nodal Dept: DoT	To provide mobile connectivity to about 42,300 villages
Public Internet Access Programme (PIAP): National Rural Internet Mission	**Common Services Centers (CSCs)** Coverage: 2,50,000 villages (130,000) Timeline: 3 Years - March 2017 Cost: Rs. 4750 Cr Nodal Agency: Deity **Post Offices as multi-service centers** Coverage: 1,50,000 Post Offices Timeline: 2 Years Nodal Agency: D/o Posts	To make 250,000 CSCs operational at Gram Panchayat level for delivery of government services To convert 150,000 post offices into multi-service centres
e-Governance: Reforming Government through Technology	Government **Business Process Re-engineering** using IT to improve transactions. Form Simplification and reduction Online applications and tracking, Interface between departments. Use of online repositories e.g. school certificates, voter ID cards, etc. Integration of services and platforms – UIDAI, Payment Gateway, Mobile Platform and EDI. **Electronic Databases** – all databases and information to be electronic **Workflow automation** inside government **Public Grievance Redressal** - using IT to automate, respond, analyse data to identify and resolve persistent problems – largely process improvements	To use business process re-engineering to transform government processes and make them simple, automated and efficient
E-kranti	**Technology for Education – e-Education** All Schools connected with broadband Free wifi in all schools (250,000) Digital Literacy program MOOCs – develop pilot Massive Online Open Courses **Technology for Health e-Healthcare** Online medical consultation Online medical records Online medicine supply Pan-India exchange for patient information Pilots – 2015; Full coverage in 3 years **Technology for Planning** GIS based decision making	To use technology for service delivery such as e-education, e-healthcare, technology for

	National GIS Mission Mode Project **Technology for Farmers** Real time price information Online ordering of inputs Online cash, loan, relief payment with mobile banking **Technology for Security** Mobile Emergency Services **Technology for Financial Inclusion** Mobile Banking Micro-ATM program CSCs/ Post Offices **Technology for Justice** e-Courts, e-Police, e-Jails, e-Prosecution **Technology for Security** National Cyber Security Co-ordination Center	planning, farmers, security, financial inclusion, justice, etc.
Information for all	**Online Hosting of Information & documents** Citizens have open, easy access to information Open data platform **Government engages through social media** and web based platforms to inform citizens MyGov.in **2-way communication** between citizens and government **Online messaging** to citizens on special occasions/programs	To provide open access to government information and documents online To provide two-way communication between citizens and the government through online platforms and social media
Electronics manufacturing	**Target NET ZERO Imports by 2020** **Ambitious goal** which requires coordinated action on many fronts Taxation, Incentives Economies of Scale, Eliminate cost problem **Focused areas – Big Ticket Items** FABS, Fab-less design, Set top boxes, VSATs, Mobiles, Consumer & Medical Electronics, Smart Energy meters, Smart cards, micro-ATMs Incubators, clusters Skill development &Government procurement	To target net zero imports by 2020, through various actions in areas such as taxation/incentives, economies of scale, skill development, government procurement, etc.
IT for jobs	**Train people in towns & villages for IT jobs** Coverage: 1 Crore students Timeline: 5 years Cost: Rs 200 Cr for weaker sections Nodal Agency: DeitY **IT/ITES in NE** Scope: Setting up of BPO per NE State Coverage: NE States Nodal Agency: DeitY **Train Service Delivery Agents to run businesses delivering IT services** Coverage: 3,00,000 Timeline: 2 Years Nodal Agency: DeitY **Telecom service providers to train rural workforce** Coverage: 5,00,000 Timeline: 5 Years Nodal Agency: DoT	To provide necessary skills and training that enable the youth to avail jobs in IT/ITES sector
	IT platform for messages Coverage: Elected representatives, All Govt employees 1.36 Cr mobiles and 22 Lakh emails Mass Messaging Application developed **Government Greetings to be e-Greetings**	

Early harvest programmes	Basket of e-Greetings templates available Crowd sourcing of e-Greetings thru MyGov e-Greetings Portal ready by 14 August 2014 **Biometric attendance** Coverage: All Central Govt. Offices in Delhi Operational in DeitY& Initiated in Urban Development On-boarding started in other depts **Wi-fi in All Universities** Scope: All universities on NKN 400 additional Universities Cost: Rs 790 Cr **Secure email within government** Phase I upgradation for 10 Lakh employees done Ph II for 50 Lakh employees by March 2015 Cost: Rs 98 Cr **Standardize government email design** Standardised templates under preparation **Public wifi hotspots** Coverage: Cities with pop > 1 Mill., tourist centres Nodal Agency: DoT/ MoUD **School Books to be eBooks** Nodal Agency: MHRD/ DeitY **SMS based weather information, disaster alerts** DeitY's Mobile Seva Platform ready Nodal Agency: MoES (IMD) / MHA (NDMA) **National Portal for Lost & Found children** Nodal Agency: DeitY/ DoWCD	To focus on execution of project within short timelines, such as IT platform for messages, e-greetings from the government, biometric attendance, Wi-Fi in all universities, etc.

8. e-TRANSACTION IN INDIA

India is seeing a dramatic growth in the number of online transactions involving citizens and the government. The number of such e transactions has grown by more than 200% in 2 years: from 840 million in 2014 to 1393 million in 2017. The number of transactions per service category is shown in the figure below.[3][4]

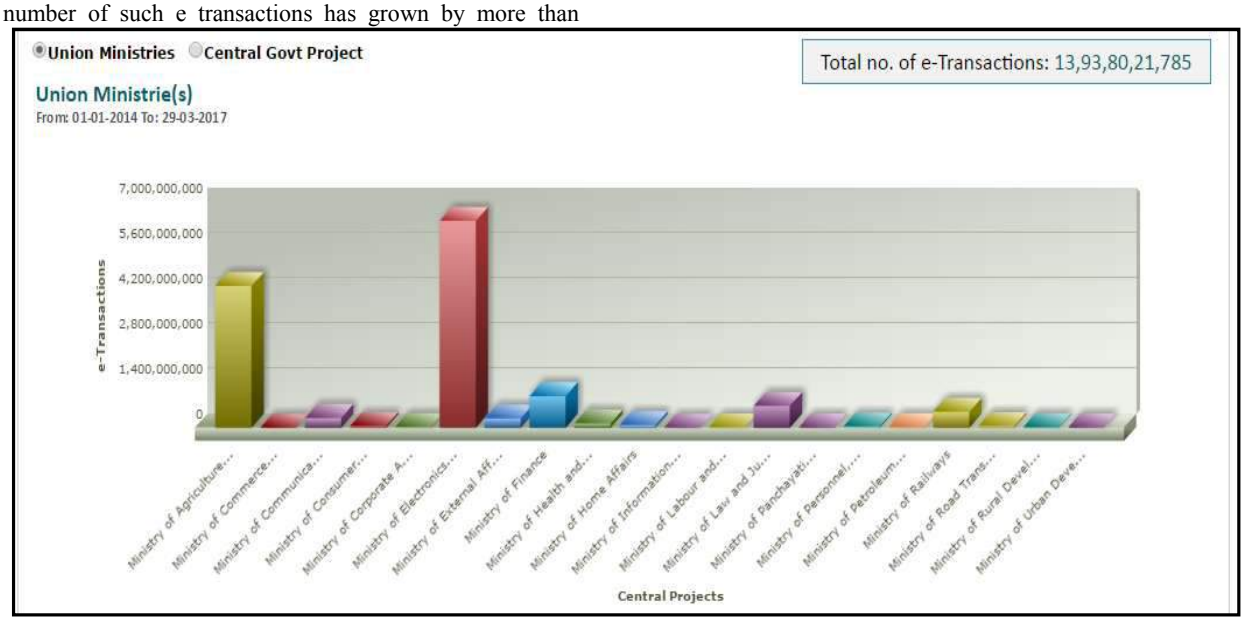

Fig 5: Comparative study of total number of e Transactions from 1.1.2014 to 29.3.2017

Fig 6: Comparative Analysis 2014 to 2015

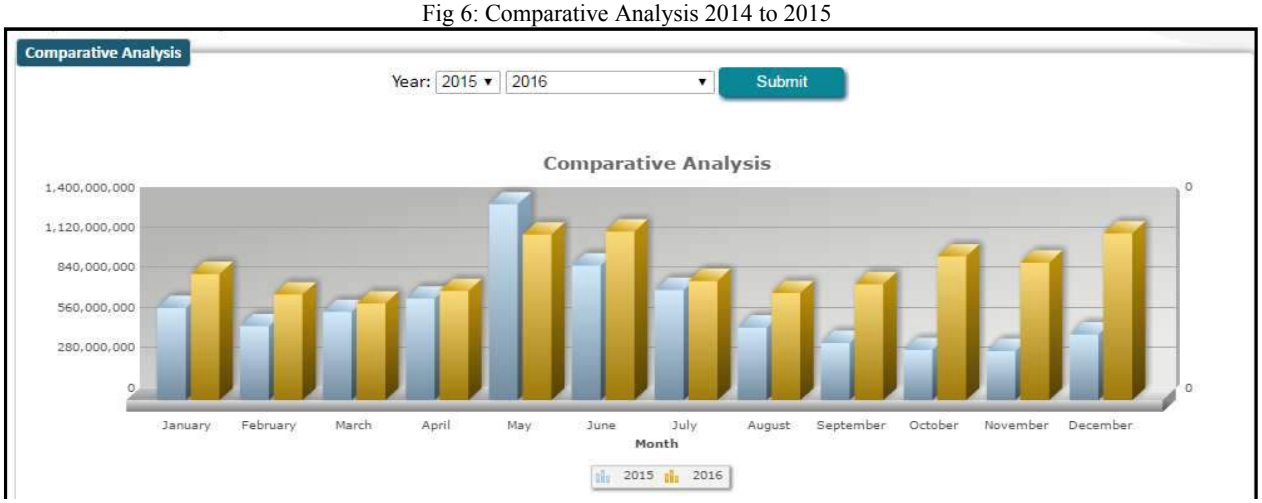

Fig 7: Comparative Analysis 2015 to 2016

Fig 8: Comparative Analysis 2016 to 2017

Fig 9: Comparative Analysis of Digital Payment as on 19th March 2017

9. INITIATIVES BY DIGITAL INDIA

Some of the initiatives are mentioned bellow [1][2][6]:

Table 4: Initiatives taken by e-Governance India

Initiatives	Functionality
ADHAAR	Aadhar identity platform is one of the key pillars of 'Digital India', wherein every resident of the country is provided with a unique identity or Aadhar number.
DIGILOCKER	Digitize India Platform (DIP) is an initiative of the Government of India under the Digital India Programme to provide digitization services for scanned document images or physical documents for any organization.
eSAMPARK	e-Sampark is a mechanism to connect the government directly with citizens across India by running mailer, outbound dialing and SMS campaigns. The platform is used for sharing informational and public service messages.
eSIGN	eSign is an online electronic signature service which can be integrated with service delivery applications via an open API to facilitate an Aadhaar holder to digitally sign a document.
GIS	Geographic Information System (GIS Software) is designed to store, retrieve, manage, display and analyze different types of geographic and spatial data.
E-PANCHAYAT	e-Panchayat is an e-Governance initiative for the rural sector providing comprehensive software solution attempting automation of Gram Panchayat functions.
eDISTRICT	The e-District Mission Mode Project (MMP) is envisaged to strengthen the district administration of the state by providing ICT support to the participating departments and district administration in terms of providing centralized software application for selected category of citizen services and training for staff of the departments.
KISAN SUVIDHA	KisanSuvidha is an omnibus mobile app developed to help farmers get relevant information instantly.
ACCESSIBLE INDIA CAMPAIGN MOBILE APP	Sugamya Bharat Abhiyaan or Accessible India Campaign is a nation-wide flagship campaign for achieving universal accessibility that enables people with disabilities to gain access for equal opportunity, live independently and participate fully in all aspects of life in an inclusive society.
DIRECT BENEFIT TRANSFER (DBT)	DBT was initiated with the aim to reform Government delivery system by re-engineering the existing process in welfare schemes for simpler and faster flow of information/funds and to ensure accurate targeting of the beneficiaries, de-duplication and reduction of fraud.
EPFO WEB PORTAL & MOBILE APP	The web portal for Employees' Provident Funds Ordinance allows employees to check their EPF balance through an ePassbook which is an online version of their physical passbook.

IRCTC CONNECT	In order to cater to the growing demand of passengers to make the ticketing application more user-friendly and faster, IRCTC Connect was developed.
MCA21	The Ministry of Corporate Affairs (MCA), Government of India, has initiated the MCA21 project, which enables easy and secure access to MCA services in an assisted manner for corporate entities, professionals, and general public.
NATIONAL CAREER SERVICE PORTAL	A national ICT based portal has been developed, primarily to connect opportunities with the aspirations of the youth.
NATIONAL SCHOLARSHIP PORTAL	NSP is a one-stop solution for end-to-end scholarship process right from the submission of student application, verification, sanction and disbursal to end beneficiary for all the scholarships provided by the Government of India.
NATIONAL VOTERS SERVICE PORTAL	The portal was developed with an aim to provide single window service electors.
PASSPORT SEVA PROJECT (PSP)	Passport Seva enables simple, efficient and transparent processes for delivery of passport and related services.
PRADHAN MANTRI JAN-DHAN YOJANA	PMJDY is a National Mission on Financial Inclusion encompassing an integrated approach to bring about comprehensive financial inclusion of all the households in the country.
UDAAN	Udaan is a special initiative to address the needs of the educated unemployed in Jammu & Kashmir.
BBNL	Bharat Broadband Network Limited is a special purpose vehicle set up under Companies Act by Government of India with an authorized capital of Rs. 1000 Cr. It has been mandated to create the National Optical Fiber Network (NOFN) in India.
COE-IT	The Centre of Excellence for IoT was announced as a part of the Digital India Initiative to jump start the IOT ecosystem taking advantage of India's IT strengths and help the country attain a leadership role in the convergent area of hardware and software.
DIGITIZE INDIA	Digitize India Platform (DIP) is an initiative of the Government of India under the Digital India Programme to provide digitization services for scanned document images or physical documents for any organization.
DBT	DBT was initiated with the aim to reform Government delivery system by re-engineering the existing process in welfare schemes for simpler and faster flow of information/funds and to ensure accurate targeting of the beneficiaries, de-duplication and reduction of fraud.
DISHA	The Digital Saksharta Abhiyan or National Digital Literacy Mission (NDLM) Scheme has been formulated to impart IT training to 52.5 lakh persons, including Anganwadi, ASHA workers and authorized ration dealers in all the States/UTs across the country.
EDF	Electronic Development Fund (EDF) is set up as a "Fund of Funds" to participate in professionally managed "Daughter Funds" which in turn will provide risk capital to companies developing new technologies in the area of electronics, nano-electronics and Information Technology (IT).
eTRADE	The Department of Commerce is pursuing the project eTRADE, the purpose of which is to facilitate foreign trade in India by way of promoting effective and efficient delivery of services by various regulatory / facilitating agencies involved in foreign trade so as to enable the trade to avail services from these agencies in online environment.
HRIDAY	The Ministry of Urban Development, Government of India, launched the National Heritage City Development and Augmentation Yojana (HRIDAY) scheme on 21st January, 2015, with

	a focus on holistic development of heritage cities.
IHIP	An Integrated Health Information Platform (IHIP) is being setup to enable the creation of standards compliant Electronic Health Records (EHRs) of the citizens on a pan-India basis along with the integration and interoperability of the EHRs through a comprehensive Health Information Exchange (HIE).
MEGHRAJ	"GI Cloud" which has been named as 'MeghRaj' is to accelerate delivery of e-services in the country while optimizing ICT spending of the Government.
OPEN DATA	Open Government Data (OGD) Platform India - data.gov.in is intended to be used by Government of India Ministries/ Departments their organizations to publish datasets, documents, services, tools and applications collected by them for public use.
SWIFT	Single Window Interface for Trade Project is to facilitate the Trading Aross Borders in India. The 'India Customs Single Window' would allow importers and exporters, the facility to lodge their clearance documents online at a single point only.
BETI BACHAO BETI PADHAO	The campaign aims at ensuring girls are born, nurtured and educated without discrimination to become empowered citizens of this country.
CROP INSURANCE MOBILE APP	Crop Insurance mobile app can be used to calculate the Insurance Premium for notified crops based on area, coverage amount and loan amount in case of loanee farmer.
e-Biz	eBiz is being implemented by Infosys Technologies Limited (Infosys) under the guidance and aegis of Department of Industrial Policy and Promotion (DIPP), Ministry of Commerce & Industry, Government of India.
eTAAL	eTaal is a web portal for dissemination of e-Transactions statistics of National and State level e-Governance Projects including Mission Mode Projects.

10. ISSUES OF DIGITAL INDIA

Technical Issues

***Interoperability*:** It is one of the critical issues of e-Governance [11]. Interoperation among ministries and departments is difficult and it became hurdle for processing and sharing data.

Security: Now days, security of online transaction is becoming big issue; insurance, banking, utility bill payments, all these services done by e-governance. In fact, there is still discontent to citizens on availing government services due to lack of security.

***Privacy*:** Any information provided by citizens should be ensured by govt. otherwise, any person or institution may misuse the valuable information.

***Authentication*:** It is very important to know the right user of the services or it may be misused by private competitors. Meanwhile, the digital signature plays major role in providing authenticity. In fact, it is expensive and causes for frequent maintenance.

Economic issues

***Cost*:** It is one of the economic issues, implementation of e-governance operations and maintenance of services fetch huge cost to government [12].

***Reusability*:** Any models developed by government, must be reusability. E-governance is being national plan, what it incorporates any software or modules should be used by other administrations.

***Maintainability*:** Maintenance should be given due importance. Because, IT ministry has been continuously developing new soft ware's in order to fill the current needs of citizens. Consequently, govt. launched new projects for example, digital India.

Portability: The primary requisite for portable applications is independence of components from hardware and software platforms in order to help in possible reuse by administrations.

Social issues

***Accessibility*:** In the era of technology, mostly number of people using internet via computers and mobile phones [13]. In the context of India, there is still gap arising between users and nonusers; it is because of language barrier, inadequate infrastructure in rural areas, etc.

***Usability*:** Users of e-governance may be literate or illiterate. Any technology or software to be used as user friendly to greater extent, only then, citizens could use it as smoothly as possible.

Use of local languages: India's population is second next to china, over 65 % only literate citizens are there; rest of population cannot understand the English language.

Therefore, govt. should make it more comfort by translating this language into their regional languages for the sake of benefit of e-services.

***Awareness about e-governance*:** Number of people in the country has not been aware of it, on account of illiteracy, non-accessibility of internet in rural areas, lack of will using internet services, etc. Therefore, educated citizens, concerned institution and dept. should come forward to get rural people benefited by e-services.

11. CHALLENGES IN DIGITAL INDIA

An initiative of this scale has never been conceived before and, apart from little availability of skilled manpower, execution has been a challenge. Hence, the vision cannot be realized without tackling such looming challenges. Some of the challenges are detailed below [5]:

NOFN Infrastructure Setup: The effort to connect about 250,000 villages through an optical fiber network has seen significant delays in the past. Just about 1% of those villages are connected to the internet through NOFN. Providing last-mile connectivity would be a challenge in the future since it is unaffordable for most Indians.

Adoption of Internet: Apart from infrastructure installation, adoption of the internet remains a concern. Internet penetration has remained close to 15% in India while in China it is nearly 46%. Moreover, people in poor areas would find it difficult to afford internet through broadband or mobile.

Data Speed: Data speed is another area where India faces a big hurdle. India is ranked 20th in mobile data speeds, with an average speed of 0.099 mbps. In comparison, Canada, the top ranked nation, has average data speed of over 4.5 mbps.

Security: With cybercrime on the rise, the idea of putting information of about a billion citizens online seems like a risky move. Hence highest levels of security measures and protocols would need to be taken to ensure a safe environment for the citizens [7].

Coordination and Standardization: Various government departments such as DeitY, DoT, Law, Finance, etc. would be involved in creating systems and operational standards for a seamless integration. Such involvement would require significant levels of coordination to ensure proper flow of information.

Private Sector Participation: In order to meet the expected timelines, participation of private sector players becomes quite crucial. Whereas, private sector players have shown limited involvement, this needs to be boosted quite rapidly.

Manpower: Skilled manpower is, perhaps, the biggest challenge of all. India has nearly 475 million people engaged in labour, out of which about 93% are engaged in unorganized labour. Skilled manpower is essential for the development and effective adoption of new technologies. Creating a system to train and provide gainful employment to so many people is an immense challenge [12].

Poverty: Accessing Internet is a costly affair for the poor who struggle for their livelihood in developing countries like India. Required infrastructure in the form of installing the necessary telephone lines needed for internet or email access is equally unaffordable in most poor countries.

Technical illiteracy: There is general lack of technical literacy as well as literacy in countries like India.

Language Dominance: The dominance of English on the internet constrains the access of non-English-speaking population. In the case of India, 95 percent of the population does not speak English. Due to such overwhelming dominance of English over these communication channels, computers and the internet are quite useless in Indian villages.

Unawareness: There is general lack of awareness regarding benefits of E-Governance as well as the process involved in implementing successful G-C, G-G and G-B projects.

Inequality: Inequality in gaining access to public sector services between various sections of citizens, especially between urban and rural communities, between the educated and illiterate, and between the rich and poor.

Infrastructure: Lack of necessary infrastructure like electricity, internet, technology and ways of communications will affect the speed which delays the implementation.

Impediments for the Re-Engineering process: Implementation of E-Governance projects requires lots of restructuring in administrative processes, redefining of administrative procedures and formats which finds the resistance in almost all the departments at all the levels.

12. FUTURE PROSPECTS

a To deliver all kind of govt. services through electronic mode [12], [13]. It will make government transparent, efficient and easily accessible to citizens to get benefitted of various services by way of e-governance.

b In order to reach out the citizens from remote control areas, mobile governance to be given priority, through which ,both transactional and informational govt. services provided and providing innovation in mobile governance.

c Govt. to try so as to infuse advanced technology for executing the ongoing projects to greater extent. It would keep the sustainability of multiple projects.

d To create an eco-system that promotes innovation in ICT for govt. and for applications that can benefit the citizens.

e To promote ethical use of e-governance services. In which, keeping the information of govt., private institutions safer and securing e-govt. cyber world.

With regard to e-governance, few targets has been outlined by 12th five year plan, they are [8]:

a A national institute for e-governance would be established as an autonomous state of the art national institute.

b At least one person per family in 50% of the families will be targeted to provide basic IT training in the twelve plan period.

c Electronic deliveries of services bill will be implemented.

d An e-governance innovation fund and R&D fund will be created to give more impetus to innovation in e-governance and mobile governance.

e Training on basic IT skills will be introduced systematically for the existing and all new entries into government service.

f Cyber security will be a major focus area during the twelve-five-year plan.

13. CONCLUSION

To realize the vision of promoting inclusive growth through empowerment of citizens, it is important to reach out to citizens in the remotest of locations and make them part of India's growth story. Globally, technology has been the greatest enabler in causing disruptive change. India's story is no different, and the use of digital technologies to educate and empower citizens is being seen as a game-changer. Given India's vast expanse and differences in demographics across the nation, there is also a vast difference in the level of adoption among the citizenry. To ensure success of its initiatives in the digital space, the government will have to take steps across multiple functional areas, some of which are outlined below: [14]

- ***Regulatory framework:***The government should focus on putting in place regulations that ensure smooth adoption of digital services. Regulations around net neutrality, use of cash cards/ wallet services, etc. should be instituted along with the initiatives of Digital India. Regulatory clarity will build trust about government services among citizens and encourage them to opt for these services.
- ***Effective implementation:***There are two key imperatives to be considered for effective implementation.
  - ❖ ***Skill enhancement:***The government should focus on skill enhancement of its workforce through training programmes or hiring of private sector experts. The government can collaborate with the private sector through PPP model, consulting assignment, etc.
  - ❖ ***Planning and implementation*:** The government, along with system integrators developing various platforms, should adopt agile implementation practices. The platforms developed should be 'future-proof' i.e. upgradable and scalable in a cost-effective manner.
- ***Budget constraints****:*The government should tap into the available pool of resources such as manpower, budgets, private sector fund, etc. in an optimal manner and should put monitoring mechanisms in place to ensure right allocation of resources at the right places. Banking institutions should be more liberal in their credit appraisal process for funding these initiatives.
- ***Bridge digital divide*:** There are two key imperatives for bridging the digital divide:
  - ❖ ***Capability enhancement of citizens*:** To enable citizens to reap the benefits of Digital India initiatives, the government should disseminate information through multiple channels and train citizens on use of technology devices and various interfaces (e.g. web portals, app, etc.).
  - ❖ ***Design of digital services:***The governments should design easy-to-use intuitive interfaces. The private sector expertise can be leveraged in this aspect. Service providers (e.g. government agencies, universities, etc.) should design simple process flows such that a user can do the transactions with minimal human intervention
- ***Security and privacy:***The government and system integrators should ensure application of state-of-the-art security protocols (e.g. 256-bit AES encryption, etc.). Relevant privacy policies should be instituted by the government so that the information is not misused by people who have access to it.

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Algorithm Analysis Tool Based on Execution Time-Input Instance-based Runtime Performance Benchmarking

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Abstract
Algorithms are a fundamental component of Computer Science, with every development in this field based on or around them. Each algorithm is evaluated for its performance using some technique, with asymptotic analysis being a frequently used one. Algorithms that have best time complexity theoretically (be it Oh, Theta or Omega Notation), may not have the best execution time in practice which depends on implementation efficacy, input dataset, constants and factors that are overlooked in asymptotic analysis. The lack of software which allows a user to compare various algorithms available for an operation for a given input dataset, supplemented with its graphical analysis encourages for the creation of the same. In this paper, we present a software tool which provides a range of algorithms for a given operation and measures the execution time for each of them. It then provides a graphical analysis of the algorithms executed, showing the performance of the algorithms belonging to a particular operation when run against a custom, input data set.

Keywords
Algorithms, Benchmark, Runtime-performance, Graphical-analysis

1. INTRODUCTION
The analysis of algorithms in terms of time complexity and space complexity is important in order to determine its usability and efficiency while performing an operation. For example, while sorting an input data set of say 50 random elements, the option of using merge sort/quick sort/heap sort is available, with all performing in O(nlogn) time depending on whether it is average case or worst case [1]. While a person familiar with the subject of data structures and algorithms may be able to decide which sorting algorithm is suitable in the given situation on the basis of asymptotic analysis, the same can't be said for a layman. He or she won't be able to determine the suitable algorithm for the given input data set solely on the basis of asymptotic complexity. For such a user, the execution time of an algorithm is the sole factor to evaluate its efficiency.

Moreover, the execution time takes into consideration the various constants that get hidden while approximating the time complexities [1]. Also, actual performance depends highly on the input datasets [2, 3]. Hence, if the sorting algorithms are compared on the basis of their execution time while operating on the above-mentioned input data set of 50 random elements, the result will be evident without any ambiguity.

2. PREVIOUS WORK
There are few libraries available which provide similar functionality of runtime performance monitoring of algorithms and methods. These are –

- JETM (Java Execution-Time Management Library)
- Google Benchmark
- Google Caliper
- Apache JMeter

Another popular library, Speedy McBenchmark exists for use in java. It provided trend analysis by performing operations on similar modules. Its main focus is to check if an algorithm scales in terms of O(n), O(nlogn), etc. We declare a constraint which shows if a particular implementation is faster than a group of some other implementations. However, it scales all the algorithms relative to the Oh notation. The drawback of this library is that it is complex to use and optimization is complicated. In general, none of these tools provide a graphical analysis and statistics for algorithms relevant to an operation based on input dataset instances [4]. Since the developed software is for educational purposes, ease of use and installation has also been ensured. Ease of modification is also to be considered if further operations are to be added. The addition of new operations in the developed application is relatively simple as compared to the above-mentioned tools.

3. PROPOSED ALGORITHMIC TOOL
The tool (application) has been defined for cross platforms, thus enabling it to be run on windows operating system as well as on various flavors of Linux. A graphical user interface (GUI) which has been created entirely using GIMP Toolkit (GTK prompts the user to select the desired operation. It is used along with CAIRO library. GTK stands for gimp toolkit. GTK+ is the latest development of GTK. Many desktop environments like GNOME, Unity and Sugar utilize GTK.

Each operation is computed using predefined algorithms which run in parallel. The sorting operation is performed using the following six algorithms: insertion sort, selection sort, merge sort, quick sort, randomized quick sort and bubble sort. The searching operation supports linear search and binary search. The following

algorithms are executed under disk scheduling: FCFS, SJF, Round robin and.

The graph analysis displayed as the final result is in the form of pie chart. The implementation of the pie chart is done using the Cairo library support for GTK. The input for any of the operation can be provided in two ways: the user loads his custom text file which contains the input data set. A button to load the file has been created in the main application window. It allows the user to navigate to the directory location containing his/her file. Apart from this if the user does not ant to provide an input data set, the application is preloaded with certain text files containing default input data sets. The default text file for say, the sorting operation, contains variations of inputs that are possible for a sorting program *i.e*. numbers arranged in ascending order, numbers arranged in descending orders and numbers arranged in random manner. This allows testing the efficiency of each sorting algorithm in various situations. The text files for the other two operations have also been created keeping in mind the various input scenarios possible for the respective operations. To maintain a log of the operation performed, a text file is generated at after the graphical analysis is displayed [5]. It contains statistics of the algorithms related to the operations. The numbers include execution times, and the number of test cases in which an algorithm was superior than the others.

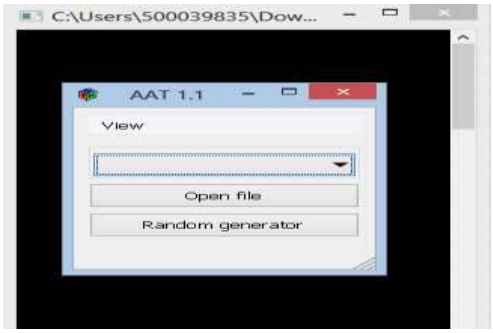

Fig 1: Application front end on windows platform

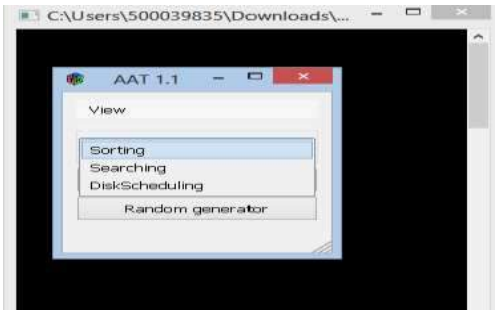

Fig 2: Dropdown box displaying list of available operations

Fig 3: Application front end in Ubuntu

4. SOFTWARE REQUIREMENTS

The following requirements ensure the smooth running of the application:

a) Operating system: Linux (any flavor) or windows
b) Code Blocks IDE (software tested on Code Blocks 16)
c) Gimp Toolkit(GTK), preferably GTK+2

5. RESULTS

Figure 4 displays the graphical output of the searching performed and Figure 5 shows the output text file generated. Figure 6 displays the graphical output of the sorting performed and Figure 7 shows the output text file generated for the sorting operation. Figure 8 shows the input text file for the disk scheduling. Figure 9 displays the graphical output of the algorithms executed on the inputs.

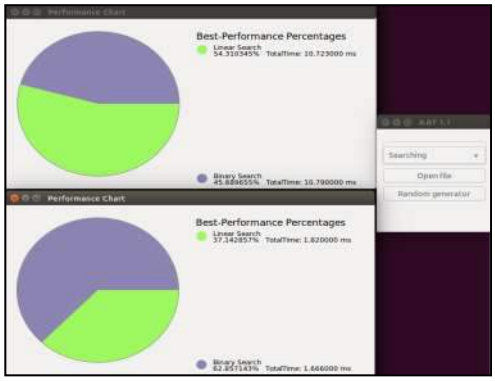

Fig 4: Searching performed.

The pie chart is divided into 2 parts denoted by green and blue respectively. The percentage indicates the number of test cases (in percentage) in which the algorithm was chosen for computation over other algorithms in the same category. In the above input, linear search was successful in 37.142% of the total test cases and the total time *i.e*., 1.82 milliseconds denotes the total time that linear search ran for the 37 % of the test cases where it was superior over binary search.

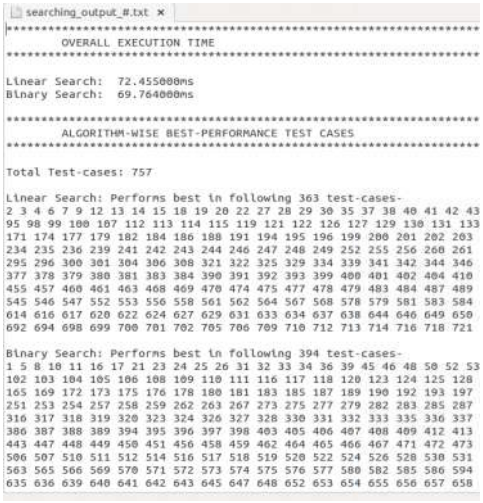

Fig 5: Output file for searching.

Each number in the matrix for each of the search algorithm signifies the test case number that was executed using the corresponding algorithm.

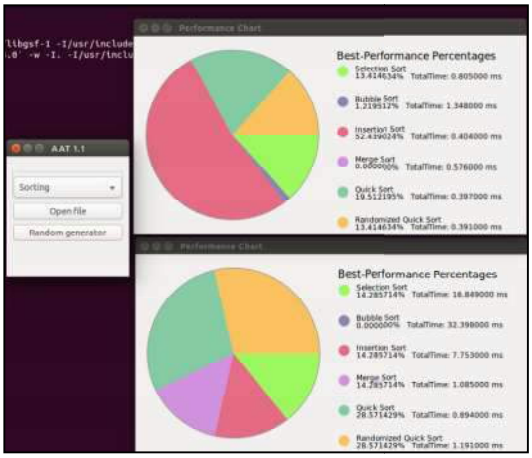

Fig 6: Sorting performed.

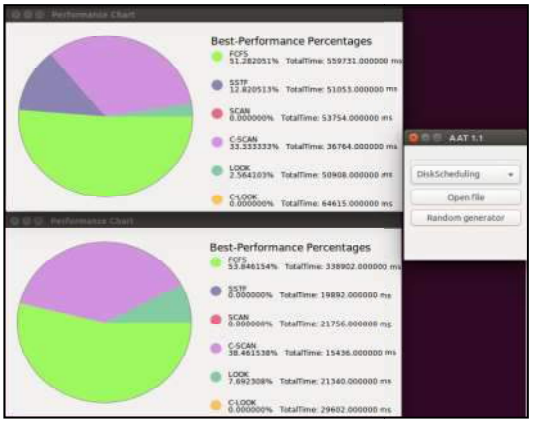

Fig 7: Output file of sorting.

If we consider the statistics of insertion sort, it performed best in 42 out of the 69 test cases provided in the input text file.

A total of 6 colors are used to denote the 6 disk scheduling algorithms. Consider C-SCAN, which is shown in purple. It ran for a total time of 36.764 ms for the 33.33 % of test cases where it was chosen as the best algorithm to be executed.

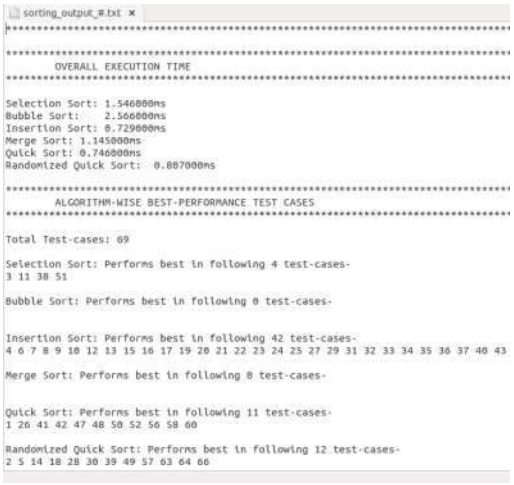

Fig 8: Disk scheduling simulation performed.

The two pie charts are indicative of two separate text files that were used to provide inputs for the sorting operation. A total of six colors are shown in the graph, each representing one algorithm. Consider the first pie chart. If we consider Insertion sort (shown in pink), it was used as the best strategy in 52.43 % of the total test cases. And it ran for a total of 0.404 ms.

Fig 9: Output file for disk scheduling.

Using the output file, we can determine in which test cases a specific disk scheduling algorithm performed the best. This can be done by examining the array generated under the scheduling algorithm to be analyzed. These figures confirm the working of the application. Similar results are obtained for windows based machine.

6. LIMITATIONS AND FUTURE WORK

A. Limitations

GUI needs more robustness: The GUI performs only searching and sorting operations. Additional functionality should be added to the interface so that it can be over for multiple purposes. The GUI should have more features which will make it robust. The GUI can have other functionality such as file handling, more operations, etc.

Chronometer module for Windows OS has lesser precision in measuring execution time: The chronometer module on windows has lesser precision as compared to Linux. It can create problem in analysis and graph precision. Analysis on value having minor difference will be tough on windows. The graph may not be built properly if the

Statistical analysis being shown graphically may not be intuitive to some users: Some users might not be interested in the graphical analysis. They might just be concerned about the execution time. Many technical analysts just need the statistical values. They are not concerned of the graphical analysis.

B. Future Enhancements:

Improving GUI robustness: This would involve adding more functionality to the GUI and adding more ways for analysis. GUI can be made more robust by adding more features to the GUI. GUI should be made more users friendly. The GUI should also include more features other than searching and sorting. It should be made more and more attractive so that the users use it for educational purposes. The GUI should also add functionality of storing files and other file handling operations. This would help in more robustness of the GUI.

Improving chronometer module for Windows OS: The chronometer for windows does not show precise values in the analysis. It should be improved so that proper graph based on analysis can be made. As most of the people use windows operating system, the chronometer should be made more precise so that people use the analysis tool for educational purposes.

Making the graphical analysis more intuitive: The graph should be made more intuitive to the users who might not be interested in graphical analysis. Some technicians may just want comparison of values. So, the analysis should be made more intuitive in such a way so that everyone uses it.

Extending support for more operations: The current GUI deals with searching and sorting operations. The functionality for adding more operations such as string matching and inbuilt functions should be added. This would make the GUI robust also. The tool can be used for educational purposes.

Adding various other graphs for improved Understanding and insight: Adding more types of graph such as line graphs, etc. should be added so that proper analysis can be done. Adding other graphs will also help in making GUI more attractive.

7. CONCLUSION

Any kind of problem requires an algorithm in order to be solved. Every algorithm is characterized by its asymptotic behavior. The asymptotic behavior is decided how long the program runs and how much space it occupies in the memory. The steps of the algorithm decide the "time" and "space" complexity. This includes the iterative functions, the function calls, etc. Now, there are multiple ways of solving a problem and this in turn gives rise to many algorithms for the same problem. Each has its own advantages and disadvantages which are deciphered from its asymptotic analysis. Moreover, the algorithms function differently on the basis of the type of input given. Determining the type of algorithm to be applied for a specified operation solely on the basis of its asymptotic behavior is not sufficient. This is because the "type of input" is also a factor [2]. The concept of the "best algorithm" *i.e.*, the one which is efficient for any kind of input data is nonexistent [6]. The above holds true for in-built function/methods provided by the compiler/interpreter/library.

Keeping this in mind, the project serves as an analytical tool wherein the user selects an operation and provides the input set accordingly. The program than runs various algorithms pertaining to the operation for the given input and decides the optimal one in terms of execution time for each dataset [7]. The result is based on a graphical analysis and for ease, a GUI is provided.

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AirBits: A Web Application Development Using Microsoft Azure

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Abstract
Microsoft Azure is a public cloud computing platform. It provides various cloud computing services, which includes computing, data analytics, storage resources and network resources. End users or Client can select and choose from these computing services to build - innovate, maintain and scale new applications, or run/deploy the existing applications, in the cloud and Moreover, it provides a pay-per-use option which considered to be very cheap or reasonable for one to use cloud resources.

KEYWORDS
JSP, Servlets, IaaS, Azure.

1. INTRRODUCTION
Today many of the companies in the world are shifting to cloud. Many applications are deploying on Cloud. Because cloud is easy to maintain and can access everywhere. Cloud Computing is a technology which delivers computing resources to the clients on request. Cloud computing mainly delivers three types of services that are infrastructure, Platform, Software and Community. In IaaS (Infrastructure as a service) deliveries hardware requirements such as servers, Storage etc. to users on request and charge back them - based on their usage. Similarly In platform provides runtime compliers etc. and in SaaS (Software as a service) provides software where software is maintain by the provider. In our project we deploy the web application which will be deployed and maintain over Microsoft Azure. The Web Application will mainly developed using technologies JSP – Java Server Pages, Java Servlets, XML.

2. PROBLEM STATEMENT
In a nutshell, a Java Web-Based Application will be develop by using JSP, Servlets and XML along with it, this Java Web application will be deployed on cloud platform which is Microsoft Azure - Platform as a Service (PaaS). As running up the web apps - 24/7, it will be expensive for the customer as the person needs to handle the charges for the usage of infrastructure resources such as CPUs, storage and networking to host and maintain the web apps and ensures that there is less downtime. So to overcome this, Client must migrate its web app towards Cloud technology which provides a pay-per-use model so it will cost him/her very less.

3. LITERATURE REVIEW
In early days web pages are static only web pages are written in html language only. In that days there is no data transmission between clients and server. Server just shows the static pages that client request. Slowly these static pages are changed to dynamic with languages like Servlets, JSP and XML. After introduction of these languages, many dynamic web pages and dynamic web applications have been developed. There are two major protocols used, GET and POST for dynamic behavior. Servlets are used to determine whether the request method is GET or POST. In simple terms servlets are used to developed dynamic web apps or web pages. First Internet came into existence. As internet came, access to the information has been standardized in the form of html pages accessed using a standard browser. About 90% of the information today is accessed using web-browsers. As the information was exponentially increasing day by day that needed large data sets to be processed in shortest possible time. Grid Computing Allowed computers from different administrative domains to run workloads in parallel. This form Distributed network of loosely coupled geographically dispersed computers. Working towards a common goal - Issues in Grid computing: Grid scaled well for all resources, but was not same for storage capacity. Grid had large anonymous computers (as the participating entities).Creating storage on anonymous, unregistered, unaudited computers includes the security risk. So the final Conclusion is that Grid is good for compute, but not for the storage part.

And now, finally Cloud Computing came into picture - For cloud computing internet development, majorly acted as catalyst. Laid foundation for a workable client-server model. As cloud computing came into existence, accessing data from anywhere is become easier. Many

companies like Microsoft, Amazon and Google started providing cloud computing services 3 deployment methods.

In a nutshell, a Java Web-Based Application will be develop by using JSP, Servlets and XML along with it, this Java Web application will be deployed on cloud platform which is Microsoft Azure - Platform as a Service (PaaS).

As running up the web apps - 24/7, it will be expensive for the customer as the person needs to handle the charges for the usage of infrastructure resources such as CPUs, storage and networking to host and maintain the web apps and ensures that there is less downtime. So to overcome this, Client must migrate its web app towards Cloud technology which provides a pay-per-use model so it will cost him/her very less.

4. OBJECTIVES

Our objective is to build the Web Application using JSP, Servlets and XML Technologies, then to deploy the Web Application on Microsoft azure – Public Cloud.

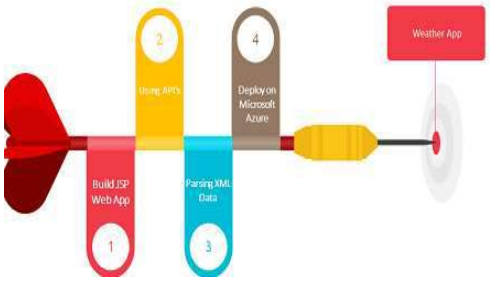

Fig 1: Objective Sequence

In above diagram we have shown our objectives in a sequential manner. It will start from building a web application and ending the processing after deploying the same on cloud.

5. METHODOLOGY

A Java Web-Based Application will be developed by using JSP, Servlets and XML along with this, the Java Web application will be deployed on cloud platform which is Microsoft Azure - Platform as a Service (PaaS). Where, Client must migrate its web app towards Cloud technology which provides a pay-per-use model so it will cost him/her very less. The following steps shows the how we will deploy the created JSP application to Microsoft Azure through FTP (File Transfer Protocol):

1. Build the Web Application using JSP, Servlets and XML Technologies

1.1 Setting up a Web Application Project

Web applications are distributed applications in a very efficient way, in other words they are computer programs or instructions that run or execute on more than one system and interact through a network zone or dedicated server. Java J2EE (Java 2 Platform, Enterprise Edition) provides support for web application through Servlets and JSPs

1.2 Creating a Java Package and a Java Source File

First, we'll start off with creating a Java project. We can use the New Java Package wizard to create a Java package and provide the justified project name along with selection of Java Runtime Environment (JRE) and an appropriate Project Layout which determines whether there would be a separate folder for the source codes.

1.3 Creating a Java Server Pages (JSP) File

Java J2EE (Java 2 Platform, Enterprise Edition) provides support for web application through Servlets and JSPs. Java J2EE - JSP technology enables rapid development of web-based applications that are server - and platform - independent. Java Server Pages technology provides the ability to add code snippets of servlet directly into a text-based document.

2. Deploying the Web Application Project on Microsoft Azure

After the completion of business logic of website, the jsp website will be deployed on Cloud platform, which is Microsoft Azure - Platform as a Service (PaaS). Microsoft Azure is a public cloud computing platform. It provides various cloud computing Services, which includes computing, data analytics, storage resources and network Resources. The web application will deployed using FTP (File Transfer Protocol). Microsoft Azure provides a means to run/deploy Java web apps in the cloud using the Azure Portal's configuration UI, and the Azure Marketplace. It was created to allow user to easily on board any Java application on Azure.

The experiments were conducted on following configuration:

Hardware - RAM : 2 GB, HDD : 100GB, Processor: Intel Core i3/i5/i7

Software - OS : Windows XP/7/8/8.1/10 | Ubuntu), Local Server : Apache Tomcat

Compiler - Eclipse Neon 2.0 | Eclipse Mars - Java J2EE

Web App – Microsoft Azure Platform

5.1 Flowchart of Work Proposed

The figure 2 represents the flow chart of the proposed system.

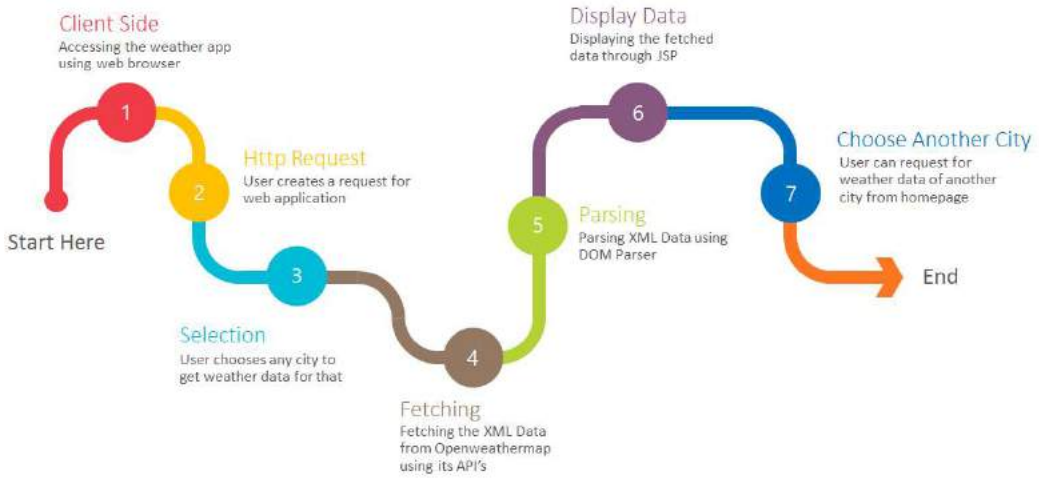

Fig 2: Flow Chart of Proposed System

5.2 Implementation

The figures 3 and 4 show the implementation process.

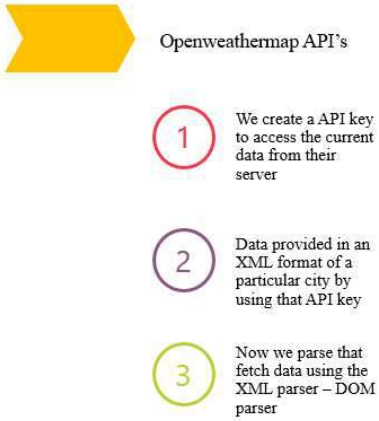

Fig 3: Openweathermap steps

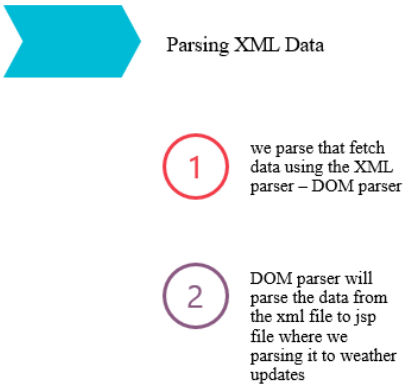

Fig 4: Parsing of XML data

6. CONCLUSION

Our weather app will revolutionize the way web applications are designed. In our project we have deploy the web application over Microsoft Azure. The java based weather application is developed using technologies like JSP – Java Server Pages, XML, CSS , Here we provide a user friendly interface which will cater user needs, specifically detailing the ongoing temperature for the desired location. SaaS is defined by delivery via Internet in addition with periodic payments. Hence we aim to design a self contained weather web application which gives us weather information obtained from Openweathermap service provider using its respective APIs

7. FUTURE WORK

Weather forecast: Weather forecasting is the application of science and technology to predict the state of the atmosphere for a given location. Openweathermap is a service provider who provide the API's to access the weather data of a particular city, we will use the suitable APIs for weather forecasting Login system connectivity through JDBC: we will use JSP for creating dynamic web application and through the JDBC drivers we connect to the database, and with this we will create sign up page along with database connectivity in java where we have created a new user sign up page and stored its record into database.

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West Bengal and Education Systems: The Need and Initiatives of Cloud Based Education Systems

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Abstract
If the history of development of Indian education structure is studied minutely then it is found that education in West Bengal has played a vital role there. Educational environment of West Bengal was very rich from past days. Ram Mohan Roy, David Hare, Ishwar Chandra Vidyasagar, Shashi Bhusan Chatterjee, William Carey and many others educationist and social reformers the pillars of bring new age of revolution called renaissance in the Indian History. According to current census report West Bengal has got a literacy rate of 77.9%. Now-a-days technology plays a pivotal role in education system. Through different learning management system student gets immense opportunities to access vast field of resources of their need. In the field of education, cloud computing has its use in the field of education for a number of reasons. This computing technology will enable a numerous educational institution to use of the global internet resources for data management issues like data analysis and data storage. Through this paper the need for cloud computing in the field of education in West Bengal perspective has been pointed out in a very simple way.

KEYWORDS
West Bengal, Higher Education, Cloud Computing, Virtualization

1. INTRODUCTION
In Modern days the development of the society mainly depends upon the Higher education .In the transformation of society and the entire world economy, the partnerships between universities, government and industry, researchers and students have their significant contribution. Lack of resources like small classrooms, staffing cuts, shortage of qualified teachers are the main constrains for our entire educational system. It has been suffering from these problems continuously. The Cloud technology can be treated as the solution to this problem because it is a valuable tool that can be used to improve accessibility to quality education and to boost achievement. Most significant benefits of cloud computing is the cost saving scenario which is root cause behind all challenges faced during implementation of new technology in any system [1], [2], [7]. These by implementing the virtual classroom environment the problem of outdated, too-small, overcrowded classrooms can be solved. Students can attend classes outside of the classroom environment by actually log onto a space online. Cloud environment provide an effective tool to the students to share their ideas and help educational institution to drastically reduce the overhead expenditures on quality learning materials like books and software. Cloud based education system help to give equal access to those scarce resources which helps the students to improve their academic performance. The goal of Cloud based education system is to provide best quality of education with minimum resource utilization.

2. OBJECTIVE
Though this paper the prospective of cloud computation initiatives in the field of education in West Bengal has been highlighted. It mainly focuses on the area like the current scenario of higher education in West Bengal and its future enhancements. The aim of this paper is include to learn about the implementation of virtual e-learning system in the field of Higher Education. Its benefits alone with the risk analysis while implementing. The infrastructural constrains also be mentioned in this paper.

3. HIGHER EDUCATION
West Bengal is an Indian State located in Eastern Part. Kolkata is the Capital of West Bengal. There are two types of sectors such as public and private control the entire education system in west Bengal. Funding coming from three levels: central, state, and local. Compulsory Child education is fundamental policy of West Bengal education System. Modern Education System development in West Bengal are first initiated by British missionaries and the Indian social reformists. West Bengal has many new and old universities such as University of Engineering & Management, Amity University, The University of Calcutta, The University of Burdwan, Vidyasagar University, The West Bengal State University, Indian Institute of Management Calcutta (the first

IIM), Indian Institute of Technology Kharagpur (the first IIT), IIEST Shibpur (Second oldest engineering institution in India), Jadavpur University, Presidency University, Indian Institute of Science Education and Research, Kolkata, National Institute of Technology, Durgapur, Indian Statistical Institute and Visva-Bharati University. However West Bengal has received many new universities such as Raiganj University, Kazi Nazrul University, DHWU, PBCU-Coochbehar, Bankura University [3], [8], [13], [15].

Two categories of schools are mainly found in West Bengal run by either State government or private organizations and major medium of instruction is either English or Bengali in addition to this several regional language like Urdu ,Hindi, Nepali Medium schools are also available in the state. As far affiliation body is concerned the Council for the Indian School Certificate Examinations (CISCE) controlled by CNI, the Central Board for Secondary Education (CBSE) controlled by Central Government, the National Institute of Open School (NIOS) or the West Bengal Board of Secondary Education are major key players. Several streams are available like liberal arts, commerce or science in pre-university standard. After completion students are entitled for degree programs.

West Bengal is the intellectual state and produces several scientist, social scientist and distinguished professionals. Among the distinguished professionals named physicists Satyendra Nath Bose, Meghnad Saha, and Jagadish Chandra Bose; chemist Prafulla Chandra Roy; statisticians Prasanta Chandra Mahalanobis and Anil Kumar Gain; physician Upendranath Brahmachari; educator like Ashutosh Mukherjee, including few Nobel laureates Rabindranath Tagore, C. V. Raman, and Amartya Sen were born, worked or studied in the in this West Bengal [13], [15].

In the state the number of universities is 30+ where as affiliated colleges are about 700. The Secondary school is about 6000 where as primary school is about 50000. Hence Lakh of students at presents studying in several capacities.

To see the benefits of E-Learning and Education Technology, Government of West Bengal has proposed cloud based "Virtual classrooms" system through which student and a teacher from anywhere in the world can have access to the any type of study materials through online video conferencing and in very near future this become reality in West Bengal soon. As per the source Rs. 100 crore for the purpose is presented in the budget and was already presented in the assembly.

4. CLOUD COMPUTING AND SYSTEMS

Cloud computing (CC) is a new paradigm which means storing and accessing data and programs over the Internet by using a network of remote servers hosted on the Internet rather than a local server or a personal computer. It is just a metaphor for the Internet. Distributed networked based virtual resources are the basic platform used by all applications and services provided by Cloud Computing. They are run by common Internet protocols and networking standards. The main task of Cloud Computing is to ensure that the users can simply use the computing resources on demand and pay money according to the usage. Information technology is the exploring means used by the universities, colleges and schools for imparting the training programs. The need for the networks, servers, storage, applications and services are increases day by day. Infrastructure, platform and software are main thrust area for investment by Educational Institutions. Demand for the computing needs in the case of Educational Institutions keep on changing from time to time. The students are expectations to have access and view the information in his PDA, Tablets and Mobile Phones. Cloud Computing fulfill this needs for the educational institution with its resource sharing and virtualization technologies. The Characteristics of Cloud Computing is on-demand Self-Service, Broad Network Access, Resource Pooling, Rapid Elasticity and Measured Service [4], [9], [12]

5. CLOUD BASED EDUCATION IN WEST BENGAL: EXITING SCENARIO AND FUTURE INITIATIVES

It is the agenda of West Bengal Government that at least two virtual classrooms equipped with high-speed internet and video facilities will be for 2,000 schools and about 732 colleges each. Students from distant village can have accessed to the whole world with one button on. The core aim of this movement is to remove disparities based on geographical location [17]. They follow the education system of various renowned educational institutions of the world such as Harvard in the US, the London School of Economics and from the Ecoles of France so that government can readily implement the system. Virtual classrooms provide an environment through which the gap in the quality of education between main university campuses and their affiliated colleges can be abolished. It is a convenient technology by which the working class and housewives can go on with their further education. The classrooms will have state-of-the-art

features, like interactive white board, a digital podium, Internet-enabled touch screen Android TV, document cameras to project live experiments and 3D diagrams (A Basic Figure on Cloud into Education depicted in figure 1). The main vision of the Virtual Class room project is:

- It improves the lesson planning and in-class teaching experiences of teachers.
- It provides the environment where student can learn with fun.
- It provides the students' classroom experiences by diversifying learning activities.
- To gives an improve environment where student can have learning outcomes in all aspects including subject-specific and in a broader context.
- Providing technology with curriculum-aligned learning content.
- It help to Conduct holistic trainings which make teachers to familiar with the technology into their classrooms.
- It provide ongoing technical and lesson planning support to teachers.

All the teachers in-charge (TI) are asked to submit the report of the infrastructure in schools where virtual classrooms program are going to be implemented by the West Bengal Government.

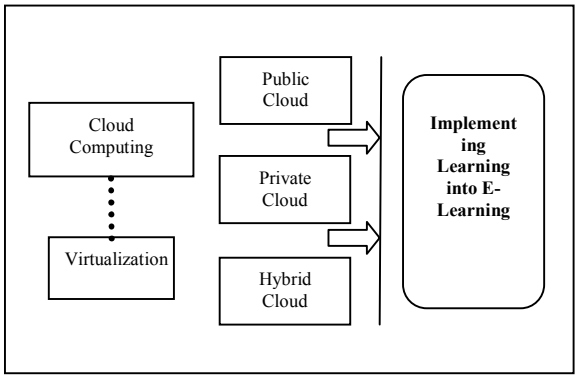

Fig 1: Cloud and its Ultimate result in Education Systems

Senior officials of the of the West Bengal Government also confirm the order given to the school authority where virtual classroom are going to be set up. In this virtual class room implementation program, Government primarily chosen the most backward three districts situated at Jagalmahal area and remotes villages located in Terai and Dooars region, North Bengal. District primary councils are also asked to submit the same report on the infrastructure details by the Senior officials of the state government. Main constrains about setting up virtual classroom program in schools of West Bengal is the low speed internet facilities and in addition to that inadequate infrastructure and lack of proper trained professionals. So setting up adequate infrastructure in schools with proper arrangements is an important issue here. High speed internet facilities should be provided in the classrooms. It has been found from the study that the classrooms having capacity to accommodate at most 100 students are the best suited for conducting a virtual classroom and so efforts will be made to set up the virtual classrooms in those rooms with comparatively high seating capacity [5], [6], [10].

6. FUTURE POSSIBILITIES

Cloud Computing has reduced responsibility of the maintenance burden of the education system. Cloud provides instant global platforms, to implement high speed capacities and it also reduced cost and easily take care of the, scalability issues. [14], [15]. There will be an online survey to collect the required data for the implementation of cloud based education system in the universities and other governmental or private institutions in the region

The main strengths of the future possibilities of implementation of V-learning services using cloud computing are:

- English speaking, highly qualified and techno savvy manpower.
- Safe Electronic Environment – Official recognition for Digital Signatures and E-transactions.
- Human resource cost in minimized here in compared with developed country.
- It will provide a Strong domestic education industry which up-gradation of skills of the students as all as teaching faculties with the help of High speed internet facility.
- Growing services of software technologies.

7. CONCLUSION

With cloud computing as part of IT strategy, the data capacity without compromising security or requiring of school, college, or university to make heavy infrastructure investments can be increased with low cost of ownership. Usage of Cloud Computing while put into use Virtual Learning system can immense influence in Education System. Virtual learning is really the new age of learning. The future of V-learning is very bright. This idea has been mounting at a very rapid rate as more and more uses for the computer in education have been discovered and attempted in West Bengal educational scenario. There is an explosion in information and it is beyond the edge of places. It is available everywhere. Interactive

web is creating new thresholds of the hour. V-learning is the future of e-learning.

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A Comparative Study of B2C and B2B e-Commerce Development Platforms

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Abstract
Innovation and Technology has changed the perception of entire world. The world of retail market is also influenced by this unprecedented wave of innovation. Businesses are using e-commerce instead of their traditional ways of trading and marketing. The key focuses while accepting e-commerce are on consumer behaviours, consumer expectations, wider retail value chain and coverage of consumers as much as business can. To use e-commerce for business, one should choose the right e-commerce development platform that can fulfil all the business needs as well as fits into budget. This paper has been written to present a comparative study between the widely used e-commerce development platforms and to help business to choose the right e-commerce development platform.

KEYWORDS
E-commerce, B2C, B2B, E-commerce platforms, SAP-Hybris, Magento, ATG, BigCommerce

1. INTRODUCTION
Electronic commerce or e-commerce refers to a wide range of online business activities for products and services [1]. It also pertains to "any form of business transaction in which the parties interact electronically rather than by physical exchanges or direct physical contact" [2]. Electronic commerce is the process by which businesses and consumers buy and sell goods and services through an electronic medium. Any products or services that are sold or bought online (via internet) through electronic medium (mobile, desktop, laptop etc.), come under E-commerce.

E-commerce emerged in early 1990s, and its use has increased at a rapid rate. Taking the example of today's scenario, everything from daily needs to occasionally required things, you can buy/sell online. We have some examples of such online stores that are providing services to its consumers to fulfil their all kinds of needs e.g. Amazon, Flipkart, Paytm, Myntra, Foodpanda, etc. According to an article, Retail e-commerce sales- which include products and services ordered via internet over any device- will reach $1.915 trillion in 2016, accounting for 8.7% of total retail spending worldwide. The expected retail e-commerce sales will be increased to $4.058 trillion in 2020, making up 14.6% of total retail spending this year [3]. E-commerce business models can generally be categorized in following categories [4]:

(i) Business to Business (B2B): websites sell its products to an intermediate buyer who then sells the products to consumer.
(ii) Business to Consumer (B2C): websites directly sell its products to consumer.
(iii) Consumer to Consumer (C2C): websites help consumers to sell their assets to other consumers.
(iv) Consumer to Business (C2B): websites to which consumer approaches for a particular service from multiple business organizations showed by website.
(v) Business to Government (B2G): it's a variant of B2B, websites are used by government to trade and exchange information with various organizations.
(vi) Government to Business (G2B): government uses this model website to approach business organizations.
(vii) Government to Citizen (G2C): government use this model website to approach citizen in general.

With the boom in smart phone and tablet ownership, E-commerce has one device based category known as **M-commerce**. The term 'm-commerce' stands for mobile commerce, and it's the browsing, buying and selling of products and services on mobile devices. In other words, it's a complete online shopping experience, but with all the convenience of being on a cell phone or tablet [5]. So, basically m-commerce helps the organizations to sell their products and services through mobile devices using any of the above said business models.

To run their business on Internet, organizations choose either B2C or B2B e-commerce model. To implement any of the above model, organizations need a platform that can help to run their business online, to manage all the resources like products, customers etc., to grow their business online and to cover as much as target end users. There are lots of platform now-a-days that help an organization to implement their business and run it smoothly. This study presents some models that are most popular now-a-days for B2C and B2B implementations and which model is best suited for B2C business and which model is best suited for B2B business.

2. RELATED WORK
E-commerce emerged in early 1990s, and after that its use has increased at a rapid rate. Bell and Tang [6] presented the website effectiveness from the consumer's perspective, Teo et al. [7] has examined the rapid usage of

Internet, Kim et al. [8] has presented on website designs, Gonzalez and Palacios [9] has presented on commercial websites, Sen et al. [10] presented about pricing paid placements on search engine. To grow their business, organizations had started the online advertisements in place of traditional advertisements. This form of online advertising emerged in 1998 [11], rapidly has become the central business model of the major search engines [12], and is one of the most rapidly growing segments of the online marketing area. McConnell [13] considered e-readiness a prerequisite for successful e-business. Poon and Swatman [14] and Turner [15] found that technology adoption helps for industries to grow and it has lots of benefits for the business. Agrawal et al. [16] and Schneider and Perry [17] has marked a change in perception towards e-commerce before the dotcom crashes of 2000. Akkeren and Cavaye [18] stated the well-known fact that e-commerce and Internet technologies can benefit organisations. Thong and Yap [19] state that if an organization has large amount of data and transactions, then it is more likely to adopt IT which can help streamline operations and offer process efficiencies within the organisation. Cloete et al. [20] found that small businesses among manufacturing sector in Western-Cape province of South Africa accepted and adopted e-commerce and showed potential benefits of e-commerce.

Different Models: The most used types of e-commerce now-a-days are B2B and B2C. There are different e-commerce frameworks that are helping the organizations to grow their businesses using any of B2B and B2C models. Some of the most used frameworks are:

(i) **Magento**: Magento is one of the leading platform for open commerce innovation. Magento works hand-in-hand with the world's biggest retailers, brands, and branded manufacturers across B2C and B2B industries. Magento offers merchants complete flexibility and control over the user experience, content, and functionality of their online channel.Its intuitive administration interface features powerful marketing tools, a catalog-management engine and is SEO (Search Engine Optimization) optimized to give merchants the power to create sites that provide an unrivalled and rich online shopping experience for their customers, tailored to their unique business needs.

In addition to its flagship open source commerce platform, Magento boasts a strong portfolio of cloud-based omni-channel solutions including in-store, retail associate, and order management technologies. Magento commerce is now backed by the Permira funds (founded in 1985), the firm advises funds with a total committed capital of approximately 25 billion [21].

Magento is a PHP based e-commerce development framework that comes with most of the functionalities OOTB (Out Of The Box). The architecture of Magento consists of four layers namely, Presentation, Domain, Service, and Persistence, as shown in Fig 1. Presentation Layer is the layer to which all the consumers or target users interact with. The presentation layer contains both view elements (templates, blocks, layouts) and controllers, which process commands to and from the user interface. Presentation layer makes call to the Service layer, which in turn calls to Domain layer. The Service layer provides a bridge between presentation and the model layer of domain logic and resource-specific data. This is implemented using service contracts, which are defined using PHP interfaces. The Domain layer of Magento does not contain resource-specific or database-specific information, instead it holds the business logic layer of Magento module. The business logic defines which operation can be performed on particular types of data such as products, customer etc. The Persistence layer of Magento contains all the model objects; a resource model that maps an object to one or more database rows. The resource model is responsible for executing all CRUD (create, read, update, delete) requests and performing additional business logic such validations of data.

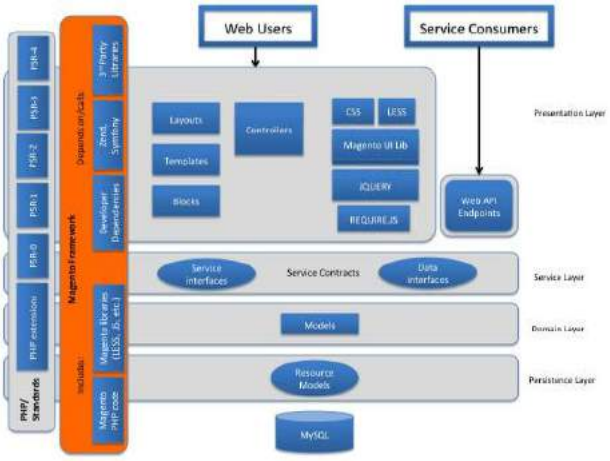

Fig 1: Architecture of Magento

(ii) BigCommerce: BigCommerce is one of the leading platform for creating beautiful, intuitive e-commerce websites that enhance your brand and engage shoppers. It offers its customers to build a web site either using OOTB (out-of-the-box) themes or advance customization framework [22].

BigCommerce provides you all the tools to build a modern and high converting e-commerce website. It provides you interactive and beautiful templates, easy setup, reliable hosting and much more. IT includes dozen of features to increase traffic on your website and turn more shoppers into customers.

BigCommerce uses RESTful API (Representational State Transfer) architecture which supports JSON (JavaScript Object Notation) media type and UTF-8 character encoding. This is the underlying architectural principle of the web. The client (browser) and server can interact in complex ways without the client having any knowledge about the server and the resources it hosts. The client sends its request to server in a certain kind of request format (in case of BigCommerce, JSON format) and gets a response from the server in either same or different format. BigCommerce allow the developers to code in the language of their own choice like Java, PHP, C#, Ruby, Python etc. BigCommerce provides its own APIs that can be used to automate various commerce, business and publishing tasks. There are two versions of APIs: v3 Catalog API and v2 Catalog API.

(iii) ATG: Oracle ATG (Art Technology Group) web commerce enables user to deliver a personalized online buying experience for each customer by presenting relevant content and merchandising, personalized search, customized marketing programs and tailored websites. ATG Web commerce capabilities allow you to merchandise more quickly, easily, and effectively, rapidly launch commerce sites for new brands, markets and even single-purpose campaigns, easily create and manage both simple and complex promotions, use mobile devices and social media to drive sales, and quickly expand internationally and target new countries and segments more effectively.

ATG web commerce enables you to deliver an engaging, consistent and coordinated customer experience across all channels, including web, contact centre, mobile device, kiosk, or store. ATG web commerce helps you:

- Personalize the customer journey by creating individualized sites and relevant product content, and personalized search
- Optimize the execution by tailoring recommendations, and providing assistance relevant answers at the point of need.
- Maximize the engagement by increasing agility through merchandising and site administration, delivering a personalized brand experience, and leveraging social data.

Built on a foundation of proven capabilities, including personalization, business user control, cross-channel support, and a flexible platform, ATG web commerce boosts your cross-channel business growth [23].

The diagram below shows the recommended server architecture for a multiple application environment running on Oracle ATG Web commerce.

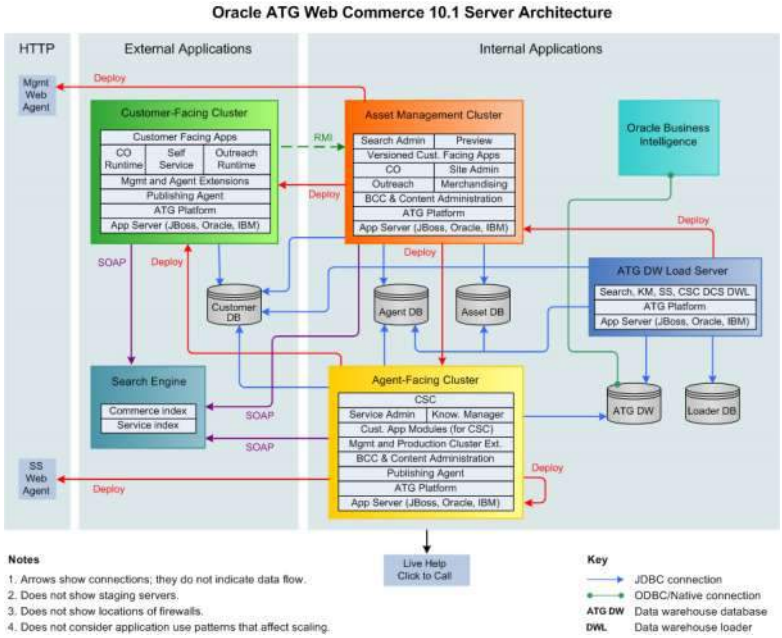

Fig 2: Architecture of ATG web commerce

(iv) **SAPHybris**:Five students used their apartments as offices and started to develop software for e-commerce in 1997 named as **hybris** (with a lower-case 'h'). They struggled with their software till 2001, so they decided to go for a new business model. Instead of selling what was essentially a boxed software product to small and midsize enterprises, hybris began to develop and sell web-based product to much larger firms. They changed their technology as per the demands of future and provided a multi-channel commerce by 2010. Early mobile phone platforms hadn't worked but the firm saw the potential. The advance in technology meant hybris had an opportunity to become a true multi-channel software provider. It was a risk but it paid off [24].

In 2013, hybris joined SAP family to become part of the market leader in enterprise application software. On Jan 1, 2016 **hybris** became **SAPHybris**, replacing the lower-case 'h' with and upper-case 'H' to signify the change. SAP Hybris is a software for commerce, marketing, billing, service and sales. It is a powerful stuff with all the functionalities that a B2B and B2C business requires to run online. The software is a means to an end, and that end is creating relationship between businesses and their customers. SAP Hybris delivers a consistent and relevant experience to customers across every channel and on every device. Everything Hybris designed, is to simplify the experience for customers and for business.

SAP-Hybris uses façade design pattern to develop B2C and B2B applications. The front-end or presentation layer is the layer to which all the users (like customers, administrator, managers etc.) interact with. It contains all the web pages and controllers that are responsible to handle all the requests made by client. The presentation layer makes a call to façade layer which in turn makes a call to service layer. The façade layer acts a bridge between which gets the data from different services, converts the model object in to a single data object and sends the data object to presentation layer.The service layer contains the business logic which manipulate the data received from persistence layer. The persistence layer contains all the resource models; a resource model is mapped as a row in database. In Fig 3, the architectural overview of SAP-Hybris has been shown.

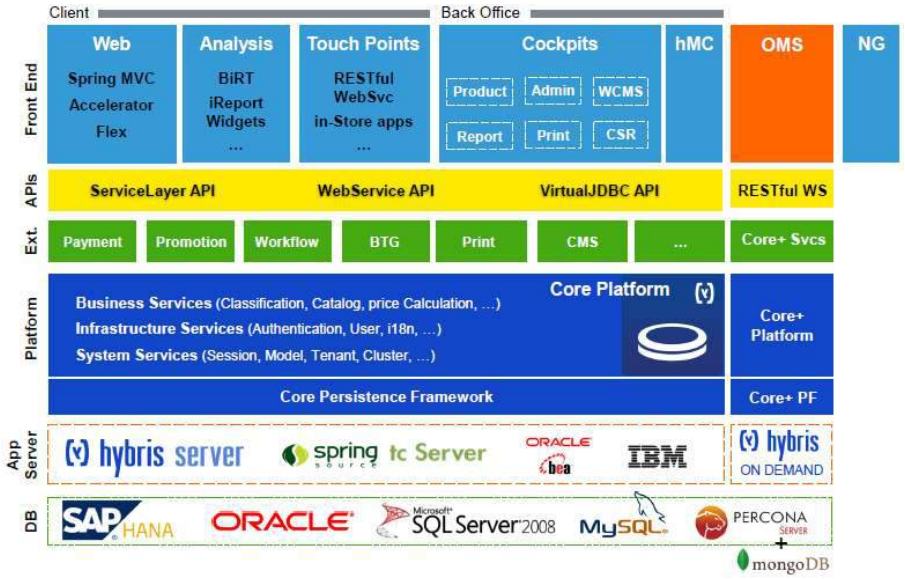

Fig 3: SAP-Hybris Architectural Overview

3. COMPARATIVE STUDY

There are lots of other platforms that are being used for e-commerce development now-a-days. Some of them has been taken into consideration for comparison because of their popularity in B2C and B2B e-commerce.

We can compare the platforms based on their features they are providing like development of websites, customer experience, multichannel supports like mobile, desktops, tablet etc., ease of adopting the technology and helping the business to run smoothly and grow on Internet. Every platform has its own merits and demerits, let's take a look on those aspects of the mentioned platforms:

(i) **Magento**: It comes with the following features that helps to run your business smoothly [21, 25]:

a. Magento is open source, you can install, modify or use its Community edition in any manner you like.
b. Magento provides marketing, promotions and conversion tools that help you to up-sells, cross-sells, flexible promotional pricing and coupons restricted to stores, categories or products, newsletters etc.
c. Magento is 100% search engine friendly. It helps to create search engine friendly URL's that make your websites popular on the web.
d. Magento provides you one Administration Panel to control your multiple stores and websites with sharing of as much or as little information as needed.
e. Magento has open system architecture; a Magento specialist can therefore help to create appealing and highly unique user experience corresponding to different types of access devices.
f. Integrations of third party applications like payment gateways, database applications, shipping, shipment tracking etc. is quick and easy.
g. Magento supports Mobile commerce as well so that user can have superior mobile shopping experience.
h. Magento is highly performable in terms of page load speed, query processing time and other such performance parameters.
i. Magento provides the functionality to merchant to enable reward points feature that provide some incentives to frequent shoppers.
j. Magento helps the customer to create multiple wish lists and move their products from list to list.

There are lots of other features that Magento provides you but still it has below mentioned problems that users have experienced:

a. Although Magento is highly performable, but still it does not work on standard 8 MB but requires at least 20 MB to work properly (PHP requirement to run). Users have complained that it is relatively slower than other e-commerce solutions. The reason may be it's not effectively written on PHP Zend framework.
b. Customization is not that easy as with other shopping carts. Built on Zend framework and MVC approach, a good developer will take time to bring the changes.
c. Unusable in shared hosting environment and requires some amount per month for hosting as you need a semi-dedicated VPS server. Requires a good hosting environment and store management in order for Magento to run smoothly otherwise you may experience problems with speed.
d. In case of B2B, there is no built-in quotation process where customer asks for quotations of products to merchant.
e. Integration with ERP systems is complex task.
f. Magento is purely for B2C and for B2B, it requires third party extensions to integrate, no OOTB support is provided.
g. Technical documentation is available in limited space which makes it difficult to customize and modify the program.

(ii) **BigCommerce**: BigCommerce is also one of the most popular e-commerce solution with following features [22]:

a. BigCommerce offer more than 100+ responsive OOTB templates which can be used to create beautiful, intuitive e-commerce website.
b. It offers its own code libraries to build a completely custom online store over the industry-best theme framework.
c. BigCommerce has a global network of more than 2,000 designers and developers who can help to build the ultimate store for business and also to migrate stores from other platforms to BigCommerce without loss of data within minimum timespan.
d. BigCommerce has built-in M-commerce support in its templates. The store will look and perform equally well on desktops, tablets and mobile phones with no extra coding or design work.
e. BigCommerce allows easy integration with Paypal and other payment gateways, integration with several e-newsletter services and other third party tools.
f. BigCommerce has a feature to send automated reminder emails to people who abandoned their carts at checkout.
g. BigCommerce provides the advance features like custom pricing, customer groups, product-level discounts etc.
h. It provides built-in inventory management as well as integration support with third party vendors.
i. It has its own B2B tax solutions that can be used to manage the taxes and accounting.
j. BigCommerce is built to handle large and complex catalogs, with support for a high number of SKUs, product options and variants, and catalog customization via our open API.

BigCommerce has the following disadvantages [26]:

a. BigCommerce is not an open source, it provides some packages that can be used to create online stores.
b. BigCommerce provides the non OOTB functionalities in terms of app which needs extra cost.
c. BigCommerce charges transaction fees, the additional fees paid to the platform as a percent of sales.

d. BigCommerce doesn't provide any mobile apps to manage stores on the go.
e. BigCommerce has placed limits on annual online sales, if that limit exceeds, then plan needs to be upgraded.
f. BigCommerce lacks in bulk ordering where multiple products can be added to cart in one go.

(iii) **ATG**: ATG has the following features [27]:

a. ATG allows businesses to personalize their online content, promotions, e-mails, and entire multi-channel marketing campaigns.
b. ATG has advanced facet search feature which support 25 languages, industry-specific dictionaries and misspelling corrections that helps website vendors to find a desired product.
c. ATG helps business to grant access rights to marketing specialities, developers, managers and other group of users to maximize website(s) performance.
d. ATG allows business to accept all major credit cards, integration with Cybercash, PayPal, Google checkout and much more.
e. ATG provides automated tools to calculate the order's price including taxes, delivery options, coupons, gifts and discounts.
f. ATG provides a customizable pre-built storefront that decreases the time of the production environment launch.
g. ATG helps business to manage multiple websites via a single instance.
h. ATG supports order processing and fulfilment tools which include multiple payment, delivery and shipping options, order confirmation messages, administrative management tools to view order status etc.
i. ATG provides multiple options to browse online catalogs. Find the item or group of items based on their IDs, description, date of adding to the website, etc.
j. Abandoned Order Services Module allows Oracle/ATG Web Commerce to detect, respond to, report on abandoned orders and related activity and, subsequently, e-commerce businesses to analyze and improve shopping cart abandonment rate.

ATG has the following drawbacks in e-commerce development:

a. ATG takes more time and cost for implementation of B2B in comparison of other platforms.
b. Creation of new modules in ATG is very complex tasks as the folder structure need to be created manually.
c. If the remote system is unavailable, then no form of the data is available to the ATG web application.
d. Frequent queries to the remote system can affect the performance of the remote system as well as of ATG web application.
e. There is no support for local system to keep in sync with remote system that may lead to data conflicts.
f. ATG takes specified amount of initial time to set up and linking with other application servers.
g. In case of promotions it's not feasible. The more promotions a customer has in his/her profile, the longer it takes to generate a price for that customer.

(iv) **SAP-Hybris**: SAP-Hybris has the following features in both B2C and B2B scenarios [24]:

a. SAP-Hybris provides standard e-commerce content pages with multichannel supports (e.g. mobile, desktop, tablet).
b. SAP-Hybris provides guest and express checkout for B2C and multi-step or express checkout for B2B.
c. SAP-Hybris provides full text search capability and integration with Apache Solr.
d. SAP-Hybris provides the feature to manage customer accounts and order history.
e. SAP-Hybris provides reporting and analytics integration to keep an eye on business.
f. SAP-Hybris provides customer quote negotiation and special pricing as per the customer groups.
g. SAP-Hybris features cross and upsells of compatible accessories, bundling of products and services, management of digital and physical goods package etc.
h. To cover the e-commerce in china, SAP-Hybris provides china accelerator which comes with china specific style page templates and components.
i. SAP-Hybris provides third party integrations for payments and integrations with backend systems for data exchange while keeping them online or offline.
j. SAP-Hybris features the creation of custom themes, support for multiple languages, supports for multiple stores on a single server as well as using different servers for single database.

SAP-Hybris has below disadvantages [28]:

a. CMS-cockpit has been claimed as slow and inefficient, which can be a drawback especially when content has become a key to a websites SEO/Marketing success in recent years.
b. SAP-Hybris is quite costlier for implementation of e-commerce in comparison to other platforms.
c. SAP-Hybris lacks in its analytics, reporting and order management capabilities.

4. CONCLUSION

The Internet has been so well established and has taken a huge place in normal life that the business must be transformed from traditional channels to the online channels. E-commerce is the solution to help in growing business from a small limited regions to large regions. To do the business online, one must identify the right platform to grow its business. Generally, there are two kinds of business; B2C: where the business reaches to consumers and B2B: where the business reaches to intermediate buyers or different businesses. In B2C, where the business focuses more on its consumers and their experiences, while in B2B, business focuses more on long-term relationships, specific deals with customers, schedule and setup in place with an e-commerce business.

Keeping the above things in mind, for B2C business models, Magento is best choice as it takes less cost and time to implement as well as provides good customer experience, SEO/Marketing related contents. For B2B business models, SAP-Hybris is best choice as it provides all the B2B related functionalities OOTB, just need to add the extensions or need to install the add-ons on the store, apart from this it helps to customize complete process as well, if business requires.

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Carceptron: Prediction of Car Purchasing using Backpropagation Neural Network

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Abstract
We make so many predictions on a very little fact. Sometimes, we are wrong quite often. We can't afford to make wrong prediction or decision where we have to invest. Like cars where we are investing a lot and there are many fishes in the sea type of fact here because we have more than 300 brands of car and in those we have different categories of them. So, it's bit confusing what to do and where to invest. Carceptron, it's all about making accurate prediction, which will help us to invest on a right car. In this paper we have used C programming language and implemented the Backpropagation algorithm using Multilayer Perceptron in neural networks and used the car evaluation dataset for analysis and predicting whether the car is good for buying or not the basis of the input data by user.

KEYWORDS
Perceptron, Carceptron, Backpropagation

1. INTRODUCTION
Car is one of the huge investments that one makes in his life. With number of options in hand, car purchase is a very confusing and tough task. Selecting the right choice according to the needs, features and budget with more number of available brands and models in market. This sometimes can lead to wrong decisions. Hence, there is a need of a concept which can predict the car on the basis of buyer's requirement and produce the best suitable output. Our report proposes the concept of Carceptron which will make accurate decisions by implementing Backpropagation artificial neural networks [1, 2]. Some of the most important factors which effects the car purchase are been considered and there response is been trained using Backpropogation algorithm, which analyze the information and will tell the customer about the car whether it is feasible to purchase the car or not.

Artificial Neural Networks (ANN) are used for processing of information like our biological Nervous system works. Neural Networks can be used in various sectors and has many applications such as speech recognition, pattern recognition, classification of data, image analysis etc. [3, 4].

Training is compulsory when we have to pass a random function using Artificial Neural Network Training means when we have values generated from a function are not accurate or approx.

2. PROBLEM OVERVIEW
In today's world we have more than millions of features, brands and models present in the automobile world and selecting the best possible car with all the needed facilities within the budget in very difficult and a tough task as many options are available today, and when you plan to buy a car you need to do a lot of research, many conditions are to be kept in mind like budget, safety conditions, boot space, comfort etc, and if you do not do proper research work then it can lead to loss of money which is not affordable . People today are so busy in their life that it is very difficult to review all the feature, brands and models of the car available in the market due to busy schedule and unawareness.

3. BASICS OF NEURAL NETWORKS
Artificial Neural Networks are relatively crude electronic models based on the neural structure of the brain [5]. Neural networks are arranged in layers. Each individual layer is made up of nodes. Each layer is connected to the next layer and nodes are all interconnected. Each hidden layer consists of sigmoidal activation function which helps network to stabilize. [6-8]

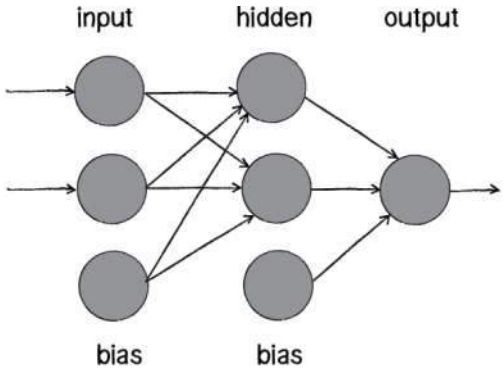

Fig 1: Neural Network

This forms a complete network which consists of an input layer, hidden layers and an output layer. At input layer, we take pattern as input. Hidden layer processes it and finally we get output at output layer.

The perceptron: A perceptron is the simplest neural network possible: a computational model of a single neuron [6]. It consists of one or more inputs, a processor, and a single output [6].

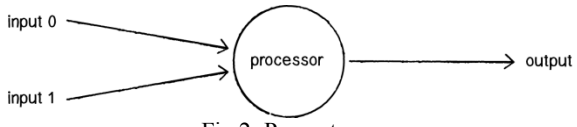

Fig 2: Perceptron

One of the important features of a neural network is its ability to learn. There are different types of learning:

Supervised learning: The system where input and output is provided for training[7].
Unsupervised learning: In this system in which only the input is provided, and a certain pattern has to be found out within the set of inputs by the network [7].
Reinforced Learning: It is similar to supervised learning in that some feedback is given, however instead of providing a target output a reward is given based on how well the system performed[7].

4. LITERATURE REVIEW

According to the Muller et al. [2] there are two main reason for NN investigation, first is to try to get an understanding on how human brain function and second is desire to build machines that are capable for solving complex problems that sequentially operating computers were unable to solve. It has also been said by some of the researchers that errors are handled better by NN than traditional computers programs. So predicting the result of a dataset which has huge number of attributes and undefined output can be made easy using neural network .It is a more efficient way for predicting and classifying data rather than doing it with any of the traditional methods. Results that they get using neural networks are encouraging. That is why NN are becoming so popular.

5. PROPOSED WORK

This section will address the idea behind the Carceptron, people get too confused while buying any car from the varieties which fall in their budget. The proposed model is calculating the condition of the car and categorizing the cars into four different categories.

Firstly, there are six attributes on which any car is decided to buy or not which are number of doors, buying cost, maintenance cost, safety, luggage boot, number of people accommodation. These attributes are assigned a random weight and multiplied with a bias function for every six attributes there are six nodes generated in hidden layer for every node the sigmoid function is calculated. Then similarly, last layer output layer is calculated by same.
The assigned weights to the nodes are random values so there must be an error or deviation from the original values. So error is calculated in the each node by using formula

Error = (output of feedforward)*(1-output of feedforward)*(1-output of feedforward)

Then errors on hidden layer is calculated by using the formula

Error = output*(1-output)*(error of output layer)*(weight)

Then feed forward is run again for the accurate results. Here, there is proper implementation of multilayer perceptron using artificial neural network the last accurately obtained results are the accurate/expected outputs after the removal of errors.

6. ALGORITHM

Step 1- Normalize data to set between 0 and 1, using (ch[i]-xmin)/(xmax - xmin)

Step 2- for every dataset in the training set
Input the dataset to the network
Transfer the input forward to the next layer through the network:
for every single layer in the network
for all the node in each layer

1. calculate the random number using rand()/(double)RAND_MAX
2. Calculate the sum of the inputs each node in the layer
3. Add the bias to the sum of inputs of each layer
4. Calculate the activation function for the node using1/(1+pow(2.71,(-1)*sum));

End

Step 3- Propagating the errors backward through the network layer by layer for each node in the output layer calculating the error using the formula

(output of feed forward)*(1-output of feed forward)*(1-output of feed forward)

for all hidden layers in the network and each node in the layer

1. Calculate the node's error using output*1-output*error of output layer*weight
2. Updating each node's weight in the network using the formula

((random1[1][j])+(l*erroroutputlayer[i][0]*outputofnetwok[i][1]));
End

(i) Feed-forward in the network

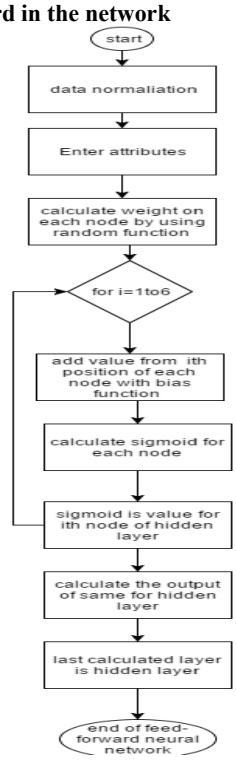

Fig 3: Feedforward Flowchart

(ii) Backpropogation implementation in the network

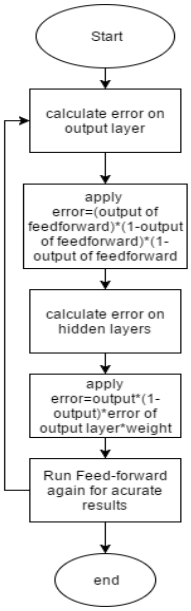

Fig 4: Backpropogation Flowchart

7. IMPLEMENTATION

```
Value of buying cost is : 4
Value of buying cost is : 4
Value of buying cost is : 4
Value of buying cost is : 4
Value of buying cost is : 4
Value of buying cost is : 4
Value of buying cost is : 4
Value of buying cost is : 4
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Value of buying cost is : 4
Value of buying cost is : 4
Value of buying cost is : 4
Value of buying cost is : 4
Value of buying cost is : 4
```

Fig 5: Data input in the network

```
Normalized data for input 2 is 0.666667
Normalized data for input 2 is 0.666667
Normalized data for input 2 is 0.666667
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Normalized data for input 2 is 1.000000
Normalized data for input 2 is 1.000000
Normalized data for input 2 is 1.000000
Normalized data for input 2 is 1.000000
```

Fig 6: Data Normalization output

```
----------FEED FORWARD----------


Number of hidden layers: 1
Number of nodes in input layer: 6
Number of nodes in hidden layer: 6
Number of nodes in output layer: 4
Layer 1
Node 0 = 0.505917
Node 1 = 0.511833
Node 2 = 0.517746
Node 3 = 0.523653
Node 4 = 0.529554
Node 5 = 0.535447

Layer 2
Node 0 = 0.541330
Node 1 = 0.547201
Node 2 = 0.553059
Node 3 = 0.558903
```

Fig. 7: Feed forward output of the network

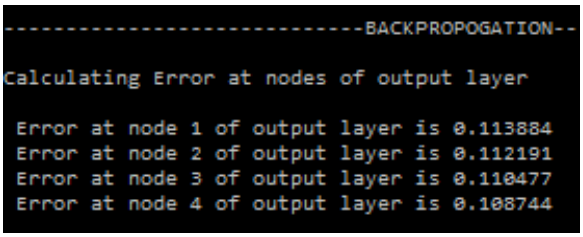

Fig 8: Backpropogation output of the network

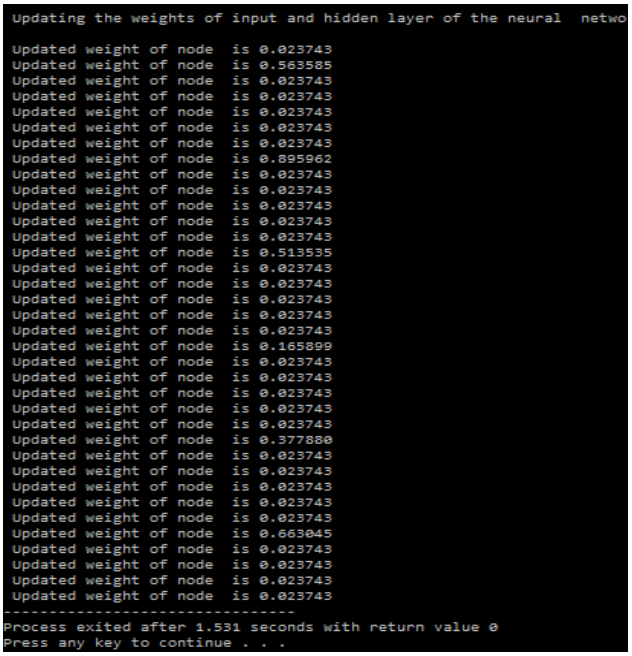

Fig. 9: Updated weights of the network

8. CONCLUSION

We have been able to complete our Paper work successfully to full satisfaction .As proposed we have implemented backpropogation neural network algorithm on our dataset. We were able to generate a code for the system. In the course of completion we have obtained a sound knowledge over general programming logic and C programming environment.

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e-Governance Initiative: A Path Towards Futuristic Identification Implementation in Indian Education System

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Abstract
In India, there are several identification mechanisms for individual in place. But none of the existing identification system provides the information about individual's up to date educational qualification details. This study is probably first to design an E-Card which will carry all the educational details along with other necessary personal details of an individual. This card will reduce the huge amount of data entry and data replication. It will facilitate Quick Response (QR) Code and Smart Card through which anyone can access the educational and other necessary personal details such as address, mail id, phone number, experience etc. of an individual. It will also give permission to employment sectors to access and verify educational and personal data of candidate or employee.
E-Card will carry a Unique Identification Number for each educated individual in India. As the individual accelerates towards the Higher education it is just a matter of updating the details of the same in the particular identification number. E-Card can be made mandatory everywhere in rural/urban which will not only reduce the burden of carrying important certificates or marks cards but also will give the advantage of using it anywhere and anytime whenever required encouraging paperless and faster communication.

KEYWORDS
E-Card, Unique Identification Number, Centralized System, QR Code and Smart Card Technology

1. INTRODUCTION
Governance refers to that structures and processes that are designed to ensure accountability, transparency, responsiveness, rule of law, stability, equity and inclusiveness, empowerment, and broad-based participation. E-government is organizing public management in order to increase efficiency, transparency, accessibility and responsiveness to citizens through the intensive and strategic use of information and communication technologies in the inner management of the public sector (intra and inter-governmental relations) as well as in its daily relations with citizens and users of public services. E-governance is an ICT-enabled tool to achieve good governance [11].
Digital India is a program to transform India into a digitally empowered society and prepare India for a knowledge future [12].

Methodology for Digital India Programme:

- Ministries / Departments / States would fully leverage the Common and Support ICT Infrastructure established by Government of India. Deity would also evolve/ lay down standards and policy guidelines, provide technical and handholding support, undertake capacity building etc.
- The existing/ ongoing e-Governance initiatives would be suitably revamped to align them with the principles of Digital India. Scope enhancement, Process Reengineering, use of integrated and interoperable systems and deployment of emerging technologies like cloud and mobile would be undertaken to enhance the delivery of Government services to citizens.
- States would be given flexibility to identify for inclusion additional state-specific projects, which are relevant for their socio-economic needs.
- e-Governance would be promoted through a centralized initiative to the extent necessary, to ensure citizen centric service orientation, interoperability of various e-Governance applications and optimal utilization of ICT infrastructure/ resources, while adopting a decentralized implementation model.
- Successes would be identified and their replication promoted proactively with the required productization and customization wherever needed.
- Public Private Partnerships would be preferred wherever feasible to implement e-Governance projects with adequate management and strategic control.
- Adoption of Unique ID would be promoted to facilitate identification, authentication and delivery of benefits.
- Restructuring of NIC would be undertaken to strengthen the IT support to all government departments at Centre and State levels.
- The positions of Chief Information Officers (CIO) would be created in at least 10 key Ministries so that various e-Governance projects could be designed, developed and implemented faster. CIO positions will be at Additional Secretary/Joint Secretary level with over-riding powers on IT in the respective Ministry.

Identification system is a mapping from a known quantity to an unknown entity, the known quantity is called the identifier and the unknown entity is what needs to be identified. It is the process to find, retrieve, modify, delete or report specific data without ambiguity from data storage. In India, several Government identification system exist such as Passport, Voter ID Card, Driving License, Pan Card, Aadhar Card and other

Government ID proof. But none of the system provides the educational qualification details of any individual. Beside these, an individual also needs Governmental identification proof issued by Government during his or her study period (primary, Secondary, Higher Secondary and tertiary education). Any individual is eligible to apply any identity proof after attaining age 18. The E-Card will be an identification proof of any student issued by Government which will carry all the educational details along with other necessary personal details such as address, phone number, mail id, experience etc. The E-Card will also allow individual to pay course fee and examination fee through online using its smart card feature. So he or she can avoid visiting brick 'n' mortar and standing in a queue to pay in cash or to make Demand Draft or bankers' cheque [1, 2].

E-Card is a concept which will allow the students or professionals to carry all the educational details starting from the day of their education. As the student proceeds towards higher education the concerned institution is assigned to update the details. Say for example Mr. Prakash took admission in Class I in St. Claret International School, Bangalore in the year 2006. He studied in the same school and completed his matriculation from there in the year 2015. Therefore, his E-Card should carry the following information along with other specified details:

- Name of the Institution and the Board from which he has passed his X Std.
- The marks and percentage he got in class X examination.
- Conduct and school leaving certificate
- Extra-curricular activity details such as sports, cultural, NCC, Scout or NSS

Now he decided to take admission in Ryan International School, Raipur. So, while taking admission into Ryan International School in the year 2015, he can produce his E-Card or he can mention the Unique ID to the school so that they can cross verify the information from centralized database which are supplied by the previous institution (*i.e*. St. Claret School). So, it is just a matter of swapping the card (using QR Code facility) or verifying with unique ID. Now it is Ryan International Schools' responsibility to update the details about post matriculation qualification in the centralized database. But due to some reason Mr. Prakash stopped his study after appearing 11^{th} examination. So, his E-Card status will show that he has appeared /passed 11^{th} examination in the year 2016. After two years, he wanted to continue his study in a Pre-University college in BJB College, Bhubaneswar so there he can produce his last updated E-Card and proceed.

E-Card facilitates online payment using smart card technology. E- Card highlights different Smart card technology such as Chameleon card with Tokenization Process. The Chameleon Card is a programmable card, represents each of the owner's credit, debit, and customer cards which avoids unnecessarily carrying all of the aforementioned. Tokenization is the process of replacing sensitive data with unique identification symbols that retain all the essential information about the data without compromising its security.

When a candidate proceeds towards higher education, he or she can pay the course fee and examination fee through E-Card which facilitates electronic wallet feature. The smart card number of E-card is equivalent to the E ID of E-card. Based on the smart card number, an individual will open an account in any bank. After opening the account, he or she can do transaction based on his or her smart card number given in E-card which will be remain same for all banks. It means bank will create separate account for each individual based on the unique smart card number for their officially usage. When an individual will swipe the card for any transaction, the smart card number will refer in an encrypted way to the corresponding bank's account number and transaction will be made for him or her. Say for example Mr. Prakash is doing his PGDM in Christ University, Bangalore. He can pay the semester fee and semester examination fee through E-card.

E-card also facilitates QR Code feature where it scans the code and to get all the required information such as personal, name of the institution/ board/ council/ University/ year of appearing examination/ percentage scored/ co-curricular and extra-curricular achievement/ project details/ workshop or conference or webinar attended and also presented any research article. Therefore, we can say that if E-Card is made mandatory everywhere in rural and urban it will not only reduce the burden of carrying important certificates or marks cards but also will give the advantage of using it anywhere, anytime whenever required encouraging paperless and faster communication. An individual can avail the learning material and resources from different learning center such as INFLIBNET, British library.

2. FRAMEWORK OF E-CARD

The framework of E-Card system is explained with the help of Unified Modeling language (UML) object class diagram. In this object class diagram there are different classes namely Student, Secondary Board / Higher Secondary Board / University, Primary Institution / Secondary Institution / Tertiary Institution, Government / Ministry of Human Resource Development (MHRD) and Employment Sector (Government sectors and Corporate Industries). All these classes are connected to the centralized database where all the educational, curricular and other personal information are stored and retrieved. Each class performs unique tasks. The centralized database is created and maintained by Government or Ministry of Human Resource Development (MHRD). The Ministry of Human Resource Development is an Indian government ministry which is responsible for the development of human resources. The essence of Human Resource Development is education, which plays a significant and remedial role in balancing the socio-economic fabric of the Country. Since citizens of India are its most valuable resource, our billion-strong nation needs the nurture and

care in the form of basic education to achieve a better quality of life. This warrants an all-round development of our citizens, which can be achieved by building strong foundations in education [1, 2].

The main objectives of the Ministry of Human Resource Development would be as follows

- Formulating the National Policy on education and to ensure that it is implemented.
- Planning development, including expanding access and improving quality of the educational institutions throughout the country, including in the regions where people do not have easy access to education. Paying special attention to disadvantaged groups like the economical backward, females and the minorities.
- Provide financial help in the form of scholarships, freeships, loan subsidy, etc to deserving students from deprived sections of the society.
- Encouraging international cooperation in the field of education, including working closely with foreign governments as well as Universities, to enhance the educational opportunities in the country.

Currently, the MHRD works through two departments:

- Department of School Education and Literacy. The Department of School Education and Literacy has set the "universalization of education" which makes better citizens out of our young brigade. Department of School Education and Literacy deals with primary, secondary and higher secondary education, adult education and literacy.
- Department of Higher Education. The Department of Higher Education is responsible to bring world class opportunities of higher education and research to the country so that Indian students are not finding lacking when facing an international platform. Department of Higher Education deals with university education, technical education. It also deals with scholarship, freeship, loan subsidy, etc to deserving students from deprived sections of the society.

While the Department of School Education and Literacy is responsible for development of school education and literacy in the country, the Department of Higher Education is responsible for development of largest Higher Education systems of the world.

3. ROLE OF E-GOVERNANCE AND MHRD

- The ministry should create a centralized database which will store the educational details of the students offered by different institutions [3].
- The ministry will also design the E-Card which will carry the information of a student such as Name, Fathers' Name, Mothers' Name, Date of Birth, Sex, Nationality, E ID (Permanent id for an individual), bio-metrics of the student, Quick Response Code (QR Code) facility and Smart Card facility and a permanent smart card number which is based on E ID of E-Card. Anyone can access students' details from the database through the E ID or QR Code.
- It will generate the E ID for each student which is based on country code, state code, birth place pin code and ten digit unique codes.
- The ministry will also generate unique authentication id for Primary Institution, Secondary Education and Tertiary Education institution to upload and update educational and curricular and extra and co-curricular information. It will be mandatory to all the institutions to upload all education related data in different stage of education by different institution. This needs to be further verified by Secondary board, Higher Secondary council or University.
- The ministry will also generate unique authentication id to student to upload and update their personal information such as address, mail id, phone no etc. The student can also borrow various library resources from reputed libraries.
- The ministry will also generate unique authentication id to Secondary board, Higher Secondary council or University to verify whether different Primary Education, Secondary Education and Tertiary Education institutions are uploading correct educational information and curricular and extra-curricular information for each individual or not. If they get any mismatch information, they will send a reminder to make a correction.
- In rural and tribal areas, the ministry can establish nodal center with the help of state government where all nearby educational institute can come and upload and update the educational details of a student.
- It will also give permission to governmental and corporate employment sectors to access and verify educational and personal data of candidate for preparing the merit list to conduct campus recruitment process and internship process or of employee for appointing in different task.
- The Government can also identify list of eligible students to *disburse scholarship and free ship* where the amount can be disbursed in the different categories such as SC, ST, OBC, Minorities and other Economically Backward Class according to the deserving candidates.
- It can identify the dropout rate of students and specially girls.
- The government can generate the *annual report on literacy rate*.
- The Government can also identify list of eligible students for government jobs and intimate them through given mail id and phone no which is uploaded by student in their personal information.
- The ministry can tie up with different banking sector to generate the permanent smart card number for each candidate using their E ID.
- The candidate can use E-Card as an electronic wallet to pay course fee and exam fee.

- Whenever the candidate will open account in any bank, the same smart card number will be used to create an account and will be carried further.
- The entire online bank transaction can be done using smart card technology. The smart card will hold all information about the candidate and the bank and account details. The institutions will make a mandatory clause to pay different fees through online which can be possible through the E-card. He or she can increase the debit limit by using E-Card as electronic wallet.
- In the beginning of the academic year, the ministry will send circular to different institution and university to upload the educational, co-curricular and extra-curricular information of students in the centralized database.
- The database admin will maintain the database as well as the security of all data at institution level.

A. Role of secondary board, higher secondary council and Universities

The unique id and password will be generated and given by MHRD admin to all boards of secondary education, council of higher secondary education and universities of different states in India [6].

- The boards and councils will verify all data and result details from the centralized database uploaded by different primary institution, Secondary and higher secondary institution respectively. If there is any data mismatch then they must send the reminder to those institutions to rectify the mistake within the time limit. It also ensures that there will not be any data redundancy and duplicity done by any institution.
- Similarly, University will also get unique id and password from admin of the database created by MHRD. Through the id, the University can check the result from the database uploaded by tertiary educational institution.

B. Role of Primary, Secondary and Tertiary Educational Institutions

- The unique id will be also given to different primary, secondary, higher secondary and tertiary educational institution. Through the id, each institution can upload their institutional admission details, students' caste wise details, gender wise details etc. and result of each individual student in the database either annually or semester wise.
- They can also upload students' curricular and co-curricular activities details in the database created by MHRD for E-card. They include students' participation in different wings of NCC, NSS or Scout. They also upload and update participation and achievement of different level of State and National level Sports and Cultural participation [7].

4. HOW DOES E-CARD WORK?

- *[How to apply for E-Card?]* Students have to provide all necessary information to the school authority at the time of admission. Then the school authority will submit that relevant information in the database created by MHRD. Once it is submitted the student will receive the permanent E-Card from MHRD [7].
- *[What does E-Card contain?]* The card will provide all the relevant information of student such as Name, Father Name, Mother Name, Date of Birth, sex (male or female), Student's E ID and bio metrics of the student. This permanent E ID will be based on country code, birth place pin code, and ten digit id code. For example: The id of one student from Jalahalli, Bangalore will be 09 / 560013 / 1234554321.
- *[Validity of E-Card]* The E id will remain same for life time.
- *[As an Identification Proof]* The student can use the E-Card as an identification proof and it is helpful to apply for other nationalized documents like passport and Driving License etc.
- *[Use of E-Card]* Through the E ID, anyone can access the educational details and personal information of a student. Also, scanning QR code, anyone can get those information in details. Using the E ID and Smart card number, banking sectors can create bank account and provide electronic payment option using smart card technology.
- *[How students can make use of E-Card?]* Through the id and password generated for the student, the student can update his or her personal details such as address, e-mail id, phone number, add-on course details, certification course details and all other necessary information with time changes. He or she can also update his or her areas of interest and employment details like year of experience and details of different employers. The student can create electronic wallet using smart card feature of E-card. The debit amount can be further revised by student to pay course fee and examination fee.
- *[As an electronic wallet]* The student can pay his or her course fee and other study related fee to the institutions using E-card which facilitates the electronic payment option.
- *[Job Alerts]* The students can receive intimation from Government and corporate organization regarding job vacancies through their given email id and phone number.
- *[Helpful Tool for Employment Sector]* The Government and corporate employment sector can also use centralized database created by MHRD. They can access the database and collect information of a particular student according to the criteria. They can also prepare a list of students in general, SC, ST category for interview process, inform them about schedule of interview through mail id. Based on the merit list, employment sectors can organize campus recruitment process or candidates about current vacancies. They can verify the educational details and personal information

details of a student from the database. The organization can easily identify the fake candidates as well as the forge information submitted by candidates. The organization can upload previous experience of employee and insist the employee to update his or her newly assigned task and details which can be further verified by the authority of employment sector. The organization can also prepare a list of students for internship program according to the merit list. The database will be maintained by the system admin appointed by MHRD. The system admin will take care of the security of the database [8].

- *[Helpful Tool for Banking Sector]* Candidate can create the bank account in different banks using the E ID and permanent smart card number given by MHRD. All information related to candidate, bank and account can be created and updated with the help of smart card technology. Whenever any device will read the smart card, a report of all necessary information will be generated. It means bank will utilize the smart card number to create its own account number. The smart card number will remain same for other banks also. It means if candidate will open another account in a different bank, the same smart card number will be utilized. When system will read the smart card number, it will encrypt that number to bank's own account number given to the candidate in a secure way. So the candidate can do transaction without having separate account and separate debit card. Using the E-card, which facilitates electronic wallet feature, an individual can do different transaction. And any bank can avoid generating different passbook, debit card, ATM card etc. Further banks can add credit facility to E-Card where candidate can use the same smart card number and create credit account for him or her. Say for example- Ms. Somanjoli is opening five different accounts in five different banks; the smart card number will refer to those accounts. She can access all those accounts using her smart card number of E-card. It is the matter to swipe the E-Card and swipe the smart card number to avail the electronic wallet feature. Now she can pay her course fee and examination fee using E-Card [13].
- *[Transaction Alerts]* The students can receive intimation from banking sectors regarding different transaction made by students with the help of E-Card through their given email id and phone number [14].

5. QR CODE

Quick Response Code is the trademark for a type of two-dimensional matrix barcode. A barcode is a machine-readable optical label which contains information about the item to which it is attached [9]. The QR Code system have different applications such as product tracking, item identification, time tracking, document management, general marketing etc. A QR code consists of square dots arranged in a square grid on a white background, which can be read by an imaging device. The required data are then extracted from patterns present in both horizontal and vertical components of the image. There are mainly six variants:

- *Micro QR code* is a smaller version of the QR code standard for applications where symbol size is limited. There are 4 different versions of Micro QR codes: the smallest is 11×11 modules; the largest can hold 35 numeric characters.
- *Model 1 QR code* is an older version of the specification.
- *Model 2 QR Code* is an improved Model 1 QR Code which can read smoothly even if it is distorted in some way.
- *SQRC*, a type of QR code which is used to store private information.
- *LogoQ* is a type of QR Code created to enhance visual recognition by combining it with letters and pictures in full color.
- *IQR code* can fit the same amount of information in 30% less space. An IQR Code of the same size as an existing QR Code can hold 80% more information than the traditional QR Code. It is a 2D matrix code which can store more data than others. Using this, smaller-sized codes than the regular QR Code can be generated. Rectangular modules, as well as square modules, can be generated by this technique. It is also possible to overwrite rectangular modules with a space where a barcode is and to print it on cylindrical products while maintaining the code's readability.
- The E-Card consist six different QR Codes. Those are
- QR Code for an individual personal information which provides individuals name, fathers' name, mother's name, date of birth, sex, E ID number and necessary information which is uploaded by individual. It also provides an individuals' achievement and participation in different level of co-curricular and extra-curricular activities and details of different certifications and add-on program attended by individual, details of science model or project designed by individual, workshop, conference, seminar and webinar attended and presented his or her research work.
- QR Code for schooling details which provides when and where an individual started his or her studies. It also provide information about the school, location of the school and other schools (If individual completed his schooling in different schools)
- QR Code for secondary examination details which provides the information about result of the candidate appearing in secondary examination, school where he has appeared exam, percentage and CGPA of his or her secondary examination
- QR Code for higher secondary examination details which provides the information about result of the candidate appearing in higher secondary examination, school or college where he has

appeared exam, percentage and CGPA of his or her higher secondary examination.

- QR Code for undergraduate examination details which provides the information about result of the candidate appearing in semester or annual university examination, college where he has appeared exam, percentage and CGPA of his or her university examination.
- QR Code post graduate examination details which provides the information about result of the candidate appearing in semester university examination, college where he has appeared exam, percentage and CGPA of his or her university examination.

6. SMART CARD TECHNOLOGY

A smart card or chip card or integrated circuit card (ICC) is any pocket-sized card with embedded integrated circuits or embedded microprocessor [10]. The microprocessor is under a gold contact pad on one side of the card. Smart cards can provide identification, authentication, data storage and application processing. Smart cards may provide strong security authentication for single sign-on (SSO) within large organizations. This card can be periodically refreshed for additional use. A smart card contains more information than a magnetic stripe card and it can be programmed for different applications. Some cards can contain programming and data to support multiple applications and some can be updated to add new applications after they are issued. Smart cards can be designed to be inserted into a slot and read by a special reader or to be read at a distance. Cards can be disposable or reloadable for most applications.

Applications

- Smart cards serve as credit or ATM cards, fuel cards, mobile phone SIMs, authorization cards for pay television, household utility pre-payment cards, high-security identification and access-control cards, and public transport and public phone payment cards. Smart cards may also be used as electronic wallets.
- The subscriber identity modules used in mobile-phone systems are reduced-size smart cards, using otherwise identical technologies.
- Smart-cards can authenticate identity. Usually, they employ a public key infrastructure (PKI). The card stores an encrypted digital certificate issued from the PKI provider along with other relevant information.
- Smart cards and integrated ticketing are used by many public transit operators. Card users may also make small purchases using the cards.
- Smart cards can be used as a security token.
- Smart cards are being provided to students at schools and colleges. It can be used for tracking student attendance, as an electronic purse, to pay for items at course fee, exam fee, canteens or vending machines, for tracking loans from the school library, college library other resources as INFLIBNET, British library and so on and for accessing transportation services.

a. Chameleon Card (Smart Card Technology)

The Chameleon Card is a programmable card, represents each of the owner's credit, debit, and customer cards which avoids unnecessarily carrying all of the aforementioned. It works with a small handheld device called the Pocket Vault. The Card has security features which guard against identity theft, physical theft of cards, and theft of the card information over the Internet. The device also has built in radio frequency identification (RFID) technology and the capacity to display a user's photo [10].

Working Principle:

The small handheld device known as Pocket Vault reads and stores the information from candidates' card in a secure Internet session while docked to a computer. After reading the information from a card, it displays an icon for it on its touch screen. To make a transaction, candidate must identify himself or herself through finger scanning authentication and select the card he or she wants to use. When he or she makes his or her selection, the Pocket Vault programs the appropriate information into the card and emits it for use. The usual information, such as a card number and expiration date, appear on the card's display area. Then he or she just swipes the card in the usual way.

Although the idea of only carrying a single card is appealing, the security features may be a more compelling reason to purchase pocket vault device. Because this pocket vault device requires biometric authentication. It would not work for anyone but the legitimate user. If your wallet is stolen, the thief has no access to information that could be used to assume your identity. Even if someone steals the card while it is activated, the potential harm is limited. After 10 minutes, the information on the card is rendered unreadable and the transducer stops working. Using this device candidate's information needs never be stored on the computer or on a Web site's customer database during online transaction.

b. Tokenization (Smart Card Technology)

Tokenization is the process of replacing sensitive data with unique identification symbols that retain all the essential information about the data without compromising its security. Tokenization has become a popular way for small and mid-sized businesses to bolster the security of credit card and e-commerce transactions while minimizing the cost and complexity of compliance with industry standards and government regulations.

Working Principle

Payment card industry (PCI) standards do not allow credit card numbers to be stored on a retailer's point-of-sale (POS) terminal or in its databases after a transaction. To be PCI compliant, merchants must install expensive end-to-end encryption systems or outsource their payment processing to a service provider who provides a "tokenization option." The service provider handles the

issuance of the token value and bears the responsibility for keeping the cardholder data locked down.

In such a scenario, the service provider issues the merchant a driver for the POS system that converts credit card numbers into randomly-generated values (tokens). Since the token is not a primary account number (PAN), it can't be used outside the context of a specific unique transaction with that particular merchant. In a credit card transaction, for instance, the token typically contains only the last four digits of the actual card number. The rest of the token consists of alphanumeric characters that represent cardholder information and data specific to the transaction underway. Tokenization makes it more difficult for hacker to gain access to cardholder data, as compared with older systems in which credit card numbers were stored in database and exchanged freely over network. Tokenization technology can, in theory, be used with sensitive data of all kinds including bank transactions, medical records, criminal records, vehicle driver information, loan applications, stock trading and voter registration.

E-Card facilitates smart card feature. The smart card is having permanent number which holds several information of an individual such as candidates' name, address, bank account number, location of bank and date of issuing the account etc. Candidate can create the bank account in different banks using the E ID and permanent smart card number given by MHRD. Whenever any device or system will read the smart card, a report of all necessary information will be generated. It means bank will utilize the smart card number to create its own account number. The smart card number will remain same for other banks also. It means if candidate will open another account in a different bank, the same smart card number will be utilized. Using the E-card, which facilitates electronic wallet feature, an individual can do different transaction. And any bank can avoid generating different passbook, debit card, ATM card etc. Further banks can add credit facility to E-Card where candidate can use the same smart card number and create credit account number for him or her.

Fig 1: Facing side of E-Card

Fig 2: Back side of E-Card

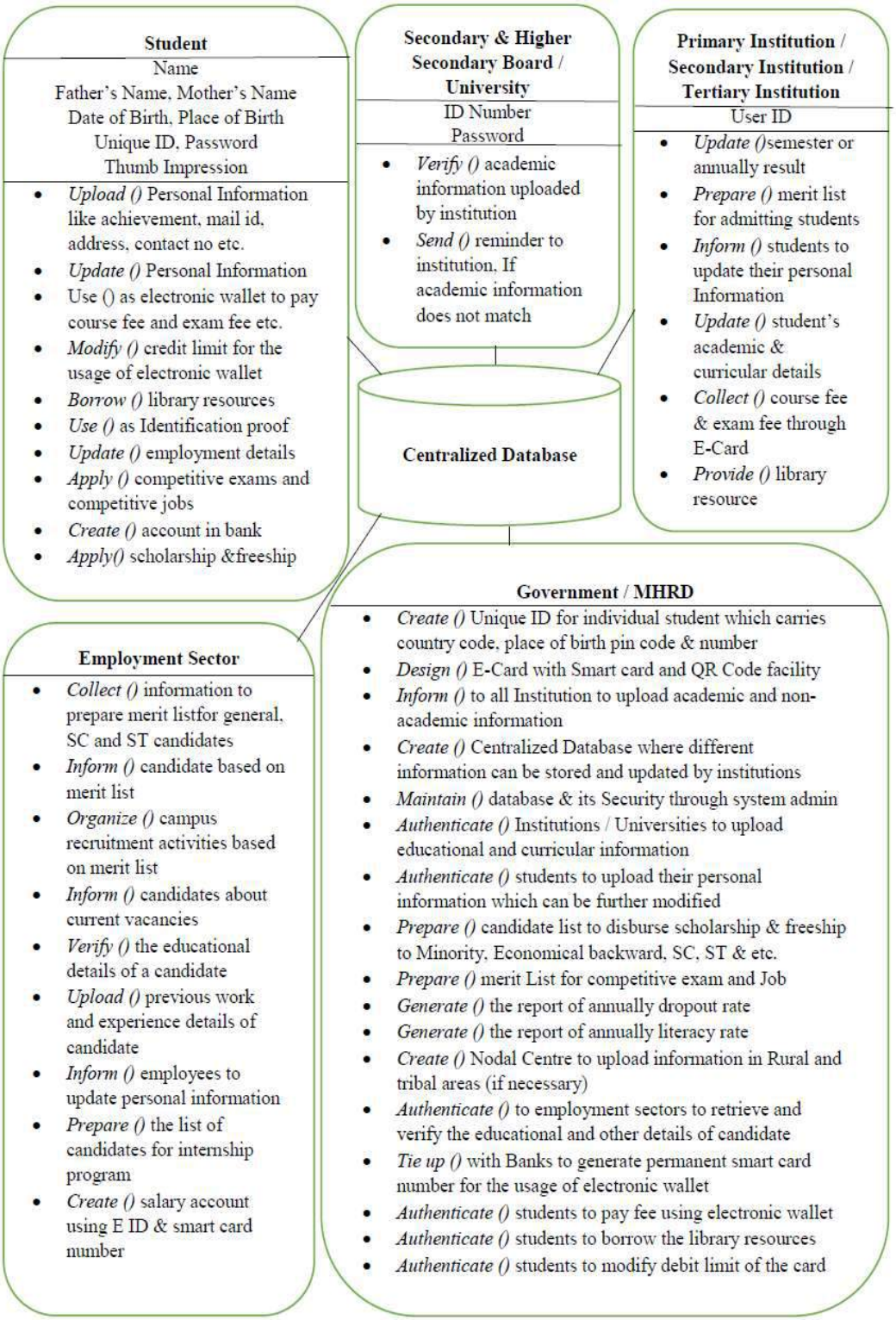

Fig 3: UML Class Diagram [4] [5] [13][14]

7. BENEFIT USING E-CARD

E-Card can hold all necessary information of a candidate along with educational, co-curricular, extra-curricular and personal information. E-Card can be used as identity proof and as most valuable documents to apply other nationalized documents such as passport and driving license. It can also be used to borrow learning resources from INFLIBNET and British library etc. E-card can be used as electronic wallet to pay several fee during studies and further used also. It can be used as debit as well as credit card. E-Card holds E ID, through which anyone can access the details of educational, co-curricular, extra-curricular and personal information. It facilitates QR Code which can be scanned to get the details of educational, co-curricular, extra-curricular and personal information. It also facilitates smart card technology through which electronic payment option can be generated to pay several fees during studies and so on. Having this, any candidate can apply different competitive examination, government and corporate job. Using this, a candidate receives different financial support from different government agencies without applying. E-Card can be used anywhere and anytime which encourages paperless and faster communication.

8. CONCLUSION

Implementation of E-Card can bring revolutionary change in education system in India. It serves as a strong identification proof for educational details of a student. Validation and verification process at various level of education system guarantees the authenticity of information. Addition of QR Code facilitates the freedom to anybody to use the card to collect and verify an individual's details. Addition of smart card technology facilitates the freedom to the students to use card for paying different fees in a secure way which cannot be possible with any other identity proof. In this case, the E-Card system is introduced and the benefits are analyzed. If the Government takes up this initiative in a serious note then the destination is not so far to reach.

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Hardware Tuning Based Approach for Data Warehouse Tuning

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Abstract
The concept of the data warehouse has been emerging over the last few years, but with the new, faster computers and the reduction in the cost of disk storage, the data warehouse is finally becoming a reality. This paper first looks at what a data warehouse is, then at the characteristics of the data warehouse, and then at the data access patterns seen in the data warehouse.

KEYWORDS
OLTP, DSS, Data Warehouse, OS

1. INTRODUCTION
As its name implies, the data warehouse is a storage depot for corporate data. Enormous amounts of data are concentrated in the data warehouse; sources for the data include the following:

- Customer information databases
- Accounts receivable
- General ledger
- Inventory databases
- Customer credit databases
- Other sources

These sources combine to provide a wealth of data about customers and their buying habits as well as information about the general state of our business.
A data warehousing system is similar to a DSS system in some of its functionality, but the scale and focus are different. A typical DSS system focuses on one type of business function; by using its various data-input sources, the data warehousing system may perform much broader business queries. Data warehousing systems can easily achieve sizes in the hundreds of gigabytes; some systems even break the terabyte barrier. These systems are made possible by the continuing trend of computer hardware to increase in speed while decreasing in price. In the near future, it may not be uncommon to see tables of a terabyte in size [1. 2].

Although the cost of data warehousing hardware is decreasing, it is still out of reach of the main stream for now. As we go further into the information age and the value of information is better understood, We believe data warehousing will become more mainstream.

2. CHARACTERISTICS OF A DATA WAREHOUSE
Here are some of the characteristics of the data warehousing system:

- **Queries against large volumes of data.** The data warehousing system consists of much more data than the typical OLTP or DSS system.
- **Queries exhibit a variety of access patterns.** Queries may be simple or quite complex, with complicated joins and aggregations on large amounts of data.
- **Highly complex queries.** Queries on a data warehouse are typically much more complex than those used in OLTP and DSS systems.
- **Data access stresses the system to its limitations.** The processes stretch the system in terms of both performance and capacity.
- **Intense load activity.** As data from various sources is entered into the data warehouseing system, the load increases dramatically.
- **Is a conglomeration.** A data warehouse is a compilation of various input sources, usually tied into the corporate OLTP databases and other sources.

The load on the data warehousing system is typically very high. As with the DSS system, because users do not typically use a data warehousing system for online processing, it is reasonable to push the system to its limits. It is not uncommon for the decision support queries run against the data warehousing system to take hours or even days to complete. The queries are complex and the amount of data being queried is enormous. These systems are optimized for throughput rather than for response times. By maximizing throughput, some jobs may suffer in terms of response time. If we think that the data warehousing system is just a glorified DSS system, we are partially correct. The data warehouse may just be the next step in the

evolution of the DSS system. There are many similarities, but there are many differences as well.

3. DATA ACCESS PATTERNS

The data access patterns seen in a data warehouse are fairly similar to those seen in a DSS system. Based on the types of transactions we generate, we should be able to fairly accurately determine these patterns. Although each system has its own specific data access patterns, the data warehousing system has the following, general characteristics:

Redo log activity is moderate to high. Unlike the DSS system (where the redo log activity is very low), the redo log activity for a data warehouse may be moderate or even high. This is caused, not by the activity of the business transactions, but by the procedures necessary to prepare and load the data. The metadata may be constantly put together from many external sources.

- **Archiving activity is moderate to high.** As with the redo logs, there may be significant activity due to the conglomeration of data stored in the data warehouse.
- **Data access for each query is mostly sequential.** Because the queries usually extract large amounts of data from the tables, full-table scans are not uncommon.
- **Data reads can (and frequently do) take advantage of multiblock reads.** We can expect that many of the disk accesses are the size of multi block reads.
- **Access to the data files is somewhat random.** As with the DSS system, this random access is caused by contention with other transactions and join and indexing operations that result in fairly random access across the data volumes. However, these random reads from the disk drives access the data with a much larger data request.
- **Data access may be sparse.** Because of the massive amounts of data being stored, there may be pockets of data infrequently accessed and other pockets that see much more frequent access.
- **Heavy access to the temporary tables.** Because of the typical size of many of the join and sort operations, the temporary tables are hit hard. Remember that only the sorts that use less memory than SORT_AREA_SIZE are in memory.
- **Data access may not be distributed evenly.** Because of the massive amount of data stored in the warehouse, it is not uncommon for queries to use only isolated pieces of data.

Although these patterns vary depending on how our system operates, the general principles are the same. The access patterns to our tables vary based on how often and how much is done to each table.

4. SYSTEM LOAD

Like the DSS system, the CPUs in a data warehousing system are usually 100 percent active during the large business queries. Where OLTP systems have many users with small queries, the data warehousing system has relatively few users and massive queries (as does a DSS system).These queries should be able to take advantage of the capabilities of the CPUs and memory as long as the system does not become disk bound. By tuning the server using some of the concepts, we can avoid becoming disk bound. The typical OLTP, batch, or DSS system may have an insufficient number of disk drives, which causes an I/O bottleneck. The data warehousing system may not have this problem because so much disk space is needed for the hundreds of gigabytes of historical and current business data, that, with careful planning, there are plenty of disk spindles to distribute the I/O load. Following is a list of some of the load characteristics of a data warehousing system:

- **Relatively few processes on the system.** If we take advantage of the Parallel Query option, we add more processes and subsequently more process switches.
- **Minimal network traffic.** Network traffic is low during the transaction processing phases but may be significant during the data loading and updating phases.
- **Heavy I/O usage.** The decision support queries associated with the data warehouse usually generate large amounts of I/O to the data files. This I/O is somewhat random if multiple decision support queries are active simultaneously; but the I/Os are larger in size because of multiblock reads.
- **Moderate to high redo log activity.** Unlike the DSS system (where the redo log activity is very low), the redo log activity for a data warehouse may be moderate or even high. This is caused, not by the activity of the business transactions, but by the procedures necessary to prepare and load the data. The metadata may be constantly put together from many external sources.
- **Moderate to heavy use of rollback segments**. During the decision support queries, rollback segments will not be used heavily, but during the data-creation or conversion phase, rollback segment activity can be significant.
- **Large amounts of memory.** The memory is used not only for the SGA but for each of the server processes required for sort and join operations.

Defining and understanding these characteristics can help we design and tune our data warehouse [3] for optimal performance. The first sep in this design process is to set goals for what we want to achieve.

5. GOALS

The goal in tuning the data warehouse is to achieve a system that has certain characteristics. Here is a list of the characteristics of an optimally tuned data warehouse:

- **The system is CPU bound during decision support queries.** By removing all other bottlenecks, the system should be able to process as fast as possible, which is the speed of the CPUs.
- **The system is not drive bound.** Any disk bottleneck degrades performance. If this is the case, we should add more or faster disks.
- **Memory is sufficient.** If the machine pages or swaps, performance is severely degraded. The best solution is to add more memory; if that is not possible, reduce the size of the SGA or the number of users until the system no longer pages or swaps.
- **The system meets any additional requirements we might have.** With some data warehousing machines, we must keep current with the OLTP systems by updating on a nightly basis. With the data warehouse, we may have to update the data within a certain time frame.

By setting goals for how we expect the system to perform, we can determine whether we are successful. We can also determine earlier whether we will be able to achieve our specified goals.

6. DESIGN CONSIDERATIONS

Looking at data access patterns can give us a good idea how to design the system. Before looking at the design process, consider these important issues, introduced earlier in this book:

- **I/O is typically the limiting factor in the system.** We can do only a fixed number of random I/Os per second per disk drive.
- **I/Os can be reduced by caching data blocks in the SGA.** If the data we want to access is already in the SGA, a disk I/O is not required.
- **Isolate sequential I/Os.** Most of the time spent reading from or writing to the disk is spent seeking to where the data is located. If we can reduce seeks, we can achieve more I/Os per second.
- **Spread out random I/Os.** Random I/Os have a maximum rate per drive. By spreading the I/Os out among many drives, we increase the overall rate.
- **Avoid paging and swapping.** Any time the system pages or swaps, performance is severely degraded. Avoid this at all costs.

All these factors contribute to the optimal data layout of the system. The physical layout along with SGA and shared pool tuning creates an optimally configured server for the decision support tasks usually performed in the data warehouse. In data warehousing systems, the design of the queries is also very important, as we will see in later chapters.

7. PHYSICAL DATA LAYOUT

This section looks at how the data in a data warehouse should be configured. First, it looks at how to lay out the data on traditional disks; then it looks at disk arrays. We recommend using disk arrays if at all possible; the ease of use and performance benefits are worth the cost of the array.

The main goals in designing the physical data layout are to balance the I/O across all the disks that are randomly accessed and to isolate the sequential I/O. The data warehousing system typically involves loading and processing of data, which causes moderate to significant use of the redo logs. By isolating the redo log file in a data warehouse, the majority (if not all) of the data files are accessed in a random fashion but can take advantage of multiblock reads. To take advantage of multiblock reads, stripe the data over as many disks as necessary to achieve I/O rates our disk drives can handle.

8. TRADITIONAL DISKS

The layout for a data warehouse can be large and difficult to manage. A minimal configuration should look something like this:

Element (# of Disks)	*Comments*
System (1+)	The system disk is used for the operating system, swap file (if applicable), user files, and Oracle binaries.
Redo log (2+)	Because there is moderate to heavy redo log activity, it is best to have at least two disk drives so that you can mirror the logs. When you factor in archiving, you may be better off with at least four disks.
Archive logs (1+)	You can take advantage of the sequential nature of the archive process by isolating the archive log files to their own set of disks.
Data files	The number of disks you need for data is determined by the amount of random I/O your user community generates and the size of the database. In this type of environment, the number of disks can be significant.
Index files	The number of disks needed for indexes is determined by the size of the indexes and the number of I/Os to the indexes. In this type of environment, the number of index disk drives can also be significant.

Both the data files and the indexes should be striped over as many disk drives as necessary to achieve optimal I/O rates on those disks. remember that we can only push a disk drive to a maximum random I/O rate. The data and indexes can be striped across the disks using Oracle or RAID striping or a combination of the two. With large data warehousing systems, We recommended OS or hardware striping. To take advantage of the Oracle Parallel Query option, we will benefit from having several large extents. An optimal configuration may consist of several data files residing on the same large, striped volume. If we do not use

Oracle striping and build one large extent, we may not see the full benefits of the Parallel Query option. We preferred a hardware disk array to manual Oracle striping primarily because the disk array provides excellent performance and is easy to use. When we use a disk array, the task of distributing I/Os can be greatly simplified.

Disk Arrays

The layout for the data warehouse on RAID volumes is much simpler than it is on traditional disk drives. A minimal configuration should look something like this:

Element (# of Volumes)	*Comments*
System (1+)	The system disk is used for the operating system, swap file (if applicable), user files, and Oracle binaries. If possible, you should mirror this disk for additional fault tolerance.
Redo log (2+)	Because there is moderate to heavy redo log activity, it is best to have at least two disk drives so that you can mirror the logs. This volume should be made up of at least two physical disks using RAID-1. By using only one log volume, performance degrades during archiving because the sequential nature of the log writes is disrupted.
Archive logs (1+)	The number of disks needed for the archive log files is determined by the amount of data you need to archive. This data can be written to tape as necessary. You can take advantage of the sequential nature of the archive process by isolating the archive log files to their own set of disks.
Data and index (1+)	Because you always have concurrent access to disks in a disk array, it is not necessary to split the data and indexes into separate volumes. The number of disks you need for data and index is determined by the amount of random I/O your user community generates and the size of the database. This logical volume may consist of many disk drives. Performance is enhanced by using as few volumes as possible and striping over as many drives as possible.

Both the data files and the indexes should be striped over as many disk drives as necessary to achieve optimal I/O rates on those disks. we can only push a disk drive to a maximum random I/O rate. Unlike traditional disk drives, when we use a disk array, the data is automatically striped across all the disk drives; therefore, it is necessary to create only one table space and table for all our data. We do not even have to put indexes into another table space although We recommend doing so for other reasons (such as monitoring and maintenance).With traditional disk partitioning, it is difficult to manage hundreds of data files and disks; with a disk array, we can manage hundreds of disks with just a few data files. Of course, Oracle has a 2 gigabyte limitation on the size of a data file, but this is easily resolved by creating a data file for every 2 gigabytes of space we need. The data files can all reside on the same disk array volume. By splitting table spaces into several data files with tables striped across them, all residing on the same logical volume, we can take better advantage of the Parallel Query option. Because the data warehouse may have a large amount of data that is sparsely accessed, it is to our advantage to put many different types of archival and current data on each disk volume. By spreading out the data, the I/O load is more evenly distributed. If we use a disk array, many of the management tasks and load balancing tasks are greatly simplified. With the disk array, we also have the option of using fault tolerance without affecting system performance. Of course, using fault tolerance requires significantly more disks. We recommend that we use a disk array if possible. Software striping is fine, but if our system is under heavy loads (as it is with a typical data warehousing system), we can achieve better performance by offloading the striping overhead to a hardware RAID controller.

9. FAULT TOLERANCE CONSIDERATION

Because the data warehouse contains so much data, we can take one of two approaches to data protection:

- **Protect everything.** Because there is so much data and so many disks in use, everything must be protected. The large number of disks in use increases the possibility of a disk failure. The massive amount of data increases the time needed for backup and recovery.
- **Conserve cost.** Because there are so many disks involved, it may be cost prohibitive to use RAID-1 or disk mirroring. When we mirror the disks, we double the number of disks.

In a data warehousing system, a good compromise is to use a fault tolerant method such asRAID-5 for the data files. We can be somewhat selective and use RAID-1 on volumes with heavy update activity and RAID-5 on volumes with more read activity. Remember that the performance penalty for RAID-5 is only on writing; we can achieve excellent read performance from RAID-5.

10. HARDWARE CONSIDERATIONS

When choosing hardware to use for a data warehousing system, consider these factors:

- **Low user load.** Not many concurrent processes/threads simultaneously access the system—unless we take advantage of the Parallel Query option.
- **High I/O load.** I/Os are concurrent and heavy, with mostly random I/O.
- **Huge amounts of data.** Data warehousing systems typically involve massive amounts of data. We must make sure that our system can support the high volumes of data we will be using.
- **Low network traffic during runtime, possibly high during load.** During the execution of typical decision support queries against our data warehouse, there is very little network activity. When data is being loaded or updated from other sources (possibly our OLTP systems), the network activity can be quite high.

If we can take advantage of the Oracle Parallel Query option, many different processes will use the machine at once; an SMP or MPP machine should scale very well. Because an SMP architecture uses CPUs based on the processes that are available to be run, if we always have a runnable process available for each CPU, we should see good scaling by adding additional processors. With an MPP machine, we see a similar effect but on a much larger scale. Because there is much random access to the disks, we can benefit from a disk array. We prefer hardware striping to OS striping because hardware striping does not incur any additional over head for the operating system and does not take up valuable CPU cycles. If hardware striping is not available, OS striping is adequate. Network traffic may or may not be an issue to our data warehousing system. If necessary, segment the network or add faster network hardware. A network bottleneck is an easy problem to solve: simply add more and faster hardware.

11. TUNING CONSIDERATIONS

The data warehouse is tuned to allow several large processes to run at maximum throughput. There is usually no concern for response times. We may have to tune both Oracle and the server operating system. The following sections look first at Oracle and then at the server operating system [4-12].

Server OS Tuning

We may have to tune the server OS to provide for a large number of processes (if we are using the Parallel Query option) and optimal I/O performance. Some of the things we may have to tune in the server OS are listed here; remember that some OSes may not require any tuning in these areas:

- **Memory.** Tune the system to reduce unnecessary memory usage so that Oracle can use as much of the system's memory as possible for the SGA and server processes. We may also need significant amounts of memory for sorts.
- **Memory enhancements.** Take advantage of 4M pages and ISM, if they are available. Both features can improve Oracle performance in a data warehouse environment.
- **I/O.** If necessary, tune I/O to allow for optimal performance and use of AIO.
- **Scheduler.** If possible, turn off preemptive scheduling and load balancing. In a data warehousing system, allowing a process to run to completion (that is, so that it is not preempted) is beneficial.
- **Cache affinity.** We may see some benefits from cache affinity in a data warehousing system because the processes tend to run somewhat longer. The server operating system is mainly a host on which Oracle does its job. Any work done by the operating system is essentially overhead for Oracle. By optimizing code paths and reducing OS overhead, we can enhance Oracle performance.

12. HARDWARE ENHANCEMENTS

For a data warehouse, there are several hardware enhancements that can improve performance. These hardware enhancements can be beneficial in the area of CPU, I/O, and network, as described in the following sections.

CPU Enhancements

Enhancing the CPUs on our SMP or MPP system can provide instantaneous performance improvements, assuming that we are not I/O bound. The speed of CPUs is constantly being improved as are new and better cache designs. For SMP or MPP machines, the process of enhancing the CPU may be as simple as adding an additional CPU board. Before we purchase an additional processor of the same type and speed, however, consider upgrading to a faster processor. For example, upgrading from a 66 MHz processor to a 133 MHz processor may provide more benefit than purchasing an additional 66MHz CPU with the added benefit that we now have the option of adding more 133 MHz CPUs. Because of the complexity and run time required by these queries, we can benefit from more and faster CPUs.SMP and MPP computers provide scalable CPU performance enhancements at a fraction of the cost of another computer. When upgrading our processors or adding additional processors, remember that our I/O and memory needs will probably increase along with the CPU performance. Be sure to budget for more memory and disk drives when we add processors.

I/O Enhancements

We can enhance I/O by adding disk drives or purchasing a hardware disk array. The data warehouse can benefit from the disk striping available in both hardware and software disk arrays. Using Oracle data file striping can also help the performance of our data warehouse. If our system performs only one query at a time and we are not taking advantage of the Oracle Parallel Query option, we may not see a benefit from a hardware or software disk array. In this specific case, we do not recommend OS or hardware striping; we should use traditional Oracle striping. Because we are executing only one query at a time without using the Parallel Query option, the I/Os to the data files are purely sequential on the table scans. This scenario is somewhat rare; any variance from "pure table scans" results in degraded performance. Hardware and software disk arrays have the added benefit of optional fault tolerance. We should first choose the correct fault tolerance for our needs and then make sure that we have sufficient I/O capabilities

to achieve the required performance level. If we use fault tolerance, we will most likely have to increase the number of disk drives in our system. Another benefit of hardware disk arrays is caching. Most disk arrays on the market today offer some type of write or read/write cache on the controller. The effect of this cache is to improve the speed of writing to the disk; the cache also masks the overhead associated with fault tolerance. If our queries often perform table scans, we may see good improved performance with disk controllers that take advantage of read-ahead features. Read-ahead occurs when the controller detects a sequential access and reads an entire track (or some other large amount of data) and caches the additional data in anticipation of a request from the OS. Unlike an OLTP system in which this is just wasted overhead, in the data warehouse where we are performing DSS queries, it is likely that we will need that data soon; if we do, it will be available very quickly. Enhancements to the I/O subsystem almost always help in a data warehouse environment because large amounts of data are accessed. Be sure that we have a sufficient number of disk drives, properly configured. An I/O bottleneck is usually difficult to work around. As with all types of systems, a well-tuned application is very important.

13. CONCLUSION

As the price of computer hardware especially disk drives comes down every year, the idea of a data warehouse becomes increasingly more feasible. The amount of hardware that a few short years ago would have cost millions of dollars can now be obtained for much less. The performance of this hardware is also increasing at incredible rates. PC servers are now replacing systems that was considered minicomputers a few years ago with twice the capacity at half the cost. The ongoing reduction in cost and increase in performance will promote the trend of larger and larger databases with better information retrieval. The goal of the data warehouse is to take information from production databases, legacy data, and outside sources and use this information to better our business. As hardware gets faster and faster at less cost, this trend will continue; new applications and ways of looking at our business data will be developed. It's very exciting to look at the way the RDBMS industry has grown in the last few years. It will be exciting to see where it goes in the next few years.

This paper looked at the characteristics of the data warehouse as a business model and from the data access perspective. We can use this information to determine how to configure the system to take advantage of the data access patterns. If we understand how the system operates and what affects the performance of the system, we can use this information to design a system that has well-balanced I/Os and that can take full advantage of the computer's CPU power.

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Shprior: A Customer Assistance System using Apriori Algorithm

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Abstract

Shoprior meaning priory recognizing what to shop. This would be a client help framework which would exhort client with respect to the buy he/she needs to make. Regularly we client are in difficulty of what to shop next. This product will recommend related things to be purchased. This depends on Apriori Algorithm. A priori is a fundamental calculation. The name of the calculation depends on the way that it utilizes past learning of incessant thing set properties. Once the successive item sets from exchanges in a database D have been found. It is direct to create solid affiliation rules from them. Bolster S and Confidence C will be entered by the client for showing the proper blends. Support S and Confidence C will be entered by the user for displaying the appropriate combinations.

KEYWORDS

Shoprior, Apriori, Seminal, Item Set, Association Rules, Support, Confidence.

1. INTRODUCTION

Shoprior a software which will be working on market basket analysis. This process analyzes customer buying habits by finding associations between different items that customer places in their "shopping baskets". For instance, if customers are buying bread, how likely they are to buy milk on the same trip to the market? This can help the retailer and the customer as well. This software would automatically suggest the purchaser after selecting an item from the given list [4]. The associated products will be displayed which has been retained after knowledge mining from the data sets of a departmental store.

Market basket analysis helps in designing different store layouts. Either the items can be placed in proximity or it can be placed at other end of the store hence increasing the sales.

For example, printer=>cartridge [support=3%, confidence=60%].

A support of 3% for above rule means that 3% of all transactions under analysis show that printer and cartridge are purchased together.

2. PROBLEM OVERVIEW

The project would make it easier for the customers to choose the related items needed after selecting an item in the shopping basket. The customer will be asked to select. The items would be numbered. Using association rules, if the customers wishes to shop more he will again be shown a list of related items to the previous purchase. If the customer does not needs any associated item he/she will be shown the main list of items. In this way the shopping process will altogether be easy for him/her.

3. LITERATURE REVIEW

During these years there has been advent increase in data collection equipment and storage media. This technology provides a great boost to the database and information industry and makes huge number of databases and information repositories available for transaction information retrieval and data analysis [10]. Data mining refers to extracting or mining knowledge from huge amounts of data. Association Rule: Raorane A. A., Kulkarni R.V., and Jitkar B.D. [1] in their paper referred to "knowledge mining" meaning the process that finds a small set of precisions nuggets from a great deal of raw material. Related works: "Mining utility-oriented association rules" explains, an efficient approach based on profit and quantity" [2]. Association rule mining has been an area of active research in the field of knowledge discovery and numerous algorithms have been developed to this end. The proposed approach exploits the anti-monotone property of the Apriori algorithm, which states that for a k-itemset to be frequent all (k1) subsets of this itemsets also have to be frequent. The experimental results demonstrates the effectiveness of the proposed approach in generating high utility association rules that can be lucratively applied for business development. "User centric approach to itemset utility mining in Market Basket Analysis" [3] describes Business intelligence is information about a company's past performance that is used to help predict the company's future performance [5]. It can reveal emerging trends from which the company might profit. It is from the sifting process that business intelligence gems may be found. Information mining is likewise a procedure and a philosophy for applying the apparatuses and systems. So

the concentration of this paper is to upgrade these calculations in a way that it gives visit gainful examples which help showcase examiner to settle on the best educated choices for enhancing their business.

4. ASSOCIATION RULE MINING

Association mining is a standout amongst the most imperative information mining's functionalities and it is the most famous strategy that has been examined by analysts. The advantage of these principles are distinguishing obscure connections, delivering comes about which can perform reason for basic expectation [6]. The revelation of association tenets is isolated into two stages: location of incessant thing sets and era of affiliation principles. In the main stage, each setoff things is called item sets, in the event that they happened together more prominent than the base bolster limit, this thing set is called coming item set. Finding regular thing set is simple however exorbitant so this stage is more vital than second stage. In the second stage it can produce many standards from one thing set as in shape if thing set {I1, I2, I3}, its principles are {I1 I2, I3}, number of those tenets is (n*n1) where n=number of things. To approve the run of the exchanges which contain x and y to the exchanges A% which contain x, this implies A% of the exchanges which contain X likewise contain Y. Least support and certainty is characterized by the client which speaks to requirement of the principles. So the support and certainty limits ought to be connected for every one of the standards to prune the principles which it values not as much as edges esteem. The issue that is tended to into affiliation mining is finding the relationship among various things from expansive arrangement of exchanges productivity. The exploration of affiliation guidelines is persuaded by more applications, for example, managing an account, medicinal services and assembling and so forth.

Item Set and Support Count

Let J = {ij_1, j_2. . . j_d} be the set of all items in a market basket data and T = {t_1, t_2. . . t_N} be the set of all transactions. Each transaction t_i contains a subset of items chosen from J. In association analysis, a collection of zero or more items is termed an item set. If an item set contains k items, it is called a k item set. The null set is an item set that does not contain any items. The transaction width is defined as the number of items present in a transaction. An essential property of a thing set is its bolster tally, which alludes to the quantity of exchanges that contain a specific thing set.

Apriori Algorithm

Apriori algorithm is very easy to execute and very simple, is used to mine all frequent item sets in database [7]. The algorithm makes many search sequentially item by item and transaction by transaction. First, the number of occurrences of item one is found out in all the transactions. Then similarly occurrences of each individual item. In the next iteration the combination of two items is taken and searched if the similar combinations are occurring the counter variable is incremented. Hence, telling the compatibility of one item to be bought or placed in the shelf with another item [8]. Such iterations are made for all combination of item. The improvement of algorithm [9] can be described as follows:

//Generate items, items support, their transaction ID

(1) P1 = find_frequent_1_itemsets (T);

(2) For (m = 2; Pk-1 ≠Φ; k++)

{//Generate the C1k from the PK-1

(3) C1k = candidates generated from Pk-1;

//get the item Tw with minimum support in C1k using P1, (1≤w≤k).

(4) x = Get _item_min_sup(C1k, P1); // get the target transaction IDs that contain item x.

(5) (5) Pgt = get_Transaction_ID(x);

(6) For each transaction t in Pgt Do

(7) Increment the count of all items in C1k that are found in Pgt;

(8) Pk= items in C1k ≥ min_support;

(9) End;

(10) }

Suppose we have transaction set D has 10 transactions, and the minimum support = 4. The transaction set is shown below:

T_ID	Items
T_1	I_1, I_2, I_5
T_2	I_2, I_4
T_3	I_2, I_4
T_4	I_1, I_2, I_4
T_5	I_1, I_3
T_6	I_2, I_3
T_7	I_1, I_3
T_8	I_1, I_2, I_3, I_5
T_9	I_1, I_2, I_3

Fig 1: Transaction Set

Firstly, check all exchanges to get visit 1-itemset P1 which contains the things and their support number and the exchanges ids that contain these items, and after that take out the applicants that are rare or their support are not as much as the base sup.

The following stride is to create competitor 2-itemset from L1. To get support mean each item set, split every thing set in 2-itemset into two components then utilize p1 table to decide the exchanges where you can discover the thing set

in, instead of looking for them in all exchanges. for instance, how about we take the principal thing in (l1, l2), in the first Apriori we check each of the 9 exchanges to discover the thing (I1, I2); however in our proposed enhanced calculation we will part the thing (I1, I2) into I1 and I2 and get the base support between them utilizing L1, here i1 has the littlest least support. After that we scan for thing set (I1, I2) just in the exchanges T1, T4, T5, T7, T8 and T9. For a given regular thing set PK, discover all non purge subsets that fulfill the base certainty, and afterward create all hopeful affiliation rules.

5. PROPOSED WORK

In a supermarket, suppose as a customer, he/she may want to know about what they can buy from the store after buying an item or two. It would also help the shopkeeper to arrange the items accordingly. For example either the related items can be placed at proximity and hence increasing the sales or at can be placed at one end so the customer may impulse shop on the way to other item. To achieve the desired result this proposed work uses Apriori algorithm. Which in turn mines the frequent item set out of the database available. Following is the basic architecture:

Fig 2: Basic Architecture

Following are the main components of basic architecture:

- Input Data: Giving the existing data set.
- Training the Data: The Apriori Algorithm will learn about the data.
- Building the Model: based on the support and confidence model will be build.
- Knowledge: Obtain the association rules.

6. ALGORITHM

Step 1-Start.
Step 2-Enter the name of the customer.
Step 3-fetch the text file containing the previous transaction and the name of the products along with their id.
Step 4-Display the list of items and the transactions in the file.
Step 5-Ask the user to enter the minimum support.
Step 6-calculate l_1,
A loop will be generated which will be checking the occurrence of each item and storing it in array.
Step 7-display only the items which have count equal to minimum support or more to it.
Step 8-calculate l_2, Two loops are run one starting from first item and the other loop starting from second item. f_1 and f_2 are flag variables if both are set then the combination is occurring and the value of t_1 is incremented.
Step 9-for l_3, three loops are running first loop with one, second loop with two, third loop with three.
Step 10-three flag variables are incremented for every loop.
Step 11-if all three flag variables are set then counter variable is incremented.
Step12-if the counter variable is more than or equal to the value of minimum count then display the item number along with the minimum count.
Step 13-stop.

7. IMPLEMENTATION

The proposed system consists of following four modules:

- An input is taken from the user, who will give the name for the file which will be written later on.

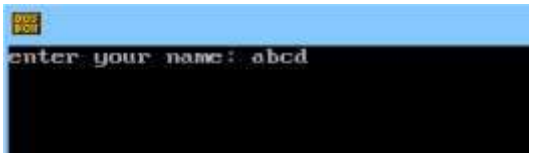

Fig 3: User Input

- Entering the minimum acceptance level

Fig 4: Minimum Acceptance Level

- Once the minimum acceptance level is entered, the algorithm starts.
- When the algorithm is implemented in dataset, a new file is created and saved with the name which was asked at starting.

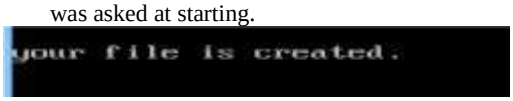

Fig 5: File Created

8. OUTPUT

Fig 6: Outpot-1

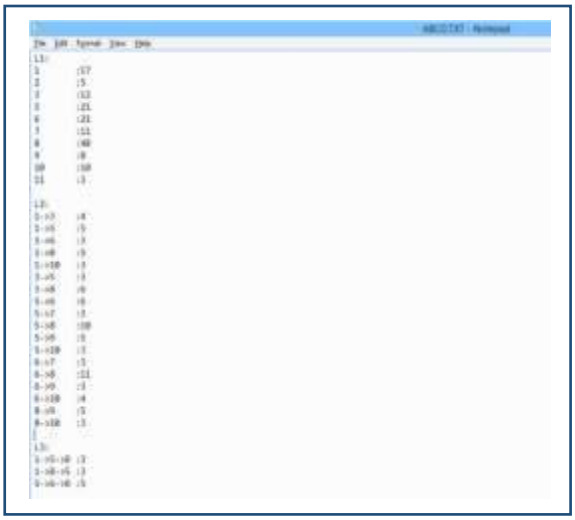

Fig 7: Outpot-2

9. CONCLUSION

We have been able to complete our project successfully to full satisfaction .As proposed we have created a customer assistance system. We were able to generate a code for the system. In the course of completion we have obtained a sound knowledge over general programming logic and C programming environment. The final phase which is the generation of the code is successfully completed and tested.

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GEOMETRIC CANVAS

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Abstract
Geometry is one of the basic concepts and forms the main element of mathematics. So to make it simple and easy to understand Logo Programming language was designed with some geometric Functions. In the proposed work we are going to implement the functions and concept of logo Programming language through C Programming Language and C Graphics with Some additional features. The logo programming includes the turtle as its cursor which could be moved or directed anywhere by giving instruction to the computer. Now, the turtle was used as a cursor on computer graphics screen where it is used to draw shapes, designs and pictures. Hence, helping the students to understand line by line geometry. Logo programming may provide opportunities for improvement of creativity and problem solving skill.

KEYWORDS
Programming, Turtle, C Graphics, Geometry.

1. INTRODUCTION
Computational geometry is the study of algorithms that can be states in terms of geometry. Computational Geometry emerged in late 1970. Computational Geometry finds its application in almost every sector of today's world. The main areas of applications for Computational geometry are Robotics, Geographic information system, IC designing, Computer-aided engineering, computer vision. The main force behind the development of Computation geometry was the progress in computational graphics and computer-aided design and manufacturing. The branches that deal with computational geometry are Combinatorial Computational Geometry and Numerical Computational Geometry [1]. The computational geometry gave a solution to understand the problems of the geometric properties and also in proper application of algorithmic techniques (paradigms). Computational geometry aided to the enhancement for the study of algorithms for geometric objects by focusing more on exact algorithms that are asymptotically fast. The ultimate purpose of the research work is to represent geometry by providing wide options for the user to understand geometrical shapes and figures and the entire concept with the use of graphics in the field of primary and secondary education .This work is implemented through the use of basic C programming language and graphics files. The work enables the user to visualize the concepts in a more better way of understanding. The project drags the scope of the work in developing its own set of commands for the ease of user input by defining its own PENCIL MOVING ALGORITHM and making it more users friendly.

1.1 Previous Work
Logo was developed in 1967 by Daniel G. Bobrow, Walley feurzeig, Seymour Papert and Cynthia Solomon. Logo was derived from the Greek word "LOGOS" meaning "THOUGHT". It was developed to give a new way to programming that was basically numbers not logic oriented [2].

Logo is generally implemented as interpreted language. The interactive approach of log aids the programmer by providing immediate feedback on instructions and helps in debugging it easily. Programs in logo are collection of small procedures. Each procedure is written in text editor. The word **"to** "is used at the beginning of each procedure. Similarly to indicate the end of the procedure, **"end"** keyword is used. Until and unless you know the logo implementation, you cannot differentiate that the words are primitive or user-defined [3].

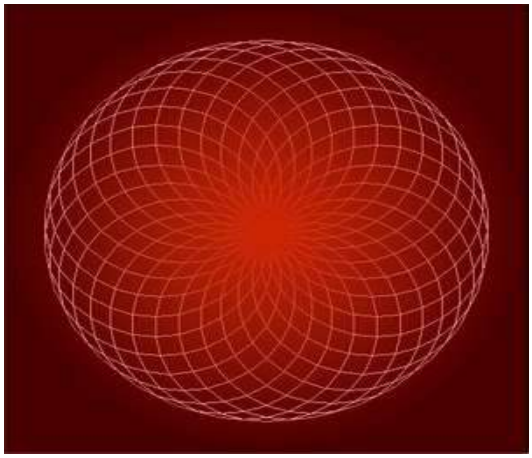

Fig 1: A sample output of Logo Programming

Despite being a general-purpose language, Logo is often is known for its use of turtle graphics, in which the commands for movement or drawing produce output *i.e*., Line Graphics on screen, with or without robot which looks like turtle. The basic idea to develop "LOGO" was to teach students, the movements of turtle. Logo is based on the programming concept of "LISP". UCBLOGO can be used to teach all computer science concepts like, handling lists, files, I/O, and recursion in scripts.

1.2 Computer Graphics

The visual representation of objects/ figures on to a Display screen such as a monitor is one of the key areas that computer graphics deals with. This Field involves manipulation/modification of real world objects using appropriate transformation in order to display them on a Visual Display Unit (VDU). Algorithms have been developed for improving the effects of picture generation [4].

Our generation in Computer Graphics has been transformed from 2D to 3D. The integration of physics with the algorithms built for graphical processing is necessary in order to simulate real world effects. The Graphics Kernel System (GKS) was the first graphics package created for use through the combined efforts of ANSI and ISO. Now computer graphics has been developed totally in a new level. Where basic 2D animations are now converted into 3D. And Computer Generated Effects are the current trend of Computer Graphics [5].

2. DESIGN

Design refers to the representation of an entity incorporated with the components needed. It is an essential phase of testing software's quality since it provides a visual representation of the final product. Users can then inspect the design in order to determine whether the requirements are met or not. We firstly designed a separate function in our project that will take process the input we then made all set of functions that will perform the input and process the respective geometrical shapes. Then at the end we implemented file handling to store the commands.

2.1 Flow Chart

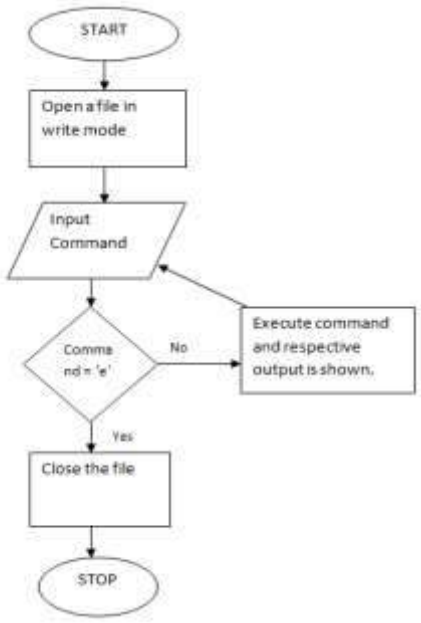

Fig 2: Flow Chart

2.2 0-Level DFD

Fig 3: Level – 0 DFD

2.3 1-Level DFD

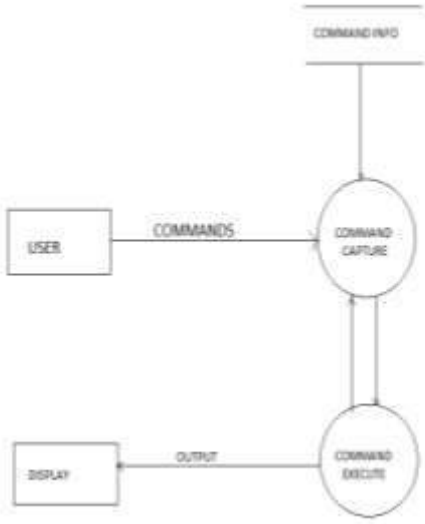

Fig 4: Level – 1 DFD

2.4 Algorithm

1. x←x coordinate
2. y←y coordinate
3. x1← 2nd x coordinate
4. y1← 2nd y coordinate
5. len← To keep track of length/radius.
6. fp← file pointer
7. a[5]← array of 5 indexes to input direction & length from user.
8. dir← to keep track of direction.
9. gd← graphic driver.

BEGIN:

10. x←200
11. y←200
12. gd←DETECT
13. Setting path for graphic library.
14. Open file Canvas3.txt in "w" mode.
15. do-while(a[0]!='e')
16. Input &a from user.
17. Write the user value into the file.
18. dir←a[0]
19. len← ((int)a[1]-48)*10+((int)a[2]-48);
20. Pass dir & len in function process(dir,len).
21. End while.
22. Close the file
23. *END*

//Start of function process(char dir, int len)
BEGIN:
24. k← len
25. if(dir is 'r')
26. Draw line towards right of length k;
27. Else if(dir is 'd')
28. Draw line vertically downwards of length k;
29. Else if(dir is 'l')
30. Draw line at left of length k;
31. Else if(dir is 'u')
32. Draw line upwards of length k;
33. Else if(dir is 'c')
34. Draw a circle with radius k;
35. Else if(dir is 'o')
36. Bring the pencil at initial position x←200,y←200;
    Else if(dir is 't')
37. Draw equilateral triangle of length k;
38. Else if(dir is 'E')
39. Enter X and Y Radii and an draw ellipse with respective radius.;
40. Else if(dir is 'g')
41. Enter X and Y coordinates and move the pencil to given coordinates ;
42. Else if(dir is 'a')
43. Enter angle and draw the arc with radius k;
44. Else if(dir is 'C')
45. Enter value from 0-15 change the colour of the pencil.
46. Else if(dir is 'p')
47.Previous commands read from the file and executed.
48. End if.
49. END

2.5 Algorithm Explanation

The algorithm used in the project is PENCIL MOVING ALGORITHM. In this algorithm 200,200 an initial coordinates has been taken and the commands are given the track of previous co-ordinates are taken and the next instruction's output is proceeded from the last co-ordinates. graphics.h header file is used which consist of line(), circle, arc() functions. A file pointer is maintained which keeps the track of all the commands and saves in a file. Now the among 13 commands we have a command 'p' which repeats the previous specified commands so if 'p' is input given by the user then file the current file is closed in write mode and reopened in read mode and all the previous commands are read from the file and operations are performed. Then to further add input other than 'p' the the file is opened in append mode then further commands can be input and can be recorded in file. All inputs are scanned from the user in form of an array and are passed in a function 'process(char dir, int len)' before passing to the function value at array[0] index is passed as a character while value at array[1] & array[2] are converted into integer and the passed to 'len'. Then in the process() there are 12 if-else conditions and according to the char value in 'dir' those if-else conditions are operated. In this line(), circle(), arc(),ellipse() and setcolor() functions are being used. The values we get from 'process (char dir, int len)' are passed in these function and the operations are performed accordingly.

3. IMPLEMENTATION

The project has used the following module:
Iterative Waterfall Model

3.1 Methodology

Water Fall Software Development Process:

Analysis: The Analysis of requirements of the system and proper working windows operating system for the coding.

Design: We'll be using PENCIL MOVING Algorithm. Our lines will move according to the commands that user will input.

Coding: Basically using C Graphics, Data Structure, and File Handling.

Testing: For different versions of Microsoft windows testing should be done and respective debugging should be implemented.

Documentation: After completion of the project Documentation is done by entire team.

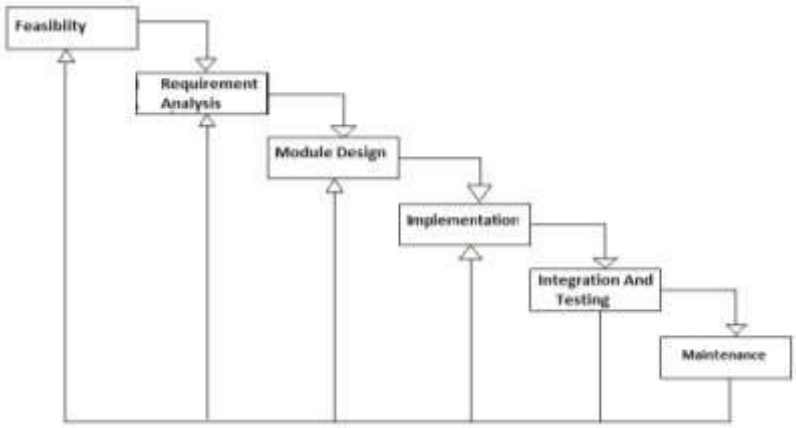

Fig 5: Stages of Iterative Waterfall Model

3.2 Output

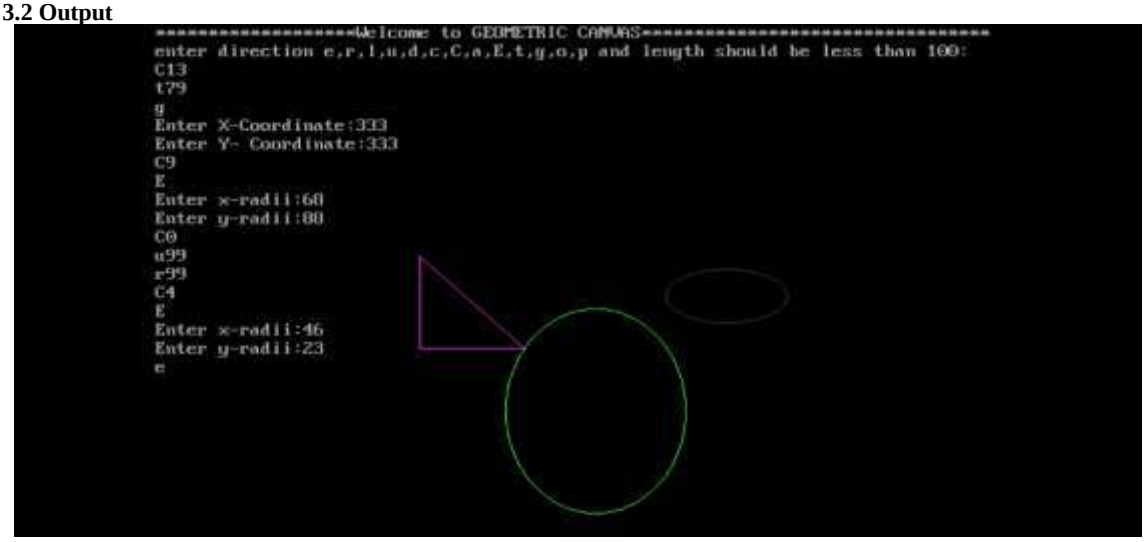

Fig 6: Output of basic geometric figure

In Figure 6 we start to make an equilateral triangle we simply use 't79' to do it. Then moving to another coordinates using 'g' to make a vertical ellipse type 'E' and give x-radii greater than y-radii. Then moving on to another coordinate using 'g', type 'E' and vice-versa to make a Horizontal Ellipse the exit.

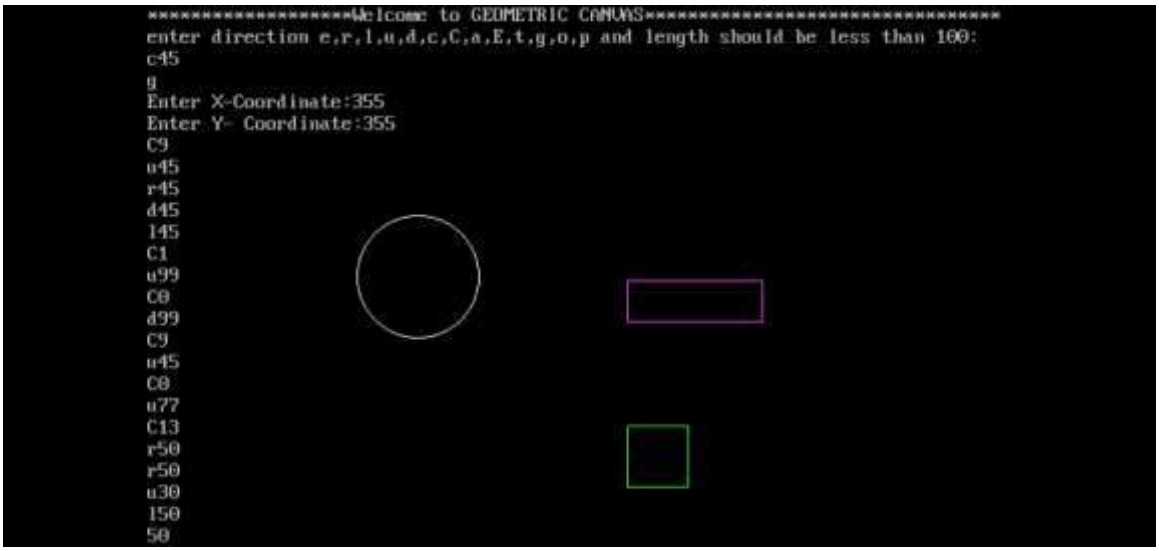

Fig 7: Output of basic geometric figure

In Figure 7 to make a circle simply entered 'c45' and a circle with radius 45 is drawn. The we move to another coordinate using 'g' and changed the color to purple using 'C9' command and drawn a rectangle with set of commands using u, l, r, d. Similarly moving to next coordinates and made a square using u, l, r, d commands and exited 'e'.

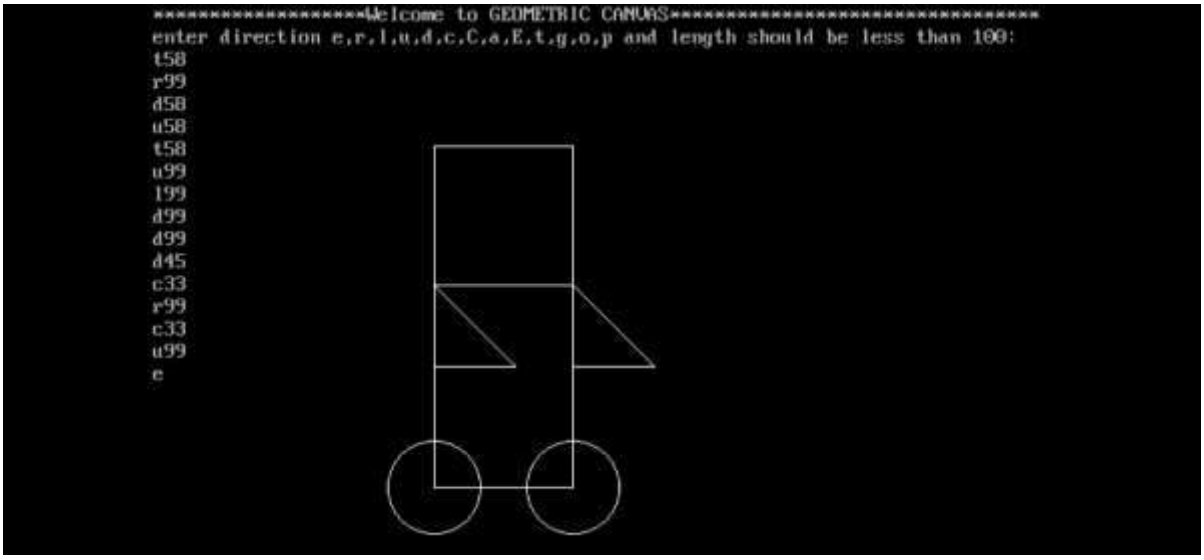

Fig 8: Output of combinations of basic geometric figures

Doing something creative in figure 8 we try to make a 'toy' 't58' made a triangle then by 'r99' made a horizontal straight line and 't58' a triangle is drawn. As to make a head we made a square and then as a body be made a rectangle. Using circle wheels are drawn. Then we exit.

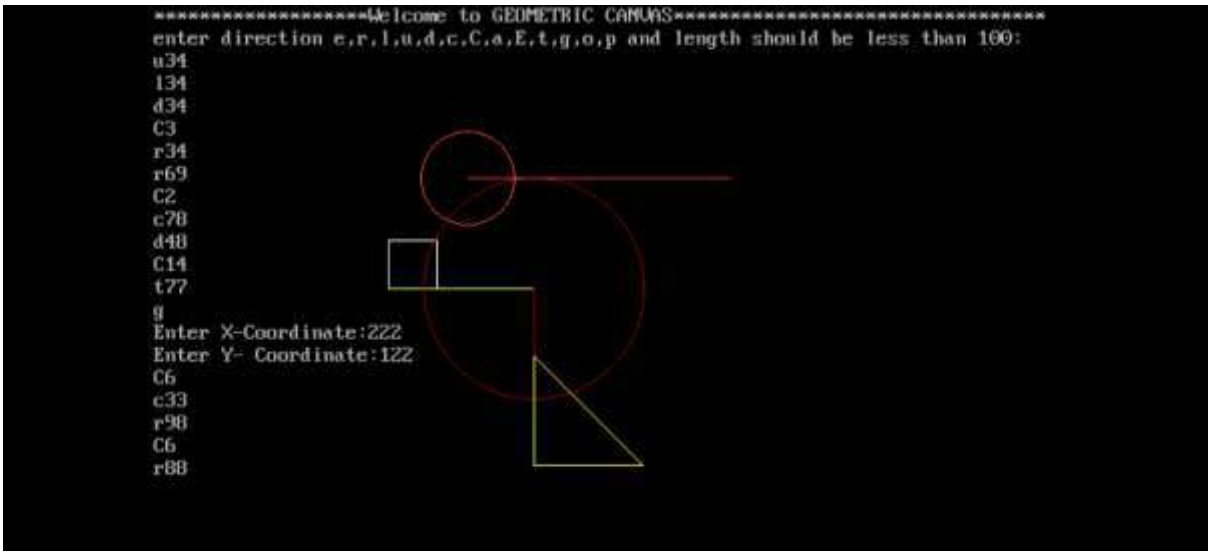

Fig 9:Sample output to represent 'g' function

In Figure 9 the pencil starts at coordinate(200,200)and moves 34 units upwards,34 units towards left,34 units downwards [WHITE] Color is changed to [yellow] and 34 units right move then 69 units right move is made. Next to that color is changed[red] and circle is drawn, then downward move is made from the centre of the circle and triangle [yellow] of measure (t77) is drawn. Input of coordinate is accepted and accordingly circle and line are drawn[red].

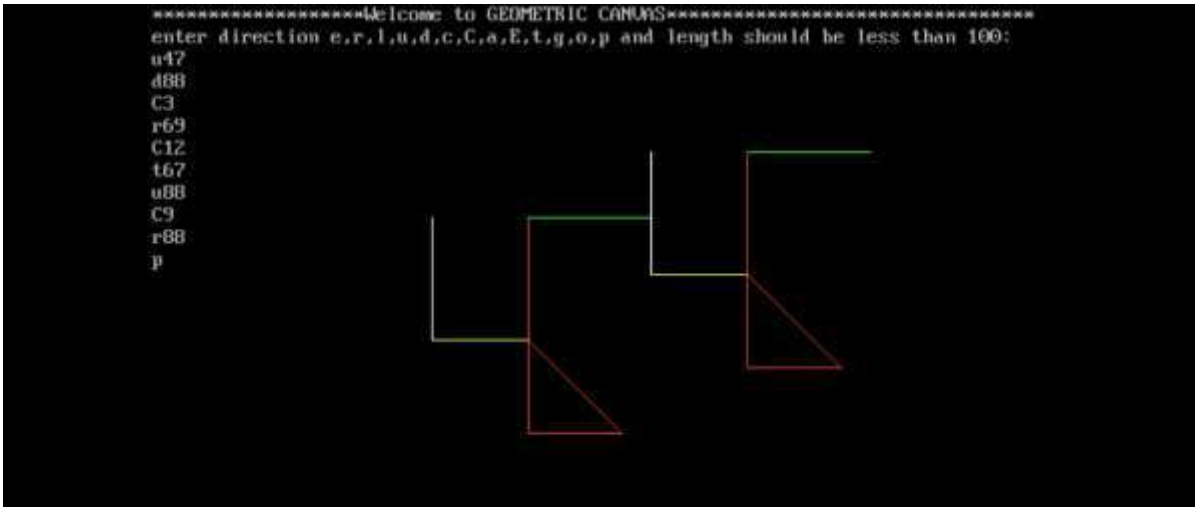

Fig 10: Sample output to show change in colors

In Figure 10 as by default the color of the pencil is white, upward and downward lines are drawn from the user defined coordinates. Then color is changed [yellow] and pencil is made move towards right then with changed color triangle is drawn[red]and upward move is made and finally right move is made [green].With the 'p' command all the moves previously performed are repeated and shown in the final step.

4. TESTING

To determine whether the final product behaves in accordance to the requirements, the testing phase is used. It involves using input data sets, also known as 'test cases', and evaluating the output for the corresponding input case.

The input set usually covers boundary conditions and certain situation where the program is known to deliver inconsistent output. Validation means checking the quality of software in both simulated and live environments. System validation ensures that the user can in fact match his/her claims, especially system performance. After a particular period of time, all the errors and failures that are detected are documented finally and are debugged and the program is finally designed as per the requirements of the user before its release. Errors are prone to occur in any phase of software development. In spite of employing error detection and removal methods, there remains the probability that certain errors may go unnoticed/ undetected. Also errors generated in one phase of development may transition to the next phase without being detected. Such errors when detected at the final stage lead to unnecessary backtracking. Hence it is important to test the phases using concrete test cases to cover all possible failure conditions.

Testing objectives are:

- To determine whether our program can take the required input specified by us or not.
- Whether any invalid input lead to program crash or not.
- Reaction of the output in case of invalid

Unit Testing

Any Program when developed is divided into components known as modules. Each Module deals with a particular functionality that is to be achieved by the program. Modules are developed in isolation to each other. There is a possibility that an error/bug/fault may occur during the coding or development phase of the module. Therefore, it is essential that individual modules also be checked for errors. The process of testing the independent modules is known as Unit Testing. We have done Unit Testing in our program and successfully processed. We have taken number of test cases and got successful output accordingly.

5. LIMITATIONS

- This project does not include the mobile application feature.
- This project does not include the feature to get the names of the shape.
- This project limits web access. The software does not work on rotating lines by using angle.

6. FUTURE SCOPE

- Description of shapes will be provided to learn shapes and their use in real life.
- The project can be implemented for web & mobile applications.
- More commands will be added according to need of kids.
- This project will have functionality to go to the coordinates using click.

7. CONCLUSION

We have been able to complete our project successfully to full satisfaction. As proposed we have created a basic platform for designing geometric. We were able to generate a code for the system. In the course of completion we have obtained a sound knowledge over general programming logic and C programming environment. The final phase which is the generation of the code is successfully completed and tested. Though this is an academic project we are sure that we would make future enhancements to this project.

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Automatic Estimation of Crowd Density

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Abstract
This paper considers the problem of automatic estimation of crowd densities, an important part of theproblem of automatic crowd monitoring and control. Anew technique based on texture description of the images of the area under surveillance is proposed. Twomethods based on different approaches of texture analysis, one statistical and another spectral, areapplied on real images captured in an area of Liverpool Street Railway Station, London, UK. The results obtained show that both methods present similargeneral rates of correct estimation, and that thepotential use of texture description for the problem of automatic estimation of crowd densities is encouraging

KEYWORDS
Crowd, Image, Surveillance

1. INTRODUCTION
The management and control of crowds is a crucialproblem for human safety, since when an accidenthappens where there is congestion of people manylives can be lost [1].Two important aspects of the problem of correctmanagement and control of crowds are the design of environments where crowd congestion is expected toarise and the real-time monitoring of crowds withinexisting, typically urban, structures. The development of models of crowd behaviourprovides a basis for informing architects and townplannersto design safer buildings. Sime reviewscrowd psychology in terms of its relationship to engineering and crowd safety and stresses the need tovalidate computer simulations of crowd movement andescape behaviour against psychological as well asengineering criteria[2].

For the problem of real-time crowd monitoring there isan established practice of using extensive closedcircuittelevision systems. As routine crowdmonitoring is tedious, human observers, responsiblefor the simultaneous monitoring of many differentareas through an array of television monitors, arelikely to lose concentration. The advantages andnecessity of automatic surveillance for routine crowdmonitoring are, therefore, clear. This paper describes a new technique based on texturedescription for the problem of automatic estimation of crowd density.

2. PREVIOUS TECHNIQUE FOR AUTOMATIC ESTIMATION OF CROWD DENSITY
Davies et al [3] have proposed a technique to estimate crowd densities based on two measures extracted from the input image of the area under surveillance. The first measure is the number of for ground picture elements computed by subtracting the input imagefrom a reference image containing no people. The second measure is the number of edge picture elementsof the image computed by an edge detection followedby a thinning operation.

3. OUR METHOD
Firstly, after inputting video, we extract the foregroundimage through Gaussian mixture model, and then processforeground image; the processing includes filtering noisethrough median filtering and morphological operations. Secondly, estimate the number of people after dividingthe region of interest. The specific statistical methods are:give a preliminary judgment for the crowd density through the number of foreground pixel. For differentdensity, we use the method of pixel statistics or GLCMtexture analysis to extract crowd feature. And then uselinear regression to estimate the number of the crowd.Finally, add the number of each region and then estimatecrowd density. It is worth mentioning that we estimatethe crowd size for the high density and extremely highdensity crowd.

A**. Pixel feature**
The property of the pixel statistic is the earliest featureto be used for crowd density estimation, and it is a veryeffective feature. The basic idea of this algorithm is: thedenser crowd, the greater proportion of the foregroundimage. Researchers considered that there is a linearrelationship between the number of foreground pixel andnumber of people in the scene. Pixel features usually are:the foreground image area, perimeter, and edge pixels,and so on.

Pixel statistical algorithm is relatively intuitive, easy tounderstand, low computational complexity, therelationship between the number of people and pixelfeature is relatively simple after preprocessed, easy totrain, and the generalization ability of classifier orfunction relationship is very well after training. However,the pixel statistical algorithm has some problems:foreground image segmentation algorithm is not ideal, and needs to correct the weight of extracted pixel due tothe impact of perspective distortion, has bad result in highdensity crowd.

In this paper, this pixel statistical method is used togive the initial judgment of crowd density, and estimatethe crowd density of extremely low density, low density,and medium density.

B. Texture feature

The pixel is very important feature among crowd density estimation, but the accuracy is very low for moreserious occlusion area. To solve this problem, Maranaproposed texture analysis algorithm. Different densitycrowd has different texture pattern for texture analysis.Images of low density crowds show coarse texture, whileimages of high density crowds show fine texture. Thecalculation of GLCM texture features is a common andeffective method. In this paper, this texture method isused to estimate the crowd density of extremely highdensity and high density.

C. Definition of Classification

Polus[9] proposed crowd density from low to high is divided into five levels. In this paper, we reference to this definition, crowd density levels are defined as shown inTabl1.

TABLE I

CROWD DENSITY OF EACH CATEGORY

Classified level	Extremely low density	Low density	Moderate density	High density	Extremely high density
Crowd boundary (people)	0-10	11-30	31-60	61-100	>100

D. Our Proposed Method

Figure 1 shows the details of proposed method in this paper. This method:

a) Capture video, and use Gaussian mixturemodel to extract video foregrounds. For theforeground image, we use method of binaryprocess, noise elimination by median filtering, andmorphological operation.

b) Set the region of interest. Since the presence ofabnormal projection, especially in the process oflarge-scale monitoring, the effect of abnormalprojection is particularly evident brought by theperspective effect. To solve this problem, thispaper divides into four different sub-regions foreach scene image. The sub-region division effectis showed in Figure 1.

How the learning is done?

We evade the hard task of learning to detect and localize individual object instances. Instead, we cast the problem as that of estimating a continuous density function whose integral over any image region gives the count of objects within that region.

We start with a set of dot-annotated training images and a set of features, so that each pixel in those images is assigned a real-valued feature vector describing the local appearance (in our experiments, these features were defined using either using SIFT-based visual dictionaries or a set of randomized trees). Our system then learn a linear mapping, that transforms the feature vector at each pixel to a density value, obtaining density function value in that pixel.

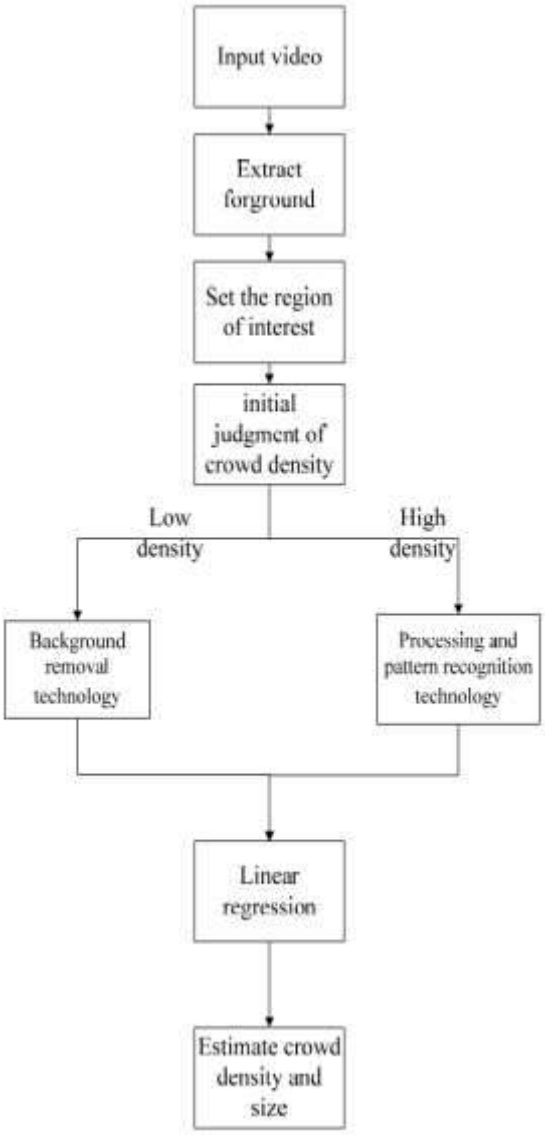

Fig 1: Proposed Method

During the training, we optimize the coefficients of this linear mapping, so that the density functions resulted from the mapping matches the ground truth density functions (defined as a sum of gaussian kernels centered at the user-provided dots) as closely as possible. Additionally, we impose a quadratic regularization on the mapping coefficients to prevent overfitting.

4. CROWD DENSITY ESTIMATION

Not all events with large gathering of people are conducted inan enclosed venue with turnstiles where crowd density estimationcan be administered seamlessly. And for some events such asparades or political protest, employing professionals to conduct human counting is infeasible. Nevertheless, estimating density of crowd is of utmost importance to better administer the well-beingof crowd as a whole,

development of public space design andaccurate documentation of historical events.

The Hillsboroughdisaster [3] is an example of the consequences of overcrowding.On the contrary to the former two aspects of crowd behaviour analysis, crowd density estimation is independent of the 'thinking' component of each entity in crowd. Existing work on crowddensity estimation depends mainly on collective motion andappearance cues, with respect to the type of inputs (*i.e.*, crowdvideo sequences or single crowd image). Different techniques areadopted to cope with crowd scene of varying density. The greaterdensity of crowd in a scene, the more complicated the task toestimate crowd density where dynamic occlusions come intopicture. It is infeasible to discerned different person and ones'body parts when a person may only be occupying few pixels [6] and further rendered by background clutter.

For instance, frameworkthat performs clustering of coherent trajectories to representa moving entity, and inferring number of individual in the sceneby Rabaud and Belongie [15], is limited to crowd scenes of sparsecrowd where continuous sets of image frames are accessible. Theresults presented in their work illustrated that for some crowdscene where individuals are closely positioned with each other,trajectories are incorrectly merged. This is due to the phenomenonof collective motion occurring between moving interacting entities.Using an analogous perception, Li et al. [11] estimate thenumbers of people in crowd by implementing foreground segmentation and head–shoulder detection approach. The proposedmethod was intended to address stationary crowd, where subtlemotions of individual is crucial and deeply relied on in definingforeground segments. Nonetheless, the proposed framework issusceptible to inter-occlusion between individuals, particularlyprominent in a dense crowd scene. Ge and Collins [12], proposeda Bayesian marked point process to detect individuals in crowdwhere clear silhouette of individuals is required for accurate projectionto a trained set for accurate detection and counting ofindividuals.

In another study, Ge and Collins [13] uses a generativesampling-based approach that leverage on multi-viewgeometry to achieve estimation of density of individuals incrowd. The work assumes that individuals in a crowd retain acertain space with each other (i.e. separation), which is one of therules of interaction between entities in the crowd. Hence, individualsshould not be occluded from all viewing angle. Alleviating the need to detect each person in a crowd, someworks uses low level crowd features formed based on the collectives of crowd to estimate crowd density. Marana et al. [14] presented a method based ontexture analysis to estimate crowd density, where the estimation isgiven in terms of discrete ranges (*i.e.*, very low, low, moderate, high and very high). Their objective was to challenge scenes of densecrowd where each individual is greatly occluded. They assumedthat crowd scene of high density tend to illustrate fine textures,whereas crowd scene of low density are mostly made up of coarsepatterns.

5. THE FORTHCOMING CROWD BEHAVIOR ANALYSIS

There are several aspects of crowd behavior analysis which theauthors believe are at their infancy and have the potential todevelop further.

Stationary crowd: Crowds may essentially develop into twotypes, i.e., stationary or dynamic crowds. Stationarycrowds are usually found as spectators or audiences at concerts,rallies, performances and speeches. Dynamic crowds are definedas crowd which is on the move, such as pilgrims that walk aroundthe Kaaba during Hajj. Most of the existing work on crowd focuses on moving patternsof individuals in the scene to infer their activities. Motion is oftendetected by using standard approaches such as frame-differencingto more complicated techniques such as dense optical flow. Theestimated motion patterns are then analyzed to deduce varioussuggestions on the crowd activities. On the other hand, stationarycrowd analysis has never been sufficiently investigated althoughthe non-motion characteristics can provide rich information. This counter-intuitive approach of stationary crowd analysis is basedon the notion that individuals or groups that remain in a particulararea for a long time are worthy of attention. The system is able to cope with hundreds of people moving around in a busy scene, to detect abandoned objectas long as the object is visible for 50% of the time. In a moreadvanced and recent work [20], a stationary crowd analysismethod is proposed to detect four major activities; group gathering, stopping by, relocating and deforming. This work alludes tothe findings of [16], where their simulation on groups in crowdshows that stationary groups have greater impact on the dynamicsof the scene than moving groups in some cases. This is justifiedfurther by simulating individuals forming stationary groups. Theformation of stationary groups acts as an obstruction that changesthe motion directions and dynamics of other individuals in thescene. Stationary crowd analysis is still at its early stage of researchand is definitely worthy of upcoming investigations for a broaderdegree of scene understanding and traffic pattern analysis, inparticular.

6. CONCLUSION

This paper proposes an approach for crowd densityestimation, which combines the pixel statistical featureand texture feature. The proposed method removedbackground with Gaussian mixture model and gave apreliminary judgment for the crowd density through pixelfeature, meanwhile reduced the impact of perspectivedistortion by dividing the region of interest. The texturefeatures were extracted using GLCM, and selected Contrast 0° and Homogeneity 0° as texture feature. Experimental and comparative results show that themethod is an effective, universal method which can beused in a real-time crowd density estimation system. Andthis paper estimated the crowd size for high density andextremely high density, which was more conducive togroup events analysis.

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IOT Card based Energy Saving System

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Comparative Analysis on Routing Protocols in MANET

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Abstract
Ad Hoc network is one of the types of network that facilitates numbers of clients to make access to different application without configuring a prior path to travel or make communication in between multiple communicating devices. Besides this, there encountered certain challenges to retain or select the most appropriate route to travel by data packets in such a network. With a motto to reduce packet dropping, data packet loss, amount of traffic sent or received by stations, load in any network, response time for the page to be accessed, routing protocols are encouraged to be configured at all the stations and routers in a network. Different class of routing protocols are configured for multiple scenarios and then comparative analysis for these performance metrics has been done. To attain a comparative analysis of performance OPNET IT GURU EDUCATIONAL VERSION 14.5 Modeler is used.

KEYWORDS
Ad Hoc Network, Routing Protocols, Hybrid Routing, ZRP, OLSR, GRP, AODV, Traffic Sent/Received, Load, Traffic Dropped, Page Response Time;

1. INTRODUCTION TO AD HOC NETWORKS

Ad hoc network [1], [4] is one of the types of decentralized cloud computing [2], [3] infrastructure. Ad hoc network is a wireless network that works under a decentralized manner of operation. The network is said to be as ad hoc when it need not to maintain or manage any kind of pre-specified infrastructure to establish communication in between the connected devices. The usefulness of ad hoc network is generally maintained by implementing Access Points (AP) [5] in every autonomous segment for each grouped numbers of device. APs are responsible to make an initiative to enable or disable communication in-between the proposed scenario of devices. It is assumed that in an ad hoc network no individual station can be treated as an AP, and cannot act or permit devices to communicate at certain time span. Implementing an ad hoc network will permit every device in a network to communicate without any restrictions. Hence each and every communicating device is allowed to transmit or flood numbers of packet at anywhere-anytime functionality, and so ad hoc is formerly recognized as 'on-the fly' network.

Since every device can transfer or flood data packets in a network freely, then decision is to be taken regarding the data packet transmission to avoid unnecessary congestion [2], [6] in particular transmission. To accomplish this, a dynamic process is encouraged that will be responsible to take decisions that which device should communicate at which time span while communication is established. Unless, the traditional use of switches, routers, and hubs [7] in a network, ad hoc networking stands off-clear in all the aspects.

Mobile Ad Hoc Network (MANET) [8] is one the aspect that includes a factor of mobility in all the devices that were intended to communicate in an ad hoc network primarily, along with the fact that mobility does not make any effect onto performance of the network or any of the communicating devices. Devices in MANET are able to move along a network while communicating or making access to resources and services. Unlikely to existing ad hoc network, MANET also concludes to be an infrastructure less, and self-configuring network and in a continuous manner.

Paper can further be classified under numbers of sections such as, Section 2: underlines about what common routing protocols in any network, and Hybrid Routing Protocols (HRP) [9] consisting of an algorithm; Section 3: underlines a simulation process necessary for the successful comparison

of normal routing protocols along with the HRP; Section 4: consists of an analysis for the proposed scenarios in section 3; Section 5: includes conclusions, findings and future scope for the proposed work in the paper.

2. USEFUL WORK ABOUT ROUTING PROTOCOLS

For successful ad hoc network, there exists numbers of routing protocols in any network. Routing protocols [2], [4], [8], [10] are generally those rules or set of standards made for the communicating device in any network to better make decisions regarding the appropriate path needed to transfer the information or to establish a reliable communication link in between the two or more destined devices.

To initiate computing in between the connected devices, a topological architecture is followed to make successful transfer of data packets from one device to another device. Since devices in an ad hoc environment doesn't know in advance the dedicated routes towards multiple destined devices with in the network boundaries. To enable this facility, routing protocols are being used which inspects the data packet and connected devices to choose most appropriate path to travel along the network.

Most frequently used routing protocols lies under the following four section in ad hoc networks, these would be such as:

Table-driven Routing Protocol

This is also known as pro-active routing protocol [11]. Under this scheme, all the routers are responsible to distribute the routing information to every other router periodically and makes a new list of destination devices every time a distribution is performed. This may result in maintaining abundant of non-useful data at routers, which may lead to slow down in eradicating failures.

On-Demand Routing Protocol

This is also known as reactive routing protocol [11]. This scheme facilitates a mechanism in which every router floods a Route Request (RR) packet to all other routers in any network on an on-demand basis. These conclude in increased latency in finding an appropriate route, and moreover results in clogging of routes.

Hybrid Routing Protocol:

This scheme is a combination of both table-driven and on-demand routing protocols [9], i.e. it consists advantages and disadvantages of both the routing protocols. At initial, all routers will establish certain proactive routes and start computing. Afterwards, an on-demand scenario will start working by flooding multiple RR packets. Zone Routing Protocol (ZRP) [11] is one of the type of routing protocol that is hybrid in nature.

ZRP protocol is both the pro-active and reactive in nature on sending data packets in any network to the destined devices. ZRP is an efficient and reliable protocol to be used in any ad hoc network, as it supports an appropriate manner to send and receive necessary routing information from all the routers within the boundaries. Thus, this method is an efficient method to find the most appropriate route to establish computing in between the devices.

ZRP contributes towards in faster delivery of data packets to destination devices and helps in reducing the processing overhead by a series of operations needed to select the most appropriate route to data transfer. An architecture is being followed in any network enabled with ZRP routing protocol. The figure 1 depicts working architecture for ZRP in an ad- hoc environment.

Fig 1: ZRP Working Architecture in Ad Hoc Network

Fig. 1 depicts ZRP architecture, how communication is taking place using routing protocols. For security purposes Authentication Authorisation Accounting (AAA) [12] Server is installed to safeguard the information from breaching out.

3. SIMULATION

This section is an experimental section that includes simulation environment under which scenarios need to be implemented to measure the performance metrics for numbers of station operating in any segment of the network. In the proposed simulation environment, computing with routing protocols is encouraged along with ad hoc network methodology, i.e. work stations operating in this environment are allowed to move freely in a network and are allowed to communicate while moving along the network.

In the proposed simulation, MANET is also introduced, so that ad hoc networking is performed by the stations that are set to mobile, *i.e.*, includes some factors associated with moveable character. Different scenarios are implemented to measure the performance metrics for devices that computes. Furthermore, configuration for the network can be described, such as:

Fig 2: Scenario with routers enabled with routing protocols in Ad Hoc Network

In the above environment, three scenarios can be implemented in the following manner, consisting each for pro-active, reactive and hybrid routing protocols in an Ad Hoc network. The list of scenarios can be, such as:

A. Simple Pro-active Routing environment:

In this scenario, all the routers are implemented to operate their take proactively while a communication need to be done, i.e., Optimized Link State Routing (OLSR) Protocol [13] is implemented.

B. Simple Reactive Routing environment:

In this scenario, all the routers are enabled with reactive routing protocol at their end, and are tend to operate on an o-demand basis whenever a data packet has to travel along the network, i.e., Asynchronous On-Demand Vector (AODV) Routing Protocol [14] is implemented.

C. Hybrid Routing environment:

Under this scenario, all routers are enabled with hybrid routing protocol, i.e., all the routers can efficiently operate and can utilize the advantages of both reactive and pro-active routing protocols, *i.e.*, Geographical Routing Protocol (GRP) [15] is implemented.

All 03 scenarios are depicted by the Fig. 2. Furthermore, the detailed configuration includes, 04 MANET stations, 02 Ethernet Switch, 01 Cisco 4000 series routers [1], [5], 02 Ethernet Servers, 02 Firewalls, 02 MANET Wireless Local Area Network (WLAN) Routers [16], [17], 01 Application Configuration module, 01 Profile Configuration module, and 01 Quality of Service

(QoS) [2], [18] Configuration module. Application module is used to provide services to the clients; Profile module is implemented to make an access to all the applications; QoS module is utilized in a sense that there must be some method to enhance the quality of work or performance of stations. Apart from this configuration, 01 servers are enabled with AAA as an access server. All the stations are enabled to operate in an Internet Protocol version-6 (IPv6) [1], [2], [5], [19] environment.

4. SIMULATION ANALYSIS

This section underlines the analysis of scenarios based on certain experimental factors. An analysis has been done to judge the performance of communicating devices through a list of performance metrics. Further analysis is done to measure the performance for Hyper Text Transfer Protocol (HTTP) [16] Application server in an IPv6 environment.

D. ***Page Response Time:*** Page response time [20] can be referred to as amount of time spent by the server or client to process back to the request made by one of the stations in a network. Fig. 3 depicts the page response time in HTTP Application Server.

Fig 3: Page Response Time packets/sec: HTTP Application

E. ***Traffic Sent/Received:*** Traffic Sent or traffic Received [18], [21] is the total traffic i.e. sent or received by numbers of stations in a network. Fig. 4, 5 depicts traffic sent or received by HTTP Application Server.

Fig 4: Traffic Received packets/sec: HTTP Application

Fig 5: Traffic Sent packets/sec: HTTP Application

F. *Packets Dropped:*Packets dropped, or packet loss [18] is an amount of data packets that are discarded by the stations and not received or delivered successfully by any of the destined stations in any network. Fig. 6 depicts traffic dropped in an IPv6 environment.

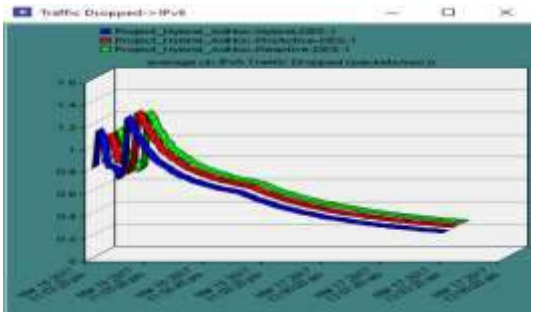

Fig 6: Traffic Dropped packets/sec: IPv6 Environment

G. Load in HTTP Application: Load [22] in any application can be justified as amount of traffic that has not been maintained or managed properly in any network on or before time out has occurred. Fig. 7 depicts th eload factor in HTTP Application Server.

Fig.1 Load packets/sec: Authentication Server-HTTP Application

Table 1: Analysis for Routing Protocols in Ad Hoc Network

S. No.	Performance Metric / Protocol Class	Page Response Time	Traffic Sent / Received	Packets Dropped	Load
1	Proactive	Extensive increase	Higher packet loss	Constant as time increases	Decreased gradually
2	Reactive	Moderate increment	Moderate packet loss	Constant as time increases	Gradually increased
3	Hybrid	Reduced	Moderate packet loss	Constant as time increases	Moderate increment
Conclusion		Hybrid routing protocols are good to implement in any network or reactive routing protocol.			

5. CONCLUSION AND FUTURE SCOPE

Ad Hoc routing is one of the alternative to configure a network without having prior set configuration. Each and every station or communicating device is given authority to provide an infrastructure-free or prior configuration-free network environment to establish successful communication in between numbers of devices. In this paper an ad hoc environment is implemented onto which three classes of routing i.e. routing protocol for ad hoc routing are also configured, namely: OLSR (pro-active routing protocol), AODV (reactive routing protocol) and GRP (hybrid routing protocol). A simulation was performed out of which is has been analyzed that stations with HRP implemented at their end, performs much better than the two other routing protocols.

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Development of Optical Microbial Biosensor for Reflectometric Nitrite Ion Detection

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Abstract

In this paper, we have discussed a microspheres-based microbial optosensor for NO_2^- ion quantitation was constructed by using immobilized *Raoutella planticola* (*R. planticola*), the bacterium expressing NAD(P)H nitrite reductase (NiR) enzyme, which was isolated from local edible bird's nest (EBN) *via* microbial technique. The whole cells and the lipophilic Nile Blue chromoionophore (NBC) were physically adsorbed on the self-adhesive photocurable poly(*n*-butyl acrylate-co-*N*-acryloxysuccinimide) [poly(nBA-NAS)] microspheres, whilst the reduced co-enzyme NAD(P)H was covalently immobilized on the succinimide-functionalized acrylic microspheres *via* peptide link to produce a reagentless nitrite biosensing system. As the microbial biosensor responded to nitrite through color change from blue to pink, a facile reflectometric approach was adopted to measure the reflectance intensity at 639 nm, before and after reaction with nitrite at optimum pH 8. The optosensor could quantify NO_2^- ion concentration within a dynamic linear response range of 0.5-400 mg L^{-1} with a limit of detection (LOD) of 0.2 mg L^{-1}. The large surface area to volume ratio of the acrylic microspheres allowed solid-state diffusional mass transfer of the substrate to occur at the micro-biosensor surface, and an equilibrium response was achieved within 5 min. The reflectometric microbial biosensor exhibited high specificity to NO_2^- ion with negligible response to some other nutritionally important minerals (i.e. NH_4^+, K^+, Ca^{2+}, Mg^{2+}, Fe^{3+}, Fe^{2+} and NO_3^- ions), which may co-exist with the target NO_2^- ion in food, water and environmental samples. The practical feasibility of using the bio-optode for nitrite assay in food matrix sample showed good agreement with the standard ion chromatography method.

Market-Based Stock Pricing Model

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Abstract
In this paper, we searched for an appropriate regression model to compare and predict the stock prices of three petroleum-related business enterprise listed in Hong Kong Stock Exchange Market but based in China, which are Sinopec Corp. (386), PetroChina Company Limited (857), CNOOC Limited (883). By figuring out the relevant independent factors such as Hang Seng Index, H-Share Index, etc., we formed a relevant regression model to evaluate the current price and to forecast the future price of these stocks.

KEYWORDS
DDM, Crude Oil, Reliability, Statistical Tests.

1. INTRODUCTION
Under the Efficient Market Hypothesis, market price of a particular stock should reflect its fundamental value. However, there are always exceptional cases. For instance, the stock price of Petrochina (857) has remained at $1.xx for more than a year, but its price has doubled within a few months just after Warren E. Buffett purchased it.

2. LITERATURE REVIEW
One of the most common stock valuation models is Discounted-Dividend Model (DDM). However, Marvin May (1971) has criticized DDM had too many restrictive assumptions that it was often unable to be applied in real world, and he has proposed a new model that was more amenable to empirical testing.

$$V_0 = \frac{I_0 r_0}{k} + I_0 \left(\frac{r_1 - k}{k}\right)\left(\frac{g}{k - g}\right)$$

where

V_0 is value or price per share
I_0 is book value (equity) per share
R_0 is the rate of return on I_0
k is the rate of return investors require
r_1 is the rate of return the firm will earn on additional increments of equity
g is the rate of growth of equity

The first portion represents the gross capitalized value of present earnings from existing equity, while the latter represents the value attribute to the net capitalized value from earnings on future increments of invested equity.
Around ten years later, Richard O. Michaud and Paul L. Davis (1982) also criticized that the DDM could be subject to significant misinterpretation and misuse. In particular, it was argued that DDM returns maybe on a different scale from actual expected returns. The implications of the scale mismatch problem were noted, particularly for interpreting parameters of the dividend discount market line and implementing the information adjustment procedure for portfolio optimization.

We found that Marvin May's proposed model was also subject to the deficiency mentioned by Richard O. Michaud, and Paul L. Davis. Hence, instead of applying DDM or revising DDM, we would like to build a new model to evaluate the appropriate stock prices by using regression analysis.

In fact, W. Michael Keenan (1968) has pointed out that a single-equation regression model for equity valuation would fail to meet reasonable statistical tests of reliability. Specifically, he found that (1) the estimated parameters of the models would not prove consistently significant, (2) the parameters would not exhibit reasonable stability in different cross-section samples, and (3) the parameters would not exhibit stability for the same sample over time. However, since our model aims only at comparing and evaluating a few stocks in a given period of time, W. Michael Keenan's criticism may not apply to our case.

K. V. Ramanathan and Alfred Rappaport (1971) found that a company's reported earnings exercised a substantial influence on expected growth rate in corporate earnings. Alternative accounting reporting schemes might bring different expectation to the stockholders in evaluating the stock price. He also stated that the reporting scheme is particular important in the contest of a merger between firms. Since all the companies we evaluated are following the same accounting system in China, we would not take this factor in our model based on the principle of parsimony.

3. METHODOLOGY
We ran three regression analyses in accordance with the three different petroleum-related business enterprises mentioned. We have selected four factors, i) Hang Seng Index, ii) Hang Seng China Enterprises Index, iii) Nasdaq Composite, iv) Futures Price of Crude Oil, as the independent variables in our analysis. The reasons are as follows:

The increase in popularity of home computing and internet access has brought a whole new world to the fingertips of investors. We believe that share prices can be affected by investors who use technical analysis to drive their investment techniques. Technical analysis, also known as Chartism, is simply the study of past share price movements and stock market index trends, which are then used to forecast how shares and stock markets will behave in future. Chartism tries to identify, for example, trends in a variety of stock market charts. They argue that if the charts show an upward trend, investors

should continue buying. If, however, the charts show a downward trend, you should sell. They also look at moving averages, showing changes in the average share price over specific periods, say a month, and employ a range of other studies to predict future share price movements. Index of different exchange has been selected for our study:

i) HENG SENG INDEX

Hang Seng Index (HSI) was started on November 24, 1969, compiled and maintained by HSI Services Limited, which is a wholly-owned subsidiary of Hang Seng Bank, the second largest bank listed in Hong Kong in terms of market capitalization.HSI is a capitalization-weighted stock market index in the Hong Kong Stock Exchange. It is used to record and monitor daily changes of the 33 largest companies of the Hong Kong stock market and as the main indicator of the overall market performance in Hong Kong. These companies represent about 70% of capitalization of the Hong Kong Stock Exchange.

ii) HANG SENG CHINA ENTERPRISES INDEX

The Index, introduced in August 1995, tracks the overall performance of 50 China's state-owned enterprises listed on the Hong Kong Stock Exchange. Full market capitalization of the H-share portion of each of the constituting company is adopted for the index calculation.

iii) NASDAQ COMPOSITE INDEX

NASDAQ Composite Index measures all NASDAQ domestic and international based common type stocks listed on The NASDAQ Stock Market. Today the NASDAQ Composite includes over 3,000 companies, more than most other stock market indices. Because it is so broad-based, the Composite is one of the most widely followed and quoted major market indices.

iv) FUTURES PRICE OF CRUDE OIL

The price of oil fluctuates quite widely in response to crises or recessions in major economies, because any economic downturn reduces the demand for oil. On the supply side the OPEC cartel uses its influence to stabilize or raise oil prices. Since the main business is oil refinery, the public do expect the changing price of crude oil should have some influence on the share price of the companies.

Model Summary[e]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	.995[a]	.989	.989	.08279	
2	.995[b]	.991	.991	.07720	
3	.995[c]	.991	.991	.07650	
4	.996[d]	.992	.991	.07405	.178

a. Predictors: (Constant), CHINA INDEX

b. Predictors: (Constant), CHINA INDEX, Crude Oil

c. Predictors: (Constant), CHINA INDEX, Crude Oil, HANG SENG INDEX

d. Predictors: (Constant), CHINA INDEX, Crude Oil, HANG SENG INDEX, NASDAQ INDEX

e. Dependent Variable: SINOPEC

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients			Collinearity Statistics	
		B	Std. Error	Beta	t	Sig.	Tolerance	VIF
1	(Constant)	-5.539E-02	.007		-7.814	.000		
	CHINA INDEX	6.785E-04	.000	.995	302.967	.000	1.000	1.000
2	(Constant)	-.155	.011		-14.772	.000		
	CHINA INDEX	6.436E-04	.000	.943	181.771	.000	.348	2.875
	Crude Oil	6.375E-03	.001	.063	12.221	.000	.348	2.875
3	(Constant)	-7.247E-02	.022		-3.357	.001		
	CHINA INDEX	6.523E-04	.000	.956	161.648	.000	.263	3.803
	Crude Oil	6.178E-03	.001	.061	11.906	.000	.345	2.897
	HANG SENG INDEX	-8.905E-06	.000	-.017	-4.373	.000	.581	1.720
4	(Constant)	-.108	.021		-5.079	.000		
	CHINA INDEX	6.410E-04	.000	.940	154.788	.000	.234	4.275
	Crude Oil	8.311E-03	.001	.083	14.693	.000	.272	3.674
	HANG SENG INDEX	-3.400E-05	.000	-.066	-9.339	.000	.170	5.866
	NASDAQ INDEX	1.624E-04	.000	.056	8.198	.000	.182	5.492

a. Dependent Variable: SINOPEC

4. RESULTS

We gathered the 5 years data for our regression analysis. We adopt Stepwise Regression. There are totally 989 values, which is large enough to avoid the over-fitted problem as there are only four independent variables. We analyze each of the petroleum-related business enterprises as follows:

i) Sinopec Corp. (386)

The p-values of the F-test is 0.00, which means that at least one of the independent variables is significant. However, autocorrelation (the computed values of Durbin-Watson statistic of all four models [by running regression four times] are less than D_L, which means positive autocorrelation) and multi co-linearity problems (VIF of some variables are as larger than 5 in model 4) do exist. And we note that Adjusted R^2 has neither increased from model 2 to model 3, nor from model 3 to model 4. Hence, by the parsimony principle, we would choose model 2 for our prediction purpose. VIF in model 2 has decreased to 2.875.

$Y = -0.155 + 0.0006436X_1 + 0.006375X_2$

Where Y is the stock price of Sinopec Corp. (386)

X_1 is the value of Hang Seng China Enterprises Index

X_2 is the Futures Price of Crude Oil

ii) PetroChina Company Limited (857)

Model Summary[d]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	.990[a]	.981	.981	.15091	
2	.994[b]	.987	.987	.12186	
3	.994[c]	.988	.988	.12073	.077

a. Predictors: (Constant), CHINA INDEX

b. Predictors: (Constant), CHINA INDEX, Crude Oil

c. Predictors: (Constant), CHINA INDEX, Crude Oil, NASDAQ INDEX

d. Dependent Variable: PETROCHINA

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Collinearity Statistics	
		B	Std. Error	Beta			Tolerance	VIF
1	(Constant)	-.275	.013		-21.296	.000		
	CHINA INDEX	9.153E-04	.000	.990	224.202	.000	1.000	1.000
2	(Constant)	-.571	.017		-34.450	.000		
	CHINA INDEX	8.116E-04	.000	.878	145.205	.000	.348	2.875
	Crude Oil	1.892E-02	.001	.139	22.975	.000	.348	2.875
3	(Constant)	-.699	.033		-21.000	.000		
	CHINA INDEX	7.945E-04	.000	.860	117.712	.000	.234	4.272
	Crude Oil	2.020E-02	.001	.148	23.334	.000	.309	3.237
	NASDAQ INDEX	7.737E-05	.000	.020	4.424	.000	.621	1.610

a. Dependent Variable: PETROCHINA

Hang Seng Index is being excluded by the Stepwise Regression analysis. The p-values of F-test is 0.00, which means that at least one of the independent variables is significant. However, autocorrelation and multi co-llinearity problems exist. By the parsimony principle, we choose model 2.

$Y = -0.571 + 0.0008116X_1 + 0.01892X_2$

where

Y is the stock price of PetroChina Company Limited (857)

X_1 is the value of Hang Seng China Enterprises Index

X_2 is the Futures Price of Crude Oil

iii) CNOOC Limited (883)

Model Summary[d]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	.934[a]	.872	.872	.3105	
2	.963[b]	.928	.928	.2337	
3	.971[c]	.942	.942	.2090	.077

a. Predictors: (Constant), CHINA INDEX

b. Predictors: (Constant), CHINA INDEX, Crude Oil

c. Predictors: (Constant), CHINA INDEX, Crude Oil, NASDAQ INDEX

d. Dependent Variable: CNOOC

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Collinearity Statistics	
		B	Std. Error	Beta			Tolerance	VIF
1	(Constant)	.439	.027		16.505	.000		
	CHINA INDEX	6.902E-04	.000	.934	82.172	.000	1.000	1.000
2	(Constant)	-.241	.032		-7.590	.000		
	CHINA INDEX	4.521E-04	.000	.612	42.183	.000	.348	2.875
	Crude Oil	4.345E-02	.002	.399	27.515	.000	.348	2.875
3	(Constant)	.548	.058		9.508	.000		
	CHINA INDEX	5.573E-04	.000	.754	47.698	.000	.234	4.272
	Crude Oil	3.556E-02	.001	.327	23.730	.000	.309	3.237
	NASDAQ INDEX	-4.766E-04	.000	-.153	-15.743	.000	.621	1.610

a. Dependent Variable: CNOOC

Hang Seng Index is being excluded by the Stepwise Regression analysis. The p-values of F-test is 0.00. However, autocorrelation and multicollinearity problems exist. We choose model 3 for it has the highest Adjusted R^2. Since our regression model aims at prediction only, so even though individual regression parameters maybe poorly estimated when multicollinearity exists, the overall prediction is still accurate provided we predict Y-value within the range of X-values in our model:

$Y = 0.548 + 0.0005573X_1 + 0.03556X_2 + 0.0004766X_3$
where

Y is the stock price of CNOOC Limited (993)
X_1 is the value of Hang Seng China Enterprises Index
X_2 is the Futures Price of Crude Oil
X_3 is the value of NASDAQ Composite Index

6. DISCUSSIONS & CONCLUSIONS

We found that Hang Seng China Enterprises Index and Futures Price of Crude Oil are both significant variables in all three prediction model. R2 are very high in all three models (0.991 for Sinopec Corp., 0.994 for PetroChina Company Limited, 0.971 for CNOOC Limited), meaning that the models have very high prediction power. We can therefore compare the market price and the predicted price as a reference for our stock purchase. Ranges of values of the variables in our regression model are as follows:

Stock Price of Sinopec Corp.: HK$1.00 – HK$3.75
Stock Price of PetroChina Company Limited: HK$1.29 – HK$4.85
Stock Price of CNOOC Limited: HK$1.23 – HK$4.525
Futures Price of Crude Oil: US$17.45 – US$55.17
Value of Hang Seng China Enterprises Index: 1560.55 – 5391.28
Value of NASDAQ Composite Index: 1114.11 – 2313.85

Let's illustrate how to predict the stock price of Sinopec Corp.by fitting the values of the independent variables on 8 March in our sample:

$Y = -0.155 + 0.0006436\ (5082.47) + 0.006375\ (54.59)$
$= 3.464$

Hence, the stock price of PetroChina should be $3.46, and the market price on that day is $3.45, which is nearly the same. If the predicted price is much larger than the market price, then we may decide to purchase it.

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A Statistical Analysis on Demand of Security Devices in India

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Abstract
The security systems industry caters to a wide range of area which includes front door management, security biometrics, CCTV cameras integrated with door locks, electronic safes and vaults, security alarms. In India the electronic security market is growing rapidly. There is vast potential in the security locks and security solutions market as they are right now a niche market and a very few consumers have the idea of the products available in the market and its advantages. So the industry demands a very high tech savvy consumer who is aware about the technicalities of the products. Another area of growth is the servicing of these locks and implementation in other areas like thermostat control, garage maintenance, front door management, etc. In this paper we attempted to analyze the demand of electronic security products in India with the special reference to Delhi- NCR region. An exploratory study was carried out by interviewing and interacting with the dealers, dealing in security products from Ghaziabad, Noida, Gurgaon and Delhi. The paper provides valuable insights about vast potential in the security locks and security solutions prevailing in India.

KEYWORDS
Security Systems, Locks and Security Solutions.

1. INTRODUCTION
Demand for security products are growing across the globe. World demand for security equipment is growing from the annual growth of 5.2% in 2008-13 to 6.8% in 2013-18. The fastest gains will be in the parts of Asia, Central and South America, Africa and the Middle East, where security markets are underdeveloped and the intensity of security product is low in use. India is expecting a growth rate of around 30-35% in coming years [1, 2]. In the United States and Western Europe, an improved economic outlook and rebound in building construction activity will provide significant opportunities. Technological innovations and the integration of security equipment with smart phones and other electronic devices, as well as with lighting, heating, and other building systems, will aid sales of security equipment. New age devices like video door phones, CCTV cameras with digital video recording and access control mechanisms not only provide surveillance of homes in the absence of owners, but in case of break-ins or burglaries, also raise an immediate alarm that not just reaches them via mobile phones, but also their neighbors [3,4].

The Freedonia industry study analyzes the $11.6 billion US security product industry. It presents historical demand data (2004, 2009 and 2014) and forecasts (2019 and 2024) by product (e.g., alarms, access controls, video surveillance, contraband detection, electronic article surveillance) and market (e.g., government and institutional, consumer, trade and distribution, industrial, air transport, financial institutions, office and lodging establishments) [5-7].

The increases in crime and terror attacks have given impetus to the demand of such security devices. It is also the best time to invest in India as India is developing as a global manufacturing hub with the vision of make in India campaign [8, 9]. In this paper we are presenting a profound statistical analysis on demand of security devices in India with special reference of Delhi NCR region. A team of students of our college conducted a ground survey. Collected data to analyses the demand of security devices in the region and the figure 1 gives a clear indication that there is high demand of such devices in India.

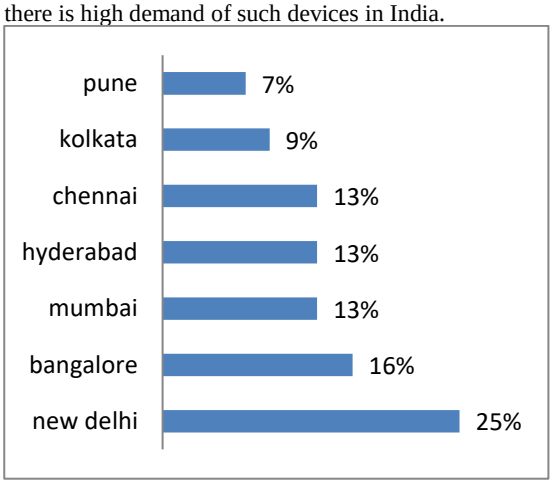

Fig 1: Demand of security devices in metro cities

2. OBJECTIVES OF THE STUDY

The study focuses to gain into following objectives:

a) To understand the market potential and growth of security systems devices in India.
b) To analyze the demand and supply of security systems in Delhi/NCR.
c) To explore the possibility of setting up an industry in Delhi/NCR to cater the present and future demand of security systems devices.

3. METHODOLOGY

3.1 Sampling Technique

A well-structured self-designed questionnaire was prepared for the collection of necessary primary date to study the market potential of security systems, its demand and supply status and how this gap could be filled with the growth in demand of such product.

3.2 Source of Data Collection

A survey was conducted involving a self-designed questionnaire to the dealers /customers respondents. Respondents were asked about a variety of questions regarding the most prospective demand for security systems. Secondary source of information here includes library resources, articles in various newspapers and magazines and online resources like company websites, online reports and articles. Sample size taken for the research was 93 respondents.

4. RESULTS & DISCUSSIONS

96% of hardware dealers deal in electronic security systems in Delhi/NCR. This shows that there is huge potential in this region. They all have coated that it was the requirement of the market demand that they have to start dealing with this product and this demand has grown in last 4 to 5 years.

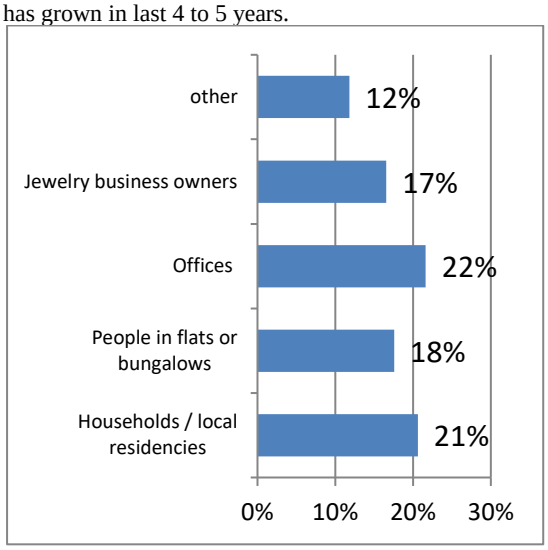

Fig 2: Most prospective clients

The figure 2 shows the results that prospective demand of the electronic security systems are mostly in office i.e. 22% compared to household with 21%, people in flats or bungalows with 18%, jewellery business owners with 17% and others with 12%. The 75% of dealers/manufactures have said that they do not manufacture security system rather they import and assemble it whereas 25% have said that they manufactures these devices locally.

During the research it was found that 32% of manufacturers face challenges while procuring the raw material in terms of import restrictions whereas supply constraints and defects in product are 24% each, 16% believed that large amount of tax is also a kind of challenges they face, only 4% see high logistic charge as a challenge as shown in figure 3.

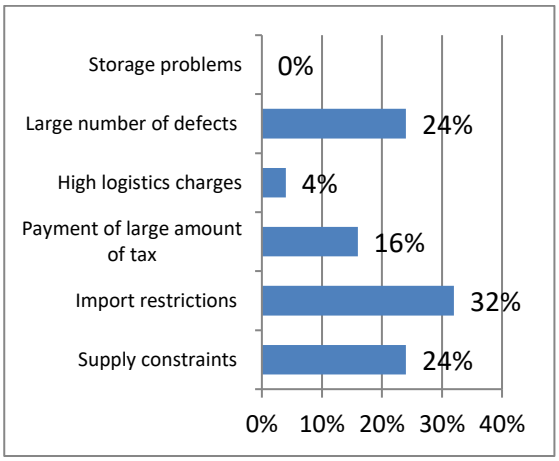

Fig 3: The challenges while procuring the raw materials required for manufacturing

From the study it is evident that those who don't manufacture, 78% procure from local vendors, 6% from international vendors and 16% procure from local as well as international vendors shown in figure 4.

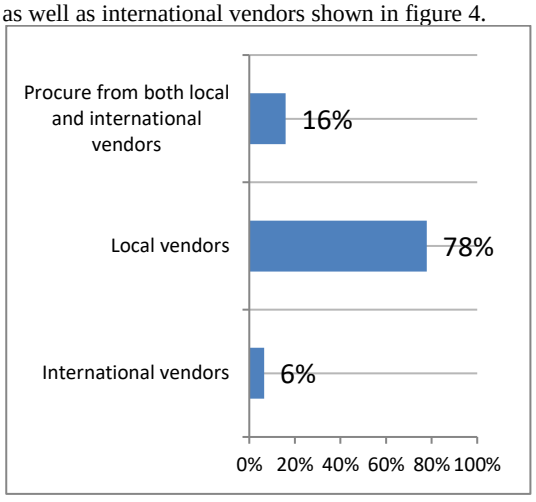

Fig 4: The security devices procure by

It is quite evident from the study that 80% of the local suppliers are facing problems related to availability of electronic security devices in India as shown in figure 5. The problems facing by local suppliers are indicating the demand of establishing the manufacturing industry of such devices in India.

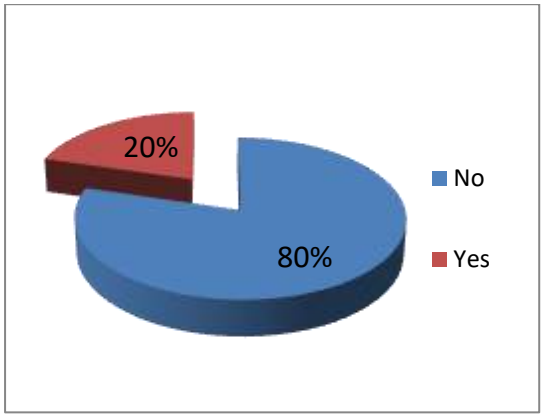

Fig 5: Facing problems related to supply

Now days, technology has connected security locks with your mobiles, so the limited battery backups hinders them to prevent their places. Frequent power cuts especially in Noida & Ghaziabad region, technical problem with the product and networking issues with modern devices are some of the hurdles that make people reluctant to use these products. The frequent complain that a dealer faces is frequent power cuts and mobile power backup. After sale services is also on the concern as most of the devices are imported from outside of India therefore these product needs technical guidance to increase the need of after sales services as shown in figure 6.

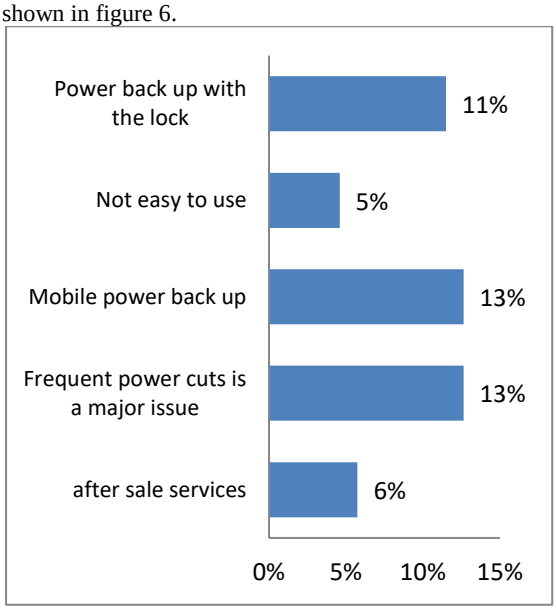

Fig 6: Consumers complaints

There are 6% of dealers reported complaints related to after-sale service, whereas 13% have experienced problems related to power back-up and 11% faced problems related to inbuilt power back up with the lock. 10% have reported technical problems and 20% have reported networking as major complaint.

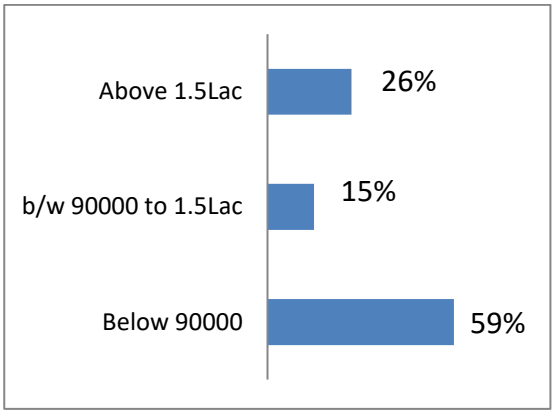

Fig 7: Various price ranges

As people in India are too price sensitive, and wants to procure best at cheap rates. So the most asked prices are somewhere as low as could be. Practically, retailers keep the huge stock of that product which is most demanded. So the majority of retailers keep the product which is less than Rs. 90,000/-. 26% also prefer to keep product above Rs. 1,50,000/-. Price range customer is willing to pay at POP: majority of customers are willing to pay the price which is as low as possible. 59% are ready to pay below Rs. 90,000/-. Only 15% are the ones who take products ranging from Rs. 90,000/- thousands to Rs 1.5 Lac. And most importantly products are sold as a bundled packages as shown in figure 7.

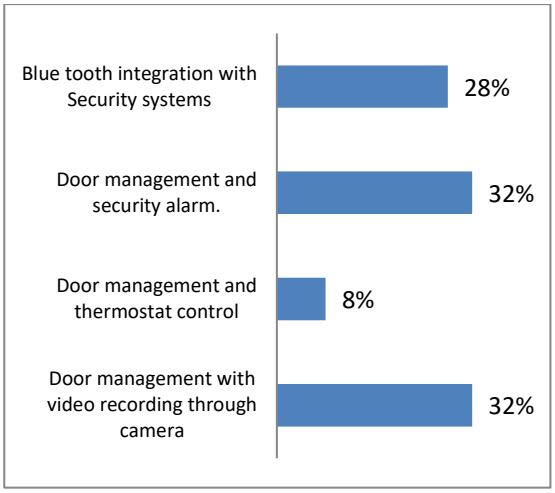

Fig 8: Other features demanded apart from the normal security features

The most demanded advancement is connecting the product with the wireless technology and wardrobes should be integrated. Some are also demanding about the blue tooth connectivity and door management with videos. During the study it was reported by dealers that 32% of customers are asking for product in both the category with "Door management with video recording through camera" and "Door management and security alarm, whereas 28% inquires for "Bluetooth integration with security systems" and 8% have shown interest in "Door management and thermostat control".

5. CONCLUSION

In summary, this research highlights that as security is always a major concern in India. Although the research focused on Delhi-NCR region but the demand for security devices is increasing day by day throughout the country as shown in figure 1. Moreover, terror attack like 26/11 have forced government establishments to think and upgrade their security systems from manual to security devices. Delhi being capital of country also plays a role in terms of increasing demand for it. Through mathematical analysis following figure gives a fair idea in terms of increase in demand of security devices.

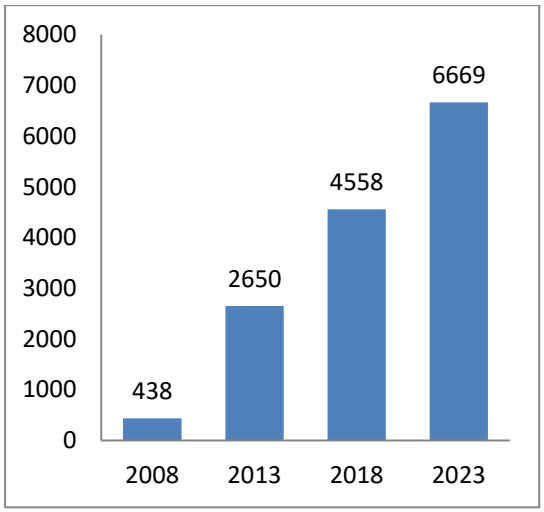

Fig 9: Prediction of growth of security equipment demand

The empirical formula for the growth of security equipment demand in India is $y = 2549 + 412\ (x\text{-}2013)$ which is obtained by the existing data. The formula is predicting that the market of security devices will increase with more than 40% growth rate and reach to the 6669 million dollar in 2023 as shown in figure 9. This shows that the Indian market is ready to become a manufacturing hub for security devices. The government of India is also inviting all the investors to invest in India in all manufacturing sector and providing all necessary support. By the existing research we have shown that there is high demand of security devices in India as well as the world and it is the key element which creates huge employment and can contribute in India's GDP.

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Significance of marriage as social institution in Indian English writings

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Abstract
The institution of marriage is the central draft of all the forms of human society which are a part of civilization. Marriage is the deepest as well as the most complex of all human relations because it is a difficult task for two people to lead their life together when they have their independent thinking and way of living. In Indian life, role expectations are highly specific and institutional in marriage, thus a woman's role in family has remained multifarious. Marriage and family, as a set of institutions, also encompass formal and informal, objective and subjective aspects. Family is the fundamental building block of all human civilization. Marriage is the glue that holds it together. The health of culture, its citizens and their children is ultimately linked to the success of marriage. The paper projects the marriage as a social institution in various writings of Indian English writers, which supports the social acceptance of marriage as a social institution through literature.

Keywords
Marriage, Social, Institution, Civilization

1. INTRODUCTION
Marriage is an institution that admits man and woman to family life. It is a stable relationship in which a man and a woman are socially permitted to live together without losing their status in the community. Marriage is not merely concerned with the couple; rather it affects the whole society and future generations. The responsibilities it entrusts a couple with are thus both heavy and delicate. In Hindu view, marriage is not a concession to human weakness, but a means for spiritual growth. Man and woman are soul mates who, through the institution of marriage, can direct the energy associated with their individual instincts and passion into the progress of their souls. Chaucer, the father of English poetry, has beautifully established a very noteworthy feature of the blissful state of marriage and husband-wife relation in his essay *The Merchant's Tale*:

Thilke blissful lyf
That is betwixe an husband and his wyf
And for to live under that holy bond
With which that first God man and woman bond
Non other lyf, sayde he, is worth a bene;
For wedlock is so easy and so clene
That in this world it is a paradys [1].

Since our childhood when children play *home -home*, the sister takes on the role of the *mother* and *brother* becomes the *father* even if he is younger. The *mother* packs lunch for the *father* before sending him to office. She then washes clothes, feeds and puts her doll children to sleep, dresses up and goes *marketing*. Sometimes the 'couple' even has mock fights, mostly over minor matters. At that very moment they are only imitating their parents but with every single day of play, the idea of *married family life* becomes much deep rooted in the minds of the children. The same minds of these children read fairy tales where every body lives happily ever after. This is the dictum they have been brought to believe in and try to make their marriage successful at every cost. Children are always taught, and will always be taught that, there are many paths they will travel in life, but for the greatest self-respect and fulfillment, they are to get but, one traveling companion, keeping their lives warm and fresh by discovering new truths about each other along the way. It is the most common way of life, the path that the majority are called to tread. Fundamentally, marital relations regulate human behavior between persons of opposite sex. It is evolved and developed with the socio-economic progress of mankind. Socially, it is an announcement of the new relationship. Since it is a demographic event, it has a great impact on social welfare. Marriage is considered a main domain of the kinsmen. One of the most important structural sub systems of every society is its kinship system, which is made up of families and other types of kin group.

Every religious tradition and culture encourages marriage as a responsible adult act, as it bears a social and spiritual significance. Even in a society where celibacy is a religious virtue, it is expected that, to become a celibate ascetic one has to first experience marriage and parenthood. Man or woman is considered incomplete without the other.

The sacred principle is referred to as *Purusha* (The Male) and cosmic energy as *Prakriti*or *Shakti* (the female), in the Macrocosm. It is the most important rite to equip man or woman for life. It is meant to bring a strong bond between two individuals [2].

Marriage reflects the loving communion of the spouses and it provides a means of population on the earth and nurturing children. Jeremy Taylor says, **"Marriage is the mother of the world, and preserves kingdoms, and fills cities, churches and Heaven itself. It is that state of thing to which God has designed the present constitution of the world" [3].**

Strong stable marriages are the best way to ensure that children become responsible members of society. Marriage improves the health and longevity of men and women; gives them access to more active and satisfactory married life, increases wealth and assets, boosts children's chances of success and enhances men's performance at work and their earning. When one gets rid of the institution altogether there are many harmful consequences. It is not just the marrying of two people together but its success or failure equally affects society. When a family falls apart, it leaves a negative impact on the community because the children of such a family are more likely to be delinquents. On the contrary when a family is strong, the community is positively affected. Every child that goes out into the world from a stable happy home is a blessing to the community, and is able to make a contribution, rather than being a drain on the community. MadhuKishwar, the editor of feminist paper, ***Manushi*** says in an interview:

A family is essentially a support system, a form of people living together in more or less permanent alliance. Most human beings cannot live without support, so if people move out of one alliance they try to move in to another [4].

The institution of marriage has been regarded as the central feature of all forms of human society. It lays down the nucleus of society. It is one of the most important social institutions of all the societies of the world. There is no greater event in a family than a wedding, dramatically evoking every possible social obligation, kinship bond, traditional value, impassioned sentiment, and economic resource. In the words of MacIver and Page:

The family has no origin in the sense that, there never existed a stage of human life from which the family was absent to another stage in which it emerged [5].

Marriage is a relationship of man to woman which is recognized by custom and law and involves certain rights and duties in the case of both the persons entering the union. According to Hindu mythology:

Creation of male and female is not an accidental fact or afterthought but the very apex of God's creative activity. Even more it is the sexual pairing of male and female activity that is the pinnacle of the creative process. To deny the distinction of two sexes is to deny what is integral to God's ultimate creative act [6].

Marriage is more important than any other institution one is capable to form in this life, as it is not individual's happiness only, but that of others also, which is affected by their conduct in it. It has been ordained for the protection of society from foul and immoral acts on the one hand, and continuance of the chain of society itself on the other.

The inherent characteristics of marriage are intimacy, companionship, procreation and parenting. Marriage is not simply a celebration or expression of love. It is the world's most basic and universal institution – the foundation on which families are created and society reproduces itself. Society suffers when procreation and parenting is separated from the definition of marriage. Marriage is the most diverse relationship known to humanity because it unites the two halves of humanity – male and female. It is not a civil right; it is an institution given specific cultural and legal recognition because of the unique benefits it confers on adults, children and society at large.

Humanity has faced certain kind of challenges over and over again since the dawn of civilized existence and it continues to face them even now. Every human being craves for permanence. Man perceives the real world through his senses, but his perception is not same as the real world, as there are aspects of the real world which lie beyond the range of the perception of the senses. Man lives in society and he has created over the centuries many different social systems to achieve various objectives. These social systems have created numerous problems which apparently are quite different in different ages whereas they have been the same in different eras of history, one such institution is *Marriage*. Most ancient societies needed a secure environment for the perpetuation of the species, a system to rule, to handle the granting of property rights and the protection from bloodshed. It is held by many scholars:

The human race must have originally lived in the state of promiscuity, where individual marriage did not exist, where all the men in a horde or tribe had

indiscriminate access to all the women, and where the children born of this union belonged to the community at large [7].

We have beautifully sung lines by Halufield Cosgayne O' Donnogue that reflect the significance of marriage in life:

Hail, wedded joy! Thou fairest growth of all
That bollm'd in Eden, or surviv'd the fall.
Thy leaves, thy flowers, thy fragrance and thy fruit,
Thou human lips were dumb, and songs were mute were cheap and precious still, whate'er the price save of lost innocence and paradise;
Thy leaves; — with love immortal vendor green;
Thy flowers—the beauty of each marriage scene;
Thy fragrance, — is the buds of nuptial bliss,
The wife's first smile—the infant's earliest kiss;
Thy fruits—why name the loveliest fruit on earth,
A numerous offspring clustering round the hearth?
Oh! Might the exulting theme exalt
My song and verse bundle as it flows along [8].

The subject of the poem has been sung by the sweetest poets; eulogized by the ablest of philosophers and has received from heaven the approving blessing of the divine presence. It carries with it the hopes and the hearts of men; it excites in them the tenderness and the sweetest affection of which they are susceptible; it fills their breasts with feelings of kindness; and affects the pious mind with sentiments of holy friendship and religious duty.

Marriage, says the *Apostle* of Divine Institution **"is honorable in all instituted by God, in the time of man's primitive innocence, as the means of his happiness and perpetuity of his race. In every age this institution has been felt and acknowledged. Men, by experience, have found that it is not good for them to live in the state of celibacy and isolation [9]."**

2. MAJOR FINDINGS ABOUT MARRIAGE IN DIVERSE CULTURE

Marriage was a civil institution in nations until about the mid-5th century A.D. Around that time, Augustine and others philosophized about marriage and the Christian Church started taking an interest in co-opting it. Christians began to have their marriages conducted by ministers in Christian gatherings. It was in the 12th century that the Roman Catholic Church, as well as other orthodoxies, formally defined marriage as a sacrament. In *Roman Catholicism*, the Sacrament of Matrimony is between God, the man and the woman. Most Christian churches give some form of blessing to a marriage; Christian communions, notably Anglicanism, Catholicism, and Orthodoxy, consider marriage (sometimes termed holy matrimony) to be an expression of grace, termed a sacrament or mystery.

The *Roman institution* of marriage has been lauded as being the first purely humanistic law of marriage, one that is based on the idea of marriage being a free and freely dissolvable union of two equal partners for life. This is quite a simplistic view, as there were many differing forms of marriage in Rome, from the arranged marriages of the elite to the unions of slaves and soldiers. The Roman did not believe in any bond of marriage as institution, but only the mutual commitment towards each other as husband and wife was enough to lead a life mutually. Marriage, for both male and female, granted them a larger network of family members and the security that came with it, and for the woman, her husband's social status.

In the *Medieval Times*, however, marriage was quite different. Women did not have a choice as to whom they would marry, most of the time they did not even know the man before they were married, sometimes men were able to choose their bride. Marriage was not based on love. Husband and wife were generally strangers until they first met. If love was involved at all, it came after the couple had been married and if love did not develop through marriage, the couple generally developed a friendship of some sort. The couple's parents did the arrangement of marriage which was based on monetary worth. The family of the girl who was to be married gave a dowry, or donation, to the boy she was to marry. The dowry went with her at the time of the marriage and stayed with the boy forever. The church ceremony in the middle ages took place outside the church door before entering the church for a nuptial mass. During the ceremony in front of the church doors the man stood on the right side and the woman stood on the left side, facing the door of the church, the reason being that she was formed out of **'a rib in the left side of Adam [9].'**

Hincmar, the Archbishop of Rheims (845-882), attempted to resolve the conflicting views about marriage in his treatise *De Divortio*. He held that legitimate marriage had to meet four conditions and that it consisted of three elements. The conditions Hincmar noted were:

The partners had to be of equal and free rank and must give their consent.
The woman must be given by her father and dowered.
The marriage must be honored publicly.
The union was completed by sexual consummation [9].

The three elements which marriage rites contained **were sacrament, mutual consent, and sexual union [9].**

Islam considers marriage as both a physical and spiritual bond that endures into the afterlife, also recommends marriage high among other things, it helps in the pursuit of spiritual perfection. The Bahá'í Faith sees marriage as, *a foundation of the structure of society*.

Buddhism does not encourage or discourage marriage, although it does teach how one might live a happily married life.

Hinduism sees marriage as a sacred duty that entails both religious and social obligations. Old Hindu literature in Sanskrit gives many different types of marriages and their categorization ranging from *GandharvaVivaha* (instant marriage by mutual consent of participants only, without any need for even a single third person as witness) to normal (present day) marriages, to *RakshasaVivaha* (Marriage performed by abduction of one participant by the other participant usually but, not always with the help of other persons).

Marriage was well established in the Vedic age. The history of ancient India may be said to commence with the period during which the *Rig Veda* was composed. Vedic literature is the prime source of all cultural manifestations in India. Marriage was considered as a social and religious institution and a necessity for two individuals of opposite sex who had attained full physical development. **Woman as wife is denoted by the words *Jaya, Jani, Patni. Jaya: shares the husband's affection, Jani: the mother of the children, Patni: the partner in the observance and performance of religious sacrifices*[10].**

Some references show that the household fire was tended by the husband and the wife together. Marriage was made obligatory for all girls by about 300 B.C. for the society found that there were pitfalls in the path of an unmarried woman than those in the way of an unmarried man, as it prevented sexual immorality to a great extent. From the religious point of view, says a Vedic passage, a person who is unmarried remains unholy and is not fully eligible to participate in sacraments. This continued to be the view of society in subsequent ages. Even in the *Vedic Age* (1500-1200 B.C.) women had considerable freedom to move about in the family and society. Marriage used to take place at the age of sixteen or seventeen. From the ancient times marriage among the Hindus was a well-established institution. For the Aryans, it was a very sacred ritual in which women held a high esteem. The husband and wife constituted an indivisible unit in society.

In the *Upanishadic period* woman was viewed not as an object of sensuous pleasure, but as an inseparable partner in life performing the religious obligation on man. Family, house and religion are always co-related to one another; from the mythological point of view every religion considers marriage as a holy institution. A Vedic passage reads:

Man is only one half and he is not complete till he is united with a wife. Hindu mythology has the concept of *Ardhnarishwara*- half female and half male combination to make the perfect whole: *Shiva* and *Shakti*[11].

In referring to a divine couple the name of the female is often taken first eg: *RadhaKrisha*, *GauriShankar*, *LakshmiNarayan*, *SitaRam*showing the exalted position held by women.

A woman's existence merged with that of a man through the performance of a ceremony and hence it was imperative for the couple to carry out their promises made before supreme witness: *Agni*. In the *Brahadaranyaka Upanishad*, the ideal picture of a wife (*Patni*) and the other half of the husband (*Pati*) have been beautifully delineated by a very telling simile of the half of a shell [12]. The development of sutra literature is generally assigned to the period from 500- 200 B.C. The nucleus of *Grihya- Sutra* in *Upanishad* is a treatises dealing with rituals beneficial to a house (*grihyahitahgrihyah*). These epics depict the importance of marriage in life, and woman not as an object of sensuous pleasure, but as an inseparable partner-in-life. *VIVAH* (marriage) according to the religious scriptures is one of the major S*anskaras* binding the couple not only in this life but also in the life thereafter.

For a woman, marriage is irrevocable and indissoluble for all times. In Hindu society marriage is supposed to be a social obligation, for it is believed that marriage is not only a means of continuing the family but also a way of repaying one's debt to the ancestors. It is a life-long commitment of wife and husband and is the strongest social bond that takes place between a man and a woman. The norms set up for regulating the marital behavior in Hindu society is closely connected with religious duties and hence the impact of religious duties has more effect than any other element. *Grahastha Ashram* (the householder stage), the second of the four stages of life, begins when a man and a woman marry and start a household.

The ancient traditions of marriage are still practiced as they were earlier. The marriage ceremony contains much of the same wording as was used in the middle ages. Today, man and woman stand on the same sides of the altar as they did in the middle ages. The wedding

ceremony includes a ring exchange, and the ring is put on the fourth finger, the same finger it was placed on during the middle ages. Wearing of ring in the fourth finger followed by feast after the marriage with the family is still followed by the Christian community even today as was in the middle ages. The diverse traditions and cultures are followed by different community to justify the commitment of two people as husband and wife through their life. In the present society, whatsoever traditions are followed, they are not new but are being followed from ages. The duties of husband and wife are also clearly defined in the epics that help in attaining the marital happiness. Lasting happiness is attained when the couple emulates the golden rule – be as enduring as *Shiva*; be an *Annapurna* eternal provider as *Parvati*. *Shiva* is the ideal husband the most carefree one. He leaves the entire responsibly to feed *Ganesha*, *Kartikeya* and an ever-increasing army of ghosts to *Parvati*but she never complains and provides for all. If marriages have broken – the inference is obvious.

Family, as an institution, is to be found even in the most primitive of human societies in the world. The Vedic word *Dampatti*, denoting jointly the husband and the wife, etymologically means the joint owners of the house. "**A family is a community of people living together in an environment which is center of healing, a place where one can live, where one can admit one's frustrations, stupidities and anger to people who do not have to relaliate [2].**"The family is by far the most important institution in society. Family is formulated by marriage, as two people get married they form a family, which moves further, and get benefit and give benefits to society. It includes relations between parents and their children and also extends to grandparents. The family disintegrates when the marital relations break, as in the case of divorce. Historically it has been transformed from a more or less self-contained unit into a definite and limited organization of minimum size, consisting primarily of the original contracting parties. It is a unit of society, society to state and state to nation. Kate Millet believes that:

The fate of the three patriarchal institutions, the family, the society and the state are interrelated as co-operation between family and the large society is essential else both would fall apart [13].

For the existence of the family it is essential to have the existence of the blood relations. The members of the family have generally the same ancestors. The family does not mean a place or location but, is rather a web of mutual relations between the members of family, in the same way in which the meaning of society lies not in its being a group of human beings but in being a web of relations between them. The foundation of the family is based upon man's biological and psychological needs. In the modern age many functions of the family have shifted to other institutions, nevertheless the psychological needs cannot be satiated without a family. The members of the family are bound in the ties of duties and rights. Proper social organization depends upon proper organization of families; if the families disintegrate, society will never be safe.

A person is socialized in the family. The child's first school is his home and family, which conditions his attitude and behavior towards the elders in society, and which imparts practical education to the child concerning the customs in society, conduct, and other important elements of culture, preservation of health, love, sympathy, and cooperation. It is in the family that the child acquires important qualities as sincerity, sympathy, self-submission, responsibility and character which help the child in becoming an important and responsible member of society. In the family the child gets full freedom of expressing his ideas and views. Psychologists have incontestably proved that the proper development of child is impossible without a good environment in the family. The 2003 report supported by Rutgers University states:

Indeed, if there is a story to be told about marriage over recent decades, it is not that it's withering away from adults, but that it is withering away from children [14].

Marriage is a legally, socially, and religiously recognized interpersonal relationship, usually intimate and sexual, and often created as a contract. Marriages are perpetual agreements with legal consequences, terminated only by the death of one party or by formal dissolution processes such as divorce and annulment. It is not just a social convenience or an invention for living together; it is ordained by God and patterned to reflect the loving relationship. Many religions have extensive teachings regarding marriage. With the changing time the role has changed but the basic idea remains unchanged.

In all the rich and various cultures flung throughout the ecosphere, in society after society, whether tribal or complex, and however bizarre, human beings have created systems of publicly approved sexual union between man and woman that entails well-defined responsibilities of mother and father. Not all these marriage systems look like our own, which is rooted in a fusion of Greek, Roman, Jewish, and Christian culture. Yet everywhere, in isolated mountain valleys, parched deserts, jungle thickets, and broad plains, people have come up with some version of marriage. It makes an incomplete human being a complete one. It makes him/her a grown up person and gives him/her

responsibilities whether those responsibilities are to feed and clothe the wife or to assist the husband. Marriage is supposed to take a person out of the hectic lifestyle that one is in and place him or her in an organized environment giving a path to follow in life and a shoulder to lean on.

In short, marriage arranges one's life. It helps to safeguard one's faith i.e. it stops one from committing such acts by which she/he could be considered immoral. It is the most basic significant social relationship among human kind. The psychological adjustment of the members of the family to one another in the course of its inexorable changes creates perhaps the most important series of the numerous problems, personal and social, engendered by an association which affects so intimately and in such incalculable ways, which more than any other engrosses, expresses, and circumscribes the personality of man.

Men and women are generically like in certain respects, but they are also unlike and they are complementary [15].

In the Indian society it is very difficult to survive alone. It is supposed that woman is safe in the boundaries of the house and with a person i.e. her husband, no matter how she is treated. In such situation women never try to step out of the house, but struggle with the situations to make them favorable.

Marriage is a serious commitment, one that is not taken lightly for most people. In light of modern day, the old tradition has changed with the new development and education. In the present time the meaning of marriage has changed. *Collins Paperback English Dictionary* states under the heading of marriage that it is the contract made by a man and a woman to live as husband and wifebut, in India marriage is not completely looked upon as a contract rather it is seen as a spiritual union. The *HutchinsonEncyclopedia* defines marriage as a, **"Legallyor culturally sanctioned union [16]".**

According to the dictionary and the encyclopedia, marriage is supposed to be a relationship that joins a man and a woman together via contract. When one looks at marriage, one finds a completely different picture. It seems as though modern couples sign a contract with a get-out-whenever-you-like-upon-trivial-matters clause, which enables both the husband and the wife to scrap their marriage contract and break their wedding oaths whenever they feel like leaving their partner and move on.

Today, the world is witnessing a new era where marriage is no longer considered necessary or even significant for a relationship. Today people are changing the traditional roles and are creating their own rules, which leaves an adverse impact not only on the lives of couples but also on society. When two people are tied in life long bond of marriage, different relations are formed that grow the family. Marriage is a source of relations where apart from blood relation, relations are multiplied, as one get new relations and can equally rely on them.

Marriage gives a form of identity and provides security and honor. Security means the certainty that a person has, that will not reject her or him under any circumstances. Honor is simply through relationship and is not affected by intelligence, money or one's contribution to the family. To speak of a person without talking about his relationship as husband, wife, son, or daughter is not possible e.g. whether in school, college records, military, prison or office records the relationship of the individual in question is invariably mentioned.

According to the social anthropologists, sociologists and historians, the institution of marriage in human society gradually evolved to its present stage starting from promiscuous relationship between male and female. Despite changing circumstances there are certain problems being faced by couples; undoubtedly divorce rate is increasing day by day, and still there is no other better option than marriage from the ancient time. In Indian society the discord arises because:

The modern Indian wife is confronted with the problem of multiplicity of roles she has to perform, the modern husband is experiencing a value conflict as he is being pulled in to two opposite directions by images and expectations of the traditional and modern wife [17].

This relationship must be nurtured and maintained for the welfare of all; without marriage, the development of the society is inevitable. Controversies apart, marriages are still made in heaven for the average Hindu couple. It is a lifelong commitment and is the strongest social bond between a man and a woman. The human society developed and redefined the institution of marriage over a long period of time. Although, scientific achievements have provided the world with all kind of amenities, the human being has not changed at basic level. The human instinct such as love, affection, joy, jealousy, hate, fear, and pride has not changed over millenniums. People still need stable family environment and friends to share life experiences. No doubt with the changing circumstances, the significance of marriage is decreasing. It is considered as something secondary, not necessary. To make a family now the new generation is adopting children from orphanages but, the fact is that for giving

the child love, affection, attachment, warmth of relations a family is required.

The surface which marriages customarily present to the worldis often misleading. Indeed, one of the central paradoxes inthis most intimate relationship is that although almosteverybody has some personal and immediate experience of it,and although there is a vast array of social research that haslooked at marriage from the outside the main impediments of a compatible marriage are technical, cultural and ecological change, identity crises, tension in marriage, less tolerance, ego clashes. Despite these impediments to a compatible marriage there is no substitute of marriage because no alternative has yet been discovered in which a man and a woman can relate to each other in the way they can in the framework of marriage. As Mount (1982) in a review of theexperience of *Marriage and FamilyinHistory* comments:

It is the essence of marriage that it is private and apart fromthe rest of society. Its 'selfishness' or 'exclusiveness'is not its undertone but its heart and soul [18].

1. LITERATURE REVIEW

Literature has served the cause very well concentrating on the problems of life and has looked at individual problem through a social frame. Marriage has been the background of social issues in all different ages. Literature in scriptures provides sufficient proof in this regard. Varied world of *Ramayana* and *Mahabharata* is packed with marriages of varied kind. Important ones are providing clue to main action. Talk about marriage of *Dusheratha* with *Kaikaiye* or *Santanu* with *Ganga*, the whole action is generated and this continues till date when we hear a modern writer Vikam Seth that his family is the most important thing and comes first.

Previously, a family crisis of the nature of a maladjustment between husband and wife was overcome by the constraining influence of the elders, kinsmen and social mores and traditions and the family was saved from disintegration but, with the existing loss of respect for the power of these modes of social control husband and wife are deprived of guide or mediator and in a fit of temper or even vengeance they destroy delicately loving nurtured sapling which is the family.

In the modern time, the institution of family is undergoing rapid changes due to which the structure of the family is changing. The tie of marriage is the basis of the family. Weakening of marriage ties results in weakening of family ties. Now-a-days marriage is not a religious ritual but merely a social contract which can easily be broken on the grounds of boredom, or some kind of misunderstanding. Consequently, there are an increasing number of divorces. A major cause of the weakening of marriage ties is the failure of men to adapt to new circumstances created by the education of women.

Previously the woman was completely dependent on her husband. Now being educated, they also earn as much as their husbands or at least possess the capacity to do so. They have come to recognize their rights and want to be equal to men in every aspect of life. They now demand the same fidelity, which men demand from them. When the men do not want to have women on an equal footing with themselves, the result is a conflict, due to which the family tends to become disorganized. Now-a-days the agreements objectives, ambitions, thoughts and ideals of the family are coming to an end or tending in that direction. Men, women, children have their own ideals, their own plans, in which they brook no interference whatever. In this way though living together, moving together, no one is concerned with the other. The house becomes a hotel where the husband and wife are employed. A similar distance is seen to exist between them but, the fact is that the social structure has to stand at any cost. Outside this structure progress is impossible even in the most advanced part of the world.

Keeping in view, the requirement of the society, and enormous challenges that are globally faced through high exposure, it is very important that the ailing areas of the institution of marriage are looked after and its strength is ensured. There is no questioning of the relevance of marriage because this institution was, is and will forever be inevitable as there is no better option for the betterment of man, woman, and society. The requirement of the time is to redefine its norms with the demand of changing time.

Social institutions and their impact on human lives and society has always been the subject of interest of authors in all periods. Men and women writers equally participated in the presentation of their ideas without being confined to specific area. The father of Indo Anglian fiction R. K. Narayan is the most unpretentious and unassuming among those writers who have successfully experimented with the novel form. In his novels he portrays the attachment between husband and wife for whom love is not an elemental force and marriage remains a sacred institution for them.

Husband wife relationship has been the primary subject frequently used by the writers and all the other relations are secondary in their works. K. R. Venkataramani's **Murugan: the Tiller (1927)**, R.K. Narayan's **The Dark Room (1938), The English Teacher(1945), The Financial Expert (1952)**, and K. Nagarajan's **The Choronicles of Kedaram** portray the husband–wife

relations. Depiction of the social scene has always been the strong suit of women novelists. Kamala Markandaya, NayantaraSahgal**,** Shashi Deshpande, Jhabvala, and Anita Desai portray the relationship between husband and wife very minutely. The relationship of man and woman has always been the subject of literature.

The novels of 30s and 40s show individuals seeking fulfillment and peace by spiritualizing their desires within the framework of marriage, religion and rules of the family. By staying in family they are able to guide each other. Common image of woman appears in various literatures of the world. Woman as mother and protector, as inspirer and cherisher, as motivating primal force, as the chaste, as suffering wife, as charmer are some of the facets familiar in literature. The figure of Indian woman is portrayed in the novels where she is her husband's wife. We see the figure of Indian woman in Shobha De's ***Snapshot***, where she shows the importance of institution. Despite holding a higher position in society, when she comes back home she is her husband's wife.Remember, a woman in our society is nothing without a husband.

Study as much as you wish, win prizes get a good job, but don't let these things affects you or, gives you a big head. You may be the Prime Minister of India tomorrow, but when you come home, you automatically become you husband's wife. If you forget, you are finished your marriage is finished [19].

If the novels written in 30s and 40s are deeply analyzed we will find that the couples had deep respect for the marital relation and the female protagonists had deep sense of tolerance and were always ready to face every problem just to make their marital relation survive. Many writers have dealt with the theme of marriage and its problems. All have portrayed man and woman who adjust with the situations and make their marriage successful. Undoubtedly, there were problems in the marital relations but writers suggested the way to cope up with the situations.

Bhabani Bhattacharya believed that, "**Art must teach, but unobtrusively, by its vivid interpretation of life. Art must preach, but only by virtue of its being a vehicle of truth.If that is propaganda, there isno need to eschew the word [20].**"In his novel ***Music of Mohini***Bhattacharya describes the difficulty of a city–bred Brahmin girl when she is married to Jaydev with his roots in village. On the contrary Jaydev's sister Rooplekha is village–bred, and married in the city. Rooplekha tells Mohini,

"**You are city – bred, village –wed. I am village –wed, city – bred. We share one common lot; we have been pulled up by the roots [21].**"

Shashi Deshpande catches the subtle psychological complexities of the individual mind. The protagonists do not disregard the importance of marriage as a social institution, and seek solution to their marital problems. In her novel ***TheDark HoldsNo Terrors,*** the protagonist Sarita attempts to resolve the problems in the married life by the process of temporary withdrawal from the family followed by an objective appraisal of the whole problem. She returns to her paternal home to escape from her husband Manohar's sadism, to make her married life successful and worth working. Her circumstances lead to her becoming mentally mature who considers marriage as worthy of preservation.

Kamala Markandaya's novels revolve round the paramount theme of East and West Encounter. She depicts the husband–wife relationship from every angle and shows that in spite of the difference there is no better relationship than this. She gives a true picture of the Indian wife who is the mixture of moral energy and spiritual gift. Rukmani in ***Nectar in a Seive***, married to Nathan, faces a lot of difficulty in life. They can hardly arrange for a square meal a day, but she is content to live in the soulful quietude of her little village. Like a patient Job she tides her crises and patiently waits for the time to be better. Her philosophy is one of fortitude. She believes that, **"*a man's spirit" is "given to him to rise above his misfortunes."* Man's wants are many and cannot be fulfilled [22].**

Anita Desai does not challenge the utility of marriage as an institution but discloses the inner psyche of the characters through their relations. She does not believe that **"marriage is a farce as all human relationships are [23]."** She has definite idea of a happy conjugal life. As marriage is a union of two different minds, some adjustment is bound to be there from both the sides: husband and wife. In her novel ***Where Shall We Go This Summer?*** she portrays a woman character Sita who marries a man of her father's choice, but with time she loses her zest for life. The cause of her grief is that she is bored, dull, unhappy and runs away to Maroni to escape from "her duties and responsibilities; from order and routine from life and city [24]." But later she realizes that she cannot stay indefinitely, and decides to go back and face the fact of life.

NayantaraSahgal and Ruth PrawerJhabvala project the married couples and their married life in their novels. In Sahgal's***A Time to be Happy*** the protagonists Maya and Kusum accept the changed life after marriage and honor the institution. In Ruth PrawerJhabvala's***Esmond in India*** the protagonist Gulab regards the institution as pious and her husband as God.

Indian novelists have dealt with family relationships with high seriousness because the traditional heritage of India

gives importance to the family unit. They have significantly dealt with the theme of man woman relationship. They believe that, **"a novel must have a social purpose. It must place before the reader something from the society's point of view [20]."**Therefore, writers consider marriage as an honorable institution throughout their works, and also give the solution of the associated problems.

3. CONCLUSION

The review of literature justifies that marriage is the noblest way to journey through life. It is a relationship between individuals, which often forms the foundation of a family and include social and religious elements. People, marry not because it is their social duty to perpetuate the institution of the family or because the scriptures recommend matrimony or because they fall in love with each other but because they lived in a family as children and cannot get over the feeling that being in a family is the only proper way to live in society and to be in a family it is essential to marry as, in almost all the societies one or the other form of marriage exists.

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The Effectiveness of Debate Practicing to Improve English Speaking Ability - A Case Study at Tactical English Enrichment

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ABSTRACT
This research is intended to explore how debate practicing effects the improvement of speaking ability which focusing on the members of certain English course called as TEEN (Tactical English Enrichment). The researchers observe half of TEEN's members with purpose of discovering the mistakes made while speaking English in debate circle. In the first of members' debate session, the researchers find out that the common speaking mistakes caused them having difficulties to speak up consist of three points such as combining local language (Indonesian) with English, speaking haltingly (not fluent), and being afraid of having grammatical error to speak up (anxiety). Then the researchers monitored 16 members (half of TEEN's members) to discover the mistakes of each of them referring to mentioned three points, and when it is calculated, encountered 38 mistakes entirely found out. After three months since the observation conducted, the researchers do theaction of reobserving to find out whether the mistakes stated previously has reducedor not. The findings hows that the members' English speaking ability improved due to the practical activity (debating), when the three point mistakes is reviewed and calculated again, it is only 14 mistakes encountered of theirs in total. It means that debating practice effects the speaking ability as it is applied frequently. In addition, the factors of members' speakinga bility improvement includes three major factors all of which related to the debating process itself. Firstly, the members are required to enrich vocabularies before debating activity, thus they do not combine the language while arguing, secondly, the members are habituated to speak up, so that they do not speak haltingly, and thirdly the members indirectly are encouraged to speak up because of worrying to be defeated by the opponentparty, it leads to reduce their anxiety.

1. INTRODUCTION

In this modern era, the need of adequate communication has been increasing widely because of the importance of communication itself which is utilized by people as social human. In terms of communication, one requires the ability to speak between groups of people. Thus, thenecessity of speaking ability is highly needed as an essential aspect in communicating. The term of speaking (adj) which is always associated with the term of speak (v) defined as the ability, and act to say words in order to express thoughts, feelings, opinions, etc. in a particular way to someone.

Developing speaking ability is a crucial step both in working and studying world of earning comprehensible communication. For instant in working area, one does have to speak clearly to their partners what they are thinking. Before conveying of what they are thinking fluently in public, there is a need to reducing ambiguous sentence as it is extremely important to reach understandable communication. Thus it will not leave the with poor communication habits, which they must work hard to recognize and overcome.

Speaking is also considered as a key to communicating some sort of interest among people to avoid poor communication. Equally important, one must have the ability of speaking to minimize the distortion while communicating. The role of speaking ability is more than that. Language also plays an important role in speaking. People from different countries may not only speak different languages but have different bodies of knowledge, different educations, and different cultures. The fact that such differences have to be coped with independent of language barrier which can easily be performed by appying the ability of speaking.

In addition to the term of speaking, it is discovered that there has been several difficulties while performing the ability of speaking. Further explanations about speaking difficulties could be seen in discussion section. Those several difficulties could becope by debate practicing. Debate practicing is assumed as an appropiate method to deal speaking difficulties due to the practical activities itself. Debate lets people involved to experience further their speaking ability. It allows them to make contact and speak directly to their potential partners. While performing debate, those who involve in the circle must not rely on other people to express opinions.

1.1 Purpose of Research

The major purpose of this research is to showing the effectiveness of debate practicing to improve Engish speaking ability. This research is expected to give a

new brief of knowledge in academic area sespecially in teaching field.

2. REVIEW OF RELATED LITERATURE

2.1 Definition of Effectiveness

Effectiveness is defined as attaining of purposed goals already determined within a specified time. According to Steers (1985), it is regarded as the activity of reaching up program as a system with certain resources and means in order to attain decided target without pushing down the doer [1]. Aligned with Emerson in Hadayaningrat (1994), when the effectiveness is reviewed from the point of goal achievement, it is not only focusing on acquiring target but as well as notice the defense in process of gaining target since it is sufficient crucial to heed [2].

Moreover, the effective way to gain target is able to be considered as how to reach up the target which means the method used is being the focus on obtaining goals within determined time based on an accord. This definition in line with Hidayat (1986) who also defines the effectiveness as standard to clarify how the targets or goals are obtained included quantity, quality, and timing which have been specified in advance [3].

Thus, the definitions of effectiveness above are able to be deduced that effectiveness itself is regarded as standard or measure to gain the purposed goals which actually has a process.

2.2 Definition of Speaking

Speaking is the action of conveying information or expressing one's minds and feelings in spoken language (in various language). According to Guralnik (1995), speaking is one's ability to communicate in certain language with purpose of obtaining communicant's understanding towards the conveyed message contained in the conversation [4].

To most people, mastering speaking skill particularly in foreign language mastery is a necessity for the communicant does not invariably come from the same country that is not using various language. Thus, having proper speaking ability assists people to interact with others particularly when the communicator masters the foreign language that officially used by lot of countries.

2.3 Definition of Debate

Debate is oral communication that is expressed by the language to defend his opinions. Every party who argue would state arguments, give reasons in certain ways so that the opposing side would be convinced and sided with him. According to Smanda (2013), debate is carried out by two groups that argue a topic as a foundation of debate process in which each group has different point of view or side towards the topic [5].

Thus, debate is recognized as arguing process of two groups that focus on owned argumentations or opinion relating to the topic critiqued.

3. RESEARCH METHOD

3.1 Research Design

The research method conduced is quantitative. The researcher performs the observation for two months to the center of English learning named Tactical English Enrichment (TEEN) contained 30 members that focus on English debate practicing. The sample taken only for 16 members of TEEN, it refers to $\frac{1}{2}n + 1$ formula.

The first, the researcher observes members at the beginning of study to discover the mistakes of theirs (members) in speaking English. And the second, until all members learn for 3 months the researcher observes the members whether they obtain the improvement or not particularly in English speaking mastery and find out the improvement factors pushed them.

3.2 Place and Date of Research

This research is conducted in Jl. A. H Nasution No. 105 Bandung Indonesia. Meanwhile the date of conducting research is on May, 15th 2016.

4. DISCUSSION

4.1 The Mistakes Discovered at the Beginning of Study

At first, the researcher observed the members at the beginning of their study in TEEN. They debated several topics provided by tutors for 2 hours. The researchers discovered three general English speaking mistakes of theirs during first debate process such as:

1. Combining local language (Indonesian) with English.
   While arguing the opinion most of TEEN's member mixing the language (Indonesian and English). It indicates they definitely recognize less vocabulary then encounter difficulties to speak up due to less vocabulary mastery.
2. Speaking haltingly (not fluent).
   Majority of TEEN's members have not stated the argument fluently yet that leading to indistinct speaking. They are only able to speak up haltingly.
3. Being afraid of having grammatical error to speak up (anxiety).
   The last point refers to members' anxiety to stating the arguments as they worry about encountering grammatical error.

After attaining those points, the researchers start processing data by monitoring 16 members selected randomly, and the findings are provided in the following table:

Table 4.1.1. Data of Members' General Speaking Mistakes at First Debate Process

No	Nama	General Speaking Mistakes			Total
		Combining	Not Fluent	Anxiety	
1	Ahmad N M		√		1
2	Alfarji		√		1
3	Anggil				0
4	Deswita R		√		1
5	Litya S A				0
6	Nadiyah				0
7	Nayla Q			√	1
8	Rahmawati H		√		1
9	Suhendar				0
10	Rafi fachmi	√	√		2
11	Dzikri	√	√		2
12	Rizki S				0
13	Eggy S		√		1
14	Esty D			√	1
15	Dede S		√	√	2
16	Dewi F		√		1
				Total	14

Table 4.1.1 shows the data obtained by monitoring 16 members during their first debate. The members' mistakes at first observation and debate circle are 38 in total. The data would be utilized as the comparison for measuring the effectiveness of debate practicing to improve member's speaking ability.

Then, the researcher monitored 16 members carefully for 3 months in debate process to obtain the final data as the measurement of effectiveness of debate practicing whether it influences members' speaking improvement or not. After 3 months conducting observation, the researcher discovered the final data of members relating to their speaking improvement, the data served in the following table:

Table 4.1.2 Final Data of Members' General Speaking Mistakes after 3 Months

No	Nama	General Speaking Mistakes			Total
		Combining	Not Fluent	Anxiety	
1	Ahmad N M		√	√	2
2	Alfarji	√	√	√	3
3	Anggil	√	√		2
4	Deswita R		√	√	2
5	Litya S A	√	√	√	3
6	Nadiyah	√	√		2
7	Nayla Q	√	√	√	3
8	Rahmawati H	√	√		2
9	Suhendar	√		√	2
10	Rafi fachmi	√	√	√	3
11	Dzikri	√	√		2
12	Rizki S	√	√		2
13	Eggy S	√	√	√	3
14	Esty D		√	√	2
15	Dede S	√	√	√	3
16	Dewi F		√	√	2
				Total	38

Table 4.1.2 shows the data attained from observation and monitoring for 3 months to 16 members selected randomly at the beginning of their study (debate practicing). The data provided on the table indicates the effectiveness of debate practicing to improve members' speaking ability since the amount of mistakes get decline. On the table 4.1.1 the mistakes of members are 38 in total, then after having debate process for 3 months they got speaking improvement and at the final data the mistakes are 14 in total. Based on the researchers' observation and monitoring, there are three points as the factors of members' speaking improvements, generally could be sequenced as bellow:

1. The members are required to look up dictionary frequently to prepare the material of debate would be delivered and critique, therefore it indirectly forces them to enrich their vocabulary with purpose of influencing all minds of participant and the opposite party to side them.
2. The members are required to speak up using English in debate session, thus after performing debate session for 3 months at least 24 debate sessions have been conducted, they are being habituated to speak in English and gradually fluent.
3. The members have emotional stimulus that invariably encourage them to speak up because of worrying to be defeated by the opponent party.

Thus, from the discussion above could be deduced that debate practicing is considered sufficient effective to improve one's speaking ability since the result shows the decline of mistakes encountered by the members when debate session is frequently applied in speaking learning process.

5. CONLUSION

So, does debate practicing effect to the members' English speaking improvement? Based on the finding above, it is clear that debate practicing does effect to the members' English improvement due to several reasons. The members themselves, who are member of english course named TEEN, have been observed by the researchers in order to explore the improvement of speaking ability during debating practical conducted. In terms of speaking ability, the finding also shows that there are certain difficulties effecting the members' themselves to say their expression, opinions, etc. The difficulties copedare combining local language (Indonesian) with English, speaking haltingly (not fluent), and being afraid of having grammatical error to speak up (anxiety).The major reasons supporting the members speaking ability improvement are the need to enrich the vocabularies before debating activit ystarted, the need to be habituated to speak up in public, and the anxiety or worry about being defeated by the opponentparty during debating process. The researchers identify debate as a form of play that helped those who are poor in speaking English to advance their ability of speaking. Thus, debate practical is sufficient effective to improve speaking ability.

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Development of Transdisciplinary Models to Manage Knowledge, Skills and Innovation Processes Integrating Technology with Reflective Practices

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Abstract
This paper is part of a bigger research with three cycles of reflective studies to identify essential attributes in validating transdisciplinary models to manage innovation processes, skills training and human resource development through 'Learning Science/Mathematics Together' in a borderless world [LeSMaT(Borderless)] using technology. During the pilot phase or first cycle, the innovation processes of 'Knowledge, Thinking, Incubation, Inspiration and Development' are reported involving secondary learners participating in Problem-based Learning using Scaffolded Instruction (PBL-SI) approaches. These are supported by POSITIVE monitoring/evaluation rubric to guide them involving 'Planning with Objective/ organisation, Skills development, Information/ resource procurement, Training/transferring skills, Involvement/ incorporating Pedagogical-Content-Knowledge (PCK), emphasising Values/attitudes/ motivation and Evaluation/exchange/enrichment/ exposure'. The lessons learnt from the pilot phase anchored on sociocultural/constructivist framework were adapted in the second phase to facilitate LeSMaT(Borderless) using various sustainable blended learning platforms for managing knowledge, innovation processes as well as developing thinking, technology and life (work/survival/entrepreneurial) skills. In the subsequent phase, case exemplars are reported with highlights on recently implemented Smart PLS in-service skills training workshop to validate research instruments/models that promote scenario-based Education for Sustainable Living (ESL). Implications and future direction of research are also deliberated**.**

1. INTRODUCTION

The unprecedented global challenges e.g. oil crisis, terrorism and disasters influencing world economy with impact on the livelihood are the concerns of many global citizens especially among the Malaysians who have suffered much recently on the issues such as price hike, recession and depreciation of currency exchange. Science educators have to rethink the ways to teach science/ maths with more transdisciplinary approaches to manage knowledge, skills and innovativeness as well as better prepare younger generation to face the increasingly challenging world integrating life (entrepreneurial/survival/work) skills. This is partly also because the 'Science, Technology, Engineering, Mathematics' (STEM) education has been given due emphasis by the government recently with the visions to produce critical mass of technology-based skilled workers.

Background and Rationale

In fact the success of a developing nation e.g. Malaysia depends much on the competencies, knowledge and skills of its people that are significantly affected by transformative educational systems supported by sustainable Blended Learning (BL) platforms in increasingly globalized world.

Developing 'culturally responsive student-centred pedagogical approaches supported by technology' as a mean of transformation is an important action taken by educators who constantly reflected on their own practices. Being an educator working in the leading Centre to promote Science and Mathematics education for sustainability in the SEAMEO region, the author recently experienced three stages of trialling the framework of transformative practices to develop transdisciplinary models in managing knowledge, skills and innovation processes. Science/mathematics pedagogical approaches were integrated and supported by sustainable e-learning platforms for professional development, student-centred learning and networking activities.

Aims and Research Questions

This study aims at identifying essential attributes of transdisciplinary science education model in managing knowledge, innovation process, skills training and human resource development through three cycles of reflective practices within the cyclical processes of 'plan-act-observe-evaluate-reflect' of action research protocols to be reported. Elaboration is made on authors' experiences in the piloting and implementation phases of developing transdisciplinary models as well as research instruments or research

models to promote 'Learning Science and Mathematics Together' in the borderless world [henceforth abbreviated as LeSMaT (Borderless)] leveraging on various blended-mode technological tools and social learning platforms. The following are the Research Questions (RQs) identified:

(1) How could learners' higher order thinking (HOT) skills be enhanced through student-centred pedagogical approaches (e.g. PBL) with evidences of creativity/innovativeness and what are the procedures/processes that could be implemented?
(2) What are the features of transdisciplinary science education model supported by digital tools with exemplary practices in manageing knowledge and innovation process to reach out to wider audience?
(3) What are the areas that can be focused for the development of research instrument/model to facilitate the evaluation of thinking/technology/life skills training and human resource development leveraging on digital learning platforms?

2. METHODOLOGY

This reflective study employs the cyclical processes of "plan-act-observe-evaluate-reflect" [1, 2] using the protocols of Action research. Three activities including 'research, participation and action' were involved to seek the answers for the practical questions incorporating the features of "self-evaluative, collaborative, participatory and situational" involving the author with other collaborators in three phases. The cyclical processes or spiraling cycles included identifying problem, planning actions, implementing collection of observational and behavioral data systematically, reflecting on the data analysed as well as carrying out data-driven actions. Fact-finding or problem redefinition was also implemented to explore the results of the actions taken so that further planning and actions could be taken.

Through mixed-research activities incorporating collaborative inquiry and assessment/ evaluation techniques, data were collected and analysed using both qualitative and quantitative research methods. These include documentary analysis on project or learning output as well as archival records including publication and responses posted on e-forum or social learning platforms; classroom observation, interviews or focus group discussions, checklists and administration of survey questionnaires. Mixed-methods research was used within the stages of cyclical practices as the attempt to legitimate the use of multiple approaches in answering research questions. It is a better approach than restricting or constraining researcher's choices to collect and analyse data. This is because mixed-research is complementary, expansive, inclusive and pluralistic, but not limiting form of research. Indirectly it means that researchers should be creative to take an eclectic approach for selecting methods as well as thinking about and conducting the research [3-5].

3. ANALYSIS OF CYCLES OF STUDIES AND DISCUSSION OF FINDINGS

Pilot Phase or First Cycle of Study

During the pilot phase or first cycle of this study in response to Research Question (RQ) 1 'How could learners' Higher Order Thinking (HOT) skills be enhanced through pedagogical approaches (e.g. PBL) with evidences of creativity/innovativeness and what are the procedures/processes that could be implemented', various technology-enhanced activities were carried out involving problem identification and planning of data-driven actions. The promotion of HOT among secondary learners is an area of concern identified in response to the call for the need to have critical mass of thinking workforce in Malaysia that aspires to be a developed nation in the near future. An evaluative study was conducted to examine the effects of 'Problem-based Learning through Scaffolded Instruction' (PBL-SI) approach on HOT among groups of non-gifted secondary learners. A model was designed by the researcher incorporating the teaching of secondary science topic 'Water/Matter' through PBL-SI aiming at 'resolving water issues and managing waste to sustain community living' with brief findings as summarized in the following Figure 1 [6].

The researcher developed a model to promote HOT skills of learners through technology-enhanced PBL-SI approach supported by POSITIVE monitoring/ evaluation rubric. These involved '**P**lanning with **O**bjective/organisation, **S**kills development, **I**nformation/resource procurement, **T**raining/ transferring HOT skills, **I**nvolvement/incorporating Pedagogical-Content-Knowledge (PCK), emphasising **V**alues/ attitudes/motivation and **E**valuation/exchange/ enrichment/exposure' (or abbreviated as POSITIVE). For the sake of this study in response to RQ1, the analysis of data and discussion of findings will only be focused on the 'Training and transfer of HOT' component.

It was argued by e.g. [7] that PBL with minimal guidance was ineffective, so need to consider scaffolded instruction (SI) and factors to prepare students to think beyond classroom. Hence the study on a PBL-SI programme that enhance HOT among secondary non-gifted learners (comparing Non-PBL controlled group) aimed to bridge the knowledge-learning gap problem with research implications. In this phase of study, PBL-SI groups were presented with problem scenario using support tool guided by

POSITIVE rubric while Non-PBL groups were taught through transmission approach. Several instruments were developed encompassing three main aspects to illuminate evidence or change of '*ability*, *achievement* and *aptitude'* as manifested by students participated in the PBL-SI study. One of the instrument, 'Fluid intelligence Test' (FIT) was developed during this phase involving two pilot studies to establish its validity and reliability.

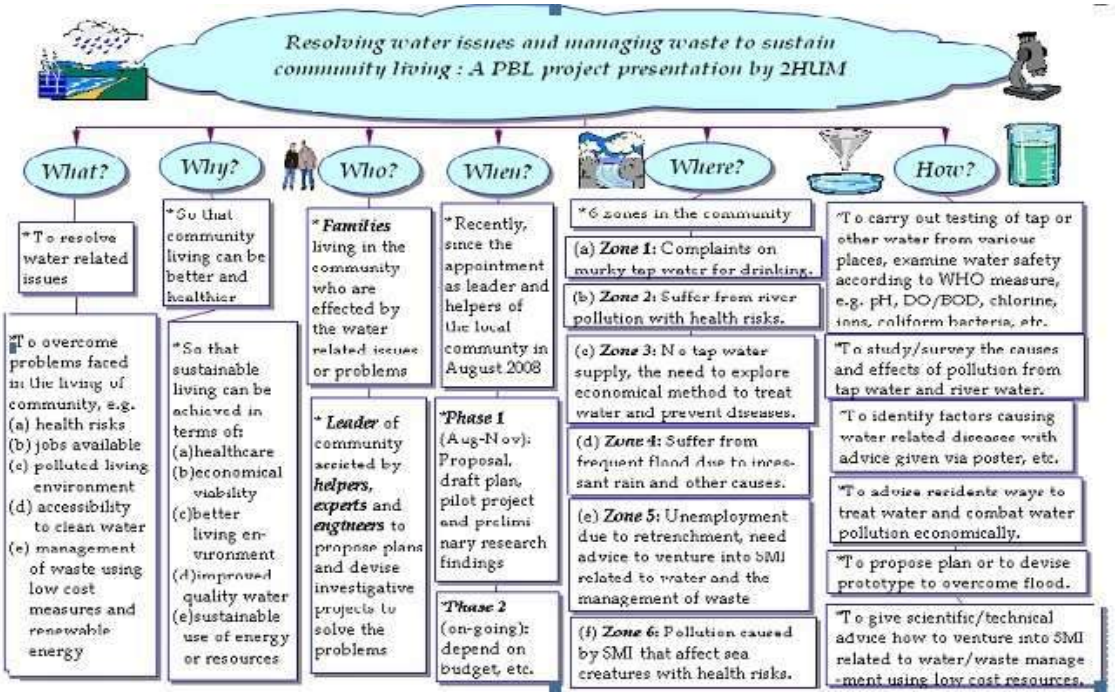

Fig 1: Summarised findings of the study on the effect of PBL-SI on students' HOT

FIT was a test of culturally independent or require culture-free mental efficiency, i.e. an example of 'aptitude' test to evaluate 'how quickly or easily the student will be able to learn in the future'. It was a type of psychometric test to evaluate learners' potential, the ability to solve new problems or the aspects of intelligence that involved the ability to see complex relationships and solve problems [8]. The questions raised in the items of FIT focus on evaluating the HOT aspects such as *creative thinking* (originality, flexibility, fluency with elaboration), *critical thinking* (identifying variables, analyzing relationship, comparing and contrasting), *logical thinking* and *reasoning skills* (choosing best solution logically with reasonable explanation of choice of response). Two pilot studies that were conducted involved the first group [N_1=40 (pilot study 1)] and second group [N_2=84 (pilot study 2)] of students selected from secondary student samples of very high, medium and moderately low achievers (recommended by the school teachers based on their academic performance in school examinations). Consequently, all the HOT questions that were piloted during pilot study 2 were accepted based on the results of item analysis that showed computed good range of $0.2 \leq \rho \leq 0.8$ and $D \geq 0.25$ (where ρ=Index of difficulty and D=Index of discrimination). The internal reliability for the final version of FIT computed through Kuder Richardson using SPSS statistics software also showed good Alpha value kr_{21} = 0.9043. Fluid Intelligence Test' (FIT) was proven to be good tool [$0.2<\rho<0.8$, $D>0.25$] to differentiate fluid intelligence of numerous types of non-gifted learners, as well as a reliable test for the evaluation of students' fluid intelligence with great implications in educational settings as it has high discriminating power. Both (PBL-SI, Non-PBL) groups were administered with FIT. The findings revealed that higher percentage of PBL-SI male scored higher in post-FIT as compared to PBL-SI female who scored higher than Non-PBL. From 'cross-case, within-case and exemplary case' analysis of value-based practices [9-11], students' potentials in science activities were also identified. 'More/moderately successful students' had shown motivation and were involved actively in preparing projects for mini science fair, young scientist congress, project proposal competitions and e-learning.

The analysis of data also revealed the following five steps of fostering creativity through PBL-SI that were concurred with the literature, i.e. "Knowledge, Thinking, Incubation, Moment of inspiration and Development" [12]. It was observed that generally the PBL-SI research samples were able to acquire diverse '***knowledge***' utilizing all the five senses through searching the literature from diverse sources of information that were relevant to their project with effective use of Open Educational Resourcs (OER) [i.*e*. '**I**nformation procurement' (or the first 'I') as required in the POSITIVE rubric]. They were given the '**T**raining' and encouraged to work in groups to '***think***' deeply as well as brainstorm ideas using graphic organizers such as concept map and fishbone diagrams that reflect the '**T**ransfer of their HOT' component. There were occasions when students were given opportunities to participate in '**E**nrichment' activities or involve in something unrelated to the problem, i.e. '***incubation***' period. But the resources they gathered were able to '***inspire***' them to prepare projects for mini science fair (by the end of 2008 in female school), research proposals for Magnificent Advancement of Young Scientists (MAAYS) 'i2discovery' proposal competition (between December 2009 to January 2010 by a few male students). Selected male students (from project team being illustrated as 'exemplary cases') had also participated in '***development***' of project ideas into useful and practical applications guided by More Knowledgeable Others (MKO) with '**S**kills'(scientific/ICT) enhancement activities.

The findings of the first cycle served as useful 'self-evaluative' feedback to improve the simplified model into a more transdisciplinary model that was used in the subsequent cycles for the management of knowledge, skills and innovation processes through 'collaborative and participatory' activities supported by e-learning platforms. These were the two of the four Action Research features that seek the answers for the practical questions as main focuses of this study.

Second Phase or Cycle of Study

During the second cycle of this study in response to RQ2 'What are the features of transdisciplinary science education model supported by digital tools with exemplary practices in managing knowledge and innovation process to reach out to wider audience', more comprehensive model was developed not merely focusing on Science PBL-SI activities. These include the teaching of Science concepts across other knowledge/subject disciplines such as Mathematics, Technology, Engineering, Economics, Environmental Education, Arts/Languages and Social Sciences. This was mainly due to the reason that the researcher was involved in developing and coordinating various technology-enhanced science/mathematics student-centred learning programmes for the SEAMEO region and beyond. Moreover, apart from involving in the development of curriculum to raise students' literacy and achievement for 'Programme for International Student Assessment' (PISA) 2015 and 2018 with emphasis on Mathematics/Science as well as Reading integrating Technology respectively, the researcher was also involved in training groups of trainers/trainees specializing in technology-enhanced science, mathematics and language teaching.

The components of '**I**nformation/resource procurement, **T**raining/transferring HOT skills, **I**nvolvement/incorporating Pedagogical-Content-Knowledge (PCK), emphasising **V**alues/ attitudes/ motivation and **E**valuation/ exchange/ enrichment/ exposure' in the POSITIVE tool validated during the first phase of study were emphasized in the second phase. As an off-shoot of the first phase of study, an on-line learning hub supported by e-learning portals was developed with potentials working with experts in SEARCH for future science and mathematics researchers. Among the sub-portals hyperlinked to 'Southeast Asia Regional Capacity-enhancement Hub' (SEARCH) include the 'Search for SEAMEO Young Scientists' (SSYS), 'Science across the World' (SAW) and 'Human Values-based Water, Sanitation and Hygiene Education' (HVWSHE) international flagship programmes, to name a few. The lessons learnt from the pilot phase anchored on sociocultural/constructivist framework were adapted in the second phase to facilitate the aforementioned sustainable Blended Learning (BL) platforms for managing knowledge and innovation processes. The development of thinking, technology and life (work/survival/ entrepreneurial) skills among self-directed learners was also facilitated through digital tools and student networking social learning platforms such as Edmodo and 'Learning Activity Management System' (LAMS) to promote SEAMEO 'Learning Science and Mathematics Together' (LeSMaT) in the borderless world [or LeSMaT (Borderless)] as reported by [13-16].

Various research instruments were also developed for the monitoring and evaluation of the aforementioned technology-enhanced learning programmes hyperlinked to SEARCH. For example, an instrument namely 'Water Attitude Scale' (WAS) was developed as well as validated to monitor and evaluate learners' sustainable water use ethics [17, 18]. Another instrument namely Attitudes towards Use of Technology in Education for Sustainable Living (ATUTESL) was also developed and validated with an exploratory study reported on the role of ICT tools in science classroom anchored on learner's efficiency model [19, 20].

Four main curriculum topics were developed in series of workshops between 2014-16 and beta-tested for LeSMaT (Borderless) in line with the aspirations of

'Sustainable Development Goals' (SDGs) [21] and reported [22, 23]. These were prepared as BL modules for Open and Distant Learning (ODL) with opportunities for higher learning [24, 25] to facilitate Training of Trainers (TOT) who are advocates of Education for Sustainable Living (ESL) and could promote critical mass of thinking workforce emphasizing ESL. Numerous educational models were prepared to manage knowledge, skills and innovation processes integrating technology to promote ESL and Education for Sustainable Development (ESD) with research evidences reported. For example, the optimized use of BL platforms to monitor and evaluate disaster risk reduction education for curriculum topic 'Climate Awareness and Disaster Risk Reduction EDucation' (CADRRED) was reported by [26]. The report on fostering global citizenship through agro-environmental project by a local school focusing on 'Conservation and Wise Use of Resources' (ConWUR) was presented by [27]. The enhancement of essential skills of learners through values-based sustainable energy education for curriculum topic 'Sustainable Energy for All' (SE4ALL) leveraging on interactive BL tools was reported by [28] and [30]. The initiative to nurture sustainable water use ethics through emerging practices in Mathematics and Science classroom integrating BL platform was presented by [29]. The teaching and learning methods for Asian communities were redefined to inform policy changes through 'Telecare and Healthy Lifestyle' (TeleHeal) collaborative learning platforms by [31]. The following Figure 2 illustrates the interrelated connections of 'Science, Technology, Arts/language and Mathematics' (STEAM) hybrid model for the lauching of model rocket [32].

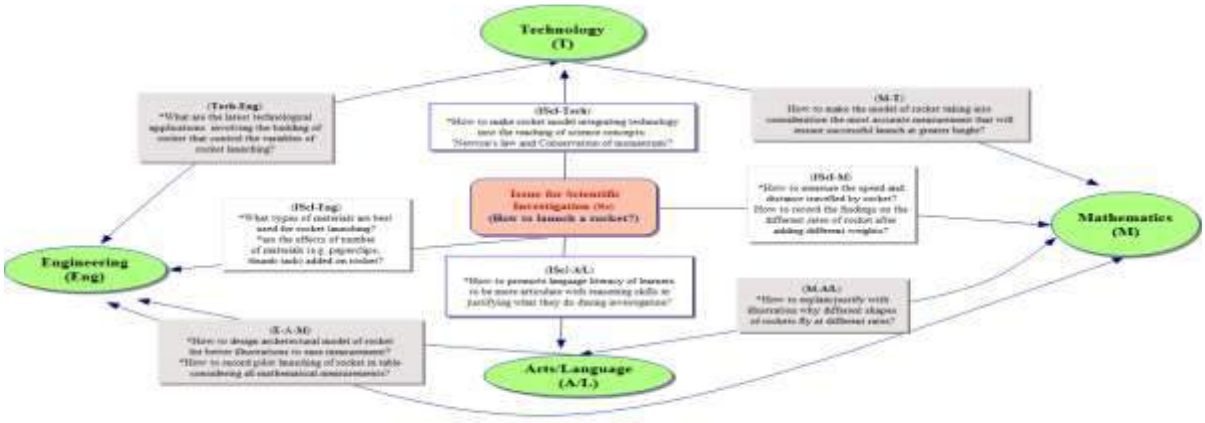

Fig 2: Concept map illustrating the interrelated connections of 'STEAM' hybrid model. (Ng et al., 2016b)

The teaching of transdisciplinary science through STEEEAMS model was also presented in a recent competition held at a local university [33].

Third Phase or Cycle of Study

During the third cycle of study, more comprehensive models were developed or refined from the previous models using problem/scenario-based approaches with the Action Research features of activities that were 'collaborative' and 'situational' in nature. These aimed at seeking answers for RQ3 'What are the areas that can be focused on for the development of research instrument/model to facilitate the evaluation of skills'. Subsequently, case exemplars were reported with highlights on the recently implemented Smart PLS in-service skills training workshop to prepare research instruments and/or models that could further promote scenario-based ESL with management of knowledge, skills and innovation processes integrating technology.

The components outlined in the POSITIVE tool validated during the first phase and adapted in various curriculum development or R&D activities in the second phase of study were revisited. Special emphasis was made on areas of '**S**kills development; **T**raining/transferring HOT skills; emphasising **V**alues-based pedagogical approaches and **E**valuation/exchange/enrichment/ exposure'. During the last workshop conducted in October 2016 to revise ODL modules for CADRRED, ConWUR, SE4ALL and TeleHeal, groups of participants from diverse background who are practising/expert teachers, educators and researchers were given an overview the use of statistical software packages. The author was the coordinator and facilitator in collaboration with an expert from a local university. The participants were given the exposure on the basic steps of using SPSS, Structural Equation Modelling (SEM) and Smart Smart Partial Lease Square (PLS) to perform data analysis as well as get more out of the data they possess by using

inferential statistics with interpretation of data in a manner relevant to their research objectives.

More specifically, the LeSMaT curriculum editing workshop participants were given special tasks to explore the development/validation of instruments and model through application of PLS in SEM (or PLS-SEM) for future R&D activities involving LeSMaT in the borderless world. The participants were divided into three groups to revisit three survey instruments and explore the development/validation of survey questionnaires as well as conceptual/research model using Measurement Model (MM) and Structural Model (SM) in Smart PLS statistical tools with input given in comparing two models. These include objectives, brief features of PLS-SEM, minimum number of samples and items required, sample surveys/models and target output for LeSMaT.

This first targetted output of this workshop was to explore the development of validated 'Water Attitude Scales' (WAS)[18] instrument using MM of PLS-SEM for future R&D activities to be conducted in 2017 with reference made on the curriculum prepared in TeleHeal module. The second targetted output was to explore the development of validated 'Survey on Core Skills for Work Development Framework' as reported by [33] using MM of PLS-SEM for further R&D activities incorporating the curriculum introduced in ConWUR module. The third targetted output was to explore the development of validated 'Living Values Instruments' (LVI) to promote ESD and ESL [30, 35] using MM of PLS-SEM for further R&D activities with reference made on the curriculum prepared in CADRRED module. The fourth targetted output was to explore the development of structural models to promote Values-based Sustainable Energy Education (VABSEE) and ESL for R&D incorporating the curriculum introduced in SE4ALL module.

Before further input given on various aspects of Smart PLS statistical tools in comparison with SPSS and SEM/AMOS, the participants were introduced two important indicators that could better guide the development of models, i.e. Reflective Indicators (RI) and Formative Indicators (FI). They were requested to brainstorm ideas on how the instrument items could fit either into RI or FI prior to the development of Smart PLS models. The analysis of the learning output revealed that they were able to differentiate these indicators by showing the arrow pointing out from the construct as 'Reflective Indicator' (RI) and pointing towards the construct as 'Formative Indicator' (FI) (Figure 3).

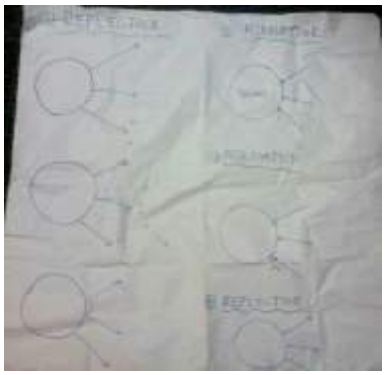

Fig 3: Learning output illustrating Reflective Indicators (RI) and Formative Indicators (FI).

Fig 4: Learning output of Smart PLS workshop to prepare models illustrating Reflective Indicators (RI) and Formative Indicators (FI).

When analyzing the instrument 'Attitudes Towards Use of Technology to Enhance Sustainable Living' (ATUTESL), the item RU1 'I always surf Internet for the latest information on Sustainable Development' is the first RI of the first construct 'Resource Usefulness' (RU)(refer the left diagram of the following Figure 4). When analyzing 'Water Attitude Scale' (WAS), the negative item 'It is alright to keep tap water running when brushing teeth' is the RI of the construct 'Water Attitude' (Figure 4).

4. CONCLUSION AND FUTURE DIRECTION

This article illustrates the reflective practices of the author on the development of transdisciplinary models supported by sustainable digital platforms for professional development of educators and networking of students with management of creativity/innovative processes as well as enhancement of technology, thinking and life (work/survival/entrepreneurial) skills.

Implication and the Way Forward

During the first phase of study, a model was developed to enhance students' HOT skills through blended-mode PBL-SI approach supported by POSITIVE monitoring/evaluation rubric and evaluated by various research instruments such as validated FIT as reported. PBL-SI groups were presented with problem scenario in support tool guided by POSITIVE rubric while Non-PBL group was taught using transmission approach. The findings revealed the effectiveness of POSITIVE monitoring/evaluation tool to promote thinking skills of PBL-SI learners. These include their enhanced FIT and evidences of 'knowledge, thinking, incubation, moment of inspiration and development' processes for innovation that concurred with the findings from the literature.

Hence, various follow-up R&D activities were conducted with research findings reported [36-39]. The author's interest was also stimulated for further development of transdisciplinary models to manage knowledge, skills and innovation processes in the subsequent cycles of reflective studies, also partly due to the increased roles of the author involving in the training of trainers/trainees specializing in technology-enhanced science, mathematics and language teaching. In addition, the experiences gained from this reflective study stimulated the idea of spearheading the EnTeaCH programme aiming to provide teachers with opportunities for Continuing Professional Development (CPD) such as the pursuit of postgraduate degrees in higher learning institutions. EnTeaCH is the acronym of programme initiated aiming at "**En**hancing **Tea**chers' **C**ontinuing-professional-development (CPD) with **H**igher-learning-opportunities" in collaboration with higher education institutions especially those with Open and Distant Learning (ODL) mode of delivery. It is envisioned to be an important pathway to form a pool of educators/trainers for ESD and ESL related issues.

In the advent of digital era, the use of technological tools in the delivery mode for sharing of knowledge and dissemination of information can expedite the process of Training of Trainers (TOT) towards achieving the aspired goals of ESD/ESL and Education for All (EFA) as reflected in the education agenda of SEAMEO and MOE Malaysia. It is hoped that teachers or educators in the SEAMEO region will be better prepared with input given on the most current technology-enhanced pedagogical approaches to facilitate student-centred learning activities in line with the SEAMEO seven priority areas [40]. It is also expected that these trainers could serve as advocates for further training of critical mass of educators and learners who are well verse in ESD/ESL issues with resiliency in facing emergencies. In fact the findings of this study concurred with the research evidences of other researchers who evaluated the effectiveness of ICT to promote technology-enhanced learning [41, 42]. In the study by [43] to link students through project-based learning via ICT integration, it was also acknowledged that global issues, especially those concerning the environment, will only be resolved by international agreement. Yet different societies have their own perspectives and priorities on matters such as water quality or energy use. It is only by understanding these differences that practical and acceptable solutions could be found. Through spiraling cycles of identifying problem, planning actions, implementing collection of observational and behavioral data, the author also experienced self-evaluative (Phase 1), participatory (Phase 2), collaborative (Phase 2, 3) and situational (Phase 3) reflective practices working in collaboration with various experts/stakeholders to improve the models for trialling and implementation. It is hoped that more improvement of the models could be seen with more exemplary practices in the subsequence phases.

Limitation and Suggestions for Further Studies

The researchers realized that there are still much constraints faced to implement the aspired technology-enhanced transdisciplinary model partly due to digital divide that did not allow full implementation of curriculum through ODL mode. The compact curriculum to be delivered within short timeframe as practised in many countries also did not permit the teachers to practise this model to manage innovation processes of learners. Longer timeframe is actually needed to pilot the instruments among secondary learners with validation and analysis of data to be completed using Smart PLS statistical tool, with sample structural model presented as shown in Figure 5.

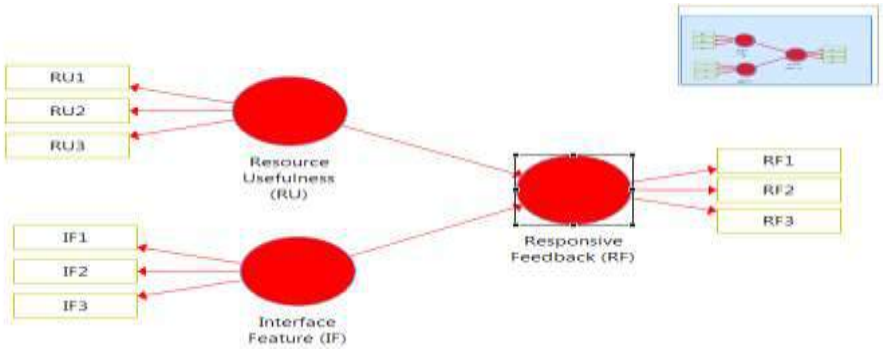

Fig 5: Sample structural model using Smart PLS statistical tools.

In addition, seeing the increasing global threats faced that are related to human's moral values such as terrorism, more R&D activities should be conducted incorporating values-based BL platforms with sharing of exemplary practices as well as exchange of findings among the stakeholders in the SEAMEO region and beyond. In order to achieve the aspiration of stronger SEAMEO community, some kind of cross-cultural ASEAN values could be incorporated during the final revision of ODL curriculum to promote ESD/ESL and Education for All (EFA). These values-based programmes should be incorporated ongoingly to cultivate lifelong, self-directed/self-paced/self-accessed learning among the learners especially on the aspects of thinking, technology and life (work/ survival/ entrepreneurial) skills development. The stakeholders in the educational community should be given more opportunities and empowerment of skill development as well as capacity building in the Community of Practice (CoP) as advocated by [44]. More workshops will be conducted for refinement of curriculum and development of research models with more training opportunities to be explored for teachers' Continuing Professional Development (CPD). These are aimed at responding to call for enhancing teachers' quality, learners' competence/capabilities as reflected in one of the objective to develop framework for 'global competence designed to measure students' awareness of the interconnected world and their ability to deal with its demands' [45].

Moreover, being the chief editor of the centre's BL publication and associate editor for the online journal, the author has recently reviewed and advised the publication of research-based articles as well as lesson plan exemplar to guide teachers practising science/mathematics teaching through transdisciplinary model. Among the recently completed publications included [32, 33, 46]. The author also explore various digital platforms and keep updated with the latest trends of BL portals that promote the aspired skills development. An e-portal (8net) was recently found to be useful to promote thinking, technology and life (work/ survival/ entrepreneurship) skills in which apart from publishing articles related to global issues that raise awareness of online readers, any learner could also practise creative writings by joining with free membership through this URL: http://goo.gl/fcbabg. The types of essays published online include 'Marketing, Funny/Humour, Reticulocyte, Insider Secrets, Global opportunities, Characters, Fashion, Home, Soul, Real estate, Entertainment, Travel, Health and fitness, Science and technology, Immigration, The law, Current affairs, Investment, Financial, Education, Life and Others'. Completed article (in Chinese and/or English languages) could be uploaded onto the platform for consideration of publication with opportunity for self-directed income generating activities and entrepreneurship. This platform was piloted since end of last year and found to be effective with potential for future R&D activities in line with the focus of this study to manage knowledge, innovation processes as well as enhance thinking, technology and life (work/survival/entrepreneurship) skills through transdisciplinary science education integrating knowledge in mathematics/technology/engineering/ environmental economics/arts and language/social sciences, to name a few.

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PROCEEDINGS OF THE INTERNATIONAL CONFERENCE ON
RECENT DEVELOPMENTS IN SCIENCE, TECHNOLOGY, HUMANITIB AND MANAGEMENT
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Dr. R. C. Singh is Professor of Physics in School of Basic Sciences and Research, Sharda University, India. Dr. Singh obtained his doctorate from Banaras Hindu University (BHU), Varanasi, India in theoretical Condensed Matter Physics. He obtained his B.Sc. (Hons.) and M.Sc. degrees also in Physics from Banaras Hindu University. He has published more than 20 research papers in peerreviewed international journals and conference proceedings. He has authored one book and co-edited one conference proceedings. His area of research interest includes study of phase transitions in molecular liquids using density-functional theory; Time-series analysis using wavelets and Biometrics. Dr. Singh is a reviewer of several international journals and has attended and organized many national and international conferences, seminars, workshops and short-term courses. Dr. Singh has successfully completed three Research Projects sponsored by the Department of Science and Technology (Govt. of India), New Delhi.

Dr. Singh has extensively travelled to many countries for delivering talks, research and promoting Indian education abroad. Some notable visits include a short tenure at The Abdus Salam International Centre for Theoretical Physics (ICTP), (Italy); Technical University of Munich (Germany); Fraunhofer Institute (Germany); University of Kaiserslautern (Germany); University of Osnabruck (Germany); Doppler Institute of Mathematical Physics, Prague (Czech Republic); Istanbul Aydin University (Turkey); University of British Columbia, Vancouver (Canada); Homerton College, Cambridge (UK) and Cambridge University (UK). While on his tours for research and academic discussions, Dr. Singh has also used these opportunities to build collaborative arrangements with Institutions abroad and his University in India.

Dr. Singh has been awarded Research Associateship by Council of Scientific and Industrial Research (CSIR), New Delhi and Short Term Visitor status in The Abdus Salam International Centre for Theoretical Physics (Italy). He was conferred the **"Bharat Vidya Shiromani Award"** by the International Institute of Education and Management, New Delhi, and the **"Pride of International Education Excellence Award"** which was presented during Indo-Nepal Friendship Summit in Kathmandu by the Intellectual People and Economic Growth Association, New Delhi. He is also recipient of the **"Star of Asia Award"** by International Business Council, New Delhi and the Global Achievers Foundation, New Delhi conferred on him **"Bharat Vibhushan Samman Puraskar"** which was presented by Honb'le Chief Minister of Uttarakhand Shri Harish Rawat at Dehradun. Recently, National & International Compendium, New Delhi presented **"Lifetime Achievement Award"** to Dr. Singh for his contribution in the field of education.

Dr. Singh has established himself as a mentor, teacher, leader and an innovator. He is known for his exemplary contribution through his dedication, commitment, innovative approach and high integrity. Dr. Singh is a strategist, a methodical planner and a composed implementer and has the uncanny ability to create a team of leaders.

Dr. Rajendra Kumar is Professor and Head of Computer Science and Engineering Department at Vidya College of Engineering, Meerut (India). He has been **Member of Board of Studies Uttar Pradesh Technical University, Lucknow (India)**. He has nineteen years of teaching and research experience. He has also taught at Meerut Institute of Engineering & Technology, Meerut (India) for eight years. He has been guest faculty at Bundelkhand Institute of Engineering & Technology, Jhansi (India). He has published and presented several papers (in Countries like Singapore, Malaysia, UAE) in International conferences. He is author of five text books namely Theory of Automata, Languages & Computation from **McGraw Hill,** Computer Graphics from Vikas Publishing, Human Computer Interaction from Firewall Media, Information and Communication Technologies for University Science Press, and Modeling and Simulation Concept from University Science Press.

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