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(ICRTSTMSD-18)

04-05 August, 2018
Bali, Indonesia

Editors
R.C. Singh
Rohit Khokher
Rajendra Kumar

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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. The first event of the Society was 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. The Society organized its second international conference on the topic International Conference on Recent Developments in Science, Technology, Humanities and Management (ICRDSTHM-17) on 28-29 April 2017 in Kuala Lumpur, Malaysia.

With great success and huge response from the participants, this year the Society is organizing the third International Conference on Recent Trends in Science, Technology, Management and Social Development (ICRTSTMSD-18) in Bali, Indonesia on 04-05 August 2018.

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.

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PREFACE

We are very pleased to introduce the proceedings of the International Conference on Recent Trends in Science, Technology, Management and Social Development (ICRTSTMSD-18), held in Bali, Indonesia during 04-05 August 2018. This volume of proceedings from the conference provides an opportunity for readers to engage with a selection of refereed papers that were presented during ICRTSTMSD-18.

Out of 114 papers submitted for publication, 61 have been selected in this proceeding after two-tier peer review. The conference received a huge response and the researchers from USA, Philippines, Taiwan, Hong Kong, Nigeria, Bangladesh, Germany, Iran, Oman, India, Indonesia, Malaysia, China, Korea, Thailand, Australia, Japan, etc. who 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 by scholars who are actively engaged in the areas of their research interests at national and international level; Part C includes papers related to Humanities by the researchers who have made significant contribution in this area.

One of the unique and valuable dimensions to the ICRTSTMSD-18 was the way the conference brought educators together from around the around the globe to discuss to discuss ways to serve learners better. All in all, the ICRTSTMSD-18 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.

R. C. Singh
Rohit Khokher
Rajendra Kumar

Keynote Address

Applications of Modern Mathematics

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1. INTRODUCTION

As we known mathematics is the mother of all technologies but the perception is different in general public and even among some scientists and engineers. The main goal of this lecture is to draw your attention towards the role of mathematics in diverse fields of science and technology. The lecture is based on references Furati, Nasheed and Siddiqi [1], Siddiqi, Al-Lawati and Boulbrachene [2], Siddiqi [3], Siddiqi [4], Siddiqi and Manchanda [5], Siddiqi, Singh, and Manchanda [6], Siddiqi, Duff and Christensen [7], Siddiqi [8], Siddiqi, Manchanda & Rashmi [9], Manchanda, Lozi and Siddiqi [10], Neunzart and Siddiqi [11], Siddiqi [12].

2. MATHEMATICAL MODELS OF REAL WORLD PROBLEMS

In this section I draw your attention towards topics discussed in reference [1]. The first long chapter by a distinguished industrial and applied Mathematician H. Neunzert, emphasized on teaching of mathematics as technology. Second chapter of this volume is devoted to applications of wavelets to real world problems which is contributed by K. M Furati, Manchanda, Ahmad Siddiqi. Other chapters are related to classical and fractal methods for Physical Problems and trends in variational mathematics. There is a chapter by KM Furati and AH Siddiqi entitles Mathematical Models and Algorithms for Type-II Superconductors pp 47-72. Which are based on papers published jointly by Furati and Siddiqi [Journal Numerical Funct. Anal. & Application vol. 2006]. Wavelet methods for Seismic Data Analysis in given on pages, 245-272. This chapter may prove helpful in prediction of earthquake. Paper of Brokate and Manchanda on sweeping process is also quite interesting.

It may be remarked that challenging problems faced by Indian Government and Indian Nation, in fact this problem is faced by whole worked, are Air pollution, Climatic Change, Communicable diseases, Brain diseases, Cheap medical care. These problems are discussed in some of the references given here. Mathematics plays very significant role in these areas.

3. APPLICATIONS OF CLASSIC MATHEMATICS

3.1. Applications of Matrices:

(a) Modeling of Traffic Flow
(b) Modeling of Temperature Distribution
(c) Matrices for Chemical Balance Equations
(d) Modeling in business by Matrix Equations
(e) Matrices in Electrical Networks
(f) Cryptography by Matrices
(g) Digital imaging processing by Matrices
(h) Applications of Markov Matrices

See: Siddiqi, Al-Lawati Boulbrachane [2]

3.2. Application of Fourier Analysis:

(a) Telecommunication and space Exploration
(b) Sound, Music and Computers
(c) Protein Structure and DNA (V)
(d) Radon Transform and Computerized Tomography
(e) Nuclear Magnetic Resonance

See: Elena Prestini, The Evolution of Applied Harmonic Analysis, Models of the real world, Birkhauser, 2004.

3.3. Applications of Ordinary Differential Equations:

(a) Population Dynamics (Exponential and Logistic Model)
(b) Radioactive Decay
(c) Carbon Daiting
(d) Newton's Law of Cooling
(e) Spread of Diseases and Rumors
(f) Series circuit
(g) Draining Tank
(h) Spring and Mass System
(i) Mixture of Salt and Payment of Loan
(j) Predator-Prey Model
(k) Model of Groundwater Contaminant Source
(l) Heart Pacemaker
(m) X-ray and Beer's Law
(n) Modeling of Spreading Information
(o) Model for circulation of money

Interested readers to read these areas may look into Siddiqi, Al-Lawati and Boulbrachene [2].

3.4. Applications of Complex Analysis:

(a) Moebius Transform
(b) Tomography
(c) Heat & Fluid Flow

See: Siddiqi, Al-Lawati, Boulbrachene, [2, Chapter 8]

4. Applications of Emerging Areas of Mathematics:

4.1: Variational Inequalities:

(a) Game theory applications to economics – Nash equilibria
(b) Rigid Punch Problem- Chair Problem
(c) Super Conductivity
(d) American options

See [12, 13, 4]

4.2. Inverse Problems:

Applications to Engineering Problems
Reference [2] and references of Chapter 9.

4.3 Wavelets Applications to

(a) Biometric
(b) CT Scan
(c) Variants of Wavelets in Medical Imaging
(d) Seismic Tomography
(e) Prediction of Natural Calamities (Earthquake and Tsunami)
(f) Prediction of Epilepsy.
(g) Study of climatic change

Fractal Methods for Climatic Studies, See references [1, 3, 4, 14-18]

A function $\psi \in L_2(R)$ is a wavelet (orthonormal / frame) if the family of functions defined by $\psi_{j,k}(t) = 2^{\frac{j}{2}}\psi(2^j t - k),$

where, j and k are arbitrary integers, is an orthonormal basis (frame) of $L_2(R).$

Prof. Yves Meyer

Note: A Wavelet is called framelet if the system $\psi_{j,k}(t)$ is a frame instead of orthonormal system

[See Definition of orthonormal basis and frame in Christensen (Introduction to Frames and Riesz Bases, Birkhaueser) or Siddiqi (Applied Functional Analysis, Marcel – Dekker, 2004)].

The Highest prize of Mathematics equivalent to Nobel Prize is known as Abel Prize and an eminent worker of wavelet theory Prof. Yves Meyer has been given this award in May 2017.

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CONTENTS

Part B: Management

Wavelet methods for Variational Problem and Fredholm Integral Equations

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Abstract

Wavelet analysis is a recently developed mathematical tool for many problems. Wavelet theory can be regarded as refinement of Fourier analysis. The noteworthy strength of wavelet theory lies in integrating apparently different domains of research in mathematics, engineering and physics. In recent years, Wavelet analysis has emerged as a major area of research in mathematics because of its significant applications in diverse fields. Wavelets decompose complex information such as images, music and patterns into elementary forms which are at different scales and positions; later the signal can be reconstructed with high accuracy. Wavelet analysis is a powerful mathematical tool for applications in science and engineering.

Fourier transform is a tool that is most widely used in signal processing. It unveils the frequency composition of a time series signal by transforming it from time domain to frequency domain. Fourier transform is quite useful for analyzing the components of a stationary signal whereas it is unable to analyze the non-stationary signals (like human speech, ECG and EEG etc). Wavelet transform was invented to overcome this shortcoming. Wavelet transform offers a structured and flexible approach for examining local properties of the non-stationary signals.

Wavelets have substantial applications in different fields such as data mining, signal processing, image processing, finance, numerical analysis, scientific computing, computer science, engineering, biology and medicine, more precisely in analyzing EEG, ECG and MRI signals. Wavelets are mathematically

well organized and useful in many applications such as geophysics, earthquake prediction, speech recognition, denoising, compression, astrophysics, computer graphics, numerical solution of differential and integral equations.

The origin of wavelets goes back to the beginning of the last century. It was Alfred Haar that constructed the first wavelet, even though he did not call it that. The Hungarian mathematician Haar [1] introduced a remarkable system of functions, which are known as Haar wavelets and proved that it forms complete orthonormal system in $L^2[0,1]$. In 1982, Morlet along with a group of engineers used wavelets for analysis of seismic data. Morlet et al.[9,10] introduced wavelets as a family formed by translation and dilation of a single function $\psi \in L^2(\mathbb{R})$ as

$$\psi_{a,b}(x) = |a|^{-1/2}\psi\left(\frac{x-b}{a}\right), \quad a \neq 0, b \in \mathbb{R},$$

where scaling parameter a, measures the scale or degree of compression and time location is determined by translation parameter b.

Definition 1 (**Wavelet).** A wavelet is a function $\psi \in L^2(\mathbb{R})$ such that

$$C_\psi = \int_{-\infty}^{\infty} \frac{|\hat{\psi}(\eta)|^2}{|\eta|}\, d\eta \ < \infty, \tag{1}$$

where $\hat{\psi}(\eta)$ is Fourier transform of ψ and C_ψ being the admissibility constant. The equation (1) is called the admissibility condition.

Definition 2 (**Continuous Wavelet Transform).** Given a square integrable function f, the continuous wavelet transform (CWT) with respect to wavelet ψ is defined as

$$\mathcal{T}_\psi f(a,b) = \frac{1}{\sqrt{|a|}} \int_{\mathbb{R}} f(x)\, \psi^*\left(\frac{x-b}{a}\right) dx, a \neq 0, b \in \mathbb{R}, \tag{2}$$

where ψ^* denotes the complex conjugate of ψ. Here $\frac{1}{\sqrt{|a|}}\psi\left(\frac{x-b}{a}\right)$ performs the same work as the $\exp(2\pi i\eta x)$ in the Fourier transform.

On letting, $\psi_{a,b}(x) = \frac{1}{\sqrt{|a|}}\psi\left(\frac{x-b}{a}\right)$, we have

$$\begin{aligned} \mathcal{T}_\psi f(a,b) &= \int_{\mathbb{R}} f(x)\psi^*_{a,b}(x)dx \\ &= \langle f, \psi_{a,b}\rangle\,. \end{aligned}$$

Definition 3. A $\psi \in L^2(\mathbb{R})$ is called an orthonormal wavelet if the collection $\{\psi_{m,n}\}_{m,n\in\mathbb{Z}}$ forms an orthonormal basis in $L^2(\mathbb{R})$, where

$$\psi_{m,n}(x) = 2^{m/2}\psi(2^m x - n), \;\; m, n \in \mathbb{Z}.$$

Therefore, $f \in L^2(\mathbb{R})$ can be expressed as

$$f(x) = \sum_{m\in\mathbb{Z}} \sum_{n\in\mathbb{Z}} d_{m,n}\, \psi_{m,n}(x),$$

where $\{d_{m,n}\}$ denotes wavelet coefficients of $f \in L^2(\mathbb{R})$ with respect to wavelet $\psi_{m,n}(x)$, given by

$$d_{m,n} = \langle f, \psi_{m,n} \rangle , \;\; m, n \in \mathbb{Z}.$$

The double series $\sum_{m\in\mathbb{Z}} \sum_{n\in\mathbb{Z}} \langle f, \psi_{m,n}\rangle\, \psi_{m,n}(x)$ represents the **wavelet series** of f which converges to the function f in the L^2-norm.

Wavelet functions have received considerable attention in dealing with various problems of dynamic systems. Wavelets also can be applied in numerical analysis. We present application of wavelets to Variational problem and Fredholm Integral equations. We have used wavelet collocation method which transform differential and integral expressions into some algebraic equations.

There has been a considerable renewal of interest in the classical problems of the calculus of variations both from the point of view of mathematics and of applications in physics, engineering, and applied mathematics. Chebyshev Wavelets [5], Legendre wavelets [6], CAS wavelets [8] and sine-cosine wavelets [7], [**?**] have been applied to find numerical solution of Variational problem. Firstly the variational problem is converted into differential equation using Euler Lagrange's equation and then collocation method is applied to solve this differential equation. Here we have used Haar wavelet for finding numerical solution. Haar wavelet is one of the simplest wavelet and is defined as

$$H(t) = \begin{cases} 1, & t \in [0, 1) \\ 0, & \text{elsewhere} \end{cases}$$

Haar wavelet has been successfully applied for solving differential equations and integral equations. Haar wavelet is very simple and has low computational cost.

For this purpose, the highest derivative present in the differential equation is expanded in terms of Haar wavelet and corresponding wavelet coefficients.

Then using integration all lower derivation can be obtained and using all these values in the differential equation and solving the wavelet coefficients can be found. Then solution to problem can be obtained by using using these wavelet coefficients.

Integral equations are employed in modeling of engineering science and other sciences as well and in numerical Computations. Many inverse problems can be easily converted into first kind Fredholm integral equations. These problems arise in signal processing, geophysics, medical imaging, spectroscopy, backward heat equation and physical problems such as angular variation of scattered light and measurement of spectral distribution. The linear Fredholm integral equation of the first kind are given as

$$g(x) = \int_0^1 K(x,t)f(t)dt, \quad x \in [0,1]. \tag{3}$$

where $K(x,t)$ is the kernel of integral equation, $g(x)$ is the observed data. We want to determine the function $f(x)$ for given $K(x,t)$ and $g(x)$. Fredholm integral equation of the first kind is an ill-posed problem that is it may have no solution, or if a solution exists, it is not unique and it may not depend continuously on the data function $g(x)$[**?**]. As it is ill posed problem, we need regularization method to solve this problem.

Regularization method is used to convert an ill-posed problem into a well posed problem. There are different techniques used for regularizing first kind Fredholm integral equations. In this paper, we have used regularization method which converts first kind integral equation into second kind integral equation. The regularization method combined with different techniques like homotopy perturbation method [3], direct method, successive approximation and Adomian decomposition method [4] and mean value method [2] have been employed to solve first kind Fredholm integral equations. We have used Legendre for obtaining numerical solution of first kind Fredholm integral equations.

In first step, we applied regularization method to ill-posed first kind Fredholm integral equationand eq.(3) transforms into the second kind Fredholm intgeral equation

$$\alpha f_\alpha(x) = g(x) - \int_0^1 K(x,t)f_\alpha(t)dt, \tag{4}$$

where α is a small positive parameter known as regularization parameter and

$f_\alpha(x)$ converges to $f(x)$ as $\alpha \to 0$, i.e.,

$$f(x) = \lim_{\alpha \to 0} f_\alpha(x). \tag{5}$$

In the second step, Legendre wavelet collocation method is employed to handle the well posed problem given in eq.(4).For this purpose, first we expand $f_\alpha(x)$ as sum of series of Legendre wavelets, i.e., we can write

$$f_\alpha(x) = \sum_{n=1}^{2^{k-1}} \sum_{m=0}^{M-1} c_{n,m} \psi_{n,m}(x). \tag{6}$$

Putting this value in (4) and satisfying it at different collocation points we get a system of algebraic equations. Solving this system we get values of wavelet coefficients. In third step, we find the value of $f(x)$ from $f_\alpha(x)$ using eq.(5). We start with $\alpha = 0.1$ and decrease value of α until the numerical solution converges to the exact solution of integral equation. Method is applied on different numerical examples. Numerical results obtained show that the method is reliable.

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Pattern Storage Neural Networks with Non-random Genetic Algorithm for Pattern Recognition

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Abstract - Hybrid evolutionary algorithms have been used widely to improve the performance of recurrent type neural network for pattern storage and their recalling. Most of the attempts have been applied to incorporate evolutionary process like Genetic Algorithm with recurrent type neural network on connection weight between the processing elements. This incorporation strengthens the performance of Recurrent Neural Network for increased capacity of pattern storage and effective recalling of patterns to minimize the problem of local minima. In most of the cases, bipolar product law has been used for pattern storage and further the genetic algorithm has been used to evolve the population of weight matrix for exploring the global optimum solutions those reflect the correct recalling of stored pattern. In this paper, we are using Edge Detection(ED) and self-organizing map (SOM) method for feature extraction. The modified bipolar product law has been used for storing of patterns and genetic algorithms have been employed for recalling purpose. The performance of proposed hybrid recurrent type neural network is evaluated for the pattern recognition of handwritten English alphabets.

Keywords**:** Pattern Storage Network, Recurrent Neural Network, Non-random GA, Hybrid Evolutionary Algorithms

1. INTRODUCTION

Recurrent Neural Network with symmetric weights and bipolar threshold function exhibits the feature of associative memory [1-2]. The pattern storage can be performed with such type of neural network architecture. It has been observed that the encoding of pattern information with Hebbian learning rule in recurrent neural network leads the problem of false minima or spurious minima for the large dimension of the network [3-4]. It has been observed that the problem of false minima could be minimize with the incorporation of genetic algorithm for recalling process [4]. Genetic Algorithm has been identified as an effective method of optimization. The neural network explores the adaptiveness in the behavior for environment with organism and the Genetic Algorithm evolves the population of these adapted organism and continue till the best or optimal organism does not obtained which explores the expected or optimize solution of the given problem [5-6]. It has been observed that the genetic algorithm used widely for getting the optimize solution of the problem where the problem space is quite large, but it lacks with the abilities of adaption whereas the neural network exhibits the adaptive nature for the given training set but it traps in the local minima during the search in weight space [7]. This can be visualized in bi-directional associative memory feature of recurrent network during the pattern recalling. Various approaches have been proposed to integrate the neural network with genetic algorithm to optimize the process of recalling [8]. Most commonly, the genetic algorithm has been used with recurrent type neural network to evolve the population of encoded weight vectors [9]. Most of the works for integration of genetic algorithm in neural network have been focused for the pattern recalling process [10]. It has been found that in all these approaches the pattern storage has been performed with Hebbian rule or bipolar outer product rule [11]. It has been also found that performance of pattern storage networks depends also on the feature extraction methods. Most of the work in this field focusing on adopting different feature extraction methods to reduce the probability of error in pattern recalling [12] with different learning rules, but the problem of false minima still occurs as the number of patterns and size of the network increase. Various researches were reported that the pattern recalling efficiency can improve by amalgam of genetic algorithms with recurrent neural network. The amalgam of both i.e. GA and NN has been accomplished for pattern recalling but the pattern storage has been performed with Hebbian learning rule. The combined approach i.e. hybrid evolutionary algorithms proves the superiority over the conventional feedback type neural network [13].

This research work is an effort to improve the storage capacity and recalling efficiency of both the noiseless and noisy pattern by introducing self-organizing map (SOM) as the feature extraction method with modified Hebbian learning

rule for pattern storage and incorporation of genetic algorithm for pattern recalling. Hence in this paper, we are applying genetic algorithm on recurrent neural network to obtain optimal weight matrices for efficient recalling of input prototype patterns. For this purpose, we consider the scanned static images of English alphabets as input stimuli. The preprocessed input stimuli are filtered using Edge dilation method. These processed inputs are represented as pattern information to Self-Organizing Map (SOM) of dimension 10×10. The code words generated from the SOM into the Recurrent Neural Network as pattern information for storage using modified Hebbian learning rule. Once all the pattern vectors are enclosed in the network using modified Hebbian learning rule, the genetic algorithm is incorporated to explore the weight space for efficient recalling of pattern information for the presented prototype input pattern. In this approach the genetic algorithm does not start from random populations of weight matrices but were it starts from the encoded weight matrix of pattern information. Thus, here the process of applying genetic algorithm is non-random i.e. it starts from the sub-optimal initial population or solution. We explore the genetic algorithm with sub-optimal weight matrix and apply the mutation, local and global crossover operator to generate the population of weight matrices. Each population is examined with fitness evaluation function. The selected populations or weight matrices are further generating more populations of weight matrices. This process continues till the global optimal minima or solutions i.e. correct recalled pattern does not obtain.

The next section of this paper describes the feature extraction methods to create the pattern vectors. The Recurrent neural network and its learning mechanisms have been also discussed here. Section 3 elaborates the simulation and implementation of Recurrent Neural Network with incorporations of genetic algorithms. The next section 4 describes the experimental results. Section 5 concludes this paper with summary & the conclusion of the study with discussion on future research aspects and followed by references in the last.

2. FEATURE EXTRACTION

In this present work, we have considered the scanned static images of English alphabets as shown in figure 1. The scanned RGB images are changed into gray level then into binary images of size 30x30. In this process the quality of images degrades, so that we applied the edge detection and dilation method to reveal defined base of the image as shown in figure 2. Now we reshape each into 900×1matrix for its pattern vector representation. Hence, we have total 26 samples images of English alphabets so that the training set is of the size 900×26. Further this training set is presented to self-organizing feature map (SOM) to extract coded pattern information of feature map.

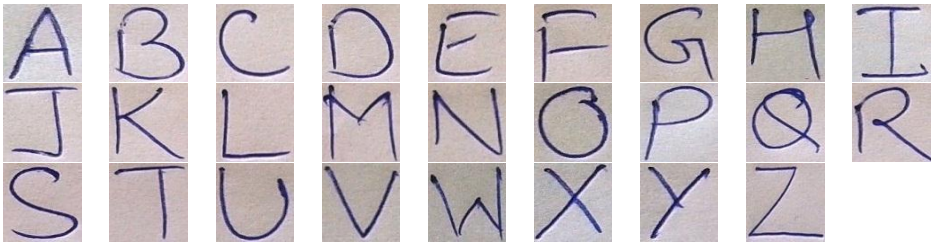

Figure 1: Original 26 images of hand written English alphabets.

a. Colored image | b. Gray image | c. Gray thresh image | d. Edge of image | e. Dilated of image | f. Binary Image

Figure 2: Various stages of images for feature processing.

Self organizing map (SOM) in our experiment considers the input pattern vectors of dimensions 900×26 and tunes to create localized responses to presented input pattern vectors and thus reflects the topological orderings of the input vectors. This ordering of input pattern vectors reflects the feature space for the training set. Therefore, the feature vectors extracted from SOM of 10×10 dimensions represent the feature space for the training set of 900×26 dimension. The features extracted in the form of code words of size 100×26 from the SOM present to the recurrent neural network pattern vector for storage. The code word of size 100×26 has been converted into bipolar before presenting it to the

recurrent neural network for storage. The recurrent neural network uses the modified outer product learning law to encode the pattern information. Further to evaluate the efficiency of recurrent neural network for recalling, we generate the test pattern sets. These test pattern sets are constructed by introducing 10%, 20%, 30%, 40% and 50% noise in the original patterns of images. Figure 3 depicts the final grid obtained after training the self-organizing map for scanned sample images of figure 2.

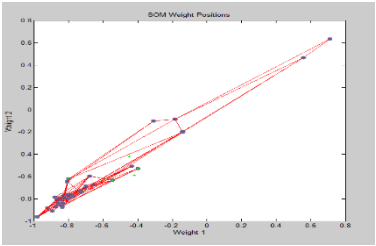

Figure 3: SOM grid for scanned sample images of figure 2

The Recurrent Neural Network

The proposed recurrent neural network model consists of N (100=10×10) units. The input pattern each of N×1 (100×1) is presented to the network for storage using modified Hebbian learning rule. Let us consider the L numbers of patterns for storage and these patterns have been encoded in the N×N weight matrix using modified Hebbian learning rules.

$$W = \frac{1}{N}[PP^T + PP^{\dagger}] \quad (1)$$

Here P represents the input pattern vector set as size N×L, and P^T is the transpose of the P and $P^{\dagger}$represents the pseudo inverse of P and N is the number of units in the network.

The units of neural network have been initialized with presented pattern as:

$$S_i(0) = a^l{}_{i+\epsilon_i} \forall\ i = 1\ to\ N \quad (2)$$

Here ϵ_i is the noise in the i^{th} component of l^{th} pattern.

The activation dynamics of recurrent neural network converges the network towards the stable state i.e.

$$\mathbf{Sgn}\ (\sum_{j=1}^{N} w_{ij}(a_i^l + \epsilon_i)) = a_i^l \forall\ i,j\ = 1,2 \ldots . N \quad (3)$$

3. SIMULATION DESIGN & IMPLEMENTATION DETAIL

In this simulation design, we implement the Recurrent Neural Network architecture with 100 bipolar processing units, symmetric weights on interconnections between processing units, asynchronous state change, deterministic updating and modified bipolar out product learning rule to store the pattern information of static images of English alphabets. These static images have been preprocessed and filtered through Edge Dilation (ED) and Self-Organizing Map (SOM) to construct the patterns information for storage. The patterns information in the training set have been encoded in the form of connection strengths between the processing unit of the network using modified bipolar out product learning rule as mentioned in equation 2.

Thus, a parent weight matrix has been constructed for the pattern vectors of training set. This parent weight matrix has been used by genetic algorithm as the initial population or solution. Therefore, in this approach the genetic algorithm does not start from the random initial population but instead of this it starts from the weight matrix of encoded pattern information. Thus, the genetic algorithm has been employed here to recall the pattern vector for presented prototype input pattern vector. It starts from the sub optimal parent weight matrix and evolve the population of weight matrix using genetic algorithm operators like mutation, crossover and fitness evaluation function.

Here, in this presented paper, the mutation operator initially applies on the encoded parent weight matrix of order N×N (100×100) with the $P_m < 0.05$. It produces the M weight matrices of same order i.e. N×N. mutation operator selects the non-zero individuals or genes or allele from the weight matrix chromosome for random modification. The random modifications have been implemented with different methods and operators. Hence different methods have been used for the modification of randomly selected allele on each iteration. The modification in the selected allele has been implemented with multiple arithmetic operator like add, subtract and multiplication. Thus, in the present approach the modification in the randomly selected allele is not random but instead of this it is modifying with mathematical criteria.

Different mathematical operators are applying on this selected allele and modify it. This process produces different weight matrices (M) or next population for the same selected allele with different values. The process of applying the mutation operator can be considered as:
Function mutation (W)

For i = 0 to N
For j = 0 to N
If ($w_{ij}^{old} \neq 0$) then
$w_{ij}^{new} = (\sum_{i,j=0}^{N} w_{ij}^{old})$ Ⓗ R^{VM}
Else
$w_{ij}^{new} = w_{ij}^{old}$
End if

where Ⓗ represents the applying mathematical operator and R^{VM} represents the method of modification.

Hence in this way we get M population of weight matrices from the parent weight matrices of equations 4 after applying the mutation operators as.

$$W = \{w_{MXN}^{1}, w_{MXN}^{2}, w_{MXN}^{3} \dots\dots w_{MXN}^{M}\} \quad (4)$$

Another important and useful operator of genetic algorithm is crossover. It selects the two subsets of genes from either the same population or chromosome (local cross over) or from the different populations or chromosome (global crossover) and interchange them with each other to produce the new populations. In the proposed methodology we divide all the M population matrices into quadrants of fix size S×S. Each quadrant matrix will contain chromosomes. We can apply crossover in two steps, first one is the Local Crossover and the Second one is Global Crossover. In the local crossover operation, the uniform crossover will apply by exchanging the one quadrant with another one to produce a new population of weight matrix of size N×N. In global crossover operation, we select randomly two populations of weight matrices from the M populations. From these two selected weight matrices, we again randomly select any quadrant of order S×S from one matrix and exchange it with other randomly selected quadrant of another matrix of same size to produce new population of weight matrix of size N×N as.

$$w_{N\times N}^{i} = \begin{bmatrix} w_{11}^{i} & w_{12}^{i} & \dots\dots w_{1N}^{i} \\ w_{21}^{i} & w_{22}^{i} & \dots\dots w_{2N}^{i} \\ \dots & & \dots. \\ w_{N,1}^{i} & w_{N,2}^{i} & \dots. w_{N,N}^{i} \end{bmatrix}_{N\times N} \quad \text{where i= 1,2,3, ….N}$$

Local crossover

$w_{1,N\times N}^{new} = w_{s\times s}^{R1} \leftrightarrow w_{s\times s}^{R2}$ where R1, R2 are any random selected quadrant from same weight matrix. Similarly,

$w_{2,N\times N}^{new} = w_{s\times s}^{R1} \leftrightarrow w_{s\times s}^{R2}$
……
$w_{N,N\times N}^{new} = w_{s\times s}^{R1} \leftrightarrow w_{s\times s}^{R2}$

Hence

$$w^{newL} = \{w_{1,N\times N}^{newL}, w_{2,N\times N}^{newL}, w_{3,N\times N}^{newL} \dots\dots w_{M,N\times N}^{new}\} \quad (5)$$

Here $w_{1,N\times N}^{newL}, w_{2,N\times N}^{newL} \dots\dots w_{M,N\times N}^{newL}$ are newly generated weight matrices after local crossover operator, $w_{s\times s}^{R1}$ *and* $w_{s\times s}^{R2}$ are two sub weight matrices selected randomly from old mutated population to perform the local crossover operation for exchange.

Global crossover

$w_{1,N\times N}^{new} = w^{i}{}_{s\times s}^{R_1R_2} \leftarrow w^{j}{}_{s\times s}^{R_1R_2}$ For i ≠ j and i, j = 1, 2, 3, … …M
$w_{2,N\times N}^{new} = w^{i}{}_{s\times s}^{R_1R_2} \leftrightarrow w^{j}{}_{s\times s}^{R_1R_2}$
:

$w_{n,N\times N}^{new} = w^{i}{}_{s\times s}^{R_1R_2} \leftrightarrow w^{j}{}_{s\times s}^{R_1R_2}$

Where $w^{i}{}_{s\times s}^{R_1R_2}, w^{j}{}_{s\times s}^{R_1R_2}$ are two any randomly selected quadrant from different weight matrices.

Hence after using this global crossover, we obtain new weight matrices as

$$w^{new\ G} = \left\{w_{1,N\times N}^{new\ G}, w_{2,N\times N}^{new\ G} \dots\dots\dots\dots\dots w_{m,N\times N}^{new\ G}\right\} \quad (6)$$

Now, we applies the crossover operations m times as:

$$w^{C} = \cup_{n=1}^{N} w_n \cup_{k=1}^{m} w_{k,N\times N}^{newL} \cup_{t=1}^{P} w_{t,N\times N}^{newG} \quad (7)$$

Where $w_n$are mutations after N+1 time and

$$w_{t,N\times N}^{newG} = ®_i(w_{s\times s}^{t}) \Leftrightarrow ®_j(w_{s\times s}^{t}) \quad (8)$$

Where $i \neq j$ and $®_i, ®_j$ are random selected matrices of order s×s.

$$w_{K,N\times N}^{new\ L} = w_{S\times S}^{K,R_j} \leftrightarrow w_{S\times S}^{K,R_i} \quad (9)$$

Where $®_i, and\ ®_j$are the selected S×S matrices from different chromosomes.

4. FITNESS FUNCTION

The next step of our proposed non-random or sub optimal genetic algorithm is to determine an effective fitness function to select the better next generation of weight matrices in each successive iteration. The fitness function *f* evaluates the individual population of weight matrices those have been obtained from mutation and crossover operation. The fitness function *f* has been constructed for whole pattern samples P (as shown in equations 3) for each weight matrix. Each weight matrix is assigned to the network for the given pattern set or prototype pattern set (which contains the erroneous sample pattern) and the recalled pattern vectors are obtained. Performance of the network for recalling has been measured from the regression value between expected pattern and actual pattern that is recalling.

The Regression value for each weight matrix has been characterized and further the mean of these values have been obtained as:

$$f_1(w) = Avg[Rw_1^c, Rw_2^c, \dots\dots\dots Rw_m^c] \quad (10)$$

Where $w_1^c, w_2^c, \dots\dots w_m^c$ are the population of weight matrices obtained from equation 11 and R is representing the regression value for the corresponding weight population.

Now, the fitness evaluation function f(w) for each individual weight matrix is defined as:

$$f(w) = \begin{cases} 1\ if\ R_{w_i}^c > f1(w)\ \forall i = 1\ to\ m\ . \\ 0\ if\ R_{w_i}^c \leq f1(w)\ \forall i = 1\ to\ m. \end{cases} \quad (11)$$

Thus, only those weight matrix populations have been selected for them, the performance of neural network during the recalling was 1 i.e. f(w)=1. Therefore, only selected weight matrices are contained for next iteration or cycle of genetic algorithm to genetic the new population of weight matrices.

5. RESULT AND DISCUSSION

Simulation results have been obtained for 26 static images of English alphabets. The static images have been stored in the recurrent type neural network using modified Hebbian learning rule. The recalling performance of network has been evaluated for noise pattern vectors. Genetic algorithm has been employed with recurrent neural network for recalling purpose. The 20 iterations of GA have been run and the population size has been fixed to 100. The simulation results are exhibiting the better performance of neural network with GA for recalling of correct pattern even through the presented prototype input pattern was containing noise or error. It can be shown that up to 50% of noise in the input pattern, the GA with neural network is able to recall the correct output pattern.

Table 1: Performance evaluation of Hopfield neural network for recalling from SOM and GA method.

	On 10% Error	On 20% Error	On 30% Error	On 40% Error	On 50% Error
Modified Hebbian Rule without GA	0.96780	0.87680	0.69350	0.46150	0.14330
Modified Hebbian Rule with GA	0.97533	0.88575	0.71774	0.46532	0.15303
Difference	0.00753	0.00895	0.02424	0.00382	0.00973
Approx % Difference	1%	1%	2%	0%	1%

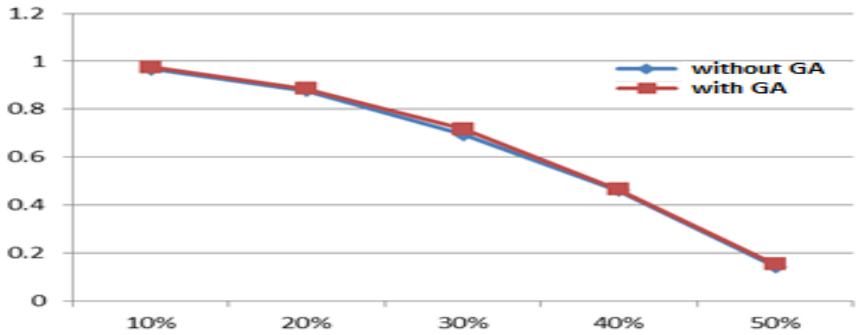

Figure 1: Comparison of Recalling using modified Hebbian learning rule with and without GA of static images.

6. CONCLUSION

It has been observed from simulation results that the stored pattern with modified bipolar product rule performs better for recalling of presented input prototype patterns with noise from 10%, 20%, 30%, 40% and 50% if the GA has been incorporated during the recalling process. It is being also observed that efficiency of genetic algorithm depends on the criteria of our fitness evaluation function. It has been observed that the performance of hybrid approach improves if the global crossover dominates local crossover. Thus, if more global crossover operations apply the convergence of GA towards global minimum improves and also the rate of convergence increases.

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Supporting Transdisciplinary Science/Mathematics Education, Management and Social Development Integrating Use of E-tools and Sustainable Technology-Enhanced Communities

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Abstract - Promoting sustainable living with cultivation of innovative potentials leveraging on available non-digital and digital resources is an ongoing concern especially pertinent in the era with increasingly depleting resources and with swift industrial 4.0 movement. In response to the call for human resource development in line with Sustainable Development Goals (SDGs), may educational institutions in the region have initiated various research and development (R&D) programmes with evidence-based studies that support transdisciplinary science/mathematics education, management and social development integrating the use of Information and Communication Technology (ICT). Under the theme 'ICT-based digital education', research/evidence-based articles will be exemplified under two major sub-themes. Among the research/evidence-based articles and/or exemplary practices illustrated in sub-theme 1 (supporting transdisciplinary science/mathematics education integrating digital tools and blended learning platforms) include use of innovative pedagogical approaches in transdisciplinary education such as contextual project-based learning, Augmented Reality, STEAM teaching strategies, blended-mode competition, criterion-reference assessment and so forth. Among the focus areas of discussion under sub-theme 2 (supporting management and social development incorporating e-tools and sustainable technology-enhanced communities) include digital knowledge dissemination, information-related business and professionals, sustainable community, Internet, ICT usage, safety issues, compaction mechanism, strategic planning/management, quality assurance, to name a few. In conclusion, the integration of ICT in transdisciplinary education, management and social development has given much implications and ongoing efforts should be made in numerous fields with more research/evidence-based studies.

Keywords**:** Transdisciplinary science/mathematics education, Management, Social development, Information and Communication Technology, Exemplary practices, Research/evidenced-based studies

1. INTRODUCTION

Promoting sustainable living with cultivation of innovative potentials leveraging on available non-digital and digital resources is an ongoing concern especially pertinent in the era with increasingly depleting resources and with swift industrial 4.0 movement. In response to the call for human resource development in line with Sustainable Development Goals (SDGs), may educational institutions in the region have initiated various research and development (R&D) programmes with evidence-based studies that support transdisciplinary science/mathematics education, management and social development integrating the use of Information and Communication Technology (ICT).

2. AIMS AND FOCUS OF SESSION

The main focus of this session is to provide forum of discussions (either face-to-face or virtually) through gathering of researchers who are interested to study the integration of pedagogical content knowledge approaches supported by digital tool, e-platforms and Technology-enhanced learning (TEL) in various subject disciplines.

The following are the focus of areas for discussions under this theme:

a) The current concerns about the integration of pedagogical content knowledge approaches supported by digital tool, e-platforms and Technology-enhanced learning (TEL) in various subject disciplines including Science/Mathematics, Technology, Management and Social Development.
b) Exemplary practices related to various strategies on transdisciplinary Science/Mathematics education integrating Arts/Language, Engineering/Environmental Economics, Technology (LearnT-SMArET)
c) Application of research methodologies related to the study of the LearnT-SMArET processes at various educational settings from pre-school to tertiary institutions.
d) Research related to development of thinking, technology and life (work/entrepreneurial/survival) skills through TEL in various multi-disciplinary subjects including Science/Mathematics, Technology, Management and Social Development.
e) Works related to achieving governmental aspirations on Science, Technology, Engineering, Arts and Mathematics (STEAM) education and SEAMEO education agenda or priority areas especially in the aspects of 21st century curriculum including school networking.
f) Studies related to the cultivation of moral values towards promoting Education for Sustainable Living in Sustainable Technology-enhanced Communities taking into consideration ethical issues such as safety/security, digital knowledge/information dissemination, sustainable community, Internet, ICT usage, strategic planning/management, quality assurance, and so forth.
g) The session not only limits to the above, but also welcomes work in the areas such as MOOCs, ODL, Augmented Reality and virtual learning that have significant application to promote LearnT-SMArET.

3. REVIEW OF LITERATURE AND METHODOLOGICAL FRAMEWORK

This section reviews relevant literature and framework that guide the direction of this theme.

Transdisciplinary Science/Mathematics Education Supported by Information and Communication Technology

Science, Technology, Engineering and Mathematics (STEM) education integrating Information and Communication Technology (ICT) have been given due emphasis in many developing and developed countries that require increasing numbers of skilled workers for Science and Technology (S&T) in order to support the developmental goals of numerous nations in line with Sustainable Development Goals (SDGs) (United United Nations, 2015). In line with the governmental aspiration to promote STEM education as well as thinking skills such as those documented in Malaysian Education Blueprint 2013-2025 (Ministry of Education, 2012) as well as the National Innovation Strategy (NIS) that was launched by Agensi Inovasi Malaysia (AIM) (Bernama, 2009; Innovating Malaysia, 2011), various efforts were made to incorporate technology-enhanced science and mathematics related transdisciplinary curricular/co-curricular activities. The idea of transdisciplinary literally means beyond all the disciplines but connected to all the disciplines by a unifying issue or topic of inquiry (Discovery Education, 2018a; 2018b; Kbrookepierson, 2014) that is the seventh perspective of STEM education as illustrated by Kidman (2017).

In fact, education that promotes thinking skills and creativity should start from young as the Malay's saying goes 'Let's bend the aur since its shoot time'. In response to the call for management of innovation and conservation of resources in the digital era with swift industrial 4.0 movement, numerous initiatives were taken by Southeast Asian Ministers of Education Organization (SEAMEO). SEAMEO is an international organization established in 1965 with the mandate to promote cooperation among the Southeast Asian (SEA) nations through education, science and culture (de Jesus, n.d.). The visions of SEAMEO including Education Agenda seven priority areas (SEAMEO, 2015) are in line with global visions such as e-ASEAN ICT task force and UN post-2015 Development Agenda targeting a global multi-stakeholder process that is inclusive of both developed/developing countries as well as Sustainable Development Goals (SDGs) (United Nations, 2015).

The recently implemented initiatives by SEAMEO include the organization of blended-mode STEM related online training programmes to promote Education for Sustainable Development (ESD) and SDGs. The 'Learning Science and Mathematics Together' in a Borderless World' [LeSMaT (Borderless)] is one of such programme under School Networking initiative. For example, in the recently completed SEAMEO Augmented Reality (AR) online training course organized by Achmad, Alfan, Haritz and Ng (2017), student-centred Project-based Activities (PBA) was introduced to promote '**Learn**ing **T**ransdisciplinary **S**cience integrating **M**aths, **Ar**ts/Language, **E**ngineering and **T**echnology' (with an acronym abbreviated as LearnT-SMArET) as an offshoot programme of SEAMEO LeSMaT.

Students in the SEAMEO region and beyond will be facilitated by educators in SEAMEO networking schools and institutions that promote blended-mode learning using digital tools and e-platforms. In AR online training course as aforementioned, students were presented with the guidelines to prepare project proposals with evidences of their AR output related to LearnT-SMArET as elaborated by Ng (2017). Among the methodologies and pedagogical approaches introduced include Project-based Activities (PBA), Inquiry-based approach and Problem-based Learning (PBL), Case study, Action Research reflective studies, to name a few. PBA is a time-bound activity that was mostly employed by the AR project teams to monitor and evaluate students' project work through alternative assessment techniques.

Technology-enhanced Management and Social Development in the Community of Practice

Information Communication Technology (ICT) has more recently been used to describe the convergence of several technologies and the use of common transmission lines carrying very diverse data and communication types and formats (Techopedia, 2018) especially with the advancement of Internet of Things (IoT), information can be transferred in a borderless world without boundaries. Computers can be used as tool for data handling (for collection, storage and retrieval, analysis and presentation) as well as research to obtain information and results. (Albion, 1999). In fact, ICT is one of medium to contribute to SDGs such as promoting smart health as reported by Solanaset al. (2014) as well as sustainable cities and overcoming poverty as reported by Figueiredo, Prado and Kramer (2012). Hence, apart from enhancing quality education, ICT also plays important role in administration, social development as well as management of system and knowledge management that has become the key factor for the success of all organisations. Numerous researches were conducted to address issues related to technology-enhanced management (e.g. Jemala, 2012) and social development (e.g. Latchem in Baggalay, 2006). Among the topics discussed in technology management included 'technology foresight and planning, technology analysis and radar, technology transfer and sale, technology IPR and marketing, management of technology portfolio, tehnology education and personnel development, technologyinnovation, technology assessment, technology R&D, and so forth' as reported by Jemala (2012). Among the focus areas of concern for technology in social development included 'collaborative Open and Distance Learning (ODL), capacity-building, use of open-source software for ODL, viability of SMS technology for distance education, to name a few as reported by Baggalay (2006).

Apart from management and social development, ICT is also powerful tool to support interactive social activities. Social act includes learning that is situated in a socio-cultural context, in which the process involves interacting with other members of a community (i.e. in schools, homes or other settings) that is also known as Community of Practice (CoP). In the CoP as advocated by Lave and Wenger (1999), the shared knowledge of experts and novice that is beneficial in the cognitive development of learners or participants in the community will be taken into account according to socio-cultural theory as it is believed that learning process cannot be understood without reference to socio-cultural situation (Merriam & Rosemary, 1999). Literature revealed that in CoP or sometimes referred to as Communities of Practice (CoPs), learners interpret, reflect, and negotiate meaning in an open process through interactions in the community that is supported by blended-mode platforms. Wenger (2000) defined CoPs as groups of people connected for multitude reasons; sharing a concern or a passion for something they do and learn how to do it better as they interact regularly through vari0ous blended-mode platforms supported by ICT. Hence learning through transferring of knowledge and cooperating with arguments is fundamentally the result of participation in CoPs (Lave & Wenger, 1991). The study by Crawford, et al. (1999) revealed that a learning community or CoP with desirable environment could provide opportunities for learners/participants to be engaged collaboratively in solving contextual problems when faced with scenario.

4. ANALYSIS AND DISCUSSION

Under the theme 'ICT-based digital education', a keynote speech entitled '*Online training and competition in Southteast Asia*' will be presented by Dr. Gatot Hari Priowirjanto, SEAMEO Secretariat Director. This section will also summarize the papers presented that are classified and elaborated in the following two main sub-themes.

Supporting Transdisciplinary Science/Mathematics Education integrating Digital Tools and Blended-learning Platforms

Table 1 summarizes the titles of the papers presented under this sub-theme of which the first paper will be presented through Skype and the subsequent two papers will be presented through WebEx virtual learning platform after keynote presentation respectively during the first and second day of the conference.

Table 1: Titles Related to Supporting Transdisciplinary Science/Mathematics Education Integrating ICT

No.	Title of presentation related to transdisciplinary science/mathematics education	Authors
1	STEAM teaching strategies in related subject	Corrienna, Intan Bidayu, Shamini, Nur Wahidah, Marlina and Ng (2018)
2	Enhancing Effective Science Learning through Augmented Reality: Challenges and the Way Forward[4]	Sari, Indarjani and Ng (2018)
3	Learning Mathematical Concepts Contextually Supported by Digital Tool and E-platform[5]	Wahid, Dede, Davi, Dava and Ng (2018)
4	Integrating Indigenous Knowledge and Skills in Technology Enhanced Science Project-based Activities: Exemplars, Issues and Challenges[1]	Natthasurachet, Karnchanaphan, Ng and Lee (2018)
5	Promoting LearnT-SMArET through managing blended-mode competitions: A reflective study with exemplary output from criterion-reference assessment[2]	Ng, Gatot, Achmad, Lay and Awangku Hassanal Bahar (2018)
6	Involving Primary Students in Project-based Blended-Learning Activities: Exemplary Practices in a Local School at Thailand[3]	Karnchanaphan, Natthasurachet and Ng (2018)
7	The development of regional curriculum standards in the case of south east Asia Ministers of Education Organization (SEAMEO) in Mathematics	Montecillo, The and Isoda (2018)

[1, 2, 3]- Refer abstracts in Appendix A

[4, 5] - Refer screenshots in Appendix B

Supporting Management and Social Development Incorporating E-tools and Sustainable Technology-enhanced Communities

Table 2: Summary of the titles of the papers presented under this sub-theme of which all papers will be presented during the conference.

No.	Title of presentation related to management and social development	Author(s)
1	Transforming Public Libraries into Digital Knowledge Dissemination Centre in Supporting Lifelong Blended Learning Programmes for Rural Youths	Alizah, Lee, Ng, Noraini and Siti Zarikh (2018)
2	Recognizing the Personal Competencies of Future Information Professionals	Norhidayu, Nurhidayah, Noor Faraliza, Salasiah and Nor Farmiza (2018)
3	Life Skills and Community Service Learning Towards the Development of a Sustainable Community in Thampla Wittayayon School: An Assessment	Arunee (2018)
4	Internet benefits, risks and issues: A case study for cyber parenting in Malaysia	Razifah, Kamal, Rabiatul Adawiyah and Dia Widyawati (2018)
5	Privacy Concern of Personal Information in the ICT Usage, Internet and Social Media Perspective	Jashira, Noor Arina, Siti Aishah, Nik Nur Izzati and Amira Idayu (2018)
6	Measuring Students' Attitude Towards Behaviour in Doing Information-Related Business	Nurhidayah, Faddliza, Norhidayu, Zalina and Huda (2018)
7	The impact of attitude, subjective norm and safety on consumers' purchase intention in Johor, Malaysia	Noreen Noor, Eta Wahab Nurul Aien and Wan Haslin Aziah (2018)

8	Corporate memory: A memory compaction mechanism towards Malaysia's leading companies' transparent governance	Razifah, Rahimah, Aflah, Zailani and Amirah (2018)
9	Best Practices in Strategic Management in Selected Secondary Schools in Surin Province, Thailand: Basis for Asean Integration Plan	Thammathat (2018)
10	Institutional Quality Assurance Practices of a University in Thailand: Development of an Action Plan for Accreditation	Ketnakorn (2018)
11	Development of a Strategic Plan Towards Quality Education in Primary Educational Service Area Office 3, Thailand	Poovanat (2018)
12	The Development of Teachers in Teaching and Learning-based Management in the Classroom: Mukdalai School, Mueang District, Mukdahan Province	Sirikanjanarat (2018)

5. CONCLUSION

The integration of ICT in transdisciplinary education, management and social development has given much implications as illustrated in the articles presented under this theme. The use of e-platforms and digital tools were found to be effective in raising students' motivation towards science/mathematics learning as well as promoting their exchange, sharing and networking through digital learning platforms. STEAM teaching strategies presented numerous convincing alternatives to prepare teachers with knowledge, awareness and skills needed for technology-enhanced education for sustainable living. The integration of technology in management and social development also offered much promising future. Hence continuing efforts should be made in numerous fields with more research/evidence-based studies integrating ICT that contribute towards nation's global mission to groom future leaders, skilled workers, engineers and researchers who could initiate, maintain industrial development and solve problems related to STES, as the saying goes 'Intellectual solve future problems, politicians solve past problems' (Abdul Razak, 2005).

6. ACKNOWLEDGEMENT

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APPENDIX

Screenshots of presentation under subtheme 'Supporting Transdisciplinary Science/Mathematics Education integrating Digital Tools and Blended-learning Platforms'

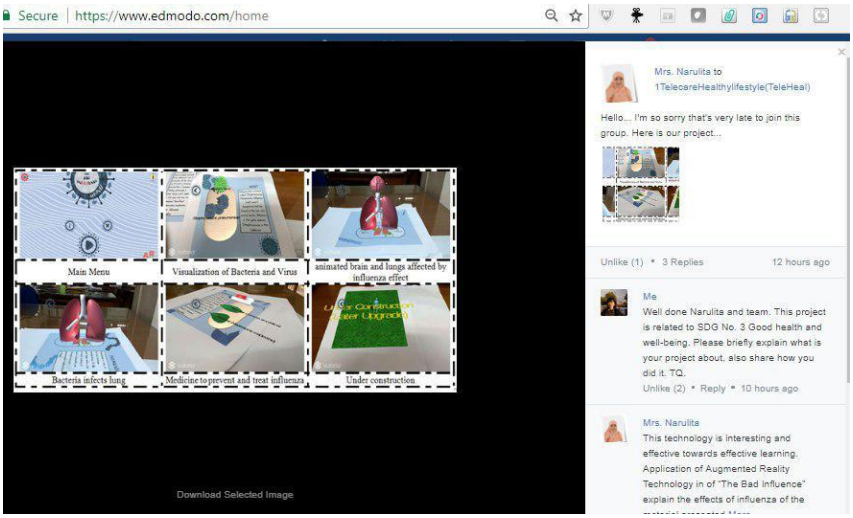

Figure 1: 'Augmented Reality (AR) for effective learning of influenza' science related project with video posted on Edmodo social learning platform sub-theme 'Telecare and Healthy Lifestyle' (TeleHeal) [https://www.edmodo.com/home#/group?id=13658913]

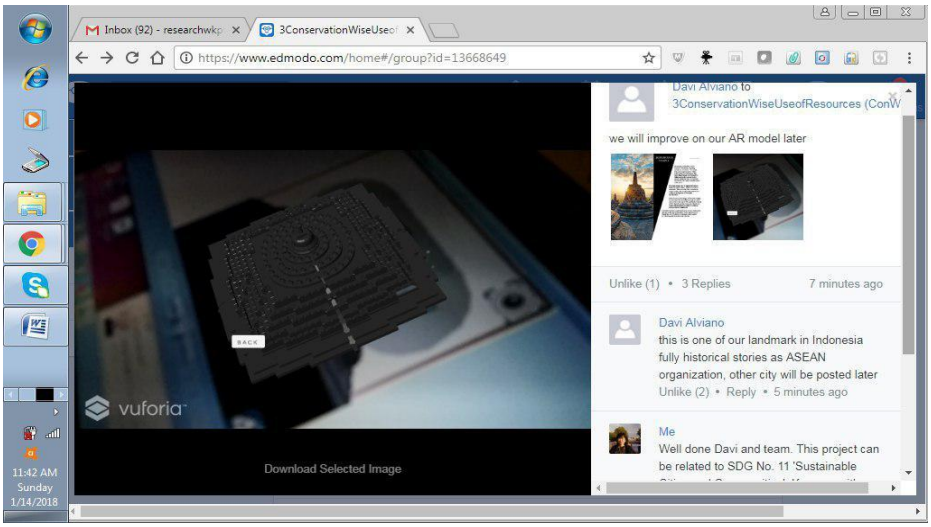

Figure 2: ASEAN landmark maths-related AR project with video posted on Edmodo social learning platform sub-themes 'Conservation and Wise Use of Resources' (ConWUR) and 'Learning Transdisciplinary Science integrating Mathematics/Arts-language-culture/Engineering-Economics/ Technology' (LearnT-SMArET)

Challenges, Trend and Future of Business Education

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1. AN OVERVIEW

The link between education and industry has been a global issue. The landscape of learning has been constantly evolving that the role of the industry need to be taken as input to the curriculum. On the other hand, industries are always on lookout for what the educational institutions provide as final products. Thus, contemporary issues facing both the educational institutions and the industry are inter-connected. This link has now been a common subject that industry and academic researchers are interested in.

This session focuses on contemporary issues and challenges that are faced by both the business and education sectors, in general. This includes business education related topics that are relevant to the needs of the industry and industry related topics that has impact on the delivery of business education. This brings two sectors into one session that will strengthen its link, learn the other side of the issue and generate ideas in a completely different perspective.

The selected papers for this session give an overview of various notable topics that mainly focuses on accounting, marketing, human resource, finance and entrepreneurship. These broad topics are relevant and responsive to the needs of the current education and industry setting. For instance, all colleges and universities across the world are tasked to produce entrepreneurs in order to boost economic development. In addition, business entities are pressured to harness their marketing techniques, review accounting methodologies and enhance finance measures to improve performance. These researches will either confirm or refute the current literature and studies on these areas.

2. CURRENT ISSUES AND CHALLENGES ON BUSINESS EDUCATION

Both industry experts and academic researchers focus on the role of education in the proper transfer of theoretical and practical knowledge. One of the most common theme for academic researchers is the role of education in the creation of entrepreneurship. As Kuratko (2003) puts it, entrepreneurial perspective can be taught to individuals. However, the basic question on the making of entrepreneurs is still a continuous debate proposition. In a study conducted by Velasco (2016) entitled 'The making of an entrepreneur: aligning institutional paradigm to the industry needs', the main argument focuses on the gap between theory and practice of entrepreneurship. The results of the study summed up that what the teachers taught was neither what the students learned nor what the entrepreneurs need. Toone (2016), however, asserts that the conception of university entrepreneurship ideas form the basis of human advancement. It holds that the means by which those ideas are converted into action are understood and can be taught. The role of education is to create a culture that will allow these ideas to grow and be converted into actions.

In the same context lies a question on the business curriculum. Kuper (2012) notes that skills are more important than credentials in many industries. If students are not equipped with the right skills, their degree will be of little practical use, regardless of how supported they were through the process. The same holds true of the results of the study of Milhauser and Rahschulte (2010) on meeting the needs of the global companies. The authors call for a tighter integration between the needs of global businesses and the focus of international business curriculum. The study pointed out that the knowledge, skills, and abilities need to be refreshed to match the dynamic nature of today's global business environment. The changing landscape of industries requires diverse curriculum to test the learning outcomes of a multi-culturally oriented individual.

The emphasis on business curriculum intensifies the need for approaches that measure the learning outcomes geared towards industry needs. For instance, professional learning (PL) has been introduced to compensate the missing piece of the business curriculum. Lawson, et. al (2011) describes this approach as industry engagement, work-integrated learning and authentic learning environments. The various approaches in PL include industry case, industry simulation, industry practitioner delivery, industry mentoring, industry study tour, industry placement, industry competition and industry project. The basic idea in this approach is the union of industry partners and business schools. In this notion, King (2015) affirms that boosting the value of today's higher education system and, most importantly, helping prepare students for life after class, means adopting a more practical and applied approach to education. The

teaching strategies shift from a regular classroom discussion to a more dynamic practical sessions that involve development of various skills.

3. CURRENT TRENDS ON BUSINESS EDUCATION

Admit it or not, globalization paved the way for a drastic change in business education. One of the major positive results of globalization is the cross-border movement of students, faculty and talent at large (Iniguez, 2016). Thus, business educators think global in all aspects of delivery, strategies and outcomes. The network of business schools around the world via academic partnerships, benchmarking and team-teaching resulted into a multi-cultural approach in teaching. This also led to collaboration of faculty research, student competitions and student organizations.

The dynamism of curriculum led also to flexible teaching methods. The online business programs are currently on demand. As to the use of IT in business education, some HEIs ponder on possible cooperation with the educational online platform (Lombardi, 2013). Meanwhile, technological innovations and the internet have changed the methods of business education delivery (Nikitina and Lapina, 2017). There are business programs that use blended learning style wherein technology is the core of the delivery. However, it should be noted that the use of IT in business education is heavily dependent on student learning style, design of the courses, and institutional environment (Whitaker, et. al, 2016).

In order to be on top, the competing schools all try to improve their rankings and recognition (Schumacher, 2015). As the competition in most of the business schools intensifies, accreditation comes in to boost the ranking. Local and international accreditations and recognitions become one of the leading mechanisms of business schools to continuously nurture a culture of excellence. As such, this assures students that the program adheres to quality. Accredited colleges and universities need to demonstrate a developing and growing paradigm, not just maintaining the existing standards.

4. THE FUTURE OF BUSINESS EDUCATION

According to Smit (2017), progressive business education institutions are already investing in the intellectual capital and delivery systems required to successfully compete on a playing field increasingly characterized by hyper-competition, technological change and innovation. This is actually the call of the day: human capital. As most of the business schools venture into physical resources, they tend to neglect the value of qualified teachers. The contemporary management invests heavily on intellectual capital so as to sustain the actions for paradigm shift. A more dynamic and qualified academician fulfills majority of the requirements for survival. In addition, the emergence of industry experts joining the academe added value to the fusion of academic institutions and industries.

Business education has been characterized as research-based. As the standards rise to a higher level, research and innovation come as a tough requirement. Academic research has been part of the business program both in the instruction and community engagement. In this regard, a more sustainable research program is expected from business schools. This includes collaboration, funding and utilization of research outputs. Apart from the individual researches done by business teachers, it is expected that outputs are more focused on the betterment of curriculum and industry. Furthermore, the delivery of the program should be geared towards research outputs in order to train students to be critical researchers and thinkers.

Lastly, internationalization of business program will be a must. Business schools should think borderless in all forms of the curriculum delivery. There will be more international linkages, cultural exchange and international internships. More and more business programs are getting international accreditations and linkages with colleges and universities across the globe. Thus, teachers and students alike enjoy the benefit of learning business in various cultural perspectives. Much more, international students and talents are expected at this pace.

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High Performance Computing Breakthrough any Supercomputing Challenge

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1. AN OVERVIEW

Solving the largest data analysis problems demands powerful supercomputing solutions. Only HPC has the combination of proven expertise and skills, comprehensive portfolio, partner ecosystem and deep commitment to innovation to strategic supercomputing partner. Our unparalleled portfolio of supercomputing solutions and production capabilities, as well as, innovative technologies to enable ever-increasing performance, scale and efficiency of large HPC clustered solutions has made HPE the world's leading provider of supercomputing.

Academia can now execute research projects that were inconceivable a few years ago. Like mapping the human genome, modeling the universe, creating massively complex deep neural networks, or creating artificial intelligence. The awesome power of High Performance Computing (HPC) makes it all possible. We have the most HPC experience and solutions, plus unmatched full support. All to help you design, deploy, implement and run with assurance the right HPC systems for you.

2. THE RIGHT CHOICE FOR HPC

We engineer solutions purpose-built for specific HPC needs and we have unmatched experience implementing complex supercomputer research solutions: we have installed more HPC systems than any other competitor. Our purpose built HPC platforms and solutions are designed to deploy more easily, with common management and configuration tools that allow you to adapt quickly to new workloads and organizational missions. We are singularly qualified to power our HPC research.

Issues Raising while Teaching & Learning English as Secondary Global Language

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Abstract- English, as global language is acknowledged and understood by people, proliferates throughout the world. Due to British rule in the many parts of the world-has emerged as the popular lingua franca. This language and has been used as a means of communication in some form or another in many parts of the world. English has become an international language of business, and it is increasingly true as international trade expands every year, bringing new countries into contact bridging cultures and language barriers. Its acquisition can guarantee the availability of opportunities of employment, travelling, higher education and even better life (Crystal, 1997). It is high time to work on the elimination of the issues which obstruct the interest of educators and learners while teaching and learning English language.

Keywords: Lingua franca, Global, Communication, Understood, Language

1. INTRODUCTION

According to David Crystal, a well-known professor at the University of Wales a language achieves a genuinely global status when it develops a special role that is recognized in every country. This might seem like stating the obvious, but it is not, for the notion of "special role" has many facets. Such a role will be most evident in countries where large numbers of the people speak the language as the mother tongue. But no language has ever been spoken by a mother-tongue majority in more than a few countries so mother-tongue use by itself cannot give a language global status. To achieve such a status, a language has to be taken up by other countries around the world. They must decide to give it a special place within their communities. **(Moira)**

English as a global language or *lingua franca* is recognized as a means of global communication which expands throughout the world that is recognized and understood by the people which enable people of diverse backgrounds and ethnicities to communicate with each other. With more than 350 million people around the world speaking English as a first language and more than 430 million speaking it as a second language, there are English speakers in most countries around the world. In most countries around the globe the English language can be found in some form or another. "What centuries of British colonialism and decades of Esperanto could not do, a few years of free trade, MTV, and the Internet has. English dominates international business, politics, and culture more than any other language in human history." (Rohde) English is a widely distributed language originating in England, now part of the United Kingdom, and is currently the primary language in several countries. It is extensively used as a second language and as an official language in many other countries, is the most widely taught and understood language in the world. An estimated 354 million people speak English as their first language. Estimates about second language speakers of English vary greatly between 150 million and 1.5 billion. English is the dominant international language in communications, science, business, aviation, entertainment, diplomacy and the Internet.

2. A BRIEF HISTORY OF ENGLISH LANGUAGE TEACHING

The history of English Language Teaching (ELT) starts from the 15th Century. The first phase is from the beginning of the 15th century to the end of 18th century and second phase is from the 19th century. The Third and modern stage is from the beginning of the 20th century to the present age. In Europe, during the end of 14th century French gave way to English language and schools in Europe started teaching English. Educational institutions in Europe taught English along with other modern and classical languages. During the 19th century, due to various factors, a rapid development of ELT was made both in Europe and British colonies. During this period the English-speaking population increased to several billions from the previous few millions. In the 17th and 18th centuries, English was the language of the leading colonial nation - Britain. In the 18th and 19th centuries, it was the language of the leader of the industrial revolution - also Britain. In the late 19th and early 20th centuries, it was the language of the leading economic power - the US." (Carneiro)

From the beginning of 20th century to the present stage ELT is divided into three phases, first phase is from 1900 to 1946 (after the Second World War), second phase from 1946 to 1970 and the third phase from 1970 to the present. During the second phase of the growth of English language, the term ELT was generally accepted. New learning theories, approaches and methods of teaching made it necessary for designing the target language learning techniques.

The primary means of communication among the peoples of the world is language. According to a well-known linguist, Frank Palmer, "*the difference between human beings and animals is poorly described by the label homo sapiens (man with wisdom). He questions what do we mean by wisdom? Anthropologists describe man as a tool maker, but even apes are known to be able to make primitive tools. In fact, what sets us apart from animals is our ability to speak. Man is a speaking animal-homo loquens-and this ability has greatly facilitated our advancement in all spheres."* For this world to be truly global, there must be some commonality or ease of communication. "If trade and tourism around the world are going to operate and a global economy function and a global culture flourish, a widely shared, reasonably accessible language is requisite." (Stevenson)

3. NEED OF EFFECTIVE TEACHING & LEARNING ENGLISH

As the English language is getting consolidated as a global language, it is indispensable for all the countries to teach and learn English or it will be difficult to keep pace with the development in the world. In particular, it is very essential for a multilingual and developing country to learn this global language. Hence, to make the learning of English effective and successful a teacher should consider the following aims and objectives. They are to enable students:

- Listen and understand English when someone speaks it at a normal conversational speed
- Use English for communication
- Read English and understand the content
- Write English for communication
- Enjoy simple content
- Develop interest in library reading and listening

4. ISSUE RELATED TO TEACHING & LEARNING ENGLISH LANGAUGE

The 21st century has ushered in a new world where English communication has become a necessity to stand out in the world of competition. In present society, life becomes very difficult for anyone who is not comfortable conversing in English. Owing to the assimilation of words from many other languages throughout history, modern English contains a very large vocabulary, with complex and irregular spelling, particularly of vowels. Modern English has not only assimilated words from other European languages, but from all over the world. Furthermore, there are a lot of people who look for ways of improving their English, but they do not know how and where to start. In most of the English classes, little attention is paid to the conscious efforts learners make in mastering a foreign language. Many of students do not know, neglect or pay not enough attention to how to deal with the task of learning a foreign language even after years of study; only a few students who have used a set of strategies, have been able to succeed and hence, learn the language. It is a neglected area in the language classes. Since the 1970's with the advent of the communicative methods and the strong reaction against the structural approaches (Littlewood and Swan 1981) due to the combination of various sociological, economic and pedagogical factors ELT has gone through changes, which brought important innovation and adjustment in the area of teaching and learning. The insight obtained from the multiple research programmes and experiments in this domain could not be just simply disregarded, they had to be fully or partly incorporated into the teaching field because they provided very useful information on the actual learning of the language (Krashen 1981; Ellis 1985)

Teaching and learning English as secondary language is an area of interest for teachers and educators. Efforts are made to reduce the obstacles in English, but unfortunately reasonable problems have been resolved. It should be borne in mind that any decision made regarding the methodology to be used in the classroom or an innovation introduced in the curriculum trigger ongoing alterations in the general context of the language teaching and learning process (White 1988; Johnson 1989).

4.1 ELT Issue Related to Learners

It is the belief that engaging students in the process of learning and assessment would encourage their learning efficiency. Studies of the characteristics of good language learners (Naiman, et al. 1978; Stern, 1983) suggest that efficient learners consciously monitor their performances, analyze them, and develop a repertoire of efficient learning strategies. In a self-directed scheme, through reducing the distance between the learner and the teacher, feelings of anxiety, frustration, and alienation decrease, and consequently the learner becomes more receptive to the learning process (Brown, 1973; Schumann, 1975). The students because of less interest in English does not find comfort while

understanding the concepts in detail, and avoid interacting with teachers. Another challenging factor is students' beliefs about the nature of learning English as a subject consisting of a list of words and a set of grammatical rules which are to be memorized and separable skills to be acquired rather than a set of integrated skills and subskills (Oxford, 2001)

4.2 Issue of Student's Less Interest

- As classes are crowded, most of the students do not have enough practice in English and do not overcome language learning problems and are not proficient enough to communicate in the foreign language. Because in the limited hours of instruction, they normally could not have the chance of learning English especially the most favored skills of listening and speaking.
- Not all students have the same motivation or purpose for learning English. Some of them look at English just as a course that should be passed and do not understand its importance as a means of communication with which they can adapt themselves to new improvements in technology and other sciences. For most learners, learning English is a duty — something that they have to, but don't want to do. They do not see pleasure in learning English. These students have low motivation to participate in class, and they simply try to get a passing mark to get rid of the course.
- Student's does not develop interest in English because of lack of concentration due to class environment. They are not aware of English vocabulary which fails to connect them with the learning of English. Because of their socio-cultural constraints, they cannot use or enhance their English vocabulary, so for them learning English learning is vain for them.
- A quick switch in the pendulum from the teacher to the learner took place, with the learner becoming the pivotal element in the learning process and the teacher adopting new roles apart from the traditional ones as animator, collaborator, dynamiser, mentor, assessor and facilitator (Wright 1987) This also had its reflection on the management of the teaching/learning process with a strong focus on learning how to learn and on learner autonomy (Wenden 1991).

4.3 Issue with Educators Ends at Less Motivation

Research in this field of language learning has shown that learners' negative perceptions can be detrimental to the whole learning program (Green, 1993 & Wenden, 1987). Teachers' perception toward the efficacy of methods and practices employed in teaching a foreign language is yet another significant factor to consider in developing a program. Willingness or unwillingness to experiment with a new method or to use innovations in language teaching is very decisive. Incongruities among teachers' beliefs based on their actual experience with learners and theoretical framework of their teaching can lead to difficulties in teaching which in turn negatively affect learners. (Salomon 1998) Educators' motivation and creativity develops interest for learning English as in comparison of other subjects, as being prominent in practical lesson English requires more focus. With the use of technology students can be more encouraged for participating in learning process of English and teachers are not aware of the latest technology for making English interesting for students. ICT have become a crucial element in ELT both within and outside the classroom. It works as a necessary tool and give full sense to the idea of learner autonomy.

4.4 Issue of Lacking Formal Scheme of Teaching

The complexity of the task which learning presents, there is never enough time within a formal scheme of instruction to ensure mastery on the part of students, and if the learner has not been prepared within the classroom to take responsibility to learn autonomously outside, it is unlikely that any learning will take place (Carver & Dickinson, 1982; Dickinson & Carver, 1980). Teachers should be concerned with helping students to learn how to learn the ways of effective learning of English as a foreign language and to achieve autonomy in their education (Akbari, 2014; and Tahririan, 2009; Jafari and Kafipour, 2013; Tabatabaei and Hosseini, 2014)

4.5 Issue of Examination Focused Learning

The mistake is in educational system itself as the teacher's target is to "prepare" his students for the examination and not to make them skilled in the use of the language they are learning (Subramanian, 1985). Therefore, students try to get the required grade and they have no internal motivation to learn English for other purposes and they move to higher grades with different grades and levels of English knowledge and even inadequate knowledge. According to Khaniya 1990, "A large number of teachers help students cope with examinations in order to preserve their reputation as good teachers" (Khaniya, T. R. 1990). Teachers' fear and the associated guilt, shame or embarrassment of poor results as a consequence of their students' performance in public examinations might lead teachers to teach English for testing purposes only (Alderson & Wall, 1993). Student's demand that their English teachers focus on prescribed textbooks, they may not like the textbook but they know that final exams are based on them. Their learning attitudes, thus,

influence the teachers' curricular and instructional knowledge (Ghorbani, 2009; Beattie, 1995). Students, particularly those who have high expectations of themselves, expect their teachers to cover all examinable topics not on developing communicative proficiency or skills.

4.6 PROBLEMS ON THE PART OF TEXTBOOK

Language textbooks seem to play a pivotal role in educational system of every country. ELT textbooks are used widely and serve as syllabus and main guideline for teachers. The textbooks taught are designed and prepared by the Ministry of Education. Based on the textbook content, the students are evaluated formatively. A big problem in language teaching which our students encounter is that the tasks included in their textbooks do not give them enough practice in the skills they will need in future. Course books should constitute an effective resource for self-directed learning and for presentation of material, a source of ideas and activities, a reference source for students, a syllabus where they reflect pre-determined learning objectives, and support for less experienced teachers who may be lacking in confidence (Cunningsworth, 1995 as cited in Tsiplakides, 2011) Ahmadpoor (2004 as cited in Maleki, Mollaee, & Khosravi; 2014) declares the inadequacy of high school English textbooks in his work as follows:

a) The use of unattractive, boring, outdated and incoherent texts in the book.
b) Incorrect, inappropriate and unattractive pictures of the book.
c) The lack of cohesion and proper relevance among the lessons and the texts of subsequent books.
d) The lack of coordination between the size of contents and the time dedicated for them.
e) Unattractiveness of grammar points and the shortage of variable activities.
f) Containing nonstandard questions.
g) Lack of logical manner and order of difficulty in presenting grammar points.
h) Lack of transparency in the general purpose of the book.

In response to this challenge, Crystal suggests that teachers should train their learners for the diversity of dialects and use of English, that they should expose them to listening and reading comprehension exercises from the very beginning and to as much variations as possible. What variety the teacher will choose will depend on the 'view as to where the students are going to go or do with the English', or on 'how likely they are to encounter such a variety' (Crystal, 2013)

5. SUGGESSTIONS

It is widely believed that "English is truly the world language." (Stevenson) English may not be the best choice, but it is the obvious choice, for an international language. English language been accepted as a Secondary global language. Psychology plays a very important role in teaching. Most of the time, students do not feel so comfortable in being honest in front of the others and say all they do not understand. But, when the atmosphere is less conventional, when they play or learn a language without being constantly aware or reminded of their stringent need to study, the students' involvement changes. To create a friendlier classroom atmosphere, the teachers can use games that involve a winner or an award. By promising a reward, the teacher creates a competitive environment in which the student will forget that he is studying the verbs, the nouns or some vocabulary items.

The knowledge obtained from the role played by variables such as motivation, age, gender, personality, cognitive style, learning strategies, intelligence and so on was crucial for a more effective management of language teaching (Skehan 1989). Role-play is a method that develops the speaking, interpreting skills and students' imagination. A spontaneous role play with a written script and lines for each character would really be both entertaining and useful. Through such exercises the student will learn how to think and use all his experience in order to react and adapt to different circumstances. In addition, imagination has to be tested and practiced it order to enhance the student's more spontaneous and fast reaction to different formal or informal professional situations. These role-plays will prepare students to cope with different situations that may occur. Teaching is important and can make the difference in students' life and can prepare them to face reality.

Norland (2006: 26) states "that a subject is learned best if students are involved in concrete, hand-on experiences with the subject. Students were able to analyze and discover their own information about the topic and language use as they are involved with tasks or projects." Main strategy for experiential language teaching is student's involvement in tasks. Norland suggests the following strategies for experiential language teaching.

1. The teacher identifies a task or activity that will help students learn the language needed in their particular context.
2. The teacher plans how the task should be implemented including any necessary language items that may need to be introduced or reviewed for the students to perform the task or activity.
3. The teacher explains the task to the students.

4. The students discuss the task and identify their roles
5. The students do their task or activity.
6. The students perform or demonstrate what they have learned or accomplished.
7. Norland considers the actual use of language in authentic situations by the target language learners, as the major strength of experiential language teaching. He insists that teachers should plan the experiential activities well, focusing on their goals and keeping in mind the pedagogical purposes. A review of the problem will reinforce the following facts:
    - Teaching practices are to be improved
    - Objectives and needs of teaching are to be matched
    - Clarity about basic concepts is to be brought
    - Principles and methods of teaching are to be coordinated

Hence, there is an urgent need to re-examine the problem and do the needful

6. CONCLUSION

Teaching and learning language is taken on priority in the field of education, as without the language in the human society the human civilization cannot exist. In this new millennium English is considered as an international language which is a guiding factor for trading, politics, economy, science and technology. The advancements in Science and Technology and their use of new terminology have been showing an immediate impact on the language, adding tens of thousands of words to the English lexicon. As these innovations come down from the English-speaking countries, those who wish to update their knowledge and learn about new inventions need to learn English well. This need has resulted in a dramatic increase of the expository material in the English language. Besides all the dictionaries, encyclopedias and books of knowledge are written and printed in English. Hence, the access to new knowledge is only through the English language.

To quote Kapoor, "Now the failure in teaching English as a second language stems not from the theory, training and mechanics of language teaching, but from the intrinsic conceptual inappropriateness in accepting English as a second language, L2, pedagogically and linguistically. Analyzing the issue further, he says that English certainly is not useful in our day to day life. This, in fact, is the main problem of teaching English. Being a foreign language, it cannot function as a second language; but it has been uniformly imposed as L2 all over the world. What is more, when one looks at the functions, goals and instructional objectives, it is evident that English is to be taught as L2.

The world is an increasingly globalized place where individuals are communicating among and between multiple cultures each day. Today, an individual has access to a vast array of information from a variety of world cultures at the touch of a button. For those of us in the English-speaking world, we take access to this information for granted. Elsewhere, however, much of the world's information is beyond their reach, locked in English. That is one reason why learning English as a second language has become the need of an hour. In fact, English is now the world's most widely spoken second language, surpassing all others. In fact, more people now speak English as a second language than as their first language

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Sustainable Development Goals (SDGs) in Africa, Asia and Latin America

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I am pleased to welcome delegates to this year's International Conference on Recent Trends in Science, Technology, Management and Social Development (ICRTSTMSD-18). As co-chair of this session, I would also like to seize this opportunity to welcome you all to this session, which is focused on the 2030 Sustainable Development Agenda. The Sustainable Development Goals (SDGs) were conceived by the international development community in 2015 as the successor to the Millennium Development Goals (MDGs), which endured from 2000 through 2015. The SDGs came into effect in January, 2016 and is driven by concerted global partnerships. Comprising seventeen goals and one hundred and sixty-nine targets; the SDGs build on the successes of the Millennium Development Goals. The agenda however comprises new issues, including climate change, economic inequality, innovation, sustainable consumption, peace and justice, as well as other priorities. The SDGs are driven by a global partnership framework, providing guidelines that allow various countries to elaborate their own development agenda in accordance to their own priorities. Therefore, the SDGs have emerged as an inclusive development framework, embracing poverty reduction at the heart of the 2030 Development agenda that is committed to leaving no one behind. They are also aimed at transforming people's lives and the environment that sustains them.

The 2018 SDGs report is a pointer to the scope of development challenges the world is facing in recent times. The global challenges are multi-dimensional, ranging from climate change risks and vulnerability, conflict, inequality, persistent pockets of poverty, demographic explosion, rapid urbanization and biodiversity loss, among others. The report reveals a rising profile of global food and nutrition insecurity for the first time in more than a decade, with approximately 38 million hungry people in the world, which has increased from 777 million people in 2015 to 815 million in 2016. The report also affirms that conflict has emerged as a major driver of food insecurity in eighteen countries around the world. The impact of the global climate change is equally manifesting around the world, with severe economic and environmental consequences. According to the report, the global community experienced the most expensive North Atlantic Hurricane season on record, driving economic losses around the world attributed to weather events to more than US$300 billion. While under-5 mortality rate reduced by more than 50% in the Least Developed Countries, the proportion of people with access to electricity has more than doubled between 2000 to 2016. The 2018 SDGs report further reveals that there were 216 million cases of malaria in 2016, compared to 210 million in 2013 and about 4 billion people were left without social protection in 2016.

While development challenges abound throughout the developing world, the burden associated with these challenges are particularly severe in South Asia and Sub-Saharan Africa, which jointly account for more than 60% of global poverty. These regions are in need of concerted efforts to transform people's lives by lifting their populations above the vicious circle of poverty into a virtuous circle of prosperity. Therefore, the major challenge of this session, among other things, is to proffer the solutions to the issues associated with the SDGs. Several papers have been submitted for presentation during the conference and provide a framework for the exchange of knowledge and robust debate critical to elaborating the issues that can inform policies to tackle the challenges.

Once again, I welcome you all and wish everybody successful deliberations throughout the course of the conference.

Part – A
Science and Technology

Measurement of Circular Saw Blade Tooth Dimensions Based on Machine Vision

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Abstract- Machine vision is a non-contact sensing technology which has been widely used in various applications, e.g. automatic inspection and robot guidance, in recent years. A basic machine vision system consists of a camera, a frame grabber, a computer, an illuminant source and image processing software. This research studies the application of machine vision for the measurement of tooth dimensions of a circular saw blade. Through backlit illumination, a CCD camera captured the image of the saw blade tooth. The image is then processed and analyzed for the tooth radius and depth. The results are compared with those obtained by an automatic precision measuring instrument (M-V Vertex 410) to verify the accuracy and precision of the machine vision system.

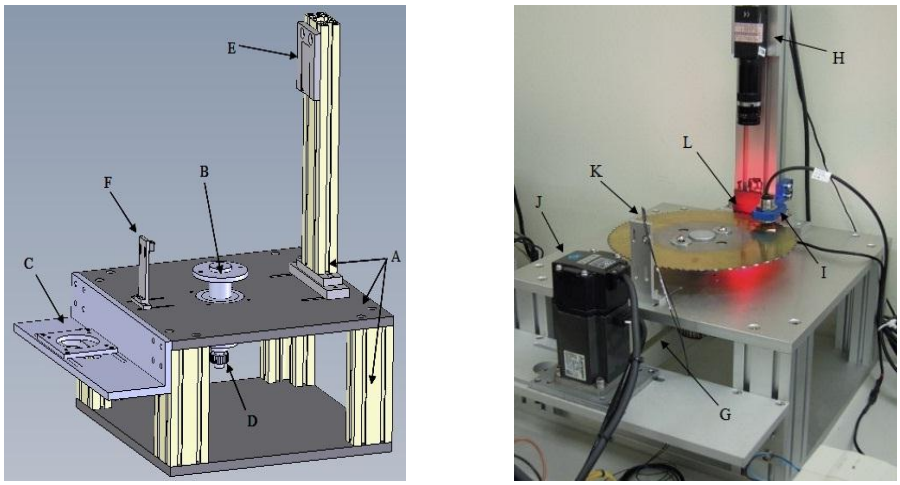
***Keywords*:** Machine vision, Tool inspection, Circular saw blade, Tooth dimension

1. INTRODUCTION

Saw cutting is an important method of machining. Tooth profiles, outer and inner diameters, flatness and concentricity, along with other saw blade parameters, affect saw cutting performance. Hence, it is essential to inspect the saw blade dimensions to ensure the saw is fit for cutting. Machine vision is a non-contact sensing technology able to rapidly collect and analyze a large amount of image data automatically. Consequently, machine vision technology has been implemented in various industries for production line monitoring, work piece inspection and robot guidance, etc. [1]-[3]. Reference [4] proposed a method for micro-milling tool wear inspection using machine vision. Computer vision algorithms for measurement and inspection of external screw threads are developed in [5]. For saw blade inspection, [6] placed several eddy current sensors beneath the saw blade and analyzed the collected data to determine the flatness. Reference [7] developed a machine vision system to measure the outer and inner diameters, roundness error, and angles of the saw blade. Reference [8] evaluated the saw blade dimensional parameters based on image processing techniques. Different tooth profiles are designed for cutting different material and work pieces. If any tooth does not conform to its dimension standards, abnormal noise and vibration will occur and cutting ability will be compromised. Other teeth or the saw blade itself will be damaged or even rupture. Therefore, it is important to inspect the teeth for any dimension variation. In this research, a measuring system is developed based on machine vision technology. The saw blade is illuminated by a backlit panel and its images are captured by a CCD camera. The images are then processed and analyzed for the tooth radius and depth. The results are compared with those collected through a commercial automatic precision measuring instrument (M-V Vertex 410) to check the precision and accuracy of the developed system.

2. HARDWARE SETUP

Typical machine vision system hardware includes a camera, an image capture card, a computer and an illuminant source. Combined with other mechanical and electrical components, an inspection mechanism is constructed for the saw blades. Figure 1 illustrates the hardware configuration the system besides the computer and frame grabber. Table 1 lists the components shown in the configuration.



(a) A CAD model of the mechanism (b) The integrated system

Figure 1: Hardware setup of the inspection system

Table 1: Components of the Inspection Mechanism

Item	A	B	C	D	E	F
Component	Main Frame	Saw Blade Mount	Motor Fixture	Timing Belt Gear	CCD Camera Fixture	Optical Fiber Fixture
Item	G	H	I	J	K	L
Component	Timing Belt	CCD Camera	Analog Switch	Servo Motor	Optical Fiber Sensor	Red Light Backlit Panel

The saw blade is mounted on the saw blade mount. The end of the mount is connected to the servo motor shaft through a timing belt. The saw blade can be rotated and positioned according to the resolution ratio between the servo motor and timing belt gear. The optical fiber sensor helps positioning the teeth accurately. A red LED backlit panel illuminates the saw blade while a CCD camera captures the tooth images from above.

3. IMAGE PROCESSING

The original image captured by the CCD camera is shown in Figure 2. It is then transformed by threshholding [9] to the binary, black and white, image in Figure 3. The black and white colors of the binary image are switched to represent the blade teeth in black. The teeth can then be observed in greater contrast to the background.

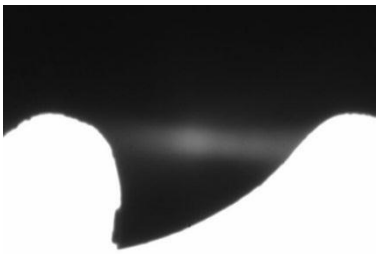


Figure 2: The image captured by the CCD

Figure 3: The binary image

As seen in Figure 3, the binary image has a small black spot outside the teeth. It corresponds to the blurry area, which reflects more light, in the image of Figure 2. The spot is eliminated by a hole-filling algorithm [10]. The image after hole-filling is shown in Figure 4. Because the edges of the teeth reflect light differently, the contours of the teeth are zigzagged. A median filter is applied to the image to produce smoother contours while preserving the integrity of the tooth outlines.

Figure 4: The binary image after hole-filling

Figure 5: The median filtered binary image

To locate the specific area for measuring the tooth dimension, a standard template of tooth image is created beforehand. The template is than compared to the image by a process called pattern matching [11]. The matched area is shown in Figure 6. A proper coordinate is essential in machine vision measurement [12]. A coordinate system is then placed on the image in reference to the template, as shown in Figure 7.

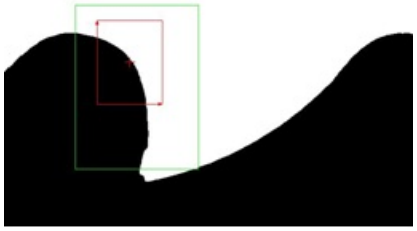


Figure 6: Pattern Matching

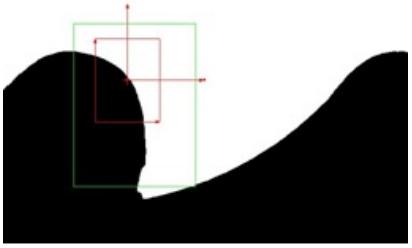


Figure 7: An image coordinate system

Dimension Measuring

The image is calibrated by importing a scale image and placing it on top, as illustrated in Figure 8. Figure 9 shows that a circular arc feature is extracted from the image and 25 points are located on the edge of the arc for measuring the radius.

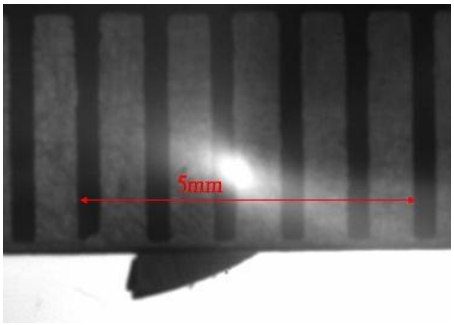


Figure 8: The calibrated image

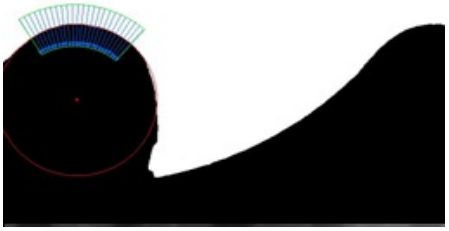


Figure 9: Extracted circular arcs

The coordinates of the i^{th} point are designated as x_i and y_i. The center coordinates of the arc are x_0 and y_0. The tooth radius r is calculated based on (1) with number of points m = 25. The estimated tooth radius is pictured in Figure 10. For the height of the tooth, the inspected area is equally divided into 65 portions, as illustrated in Figure 11. The y coordinate of the edge in each portion of the tooth image is measured. The highest and lowest y coordinates, y_{max} and y_{min} in Fig.11, can be found. The tooth height h is then estimated from (2).

$$r = \arg\min \sum_{i=1}^{m} \left(\sqrt{(x_i - x_0)^2 + (y_i - y_0)^2} - r \right)^2 \quad (1)$$

$$h = y_{max} - y_{min} \quad (2)$$

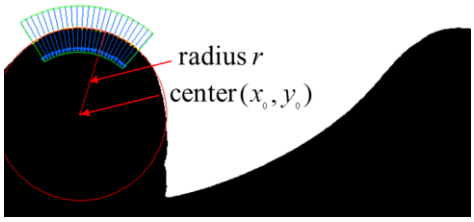


Figure 10: Estimated tooth radius

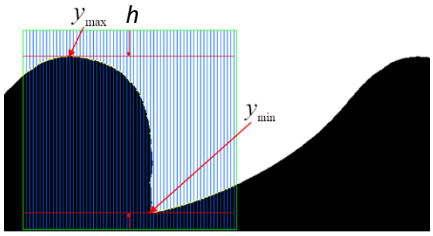


Figure 11: Estimated tooth height

4. RESULTS AND DISCUSSION

80 measurements are conducted and the results are summarized in Table 2. Table 2 also includes the data collected by an automatic precision measuring instrument (M-V Vertex 410). The results indicate that the developed system has accuracy comparable to the commercial one and even higher precision as demonstrated by its smaller standard deviations.

Table 2: Measuring results of the developed system and M-V Vertex 410

System / Tooth dim.	Developed System		M-V Vertex 410		$\frac{A-B}{B}\times 100\%$
	Mean (A)	standard dev.	Mean (B)	standard dev.	
Radius *r* (mm)	1.190	0.018	1.188	0.031	1.69%
Height *h* (mm)	2.397	0.015	2.388	0.023	0.37%

Nevertheless, it should be noted that the measured areas of two systems may not be the same. Each tooth of the same blade varies slightly. Lighting and mechanical vibration may also contribute to the measurement errors. However, the results demonstrate the effectiveness of the developed system. It can be incorporated into an automatic production line to perform accurate and fast inspection of the cutting tools. Human inspection errors can be reduced.

5. CONCLUSION

A circular saw blade tooth dimension measuring system based on machine vision is developed. The system is shown to produce accurate and precise measurement results. Fast and consistent measurement can be achieved without too much human effort and cost. Human error can be avoided. Some conclusions are made in the following:

1. A backlit LED red light source is used. The CCD camera has a good response to red light illumination. LED lights have high luminous efficacy and long lifetime. The backlit panel clearly shows the profiles of the blade tooth. Proper setup of hardware increases the quality of the captured images and decreases the complexity of image processing.
2. Image processing by median filtering and hole filling reduce the image disturbance on the edges without compromise the profile integrity. The interference of the reflected light is eliminated. Possible measurement error is avoided by image processing.
3. The measurement results can be shown on a computer user interface. An inspector can easily observe the results and decide whether or not the saw blade teeth are up to standard.
4. The measuring results of the developed system are accurate and precise as verified by a commercial automatic precision measuring instrument (M-V Vertex 410).
5. The dimension measuring time for each tooth is about 0.060 seconds. The positioning time is 0.8 seconds. For a saw blade of 140 teeth, it takes only around 2 minutes to finish the inspection.

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An Improved Energy-Efficient Policy for Overload Host Detection in Cloud Environment

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Abstract - As the cloud users and their data are growing very rapidly, the cloud service providers are also establishing the power-hungry datacenters across the world to grant all types of cloud services and to store the data. Cloud providers are facing challenging problems of energy and SLA tradeoff, minimization of operating cost and CO_2 emission in environment. The VM consolidation is extremely efficient and proactive approach for saving the energy online with dynamic workloads in cloud datacenters. In this paper, we have proposed a new host overload detection policy for reducing the energy consumption with low SLA violation. The simulation results with cloudsim guarantees for minimizing the energy consumption and maximizing the SLA by preserving the VM migration, average SLAV, frequency of host shutdown in comparison with state of arts.

Keywords*:* Energy, SLAV, Host, Virtual Machines (VM), VM consolidation (VMC), Datacenters (DC).

1. INTRODUCTION

Today, in twenty-first century the peoples and enterprises are continuously shifting their business on cloud to make the business fast and platform independent. The search engines, web-mail, facebook, twitter and YouTube are general services of cloud [1]. United States Data Center Energy Usage Report shows that energy consumption of the cloud datacenters will be approximately 73 billion KWh by 2020 [3]. On other side, Global Sustainability Initiative (GeSI) stated that the cloud DCs will be amenable for 18% CO_2 ejection and CO_2 emission will be 1430 million metric tons in coming next two years. This massive expenditure of energy is unacceptable sign for environmental and operating cost of the DCs. In cloud, virtualization is the key technology to minimize the energy misuse by sharing the same resource among the multiple guest OS called Virtual machines (VMs) [4]. Virtualization helps to create multiple heterogeneous VMs and run them in parallel manner on a host. The Virtual Machine Consolidation (VMC) is most encouraging approach in order to downplay the energy misuse by optimizing the resource usage enabled by virtualization. VMC makes possible to keep the host shutdown or in energy saving mode to the idle or under loaded host, towards eliminating the idle power usage by reallocating the VMs employing according to their current resource usage and running workloads [5]. Whenever the workload increases more number of hosts awake up from energy saving mode to activated mode. Wherever, VMC tries to lower the energy misuse, it also affects the Service Level Agreement (SLA) negatively due to high VM migrations. Exploring the solutions for achieving healthy tradeoff between energy and SLA is very crucial and important challenge for both the industry academia researchers.

In this paper, we proposed Cm (cubic mean), a new host overload detection policy to acquire the best trade-off between the energy consumption and SLAV. The proposed policy is designed based on analyzing the historical data of CPU utilizations by the VMs of the host. Rest of the paper is formed as follows. In Section 2 we review significant related state of art works. Section 3 presents the proposed overload host detection algorithm. Portion 4 discuss the evaluation methodology and performance metrics. Section 5 explains the simulation results of the proposed solution and finally we conclude the paper in section 6.

2. RELATED WORK

The VMC is the most prominent and widely used approach in literature to reduce the power usage. This section gives a brief review about the various existing VMCs, which primarily consider the energy and SLA trade-off. A VM consolidation model was proposed by Bruno et al. using AI based on Pseudo-Boolean (PB) Constraints in [6]. A PB Constraints is used to optimize costs. The proposed work reduces power by optimizing the CPU and RAM. Anton has developed the fixed utilization threshold (THR) scheme by setting up upper threshold and lower threshold for finding the overloaded and under loaded host [7]. Whenever the current utilization of the host goes below the lower threshold the host considered as the under loaded, and they migrate all the running VMs onto another normal loaded hosts, so that host can stay in power saving mode. While on other side, if the current utilization of the CPU goes high from the upper threshold then the host considered as the overloaded host, and make the migration of some required VMs to another normal loaded host till the host becomes normal and do not leads to SLAV.

A static threshold based strategy has been proposed by Zhu et.al., to spot out the overload host in DC. If the current utilization of CPU is beyond the 85% of its total CPU capacity, then host is declared as the overloaded host [8]. Moreover, as the current decade research is going on further, the researchers are using the historical data of the VMs stored while VMs are alive. Authors have studied problem with static threshold and recommended dynamic system based on the workload figure presented by the applications. Anton proposed a novel dynamic threshold [9] strategy and it used random variable of accounting the total CPU utilizations of the host. In order to find the overloaded host in the DCs, Anton also proposed some more dynamic threshold solutions based on predication of CPU utilization. The proposed overload host detection algorithms are: RLL, LR, IQR and MAD. To select the required VMs from overloaded host author also proposed three algorithms for VMs selection: MC, RS, and MMT. The results of simulation show that the MMT is more efficient then MC and RS strategies and LR outplay the previous static threshold and adaptive threshold based policies [10].

In order to gain the more effective tradeoff of energy and SLA, Phinheiro proposed the eco-friendly DC management by dynamically switching the servers into ON-OF for saving the power in [11]. However, the system is not flexible to adjust the current dynamic resources intensive workload situation at reasonable rate power dissipation and SLA violation. The proposed solutions are able to save energy in static environment by setting up static lower and upper thresholds; however, these are not convenient according to the modern exhaustive forthcoming workload they need be more dynamic in order to adopt the system perfectly.

3. PROPOSED POLICY FOR HOST OVERLOADED DETECTION

We proposed the Cubic mean (Cm) policy to make system more energy efficient under the low SLA violation constraint. This policy takes the host list as input and decides dynamically whether a host is overloaded or not. We have used two existing VM selection policies MMT and Mu to select the required VMs from the overloaded host. The objective of the proposed Cm policy is to set adaptive CPU utilization threshold by accounting VMs' average utilization. The cubic mean is calculated by dividing the total requested MIPS by VMs with the total number of VMs running on that host. Suppose that we have set U of VMs CPU utilizations, $\{U_1, U_2, U_3 \ldots U_n\}$. We calculated the total sum of CPU utilizations of VMs by sorting values in increasing order. Let S_i is the sum of VM's CPU utilization on host Hi in time t as:

$$S_i = \sum_{j=1}^{Ni} U_{ij,t} \quad (1)$$

Where, N is the number of VMs and t is time. Next we have calculated Cubic mean as:

$$Cm = \sqrt[3]{\frac{1}{N}\sum_{t=1}^{N}(S_i)^3} \quad (2)$$

After calculating the cubic mean, we predict the upper threshold for the current host. According to [10] the forecasting CPU utilization threshold T can be estimated as:

$$T = 1 - s.Cm \quad (3)$$

Where, s is the constant value and known as safety parameter. If, T crossover the current CPU utilization of the host Hi, then it is considered as the overloaded host. The pseudo code of the policy is given in algorithm 1,

Algorithm 1: Cubic Mean Host Overload Detection Scheme

1: **Input:** Host List
2: **Output:** Whether a host is overloaded or not
3: $S_i \leftarrow 1$,
4: **for each** VM of host H_i in VM List do
5: $S_i \leftarrow$ get current demanded MIPS by VMs on Host H_i
6: Cm $\leftarrow$ $\sqrt[3]{\frac{1}{N}\sum_{t=1}^{N}(S_i)^3}$
7: T$\leftarrow$ *1-s.Cm*
8: **if** T > Current utilization of the host Hi then
9: **return** true
10: **else** false

4. EVOLUTION METHODOLOGY AND EFFICIENCY METRICS

(i) Simulation Testbed

Table 1: The power consumption of underlying hosts at various level of workload in (KWh)

Server Type	Idle	10%	20%	30%	40%	50%	60%	70%	80%	90%	100%
Fujitsu M1	13.3	18.3	21.1	23.4	26.5	29.6	34.7	40.7	46.8	57.4	60
Fujitsu M3	12.4	16.7	19.4	21.4	23.4	26.1	29.7	34.8	41	47.1	51.2
Hitachi TS10	37	39.9	43.2	45.5	48.8	52.8	57.8	65.1	73.8	80.8	85.2
Hitachi SS10	36	38.8	41.2	43.7	46.3	49.4	53.1	58.8	64.2	67	69.7

To evaluate proposed policy our essential need is to implement the Infrastructure- as- service of the cloud. Although to examine the policy on real infrastructure in repetitive way is not possible and highly risky. Since, we prefer the cloudsim simulator tool to test the performance efficiency of the proposed policy. It is modern and extensively used to optimize the power usage in DCs and it also enables for creating cloud entities i.e. hosts, VMs, DCs. It also support VM's allocations, selection, migrations, power models, and with providing real workloads. We used the power models as in the [12]. To evaluate the performance of the algorithm we have deployed 800 heterogeneous servers, which have real configuration. The configuration features and energy consumption of the server at different workloads are also presented Table 2 and Table 1 respectively. The traced the energy consumption of each host according its CPU utilization have gathered from SPEC power [12].

Table 2: The Characteristics of the underlying hosts

Server Type	CPU (Xeon)	Cores	MIPS	Ram (MB)	BW (MB)
Fujitsu M1	1230	4	2700	8192	1024
Fujitsu M3	1230	4	3500	8192	1024
Hitachi TS10	1230	4	3500	8192	1024
Hitachi SS10	1230	4	3600	8192	1024

Table 3: VM Specifications (Amazon EC2 VM types)

VM Types instance	# of Cores	MIPS	RAM (MB)
High-CPU	1	850	2500
Extra-Large	1	3750	2000
Small	1	1700	1000
Micro	1	613	500

(ii) Real Workload

The important key point is that, we have conducted the experiment with using the real workload. This workload is captured in April 2011 as the part of CoMon project, monitoring infrastructure for PlanetLab [13]. The preferred real

workload consist thousands heterogeneous VMs CPU utilizations data from more than 500 different servers. The detail features of the data are discussed in [10]. The VMs types and their specifications are shown in Table 3.

(iii) Performance Metrics

Reducing the power wastage under the QoS constraints is very tedious and critical in cloud DCs and QoS generally modeled in the form of SLA. It is prerequisites to explore the basic metrics that can be helpful to figure out the energy and SLA obsessed. Therefore, we used such metrics that can demonstrate the efficiency of any policy in terms of energy and SLA.

Energy Consumption

The energy consumption is the total amount of electrical power obsesses by the deployed DCs.

Sla Violation (Slav)

The QoS management is the key need to maintain the SLA in cloud and SLA is an agreement between user and CSP. To evaluate the SLA impairment, we have considered the SLA Violation metric and can be calculated as:

$$SLAV = SLATAH * PDM \quad (4)$$

Where,

$$SLATAH = \frac{1}{N} \sum_{i=1}^{N} \frac{T_{si}}{T_{ai}} \quad (5)$$

$$PDM = \frac{1}{M} \sum_{j=1}^{M} \frac{C_{dj}}{C_{rj}} \quad (6)$$

Where T_{si} is the time unit of SLAV at host H_i, T_{ai} is the active time of the host H_i, M is the total number of VMs, C_{dj} is performance degradation by VM_j due to migration, C_{rj} is the total requested MIPS by $VM_{j\ Urj}$

Average SLA Violation Percentage

This metric is the percentage of CPU MIPS that has not been assigned to the task, when requested and arising in SLA violation. The average SLAV can be calculated as

$$SLA = \frac{\sum_{j=1}^{M} \int Urj(t) - Uaj(t) dt}{\sum_{j=1}^{M} \int Urj()} \quad (7)$$

Where, Urj (t), Uaj(t) is the total requested and allocated MIPS by all VMs, M is the no. of VMs.

Number of Vm Migrations

This metric shows the total number of total migrated VMs from one host to another host.

Number of Host Shut Down

The number of host shut down is frequency of host's reactivation occurring during the simulation.

Performance Metric (Pertric)

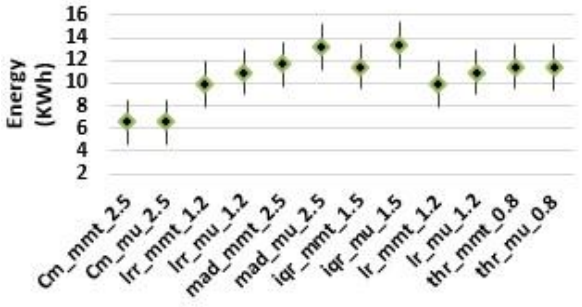
To measure the overall performance of the deployed system we imported new performance metric [14]:

$$Pertric = SLAV * HS * E \quad (8)$$

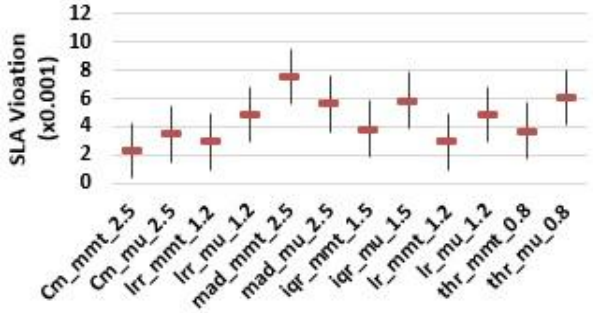
Where, SLAV is the SLA violation, HS show the total number of host shutdown, and E is the total amount of energy consumed in DC.

5. SIMULATION RESULTS

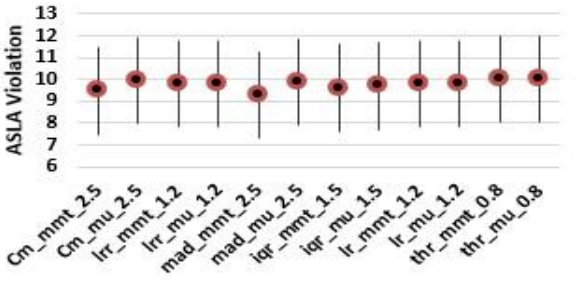
In order to evaluate the performance, the proposed algorithm Cm was simulated together with the VM selection variants MMT and Mu using the cloudsim. The simulation results of the Cm_MMT and Cm_Mu were compared with the existing host overload detection policies such MAD, IQR, LR, LRR and THR with MMT and Mu as VM selection variant. The used performance metrics are energy consumption, SLAV, ASLV, number of VM migrations, pertric and no. of host shutdown. The real workloads have been used to evaluate the performance of the algorithm. The experimental results show that the proposed policy Cm performs better by maintaining the best tradeoff between energy consumption and SLAV in comparison with other proposed algorithms.



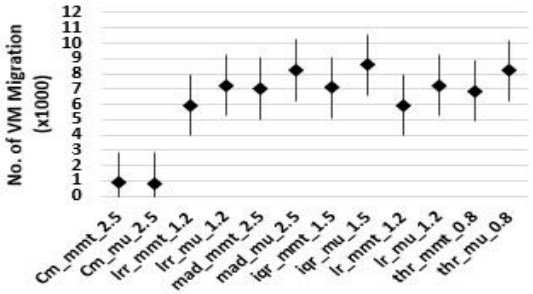
(a)Energy Consumption



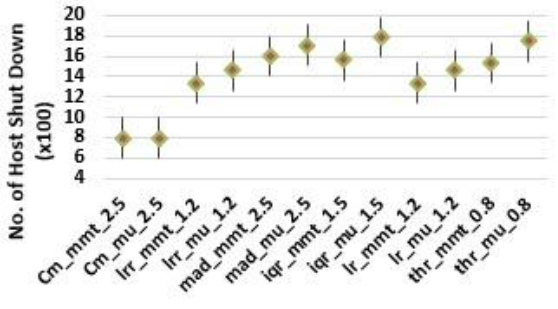
(b) SLA Violation



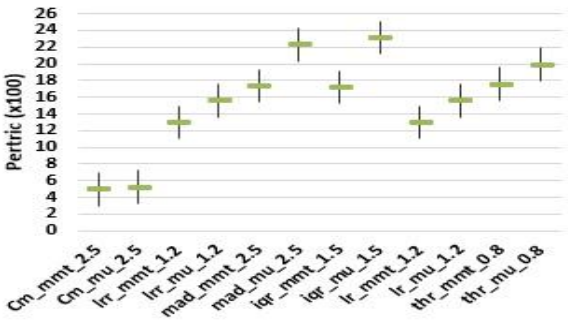
(c) Average SLAV



(d) VM Migrations



(e) No. of Host Shutdown



(f) Performance Metric

6. CONCLUSION

Energy and SLA management are the serious concern for the cloud providers as well as for academia and industry researchers to maintain the environment. A new host overload detection policy named as Cubic mean (Cm) has been proposed for energy and SLA management for virtualized datacenters. The proposed policy is based on the idea of calculating the cubic mean to predict the upper threshold utilization of the current host. The proposed policy reduces the power consumption at reasonable price in terms of SLA. The simulation results show that developed algorithm outperform many of the existing policies with regard to energy consumption, SLAV, average SLAV, VM migrations and number of host shutdown. Thus, the designed policy also enhances the overall performance of the cloud data centers. The work to further improve the VM selection policy is going on.

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Playing Doom with Deep Reinforcement Learning

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Abstract **-** In this work, we present a deep learning model based on reinforcement learning that is tied to an AI agent. The agent successfully learns policies to control itself in a virtual game environment directly from high-dimensional sensory inputs. The model is a convolutional neural network, trained with a variant of the Q-learning algorithm, whose input is raw pixels and whose output is a Q-value directly associated with the best possible future action. We apply our method to a first-person shooting game - Doom. We find that it outperforms all previous approaches and also surpasses a human expert.

Keywords: Machine Learning, Reinforcement Learning, Q-Learning, DQN, CNN

1. INTRODUCTION

Reinforcement Learning can hone the power of machine Intelligence and is the closest technique via which humans have come to building a real AI. Game-playing agents make use of the same technique to mimic the learning process of a human brain. They can be regarded as learning machines which can learn from experiences to grow, i.e. by building itself dynamically and adapting to its knowledge base. Deep Neural Networks help those agents to achieve exceptional performance benchmarks which are even impossible for humans. By implementing state-of-the-art reinforcement learning techniques and combining its power with deep neural networks, we plan to develop an understanding of how gaming agents can outsmart mimic the learning process of a human brain, and finally outsmart human intelligence [1]. We initially develop this for Doom, which is a 1993 video-game. However, the same implementation can be trained on various other gaming environments by tweaking the input action space.

1.1 Bellman Equation

Bellman Equation is a mathematical formulation to help an AI agent to choose the best action in the current state in order to maximize future rewards. It takes into account a discount factor (gamma) which helps find optimal values for each state of the environment. The equation is: $V_{(s)} = \max_a (R(s, a) + \gamma V_{(s')})$. Here, s - State, a - Action, R - Reward, γ - Discount Factor.

1.2 Markov Decision Processes

Markov Decision Processes take care of scenarios where the outcomes are partly random and partly under the control of an agent [2]. Concisely, they provide a mathematical framework for modeling decision making in such situations. Thus, the Bellman equation can be modified as follows after taking the stochastic probabilities of events under consideration: $V_{(s)} = \max_a (R (s, a) + \gamma \sum P_{(s, a, s')} V_{(s')})$.

1.3 Policy Vs. Plan

An AI agent after a certain amount of training starts to devise certain policies in the environment that lead to achieving the goal or the maximum possible reward. This is where AI agents are capable of outsmarting a human and can even take combination of steps or make a strategy to win the game in a way that humans can't even think of [3]. On the other hand, a Plan is a thought-out fixed path that the agent can follow to reach the goal. However, this approach doesn't involve the other factors that can have a significant impact on the final reward, and can sometimes also result in the agent not reaching the goal at all and get stuck in a local minimum [4].

1.4 Living Penalty

A Living Penalty refers to a certain negative reward that an agent gets on each progressing to every state that is not included in its policy. For example, to explore more, the agent is allowed to take random steps even after a policy that leads to the final goal is decided. This is necessary to acknowledge the possibility of finding a better policy or path than the previous one. In case, that random behavior leads the agent further away from the goal, it gets a negative reward. Higher the living penalty, less amount of time will be spent by the agent on exploring other parts of the environment again. So, the policies depend on the magnitude of living penalty provided.

1.5 Deep Convolutional Q-Learning

Q-Learning is a reinforcement learning procedure which attempts to learn the value of being in a given state. It tells us the utility of each state in the environment and also decides on the action that an AI agent shall take to maximize final reward by moving to a state with higher utility.

A temporal difference is the difference between the new and the old Q-value that is calculated after the agent changes a state and receives a certain reward. The method of temporal differences is used to update Q-values while the AI agent is exploring the environment and receiving continuous rewards based on its performance [5]. A learning rate parameter decides how fast the AI learns, i.e. up to what extent the Q-values are updated. However, in complex environment such as Doom, this method is very slow and we need to combine the typical Q-learning method with a neural network, and this is where Deep Q-Learning comes in. This is needed because there are endless combinations of possible states in such environments and it becomes difficult to deal with them with such an intuitive approach.

As when we humans play a game, we are capable of using our sense of sight to get an insight of the current state of the environment. Providing numerical values as a vector for each change in the current state to an ANN proves to be an added advantage to a computer system against us. In order to make our AI capable of thinking as close as possible like a human brain, we have made use of Convolutional Neural Networks instead. With this approach, the images of each frame are fed as an input to feature detectors. The detected features are then max pooled and finally passed on as a flattened vector after applying an activation function [6]. Therefore, our AI also looks at the environment from a human perspective by looking at the environment. To sum it up, Deep Convolutional Q-Learning involves leveraging the power of convolutional neural networks to update Q-values.

1.6 Experience Replay and Eligibility Trace

After running the training algorithm, a random selection from all the experiences is gathered and an average update for neural network weights is created which shall maximize Q-values or rewards for all actions taken during those experiences [7]. Since very early experiences are not so important, only a fixed number of past experiences are tracked and rest are forgotten. This process is termed as experience replay. Eligibility Trace is when the agent makes an arrangement of steps, rather than just 1 step at a time before calculating the reward it has achieved. The agent keeps a trace of eligibility during the process. For example: if there is a step that provides a negative reward it monitors that progression and tries to avoid it.

2. MOTIVATION

Tuning algorithms on self-learning procedures can significantly help to solve a wide variety of business problems. Virtual worlds such as gaming environments are a fertile training ground for AIs to learn before being released into the real world. The strategies used to conquer games may also allow us to conquer unrelated domains, such as, cancer diagnosis, climate change mitigation, financial investment decisions etc. Also, by building machines capable of thinking and acting like a human, we may move closer to the ultimate benchmark of machine intelligence: a machine that passes the Turing Test.

3. PROPOSED METHOD

OpenAI's Gym provides environment bundles for various gaming scenarios. We used the *DoomCorridor-v0* environment. In this environment, there are 6 enemies (3 groups of 2), and there is a vest at the end of the corridor. Our goal is to reach the vest as soon as possible, without being killed by the enemies.

The action space consists of the following: ATTACK, MOVE_FORWARD, MOVE_LEFT, MOVE_RIGHT, TURN_LEFT, and TURN_RIGHT. Our agent receives a continuous positive reward when it gets closer to the vest, a

continuous negative reward when it gets further away from the vest, a penalty of 100 points if it is killed by the enemies, and a reward of 1000 points on reaching the vest (or atleast get past all the enemies). The game-playing session ends when our agent reaches the vest, it dies, and when there is a timeout (2,100 frames).

The dependencies of our implementation include PyTorch - for implementing a Deep Convolutional Q-Network, Gym (also, ppaquette-gym-doom) - for testing our agent, and ffmpeg - for recording the game-playing sessions.

3.1 Building the Brain

The Brain makes the neural framework of our agent's AI. The framework consists of three convolutional layers and two linear fully-connected layers. The repeated convolution operations are used to detect more detailed features. Input of the successive operation is the output of the previous operation.

The first convolutional layer has only 1 *in_channel* because the AI deals with black & white images. The first layer outputs 32 features by using a feature detector of size equal to 5 pixels. The second convolutional layer takes those 32 detected features and outputs 32 new features for each input. Similarly, the third convolutional layer takes the output from the previous convolution operation and outputs 64 features for each input. We keep on decreasing the size of the feature detector in subsequent layers in order to detect minute details.

Another function of the Brain is to propagate the whole network in the forward direction. After each convolution operation, max pooling is applied followed by a rectifier activation function. Finally, the output from the third convolution operation is flattened into a vector. This flattened vector is fed to the hidden layer to complete the first full connection. Number of input features for the first full connection is equal to the total number of neurons in the flattened layer. The neurons in this hidden layer are activated using the same rectifier function and fed to the output layer to complete the second full connection. This output layer contains the Q-values corresponding to the number of possible actions that the agent is capable of taking, which is 6 in this case.

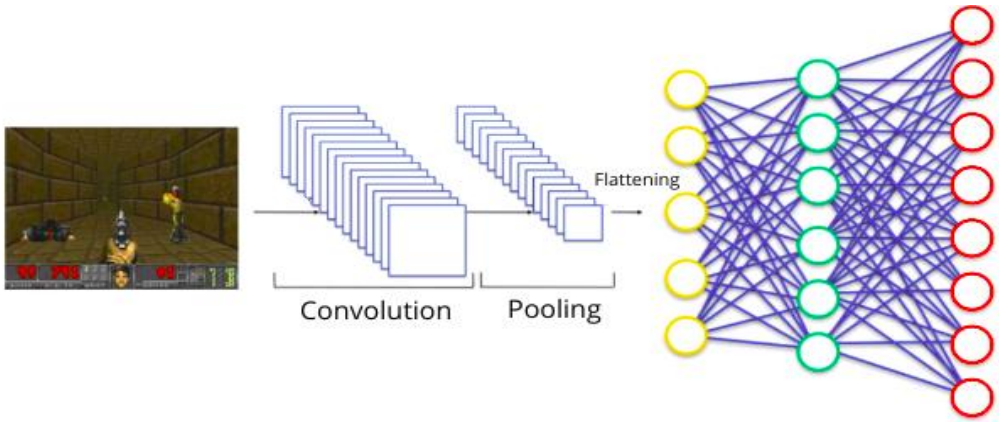

Figure 1: Neural Architecture of the Agent's AI

3.2 Building the Body

The Body is responsible for taking an appropriate action according to the received Q-values from the Brain. Its initialization includes a temperature parameter which is directly responsible for the confidence level of the agent to take an action.

The Softmax function is used to determine a probability distribution over the possible Q-values which is used to sample the best action to take in the current state.

3.3 Assembling the AI

The Brain and the Body are assembled to function as a complete AI unit that implements a convolutional neural network and also finalizes the action to be played. The initialization involves an object of the Brain type and an object of the Body type. The Body also takes care of converting the input images to suitable format that is acceptable by the CNN. The input images are converted into Tensor data type of PyTorch and the actions are returned as a numpy array.

3.4 Preprocessing Images

Gym provides the functionality to read inputs from the chosen environment and alter them according to our suitability. In this scenario, we pre-process each frame by reducing the number of channels to 1 to convert it to grayscale and then reduce its size to (80 x 80).

3.5 Implementing Experience Replay and Eligibility Trace

Rather than backpropagating losses according to the rewards received from the next possible future state, the agent learns from the experience it gains from the subsequent 10 steps which are randomly sampled from its memory capacity of the last 10000 states it has been in. We iterate the agent for those next 10 steps according to the following algorithm:

I. Initialize the doom environment, AI, a list of rewards and number of steps.
II. Define *__iter__* as follows*:*
    A. *state* ← Reset the environment.
    B. *history* ← an empty double-ended queue
    C. *reward* ← 0
    D. repeat while True ←
        1. *action* ← output from AI
        2. *next_state, r, done, _* ← take the next step according to *action*
        3. *reward* ← *reward* + *r*
        4. repeat while length(*history*) > number of steps + 1 ←
            a) Pop one element from the left of *history.*
        5. if length(*history*) == number of steps + 1:
            a) return *history* as a generator
        6. *state* ← *next_state*
        7. if *done:*
            a) if length(*history*) > number of steps + 1:
                (1) Pop one element from the left of *history.*
            b) repeat while length(*history*) > 1 ←
                (1) return *history* as a generator
                (2) Pop one element from the left of *history.*
            c) Append reward to the initialized empty list.
            d) reward ← 0
            e) Reset the environment.
            f) Clear the *history*

This stepwise progress can return rewards collected from those 10 subsequent steps when needed. As stated earlier, these steps are randomly sampled from the past 10000 steps, if they exist. For implementing eligibility trace, we need a decay factor. It is used to make decision-making better by respecting the true nature of a Markov Decision Process. In this case, we have chosen it to be 0.99. We apply eligibility trace on a batch. For each series of steps in a batch, the final goal is to get the *inputs* and the associated *targets* ready to minimize the squared difference between the two for training.

3.6 Training the AI

Finally, we train the neural network to output the right predictions of the actions that the agent is supposed to take at each state. Mean Squared Error is used to calculate the loss and for optimization, we have used the Adam optimizer with a learning rate of 0.001.

We trained the AI for 100 epochs. For each epoch, 200 successive runs of 10 steps are made. From these runs, some randomly sampled batches of a fixed size are obtained. The fixed size is taken to be 128. This means that every 128 steps, our memory will give us a batch of size 128 which will contain the last 128 steps that we have just run. The learning happens on these batches. Inside these batches, we have eligibility trace running in order to learn every 10 steps.

The inputs and targets corresponding to a single batch are obtained at each batch in a single epoch. Taking those inputs, the AI returns certain predictions which are further used to calculate the overall loss for that batch. The calculated loss is backpropagated to update the weights of the network. We also keep track of the average reward for each epoch. After many training cycles, we see that the agent surely reaches the vest and clears the level on an aggregate score of 1500. So, we stop training cycles after this score is achieved.

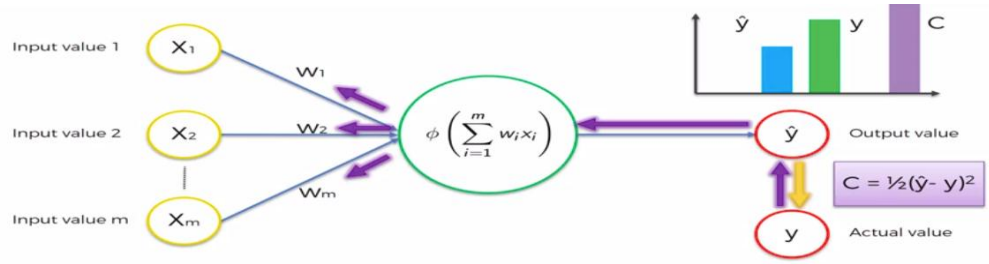

Figure 2: Simple Overview of Backpropagation

4. EXPERIMENTAL RESULTS

We achieved quite rewarding results and our agent was able to reach the desired score after only 25 epochs. This number varies significantly everytime we train the AI again because exploration is a stochastic process.

```
Terminal
(/home/manankalra/anaconda2/envs/main) manankalra@manankalra:~/folder/Python/doom_ai$ python brain.py
[2018-04-30 14:44:01,155] Making new env: ppaquette/DoomCorridor-v0
[2018-04-30 14:44:03,432] Starting new video recorder writing to /home/manankalra/folder/Python/doom_ai/videos/openaigym.video.0.6437.vid
eo000000.mp4
brain.py:82: UserWarning: Implicit dimension choice for softmax has been deprecated. Change the call to include dim=X as an argument.
  probs = F.softmax(brain_outputs*self.T)
[2018-04-30 14:44:08,638] Starting new video recorder writing to /home/manankalra/folder/Python/doom_ai/videos/openaigym.video.0.6437.vid
eo000001.mp4
Epoch: 0, Average Reward: 37.043121337890625
Epoch: 1, Average Reward: 27.14600372314453
Epoch: 2, Average Reward: 68.446291242327
[2018-04-30 14:44:40,552] Starting new video recorder writing to /home/manankalra/folder/Python/doom_ai/videos/openaigym.video.0.6437.vid
eo000008.mp4
Epoch: 3, Average Reward: 90.31376075744629
Epoch: 4, Average Reward: 90.31376075744629
Epoch: 5, Average Reward: 44.940028797496446
Epoch: 6, Average Reward: 21.389574323381698
Epoch: 7, Average Reward: 547.0705148797286
Epoch: 8, Average Reward: 916.9173858642578
```

Figure 3: Training the AI: Average Reward After Each Epoch - I

```
[2018-04-30 14:47:04,695] Starting new video recorder writing to /home/manankalra/folder/Python/doom_ai/videos/openaigym.video.0.6437.vid
eo000027.mp4
Epoch: 9, Average Reward: 842.1489552089146
Epoch: 10, Average Reward: 1009.159013227983
Epoch: 11, Average Reward: 981.844851175944
Epoch: 12, Average Reward: 1023.7386127471924
Epoch: 13, Average Reward: 999.8979559610057
Epoch: 14, Average Reward: 1063.1795592016103
Epoch: 15, Average Reward: 1152.4668429339374
Epoch: 16, Average Reward: 1107.7224263158337
Epoch: 17, Average Reward: 1176.7899073040674
[2018-04-30 14:54:06,463] Starting new video recorder writing to /home/manankalra/folder/Python/doom_ai/videos/openaigym.video.0.6437.vid
eo000064.mp4
Epoch: 18, Average Reward: 1122.226123639007
Epoch: 19, Average Reward: 1170.4565797570633
Epoch: 20, Average Reward: 1239.108026625235
Epoch: 21, Average Reward: 1312.6105475930606
Epoch: 22, Average Reward: 1347.7064546019167
Epoch: 23, Average Reward: 1396.2997868855794
Epoch: 24, Average Reward: 1463.0281442260741
Epoch: 25, Average Reward: 1569.7484532165527
CONGRATULATIONS!
Your agent has cleared "DoomCorridor-v0"!
```

Figure 4: Training the AI: Average Reward After Each Epoch - II

During these 25 epochs, multiple video sessions of our agent playing Doom under the *DoomCorridor-v0* environment were recorded. The following stills from those videos depict the progress of our agent.

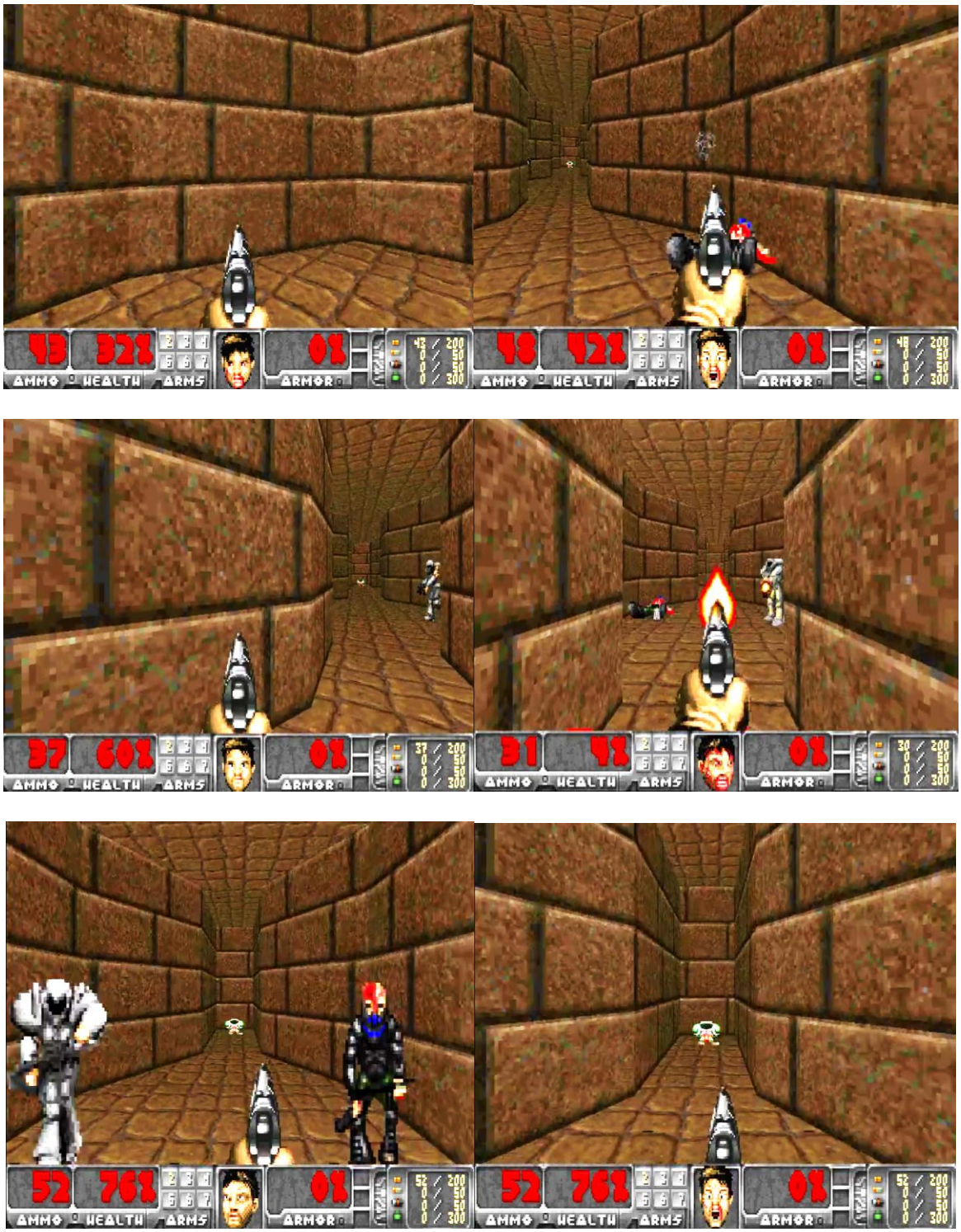

Figure 5: Video Stills Showing Agent's Progress

Figure 6: Agent Reaches the Vest

5. CONCLUSION

In this paper, we presented a Deep Convolutional Q-Network that learns to play a first-person shooting game - Doom, solely by exploring the environment and collecting rewards on subsequent changes that occur in its state. It attempts to learn from relevant experiences that it collects on following different sequences of steps during the exploration phase. We also implement Experience Replay and Eligibility Trace in order to make it function as close as possible like an actual human brain learns. We make use of an environment bundle from OpenAI which makes it easy for us to compare different approaches of our reinforcement learning algorithm. We find that our implementation of this gaming agent learns from random reward providing experiences directory from high-dimensional sensory input, that is, images. After a few training cycles, we achieved significant results on clearing the game by surpassing all previous approaches and reaching an all-time high score.

5.1 Future Work

As this model is based on a reinforcement learning approach, which doesn't require any training data like conventional machine learning techniques, we plan to test our agent on various other game-playing environments, such as Breakout. We also plan on modifying our neural architecture to adopt asynchronous behavior which will involve multiple agents interacting with it is own copy of the environment to learn more efficiently, and from each-other as well.

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Steady Incompressible Plane Parallel Flow Through Porous Medium

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Abstract- In the present paper we have investigated steady incompressible plane parallel flow through porous medium. We have investigated velocity potential, stream function complex potential and motion. Here the Fluid motion is said to be a two-dimensional flow when the flow velocity at every point is parallel to a fixed plane. here the motion under Incompressible flow where the density of the fluid changes from point to point, in fluid mechanics generally continuum mechanics, this flow refers to a flow in which the material density is constant within a fluid parcel—an infinitesimal volume that moves with the flow velocity.

Keywords: Stream function, Complex potential, porous medium.

Nomenclature: u = Velocity along x axis, v = Velocity along y axis, ϕ = Velocity potential, ψ = Stream function, W = Complex potential, η = distance transformation, k = permeability of porous medium.

1. INTRODUCTION

The theory of incompressible fluid deal with a fluid whose density does not change when the pressure changes. There is no real incompressible fluid. However, for many flow situations, the changes of density due to changes in pressure associated with the flow are very small. It greatly simplifies the solution of fluid flow equations to treat the fluid as incompressible. An incompressible flow is one for which each of the local infinitesimal blobs of fluid has a constant density as it moves through the flow field. The various tiny blobs can each have different densities, but for each one, its density remains constant. In most cases, since the fluid is usually all the same substance, treating the flow as incompressible is accomplished by taking the density to be the same everywhere in the flow field. the linear stability of plane-parallel flow of an incompressible viscous fluid over a saturated porous layer is studied to model the instability of water flow in a river over aquatic plants. The saturated porous layer is bounded from below by a rigid plate and the pure fluid layer has a free, undeformable upper boundary. In such type flow we investigated what is velocity component, complex potential etc.

2. LITERATURE REVIEW

In the present paper, we have investigated irrotational incompressible parallel plane flow through porous medium. Attempts have been by several researchers, i.e., A. M. Siddiqui, M. R. Mohyddin, T. Hayat and S. Asghar [1] investigated some more inverse solution for steady flows of a second-grade fluid. A. T. Eswara and G. Nath [2] investigated unsteady non - similar 2 - D and axi- symmetric water boundary layer with variable viscosity and Prandtl number. A. T. Hsu, Y. L. P. Tsai and M. C. Raju [3] investigated probability density function approach for compressible turbulent reacting flows. B. N. Dwivedi and Sheelvrat [4] investigated the vorticity of flow of a viscous fluid in a porous medium due to on oscillating flat plate. M.D Abbus Sattar [5] investigated free convection and mass transfer flow through a porous past an infinite vertical porous plate with time. N.M Bujurke and N. P Pal and P.K Achar [6] analyzed Computer extended series solution to viscous flow between rotating discs. Rita Chaudhary and Alok Das [7] investigated Elastico – viscous flow and heat transfer between two Rotating discs of different transpiration.

3. FORMULATION OF THE PROBLEM

Consider a thin infinite flat plate in steady incompressible plane parallel flow whose undisturbed velocity is U and its constant then $\frac{dU}{dx} = 0$. The fluid has low viscosity and the plate is at rest in such a way that its plane coincides with the direction U. Let the plate is porous through which fluid is flowing freely and continuously. Since the plate is of infinite length, the flow may be regarded as two dimensional, the x axis is along the plate parallel to U and the y axis normal to the plate.

Governing Equation

The governing equations are

$$u\frac{\partial u}{\partial x} + v\frac{\partial u}{\partial y} = \upsilon\frac{\partial^2 u}{\partial x^2} + \upsilon\frac{u}{k} \quad (1)$$

and the equation of continuity is

$$\frac{\partial u}{\partial x} + \frac{\partial u}{\partial y} = 0 \quad (2)$$

The boundary condition is

$$\text{at } y = 0,\ u = 0 \text{ and } v = 0 \quad (3)$$

$$\text{at } y \to \infty,\ u = U$$

$$\text{and } u = \frac{\partial \psi}{\partial y} \text{ and } v = -\frac{\partial \psi}{\partial x} \quad (4)$$

we take a new distance transformation

$$\eta = \frac{y}{x}\sqrt{\frac{U}{\upsilon}} \quad (5)$$

Solution of the problem

from equation (4) substituting u and v in equation (1)

$$\frac{\partial \psi}{\partial y}\frac{\partial^2 \psi}{\partial x \partial y} - \frac{\partial \psi}{\partial x}\frac{\partial^2 \psi}{\partial y^2} = \upsilon\frac{\partial^3 \psi}{\partial x^2 \partial y} + \frac{\upsilon}{k}\frac{\partial \psi}{\partial y} \quad (6)$$

From (3) and (4)

On $y = 0$, $u = 0 = v$

$$\text{On } y = 0,\ \frac{\partial \psi}{\partial x} = 0 = \frac{\partial \psi}{\partial y} \quad (7)$$

$$\text{On } y = \infty,\ \frac{\partial \psi}{\partial y} = U$$

Let $\frac{u}{U} = F(\eta)$ then from (4) $\psi = \int u\, dy$.

From equation (5)

$$dy = x\sqrt{\frac{\upsilon}{U}}\, d\eta \quad (8)$$

$$\text{and } \frac{\partial \eta}{\partial x} = -\frac{\eta}{x} \quad (9)$$

$$\frac{\partial \eta}{\partial y} = \frac{1}{x}\sqrt{\frac{U}{\upsilon}} \quad (10)$$

$\psi = \sqrt{U\upsilon}$ x f(η) (11)

where, f(η) = $\int F(\eta)d\eta$

$\frac{\partial \psi}{\partial y}$ = x $\sqrt{U\upsilon}$ $f'(\eta)$ $\frac{\partial \eta}{\partial y}$

$\frac{\partial \psi}{\partial y}$ = U $f'(\eta)$ (12)

From (12)

$\frac{\partial \psi}{\partial x}$ = $\sqrt{U\upsilon}$ [f (η) – η f′(η)] (13)

$\frac{\partial^2 \psi}{\partial x \partial y}$ = $\sqrt{U\upsilon}$ [f′(η) $\frac{\partial \eta}{\partial y}$ – f′(η) $\frac{\partial \eta}{\partial y}$ – f′′(η) $\frac{\partial \eta}{\partial y}$]

$\frac{\partial^2 \psi}{\partial x \partial y}$ = – $\frac{U \eta f''(\eta)}{x}$ (14)

$\frac{\partial^2 \psi}{\partial y^2}$ = U f′′(η) $\frac{1}{x}\sqrt{\frac{U}{\upsilon}}$ (15)

$\frac{\partial^3 \psi}{\partial x^2 \partial y} = \frac{2U\eta}{x^2} f''(\eta) + \frac{U\eta^2}{x^2} f'''(\eta)$ (16)

From (6)

$[U f'(\eta)] \left[- \frac{U \eta f''(\eta)}{x} \right] - \sqrt{U\upsilon} \; [f(\eta) - \eta f'(\eta)] \left[U f''(\eta) \; \frac{1}{x}\sqrt{\frac{U}{\upsilon}} \right] =$

$\upsilon \left[\frac{2U\eta}{x^2} f''(\eta) + \frac{U\eta^2}{x^2} f'''(\eta) \right] + \frac{\upsilon}{k} [U f'(\eta)]$ (17)

$\eta^3 f'''(\eta) + 2\eta^2 f''(\eta) + \frac{\eta}{k} f'(\eta)$ (18)

$f(\eta) = \Pi_1 + \Pi_2 \eta^{\frac{\left(1+\sqrt{1-\frac{4}{k}}\right)}{2}} + \Pi_3 \eta^{\frac{\left(1-\sqrt{1-\frac{4}{k}}\right)}{2}}$ (19)

the boundary condition is

at η = 0, f(η) = 0

at η = 1, f(η) = 0 (20)

at η = Ø, f(η) = ξ

using these boundary condition, we get

$\Pi_1 = 0$, $\Pi_3 = -\Pi_2$ and $\Pi_2 = \frac{\xi}{\left\{ \emptyset^{\frac{\left(1+\sqrt{1-\frac{4}{k}}\right)}{2}} - \emptyset^{\frac{\left(1-\sqrt{1-\frac{4}{k}}\right)}{2}} \right\}}$

From (19) we have

$f(\eta) = \frac{\xi}{\left\{ \emptyset^{\frac{\left(1+\sqrt{1-\frac{4}{k}}\right)}{2}} - \emptyset^{\frac{\left(1-\sqrt{1-\frac{4}{k}}\right)}{2}} \right\}} \left[\eta^{\frac{\left(1+\sqrt{1-\frac{4}{k}}\right)}{2}} + \eta^{\frac{\left(1-\sqrt{1-\frac{4}{k}}\right)}{2}} \right]$ (21)

$$\psi = \sqrt{Uv}\ x\ \frac{\xi}{\left\{ \emptyset\left(\frac{1+\sqrt{1-\frac{4}{k}}}{2}\right) - \emptyset\left(\frac{1-\sqrt{1-\frac{4}{k}}}{2}\right)\right\}}\left[\eta^{\frac{1+\sqrt{1-\frac{4}{k}}}{2}} + \eta^{\frac{1-\sqrt{1-\frac{4}{k}}}{2}}\right] \quad (22)$$

$$u = U\ \frac{\xi}{\left\{ \emptyset\left(\frac{1+\sqrt{1-\frac{4}{k}}}{2}\right) - \emptyset\left(\frac{1-\sqrt{1-\frac{4}{k}}}{2}\right)\right\}}\left[\frac{1+\sqrt{1-\frac{4}{k}}}{2}\eta^{\frac{-1+\sqrt{1-\frac{4}{k}}}{2}} + \frac{1-\sqrt{1-\frac{4}{k}}}{2}\eta^{\frac{-1-\sqrt{1-\frac{4}{k}}}{2}}\right] \quad (23)$$

$$v = \frac{\sqrt{Uv}\,\xi}{\left\{ \emptyset\left(\frac{1+\sqrt{1-\frac{4}{k}}}{2}\right) - \emptyset\left(\frac{1-\sqrt{1-\frac{4}{k}}}{2}\right)\right\}}\left[\frac{1+\sqrt{1-\frac{4}{k}}}{2}\eta^{\frac{1+\sqrt{1-\frac{4}{k}}}{2}} + \eta^{\frac{1+\sqrt{1-\frac{4}{k}}}{2}} + \frac{1-\sqrt{1-\frac{4}{k}}}{2}\eta^{\frac{1-\sqrt{1-\frac{4}{k}}}{2}} + \eta^{\frac{1-\sqrt{1-\frac{4}{k}}}{2}}\right] \quad (24)$$

$$\phi = -\frac{U\xi}{\left\{ \emptyset\left(\frac{1+\sqrt{1-\frac{4}{k}}}{2}\right) - \emptyset\left(\frac{1-\sqrt{1-\frac{4}{k}}}{2}\right)\right\}}\left[\eta^{\frac{1+\sqrt{1-\frac{4}{k}}}{2}} + \eta^{\frac{1-\sqrt{1-\frac{4}{k}}}{2}}\right] \quad (25)$$

The Complex potential is

$$W = -\frac{U\xi}{\left\{ \emptyset\left(\frac{1+\sqrt{1-\frac{4}{k}}}{2}\right) - \emptyset\left(\frac{1-\sqrt{1-\frac{4}{k}}}{2}\right)\right\}}\left[\eta^{\frac{1+\sqrt{1-\frac{4}{k}}}{2}} + \eta^{\frac{1-\sqrt{1-\frac{4}{k}}}{2}}\right] + i\ \sqrt{Uv}\ x\ \frac{\xi}{\left\{ \emptyset\left(\frac{1+\sqrt{1-\frac{4}{k}}}{2}\right) - \emptyset\left(\frac{1-\sqrt{1-\frac{4}{k}}}{2}\right)\right\}}\left[\eta^{\frac{1+\sqrt{1-\frac{4}{k}}}{2}} + \eta^{\frac{1-\sqrt{1-\frac{4}{k}}}{2}}\right]$$

Or

$$W = \xi\ \frac{\left[\eta^{\frac{1+\sqrt{1-\frac{4}{k}}}{2}} + \eta^{\frac{1-\sqrt{1-\frac{4}{k}}}{2}}\right]}{\left\{ \emptyset\left(\frac{1+\sqrt{1-\frac{4}{k}}}{2}\right) - \emptyset\left(\frac{1-\sqrt{1-\frac{4}{k}}}{2}\right)\right\}}\left[U + i\sqrt{Uv}\ x\right] \quad (26)$$

4. RESULT AND DISCUSSION

In the present paper, we have investigated stream function, velocity components, velocity potential, Complex potential of irrotational motion of an oscillating flat plate of incompressible viscous fluid through porous medium under the variation of magnetic field given by the equation (22), (23), (24), (25), (26).

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Dynamic Task Migration Mechanisms in Cloud Environment: Literature Review and Future Trends

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Abstract - IT sector is adopting novel cloud computing to converge the business and technology platforms in terms of ease of services which allow users to access the resources in pay as go fashion anytime and anywhere. To accomplish this goal several challenges, have to face in which balancing the load among the nodes is one of them. Despite the significance of load balancing algorithms there is no organized literature which could cover or analyze the dynamic migration techniques, their scope, limitations and challenges, so this article focus on those dynamic load balancing techniques in which lot of work has done to reduce the migration time of tasks form one VM to other. Task migration is an important load balancing metric in cloud computing by relocating active virtual machines (VMs) from one candidate node to another. To achieve better system performance load must be distribute evenly across the servers, for this under loading and overloading of VM should be avoid by migrating the extra tasks in shortest period. In this literature we have given the detailed overview of qualitative and quantitative analysis of existing task migration schemes, also merits, demerits and important challenges are addressed so that more resourceful and scalable migration algorithms could be develop in near future.

Keywords*:* Load Balancing, Task Migration, Data Center, VM, Cloud Computing, Virtualization

1. INTRODUCTION

The field of Cloud computing is in the area of computer engineering that offers the access of pools of resources such as data, network and servers etc. Every industry is enforcing for the use of cloud based services that works on 'Pay as Go' scheme. Cloud services provide user to access the remote servers with enhanced availability, scalability and tolerance of fault. It basically a service which is collection of servers and nodes subjected to the third party under which the data is stored [1]. Job Migration is an important load balancing metric in which live tasks are relocated from one physical machine to another of probably dissimilar design. Hence it is required to save the current state of the task and convalescing it on the destination machine [35]. Task scheduling is used to distribute the load evenly among the pool of resources to enhance the performance, reduced the cost by bringing the processes closer together. This paper highlights major migration techniques, classification, challenges and then future scope. Amount of data and number of user requests are increasing every day, which require more computing and processing of the servers. It distributes the computing tasks to the resource pool made from a large number of computers. In section 2 we have given detailed overview of task migration and its categories, section 3 describes the comprehensive literature review of existing dynamic load balancing techniques for reducing the migration overhead, from where the articles we have taken on the basis of certain criteria and what is the research design explained in section 4, in section 5 we focused on loopholes, disadvantages and shortcomings of existing migration techniques and also explained about future guidelines for reducing the migration time as well as power consumption.

We have three basic three layers of Cloud computing. First one is (SAAS) software as a service, that facilitates users to access the pooled resources remotely forms the cloud. The services of this layer are provided by the service providers without knowing about its management services. A software service makes the services available to the users and applications are hosted by third party. For examples- Google Apps. Second one is (IAAS) infrastructure as a service defines the architectural design like networking, access of resources, power and bandwidth [2]. In this model the third-party provider hosts the virtualized resources and storage as well as makes them available to the users. For examples Web Services, third layer (PAAS) Platform as a Service is concerned with application of clouds line hardware resources and operating systems through which user can take advantage of pooled resources on working machines. In this model third party provider host applications and its infrastructure and make the service available to the users.

Cloud computing is an emerging area and widely used today as increasing demand of data access. It is a self-service oriented utility to accessing the virtual pool of abstract information. Researchers developed various high performance static and dynamic load balancing algorithms that distribute the load to all candidate nodes uniformly with minimal response. Load balancing is a high-performance mechanism in cloud computing that is used to distribute the load equally to the virtual nodes to achieve highly scalable cloud network when the workload is high [5]. Load balancing techniques also designed to achieve green computing under the greedy approach to use the resources in an optimal manner and to avoid the hazards like server failure, high response time and to avoid bottleneck conditions. Load balancing algorithms must have major qualitative metrics for better resource management discussed as follows:

(i) Throughput (ii) Migration time (iii) Utilization of resources
(iv) Response time (v) Scalability (vi) Fault tolerance

2. BACKGROUND STUDY

Load Balancing Algorithms are basically falls under two categories Adaptive and Non-Adaptive. Non-adaptive load balancing algorithms are also called static, non-preemptive approaches under which every node has at least one task to implement. In this article we emphasized on Mata Heuristic, non-adaptive and dynamic load balancing approach that is inspired by nature and based on natural selection strategy. Task scheduling is an NP hard problem hence either heuristic or Meta heuristic algorithms will be best suited for getting better throughput and scalable service. When we go through the article Milani et al, (2016) it has found that a lot of work (about 23% of total Load Balancing) has been done to improve the task migration using dynamic load balancing mechanism but majority had not shown any desire to improve it through hybrid load balancing schemes [10]. Whatever the reasons were, but not cleared or there is misguidance that why the important load balancing metric (migration time) was not discussed in any of the hybrid techniques this is actually the gray area or research gap. We have worked in this grey area and try to review comprehensively of famous dynamic load balancing algorithms. In this article we found that there is no single dynamic load balancing technique which could reduce the task migration time with a highly scalable mechanism.

Cloud computing is the most emerging technologies and adopted at a big level in software companies to develop or host various platforms. Virtualization is also the key factor of cloud computing used to deploy the concurrent execution of parallel tasks. At every level the lifetime of a task is maintained for example: first task is uploading then assignment then execution then migration if needed and finally downloading, in order to maintain this sequence of tasks, task scheduling has to be done which is called load balancing in cloud environment. Task migration is considered very important aspect for healthy load balancing, the flow chart of task migration is shown in the following figure [22]

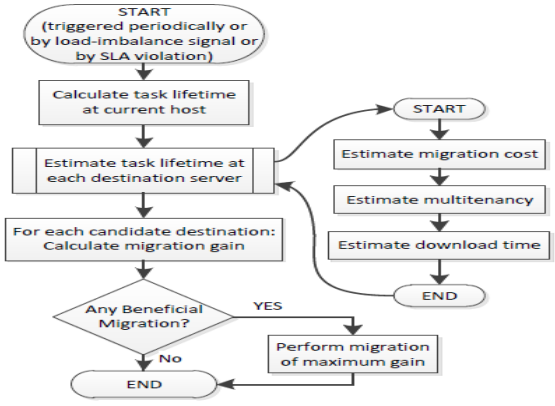

Figure 1: Flowchart of Task Selection and Migration

3. RELATED WORK

One of the basic building blocks of datacenters are Virtual machines (VMs), due to cost savings, elasticity, and ease of administration they are used to provide information as a service (IAAS) to enhance high performance computing (HPC) and to backup cloud computing. The scale of live migration can range from migrating VMs across only a few physical machines to entire racks of physical machines. Live migration traffic also consumes the bandwidth at the source and target network interfaces and competes with the bandwidth requirements of applications running within the VMs. Task scheduling the term of operating systems where multiple processes run concurrently to share the resource. In distributed computing task scheduling is a big challenge from the point of view to managing the requests of the server by different clients. As requests being an overhead for a server due to number of requests crosses the limit of server in that case there may be a chance of hardware failure. Cloud, an enhanced distributed services that is availed by users anywhere and anytime by third party also needed a synchronized mechanism to distribute the load evenly to the servers.

In cloud computing, Load balancing is very burning area where a lot of work has been done in recent years. Here author used scheme that improves the migration time of tasks during dynamic load balancing using particle swarm optimization technique. There are several disadvantages of all VM migration first one is majority attempted overloaded VMs for migration, second it prepares dirty space for Precopy mechanism for online migration of VM's, third, it requires a large memory for both physical and for host machine, another drawback is its lower downtime due to pausing the primary VM. Ramezani et al, (2014) proposed Task-based system load balancing method which not only attempts overloaded VM for migration but migrates only the extra tasks but also overcome previous disadvantages [11]. This mechanism does not provide the pausing mechanism of VM so less time will be required for task migration. However, this approach only migrates the independent arrival jobs from overloaded VM. The problem of finding optimum solution for allocating extra tasks from overloaded VM to other VM is an open issue, so need to solve in future.

Task scheduling is an NP hard problem in cloud environment, the load has to be balanced whenever some VM are under loaded and some are overloaded to achieve efficient utilization of machines. Krishna et al, (2013) introduced new approach (HBB-LB) honey bee behavior inspired load balancing that removes the tasks from the heavily loaded machine by deciding the priorities of jobs [12]. Author compared the honey bee from removed tasks. This method reduces the time of jobs that are waiting in the queue, hence lesser number of migrations and response time also minimized though this mechanism. Frequent Migration of task affects the performance of cloud environment, so here author proposed a modified bee colony algorithm to optimize the make span time and number of migrations. In section of experimental results author compared the make span time before and after the load balancing of HBB-LB with other two approaches DLB and FIFO, also compared the make span time of HBB_LB, FIFO, DLB and WRR. We make the graphs here between number of tasks and task migrated and compared HBB_LB, FIFO, DLB and WRR in all graphs it is clear that HBB_LB is the best load balancing approach. However, it may not highly scalable mechanism since it considers the tasks independently. In future we can improve the scalability of this algorithm. In order to maintain the QOS of cloud eco system the request from overloaded system must be transferred to under loaded VM. The algorithm tries to achieve minimum response time and completion time.

To improve the system stability Babu et al, (2016) modified the older version of nature inspired bee colony optimization technique by considering lower priority of tasks while migration is needed [13]. Author basically focus that lower priority task will have more chance of migration so higher priority task will unaffected hence this algorithm always selects the least priority task for migration to reduce the load disparity so that no tasks need to wait for a long time. In this article author compared the task migration, degree of imbalance and make span time between the Bee colony and enhanced Bee colony algorithms. The future scope of this approach is further enhancement by hybridization using nature inspired algorithms like Ant colony algorithm.

Cloud data centers having heterogeneous service using several VMs with different specifications, due to dynamic requests they fluctuates with resources consumption. In the reference of dynamic load balancing some servers may overload some under loaded so this may cause performance degradation. Gutierrez G et al, (year) proposed a cooperative agent based problem solving technique for load balancing using live VM migration [14]. Here VM are determined the destination of migrated task, the exact time when to migrate and VM hosted policies. This is novel approach that is very helpful to distribute the load evenly across the servers to get high performance of cloud environment or getting better QOS. This work contributes agent based load balancing for data centers in distributed fashion with deciding the priorities over the cloud during the VM migration. Future work will focus on estimating

VM migration overhead and developing a resource. However, this approach is not fully scalable, having high VM migration and it is centralized approach.

In this article we used market-based control method (MBA), to address the load balancing in cloud database using allocation and dynamic VM migration [15]. It basically a market based control approach that works on phenomenon of buyers and traders like in cloud system server and host respectively. In MBA, database nodes are treated as traders in a market, and certain market rules are used to intelligently decide data allocation and migration Buyer: buys the load from seller (or receives the data) Seller: Sells its load or sends its records A buyer is constrained to purchase a price no more than its limit price, and a seller to accept a price no lower than its limit price. If buyer pays over cost than its private value or seller takes lower trading considered to be at loss. So, for this scheme work properly a buyer always gives a lower bid price than its private & seller always gives the higher ask price than its monotonic function. This article describes the Extremal optimization approach for CPU load balancing in distributed environment. The EO approach detects the appropriate task for migration as well as steered collection of the best computing nodes to receive the migrating tasks that basically reduces the migration overhead by using two fitness functions based on unambiguous models which estimate relations between the programs and the hardware. Extremal optimization algorithm uses best fit selection strategy to choose the task for migration and also considers the best placement on destination host. Author proposed an optimal load balancing scheme for faster convergence to heuristically as well as better quality of service and tried to minimize the task migration overhead by applying guided search for best possible target selection (VM placement) by implementing standard EO algorithm with guided state change (EO-GS) [16]. Load balancing quality with EO improved by the guided search of the migration targets is showed by comparison in most cases better than that of the other algorithms. Through graphs author tries to build the relationship between average speed up and migration number for the same four algorithms as discussed earlier. In future we can more simplify the EO algorithm since it suffers from low scalability and response time is very high.

The paper reviews comprehensively the application of metaheuristic techniques in the area of scheduling in cloud environments. In this paper author focused on one of the important issue that is scheduling, goal of scheduling is much optimized resource mapping. In cloud computing, Task scheduling is considered NP Hard problems due to having a large domain of solution, since there is no algorithm that provides the optimal solutions in polynomial time. Hence metaheuristic approaches (nature inspired algorithms) are supposed to be the best algorithms that produces the nearest optimal results in reasonable time for these NP hard problems. The main focus of this paper is to reduce the energy consumption, since according to survey 50% energy is consumed for cooling the data centers because a lot of heat is produced by resources [17]. To reduce the heating of overloaded VM, tasks are migrated to under loaded VM. However it is very challenging to reduce the energy consumption without losing the performance in terms of when and how the task is migrate to keep environment cool and safe. Security and privacy aware scheduling is another area which needs to be explored using metaheuristic techniques. Future investigations are required to perform scheduling in a way that it protects the sensitive and/or private information associated with tasks/users.

To meet the ever increasing demands of dynamic load by relocating VMs in data centers virtualization is empowered by VM migration. In this article author proposed state of art bandwidth optimization methods to minimize the energy consumption. Through an exhaustive literature review Ahmad et al, (2015) elaborate the live VM migration techniques, thematic classification of VM migration is investigated through a set of parameters, the commonalities and variances are highlighted to get some research issues that originates the necessitate future consideration of optimal VM migration schemes [18]. This paper elaborate VM migration, server consolidation, dynamic voltage and other power optimization schemes. Here VM migration area highlights some open challenges and future trends regarding developing best optimal VM migration, server consolidation domain emphasized power optimization in data centers using miscellaneous modes. Further lively workload behavior in distributed VM migration schemes design can reduce the overall effort and speedup processing of VM migration. There are various challenges in field of VM server consolidation framework. Very first challenge alarms maintaining accuracy during resource demand estimation in cloud environment, second challenge concerns that in majority of research articles the issue of security was ignored and third one is regarding optimal distribution of VM in dynamic resource demand applications. Finally conclusion of this paper is to design the dedicated, fast communicative and heterogeneous nodes for VM storage for reducing service downtime and migration time.

Another optimal solution for migration is presented in Beloglazov et al, (2010) by switching off the ideal physical nodes to minimize the energy consumption in cloud VM migration environment [19]. This is a decentralized scheme of resource management system for cloud data centers handled by global policies applying to live migration to relocate the VMs. This article actually presented VM resizing, scheduling and migration policies in command forms, at earlier

optimization stage the resource utilization is observed and to minimize the energy consumption. Since there is trade-off between performance and energy saving, to solve this problem, author implemented the policy to set the upper and lower threshold for CPU utilization. If utilization is greater than upper limit some VM has to migrate, if it goes underutilization then switch off the node just after the migration of all VMs. However, there are two main problems one is switching off the nodes in case of underutilization but there is no comment about when the node is switched on or restarted if there is requirement, since if nodes will off then it may be possible that some of nodes again suffer from overutilization in this case we need more nodes. Other problem is author has not given any clue to determine particular values of utilization threshold.

VM migration is very burning area of cloud computing, many system pause VM, copy the state data and then resume the VM on destination host. These systems cause application to become unavailable during the migration process. Author proposed ZAP that could achieve lower down time of the service by transferring a process group to move the VM among hosts in LAN without disrupting its services [20]. ZAP uses partial OS visualization to allow the process domains (PODS) using a modified kernel. This approach is isolating every process to kernel interfaces like sockets and file handlers, into a namespace that could be migrated. This scheme is considered to be faster than results in the collective work due to migration. However, ZAP do not address the problem of maintaining open connections for exiting services as well as uses stop and copy mechanism.

Also, Deshpande et al, (2012) proposed an approach for VM migration using Inter rack live migration (IRLM) using Precopy technique that decreases the traffic load during VM migration on primary networks by deduplication of VM storage [21]. Due to several reasons such as maintenance, power saving, system performance and most important is load balancing we need to migrate the requests within the data centers. In this article author proposed a parallel live migration approach using live migration inter rack distributed system using technique in QEMU/KVM. Simulated results showed that total traffic on core networks and migration time is reduced by 43% and 15% respectively. Existing live migration schemes reduces the data transferring either focus on optimizing the single VM migration or multiple VM that are running on same machine but in this article author presented live migration through inter racking. IRLM technique is implemented in two parts one is preparation and other is migration phase. Under preparation phase basically duplicates the contents through hashing after it migration phase is ready under which VMs are migrated in parallel to the destination site. However, this scheme could be implemented in future using post copy approach in which target-to-target page transfers can be delayed until after the resumption of VMs at the target rack.

Furthermore Lazaros Gkatzikis et al, [22] proposed a mobile cloud migration approach (MCC system architecture) which brings the cloud nearer to mobile user to avoid communication delay. Virtualization provides the prospective for quick and on demand formation of physical machines to run various tasks, hence to avoiding resource wasting, VM migration tools enable cloud suppliers to adjust the load at every data server. Due to under load or overload of the host, VM may be migrated to another server and may continue execution form the point of view of minimal power consumption also it is called VM migration and may occur multiple times during task execution for resourceful load balancing. Migration should be transparent to the applications, so every VM is migrated along with its current state of execution so that it can resume from its previous state. After the complete execution of task the result is transferred to the user by the data center where the user has submitted task. Here author discussed many challenges like workload uncertainty, Unpredictability of Multitenancy Effects, Unknown Evolution of Accompanying Data Volume, Partial availability of Cloud-Related Information and many more.

3.1 Classification of VM Migration Schemes

The time to relocate or shift the tasks from one specific candidate node to another for execution is known as transfer time of migration time. For better system efficiency migration time will need to be minimized, and we should keep this low as we can. VM migration schemes falls under three categories namely:

Bandwidth optimization: Bandwidth optimization falls under three types (a) Precopy Migration (b) Post copy Migration (c) Hybrid Migration. Virtual Machine migration techniques monitor either post copy [25], [26] [21] hybrid [27], [28] or Precopy [21], [23], [24] migration designs to migrate VMs across data centers. VM migration methods use minimized network bandwidth so VM can deal with large data (up to hundred GBs). VM Migration deeds deduplication [21], compression [24] and fingerprinting [29] to improve network performance and application.

DVFS enabled Power optimization: DVFS-enabled migration algorithms use a prototype while considering a single-core [28], [31] or multicore [31], [30] processors. The proposed optimization schemes exploit DVFS (Dynamic voltage

and frequency scaling) [28] or power capping to minimize power consumption during hosting different workloads such as e-commerce [30], scientific [31], or integer operation-based applications [32].

Table 1: Key Points of Previous Related Surveys

Author, Year	Author's Contribution	Algorithm Used	Demerit
[20] Osman, 2002	Less memory required for VM migration	ZAP system	Using pausing
[28] Akshat, 2008	DVFT cost aware optimization	Power-minimizing Placement	mechanism
[25] Hines, 2009	Comparing Precopy and post copy	Self-ballooning compression	High response time
[31] Laszewski, 2009	Reduces wastage of server energy	INTERVAL Algorithm	
[34] Hirofuchi, 2009	Storage optimization VM live Migration over		High transfer time
[29] Xhang, 2010	WAN	MOD algorithm	
[19] Anton, 2010	Reduced Migration Time	VM allocation policies	Utilization threshold
[24] Svärd, 2011	Decentralized resource management system for		not defined
[27] Sahani, 2012	Cloud	KVM/QEMU	
[21] Deshpande, 2012	Delta compression technique	QEMU/KVM /IRLM	Less scalable
[12] Dhinesh, 2013	Hybrid migration using bandwidth optimization	HBB_LB	Not efficient using
[23] Lazaros, 2013	Reduced 26% migration time	Sonic migration algorithm	Precopy
[32] Jeong, 2013	Reduced task Migration Time		Not a scalable
[26] F Yin, 2014	Improved Precopy live migration	LZO compression	mechanism
[11] Ramezani, 2014	Reduced Migration Time using Precopy scheme	TBSLB_PSO	
[35] Rani, 2015	Three stage memory post copy Live VM		Less downtime
[14] Gutierrez, 2015	migration	MAPLOAD	
[15] Wang, 2015	Less memory required for VM migration	Market Clearing Algorithm	extra tasks allocation
[17] Mala, 2015	Reducing Migration Overhead		
[18] Ahmad, 2015	23% work done of task migration in dynamic LB		Not fully scalability
[16] Ivanoe, 2015	schemes	EO-GA	found
[10] Milani, 2016	Bid and Ask policies used to reduce migrations		Overhead to filling
[13] Ramesh, 2016	Reduction of energy consumption by migrating	Enhanced Bee colony	buyer's need
[2] Tim Yu, 2017	the tasks	WWS	High migration
[37] Osanaiye, 2017	Optimal VM deploying over datacenters	Stop N Copy	overhead
[38] Aznoli, 2017	Reduced the complexity of task selection for		
	Migration		Suffers from low
	Agent based problem solving with VM migration		scalability
	policies		
	Improved QOS by reducing Migration Time		Not fully scalable
	Reduced memory migration time		Downtime is not
	Live migration of VM		changed
	Concluded that majority not worked security		Low latency
	issues		high response time

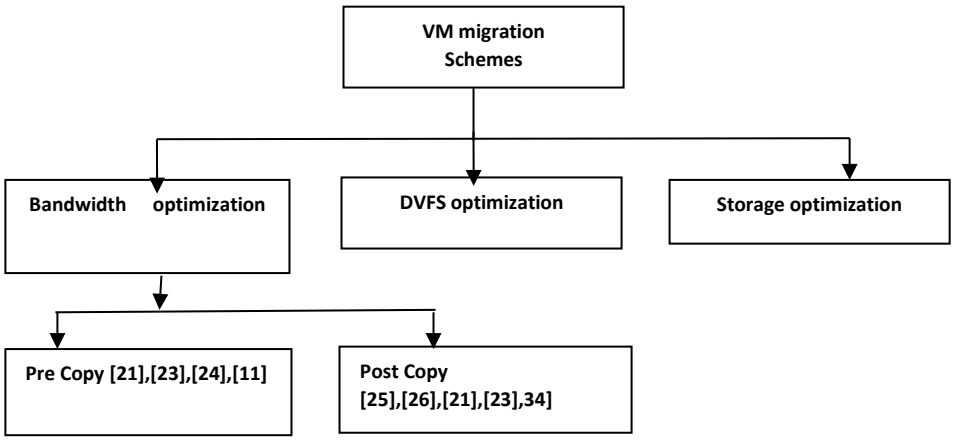

Figure 2: Classification of Migration Schemes

Storage optimization: Storage optimization covers two services target and proxy servers, both are connected to source and destination servers through a network block device connection (NBD) [33]. Prototype implementation of I/O blocked live storage migration [34] rapidly relocates disk blocks with in WAN links with less power on I/O performance.

4. RESEARCH METHODOLOGY

The word Meta-heuristic is used to search optimal solutions in most of the problems in a cloud environment. To achieve high performance for most of the scheduling problems, meta-heuristic techniques are used. Recently, this approach is used to solve the NP-hard optimization problems. Table 1 covered the non-static load balancing schemes which tried to maximize the cloud system by optimize the important metrics. We have critically surveyed about 26 articles of respected publications having good cited index. In table 1 different dynamic load balancing techniques proposed by various researchers have been analyzed with comparative analysis of different existing load balancing techniques with respect to different performance parameters. When we aggregated demerits of existing task migration schemes we get some new to directions towards future.

The above table covers contribution of author, algorithms used and the most important thing demit (term need to improve in future) is covered so that researchers can work on weak and lower attention area as well as the picture of future trends should be clear like majority of schemes suffers from low downtime, low response time with less failure

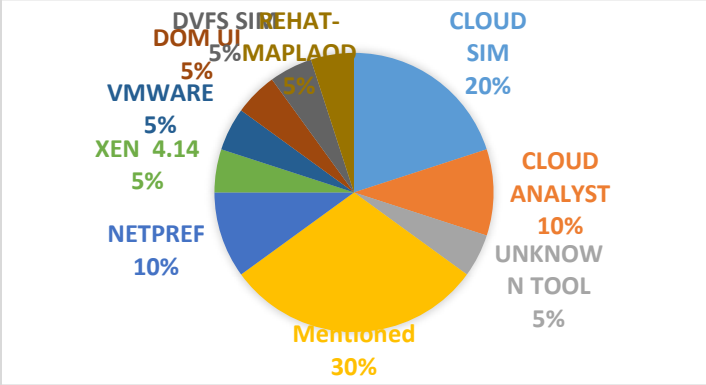

Figure 3: percentage figure of simulation tool used in revived papers

4.1 Selection of Literature

Different researches in the area of cloud computing have shown that after 2007 there is rapid change to publish the articles of cloud computing using load balancing metrices. Data selection phase summarize from the selected studies for further revivew is we foumd 467 articles when we search with specific keyword, out of them we studied abstract, conclusion with contribution of author of primary papers from some prestigous journols. By inclusion exclusion criteria finally we gone through full body text of 30 research papers that were considered as the primary for the review of literature.

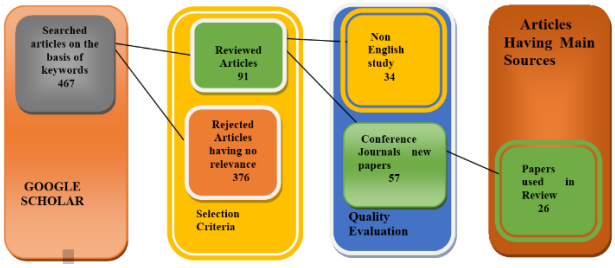

Figure 4: Overview of seletcted article documentation process

Figure 3 is showing the overview of the selection process by diagramatic fashion. The inclusion exclusion crieteria of of the slection of sources as as folows:

- **Inclusion 1** Study which is clearly describing load balancing metrics
- **Inclusion 2** Study must follow english lietrature

- **Inclusion 3** Study is published in the field of cloud computing
- **Inclusion 4** Study should be make by reasercher in peer revived publictaion.
- **Inclusion 5** Study should be from reputated confrences or journols

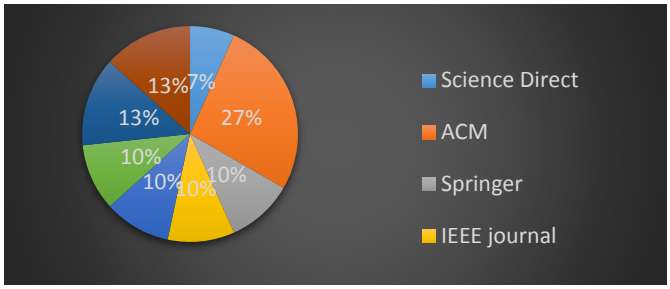

Figure 5: Percentage of published papers in publication

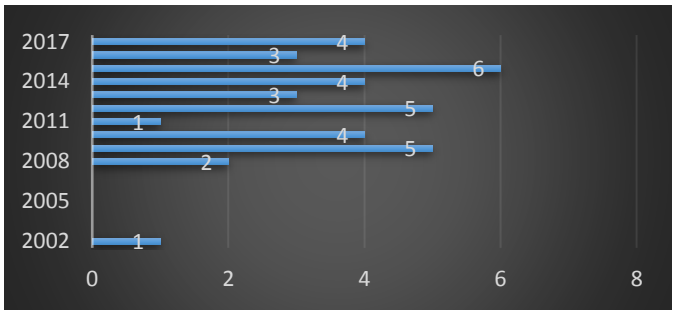

Figure 6: Chronological Review of publications in area of migration time

We attempted to conduct this systematic review as rigorously as possible. However, it might have still endured from several validity threats. Hence, future efforts, to interpret or directly utilizing the reviewed or conclusions in this systematic review should bear some limitations like. (i) Research questions (ii) Research scope

4.2 Discussion

In this section we presented a summarized performance from comprehensive analysis of various famous dynamic load balancing schemes through table 1, figure 5 and figure 6. This can be seen after systematic revive of migration reduction algorithms that a lot of work has been done to minimize the migration time (task transfer time) to improve the system performance which a very important metrics of task scheduling. Through table 1 we tried to show the algorithms used and disadvantages of the existing migration reduction techniques which shows that majority of researchers did not focus to improve the downtime and scalability of load balancing algorithms. The chief drawback of existing techniques is trade-off between migration time and scalability so in future we need to work in this direction. In addition different tools are used to simulate and compare the results but this literature showed that CLOUDSIM is very popular and best tool to create real cloud environment since it is open source also that is why we can use it very easy manner. As shown in figure 6, the rapid amelioration has been occurred immediate after year 2008 in the field of cloud computing.

5. OPEN ISSUES AND FUTURE SCOPE

This section proposes primary issues of load balancing techniques with reduced migration overhead that have not been analytically investigated yet. Here we have emphasized on basic performance metrics and area of application regarding popular dynamic load balancing algorithms. After in depth observation of collected information we observed that there is no autonomous technique which can addresses all issues involved in task migration like several load balancing technique with optimal migration time insures QOS (quality of service), scalability and reliability but some schemes ignored Completely. Also some revived techniques used simulation tools but many have either not used any tool or not mentioned its name after using it. Since most of the techniques are using open source modelling and simulation tool to validate the results hence an attractive future study point would be to investigate the effects the size would have on server efficiency on a big scale by real cloud environment or utilizing some simulator such as Cloud Analyst or CloudSim. In all the migration techniques data centers are treated as a single pool of resources, in case of any undesirable failure no scheme is holding water from the point of view scalability. An adaptive task scheduling algorithm should be robust, and resourceful but in this literature review through a table we have shown that schemes

are able to reduce the task migration time in dynamic environment but mostly are not scalable so in future we need a highly scalable mechanism that can transfer the jobs from one node to another in short span. Another area that get a low attention that dynamic migration techniques are not included failure management and downtime.

6. CONCLUSION

This literature presents a systematic review of dynamic task migration schemes in the field of cloud computing, we revived relevant dynamic task migration & load balancing articles, discussing & illuminating open queries by deeply investigated about 30 articles from 465 papers. In this study the ideas of cloud computing, task migration, DVFT based migration, storage migration, Precopy, post copy mechanism and bandwidth optimization techniques are highlighted, while challenges and future directions are highlighted in open issue section in order to design optimal task migration strategy. Here we found the evidences clarifying that healthy task migration is great mechanism that ability to keep minimum resource consumption, maximize throughput and high scalability in order to maintain the server heterogeneity. In this paper we systematically surveyed the past mechanisms of task migration by classified them in many aspects, we also highlighted the disadvantages under each and every category. Proper task migration polices in cloud environment still need a scalable algorithm that can basically take minimum time to migrate the requests from one host to other. The collected statistics from various sources help researchers to introduce the current challenges, new directions, future trends, defined queries and open research issues to heighten a good level to laod balancing system in the are of cloud computing.

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The Age of Deep Learning

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Abstract - Deep Learning (DL) has revolutionized Artificial Intelligence (AI) by outperforming the traditional Machine Learning (ML) and this is a major event in the history of AI. The intention of this article is to provide an easy understanding of some of the building blocks of DL. Also we will discuss the wider range of implementations in various industrial use-cases using the same algorithm. A significant improvements are recorded in the domain of Computer Vision and we will compare the shift in the approach which made it possible. We also cover ideas on how best to think of AI from the limited knowledge we have today. Finally, we discuss the implementations that is done in Jatana.ai to make it language and domain agnostic.

Keywords: deep learning, machine learning, chatbots, intelligent machines

1. INTRODUCTION

The rising popularity of intelligent systems and applications along with the advances in artificial intelligence specifically in Deep Learning is resulting in an exciting new world order. The overall tech industry and research domains have made a great shift from using classical feature engineering approach to adopting the proximity functions such as neural networks. According to Gartner report 2017 [1], Deep Learning is a buzzword which took over the market very quickly, and it has already crossed the innovation trigger stage. It has reached the stage of the peak of inflated expectation.

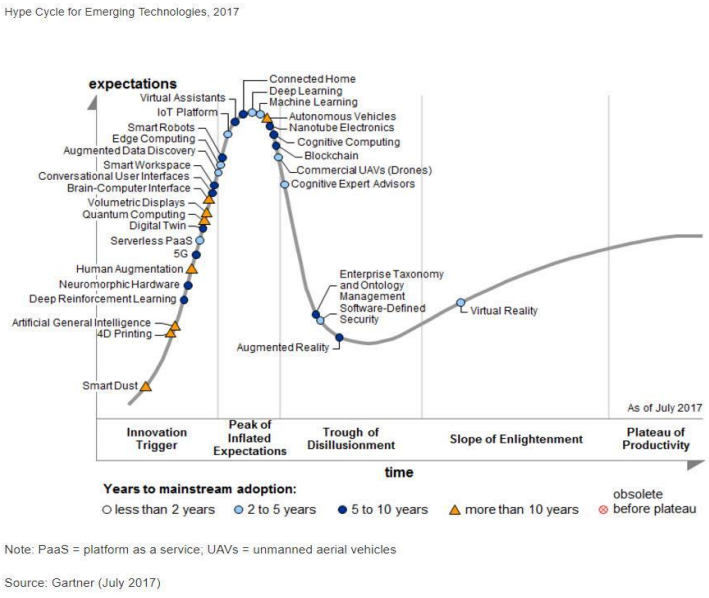


Figure 1: Hype Cycle of Emerging Technologies, 2017

It will be another few years before this technology goes mainstream. However, the applications of deep learning have already permeated in our daily lives. This article is a walkthrough for new advancements in Machine Learning specially in Deep Learning. It attempts to provide a simple explanation of the fundamental concepts.

1.1 The Idea of Deep Learning

As depicted in the figure below, deep learning is a sub-set of Machine Learning domain whereas Machine Learning is in itself a subset of Artificial Intelligence (AI) which is a field that enables machines to become intelligent progressively (an idea to build self-learning machines)

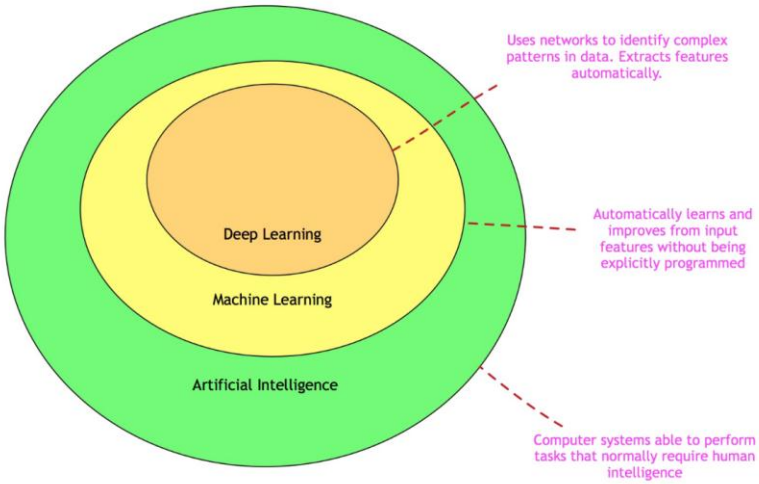


Figure 2: A vein diagram showing how Deep Learning is related with Machine Learning and Artificial Intelligence.

The models which are created in Machine learning can learn from the past data and input features. The most important thing to note is that in any ML model we need to provide the features manually. But with the arise of this new domain of Deep Learning, systems are able to learn the features automatically better than any handcrafted features. If we provide the system with a labeled data having the mapping of the input and the output which is also known as Supervised learning, it tries to learn the features by extracting the valuable patterns between them.

In industry it has made a huge impact in various domains and applications. Such as if we provide voice recording data as input to a model and transcripts in the output then the model can be used as a Speech Recognition application, similarly if we provide previously asked questions as input and the respective answers in output then it will work as a FAQ based chatbot. Also, if we feed photograph as input and captions as output then it will work as an image tagging tool. For building a face recognition system we will only need to feed face image as input and names as output.

Table 1: Mapping from a set of inputs to the set of outputs leads to a specific application.

INPUT DATA	**EXPECTED OUTPUT**	**APPLICATION**
FAQ questions	FAQ Answers	FAQ chatbots
Voice recording	Transcript	Speech recording
Photograph	Caption	Image tagging
Drug chemical properties	Treatment efficacy	Pharma R&D
Store transaction details	Is the transaction fraudulent?	Fraud detection
Recipe ingredients	Customer reviews	Food Recommendations
Faces Image	Names	Face Recognition

1.2 History behind Deep Learning

The domain of Deep Learning is not new, it has been with us from long time. It all started back in 1959 when Hubel & Wiesel, experimented with the RECEPTIVE FIELDS OF SINGLE NEURONS IN THE CAT'S STRIATE CORTEX [2]. They tried to understand how brains understands and recognizes certain structures so well, with their experiments they concluded that brain receptors get tuned with certain kinds of shapes and size. And whenever cats encountered similar kind of patterns their brain was emitting certain amount of signals. This confirmed that they were learning and were able to extract patterns from what they observe.

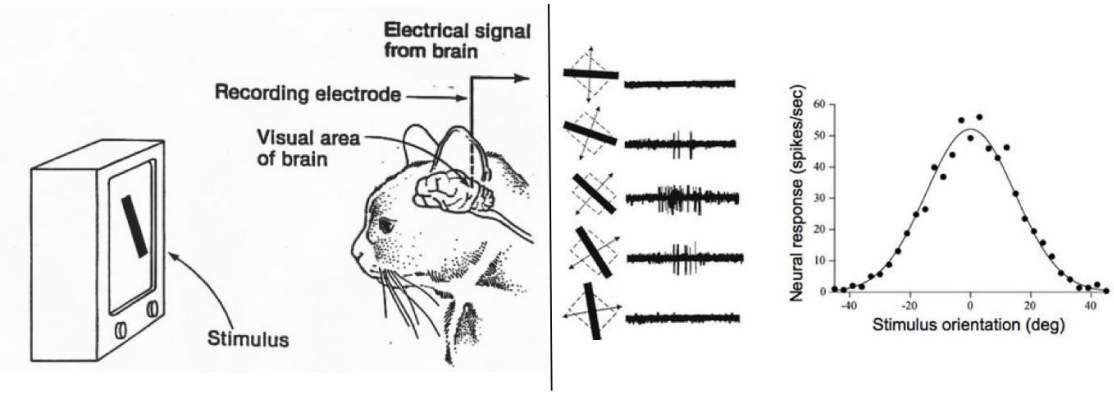


Figure 3: In left image the cat's brain is studied using an electrode connected with the neurons in the brain and cat's brain is simulated by display some visuals on screen. In right side of the image displays the amount of signals stimulated for specific kind of object in various orientations.

With all this years of experiments and conclusions the research community was able to build various techniques to handcraft features which can perform detection and recognition on images, text and voice signal data. This worked to certain extent but the results were not always profound and we failed to achieve the level of accuracy what brain can achieve.

Figure 4: Left side of the image is the output of the SoTA in 2011, car detection model which was created using various handcrafted feature extraction modules. Right side of the image is the current SoTA in 2018 which can segment various objects build using Mask-RCNN (a deep learning model).

As show in the figure above, the left image was the state of the art approach in Computer Vision in 2011 which uses GIST [3], HOG [4], SIFT [5], LBP [6], Color histogram, contour tracing, textural features [7], etc. and other handcrafted features to perform object detections and we can see how drastically it fails. It falsely claims to detect a car with 17% of accuracy which can be very critical in many industrial use-cases.

But if we look into the current SOTA (image in the right side) in Computer Vision 2018, the results are mind blowing and the details extracted are so minute that we can compare it with the level of brain accuracy.

So, what changed and how did we make this giant leap in the domain of Machine learning in just 7 years. And the reasons are

1. Huge amount of labeled data,
2. Cheaper highly competitive systems (GPUs, TPUs)

3. Deep Learning approach which is inspired from the nature of the functioning of brain.

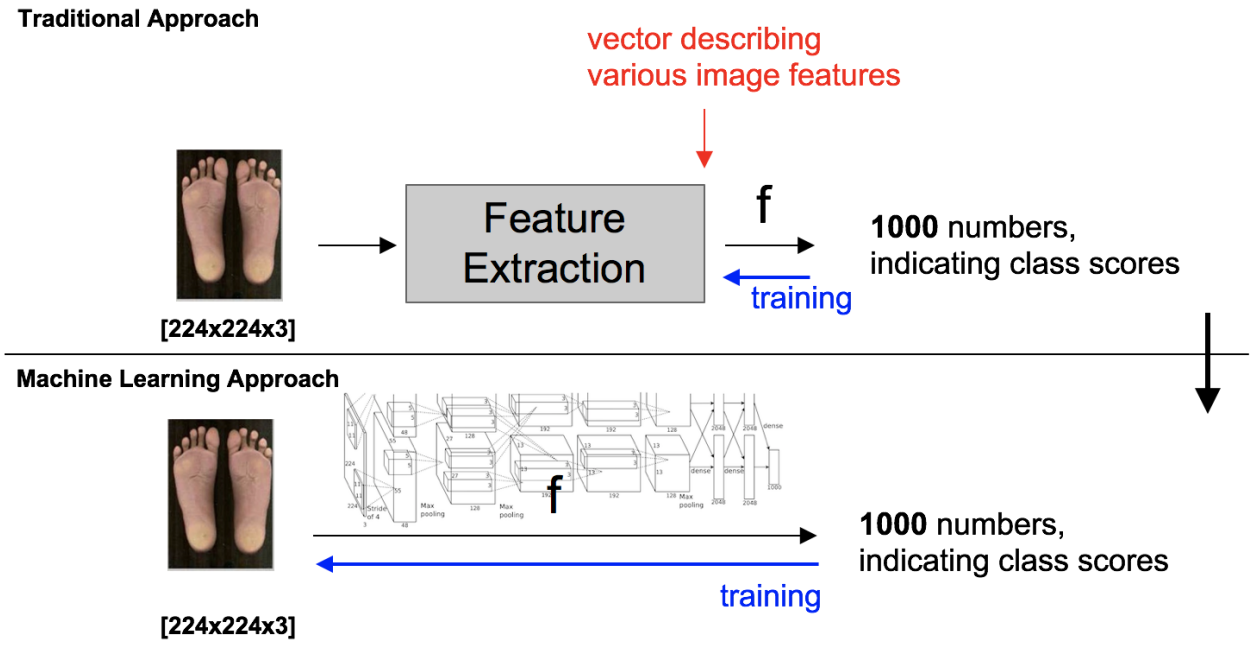
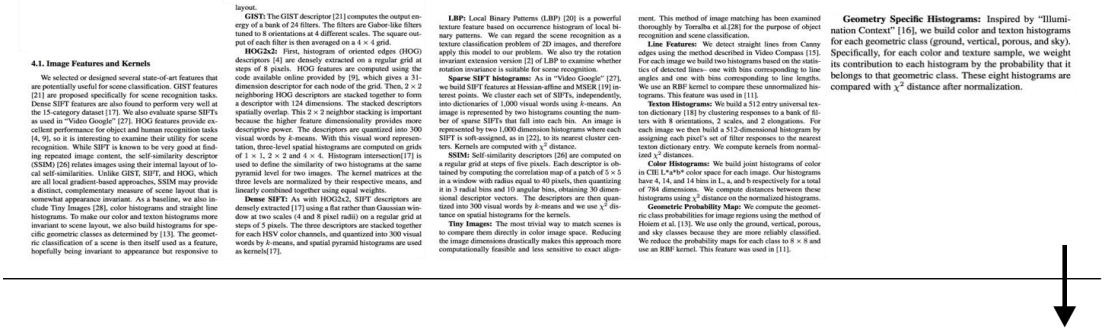


Figure 5: Upper section of the image is the Traditional approach for building a computer vision model. Lower section represents the same can be performed using the Machine learning approach.

If we analyze the whole process of classification in CV then in the traditional approach, we feed our raw data in to the feature exaction (FE) module which is majorly responsible for the data pre-processing, cleaning and transforming the data into simple feature vectors which can be further used to perform classification using any means of distance equations like Euclidean.

The major efforts are made in designing the most efficient FE modules which can extract good features from the provided raw data. And we have lots of literatures around them using wide ranges of solution. But after the evolution of Deep Learning approach, we were able to totally eliminate the FE process and let the set of proximity functions (neural networks) perform the feature engineering part by feeding them lots of raw data.



"Run the image through 20 layers of 3x3 convolutions and train the filters with SGD."

Figure 6: Overview comparison of the traditional machine learning approach with the latest approach in Deep Learning. Instead of running lots of feature engineering techniques, one can simple use a neural architecture over SGD to train a model end to end.

Using the current approach of deep learning in computer vision, researchers can save lots of time instead of handcrafting features which can only perform in certain scenarios. As we see in the above image the feature engineering modules that are developed till date can simply be overwritten by using a neural network architecture of 20 hidden layers (each layer will learn some features) performing convolution operation using 3x3 filters and training it over the stochastic gradient descent (SGD) [8] algorithm.

So now they can investigate and design better architectures and methods to do the learning part automatically and efficiently.

2. NEURAL NETWORKS: THE BUILDING BLOCK OF A DEEP LEARNING SYSTEM

A deep learning-based system can automatically learn the relevant features to solve a machine learning task. That's great! But how does it do it? The building block of a deep learning network is a machine learning algorithm called neural networks. It is inspired from the architecture of a brain where it is a network mesh of huge collection of neurons.

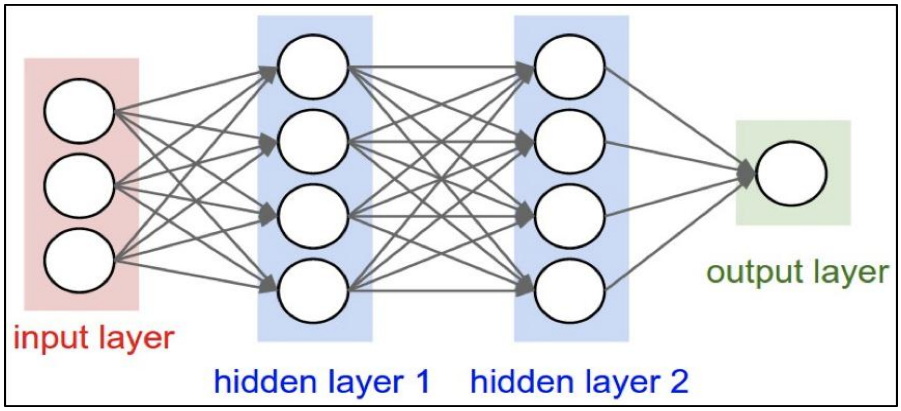


Figure 7: This is a basic architecture of fully connected Feed forward Neural Network (FNN). This architecture represents the 3 main layers of any deep model as : 1. Input layer 2. Hidden layer 3. Output layer.

A neural net consists of a lot of simple processing interconnected nodes called Perceptron's. A deep neural network has three types of layers:

- An input layer: A input or stream of data points.
- Hidden layers: Processing nodes that are interconnected with the input. A deep neural network has more than two hidden layers.
- An output layer: A node that transforms the processed information into usable output.

Neural networks work on a principle of learning simple to complex pattern like understanding line, curves and circle kind of features in initial layers and then using these collections of simple features to learn complex and sophisticated features like eyes, mouth, ears etc. The more nodes we add into the hidden layer the more complex features we will be able to learn. The process goes on until it computes the final output in the output layer.

How to choose the size of the hidden layer? While there are some general guidelines and recommendations, it always depends on your specific problem and is more of an art than a science. So, how does the computation and what kind of computation take place in neural network? Since we know the smallest unit of our neural nets are perceptron and as shown in figure below.

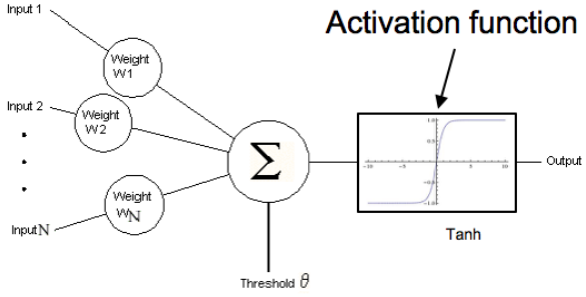


Figure 8: The smallest unit of the neural network architecture called Perceptron. The input value (x) is multiplied with the weight (W). After performing summation of all the value a bias (b) value is added and non-linearity is performed using Activation function.

The major components of perceptron are:

- Input Values (x)
- Weights (W)
- Bias (b)
- Activation function
- Output (y)

Our network makes predictions using feed forward propagation, which is just a bunch of matrix multiplications and the application of the activation function(s). If x is the 2-dimensional input to our network then we calculate our prediction a_2 (also two-dimensional) as follows:

Please use Microsoft equation editor for below equations:

$z_1 = xW_1 + b_1$
$a_1 = \tanh(z_1)$
$z_2 = a_1W_2 + b_2$
$a_2 = \text{softmax}(z_2)$

z_i is the input of layer i and a_i is the output of layer i after applying the activation function. W_1, b_1, W_2, b_2 are parameters of our network, which we need to learn from our training data. Because we want our network to output probabilities the activation function for the output layer will be the softmax, which is simply a way to convert raw scores to probabilities.

So, we perform few iterations with feedforward and backpropagation to compute and validate the entropy of the model which is basically evaluating the minimum loss between the real output and the predicted output.

Once the training process is completed we will obtain some values in W and b which is our parameters which we have learned as our features. And we assume it to work significantly for other unseen similar data.

3. PRACTICAL IMPLEMENTATIONS

So, what makes it so dominating over the classical approach?

Now once we understand the functioning of the neural networks we can implement the same for wide variety of use cases. So, we design one generic architecture which can generalize the learning process and then use if for various kinds of applications.

Let's look into one of such use case.

A very popular neural network architecture Convolutional Neural Networks [10] (ConvNets or CNNs) have proven very effective in areas such as image recognition and classification. ConvNets have been successful in identifying faces, objects and traffic signs apart from powering vision in robots and self-driving cars.

In CNN models we feed raw image data into the architecture, let's assume we have an RGB image of size 32x32. So, the tensor size will be 32x32x3 whereas 3 is the number of channels. Then we have a kernel of size 5x5x3 while will slide over (convolve) the raw image and perform the dot operation on the two tensors and generate the feature maps as shown in image below.

There are only two basic operations involved throughout the convolution process:
1.Dot products $W^T.x$ while convolution operation. Tensor w is the kernel which is randomly initialized initially and learned over the period of time.

2.Max pooling [11] operations to eliminate the low frequency data and filter the stronger signals forward.

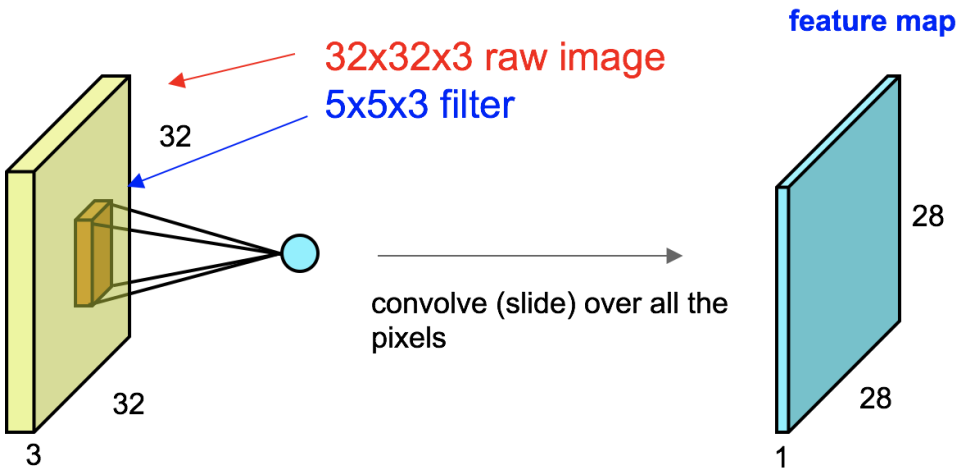


Figure 9: Convolution operation performing matric dot product between the input image matrix and the filter matrix resulting in the formation of feature map.

Rest of the functioning of CNNs architecture are again very similar to the one which we discussed above with addition to some extra operation like polling and dropouts which helps to prevent the overfitting of the model. These operations are stacked over each other multiple times and work in synergy between each layer.

Once we have successfully designed a CNN models which generalizes well, now we can use the same architecture for various kinds of use cases and implement different types of applications as illustrated in the image below.

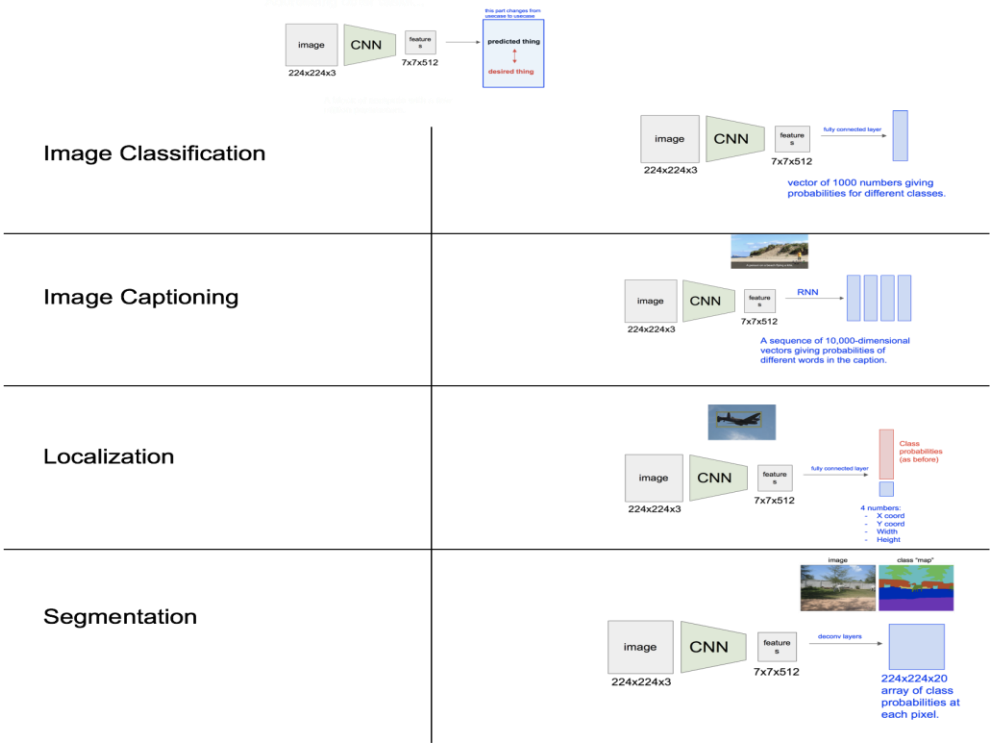


Figure 10: Implementations of single deep convolution model into various other use-cases by simple alteration on the last layer of the architecture.

4. CONCLUSION

Artificial Intelligence promises to be a major event for human kind. Recent research has made important progress on how to think about potential future and solve them using these recent advancements. It is our hope that this article will help new researchers enter the field of AI, and provide traditional AI/ML researchers with an overview of the advancements in the field and help them to contribute for the same to achieve Artificial General Intelligence (AGI).

We at Jatana.ai based out of Copenhagen, Denmark have built a generic language model incorporating the potential of deep learning algorithms. The generic engine is able to understand the context in various languages like English, Danish, Swedish, German and 200 other languages which makes it language agnostic.

Jatana AI engine embraces the vast knowledge from the open source data over web and performs transfer learning on the domain specific knowledge (medical, finance, etc) which also makes it domain agnostic.
Further we are trying to use the deep reinforcement learning models to make the engine learn from the interactions of the system and make it self-learning engine which can learn newer concepts and ideas automatically over the period of time.

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User Authentication Using Keystroke Dynamics

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Abstract **-** "User Authentication Using Keystroke Dynamics". It is a method to get the user authentication on an android application by using the keystroke dynamics of the user using Artificial Neural Networks with the help of Error Back Propagation algorithm. In this application the user enters the password 30 times and databases are used to record 45 factors that describes a user's keystroke patterns like di-graph, dwell time, tri-graph, flight time, finger size, button pressure, coordinate values which can be seen by the user in real time. Once this is done the data is taken and put in an Artificial Neural Network and trained using Error back propagation Algorithm. This process done over time produces trained set off weights that would produces an already calculated value in the output layer. This data from the network is again stored in a separate table which is then used to check the authentication of the user typing the password.

Index Terms**--** Artificial Neural Networks, Error Back Propagation Algorithm, Keystroke Dynamics, Database Systems, Mobile Phones, Passwords, PINS (Personal Identification Numbers), Android, Biometric Authentication.

1. NOMENCLATURE

Di-graph	-	Time elapsed between releasing the key and pressing the next key.
Dwell time	-	how long we press a key.
Tri-graph	-	latency between three keys.
Flight time	-	how long we take to type successive keys
Finger size	-	Amount of space occupied by finger touch.
Button pressure	-	Finger pressure applied while typing
Coordinate values	-	Location of Button pressed.

2. INTRODUCTION

As mobile technology is becoming more powerful and sophisticated it is very clear that in the coming time it would be the most universally owned device in the world. Mobile phone is becoming more and more personalized and are collecting dozens of parameters that pertain to our personal data. In this case it is very important to ensure that systems are built so that this data is not stolen or misused by someone. Our project deals with this problem. There are basically three types of authentication system that can be put to use to ensure safety over the internet. The first method in to use Passwords and PINS (Personal Identification Numbers). This method is not as successful as one might think. There are several ways to go around this system as hackers can use social as well as cyber hacking to penetrate this system

can steal the passwords. The second method is the Token authentication which is basically an object possessed by the intended user which is passed hand to hand and is more likely to be stolen on the network. The third and the most secure method is the Biometric authentication, this system is better because it uses characteristics that are unique to an individual and cannot be stolen very easily. Fingerprints are from this category but are not a perfect solution as although with relative difficulty, it is still possible to steal the fingerprints of the user and use it to gain access to the system. Hence, we decided to use keystroke dynamics. In this process the hacker cannot copy the individual characteristic of the user as the system is relying on the keystroke pattern which is net to impossible to steal as various factors to measure keystroke pattern of the user like keystroke time, pressure is kept encrypted within the device. This information is captured using various sensors like pressure pads on the mobile device.

3. LITERATURE REVIEW

Authentication via Keystroke Dynamics is quite old. The earliest studies on this method were performed in the years 1985-1990 for desktop keyboards. D. Umphress and G Williams are among the first to write on the subject of using keystroke patterns to identify a user. Their work explains the concept and introduces the idea of latency (also called digraphs), the amount of time between two keystrokes. Much of the later work on the subject used the idea of latency and it is used even today in many Keystroke Dynamics Analyzers (KDAs). KDAs were also deployed for pre-touchscreen mobiles (the ones with 12 keys). With the mainstream adaptation of capacitive touch screens and consequently convenient touch keyboards on mobile phones in 2007, this method has been applied to touchscreen phones as well [1].

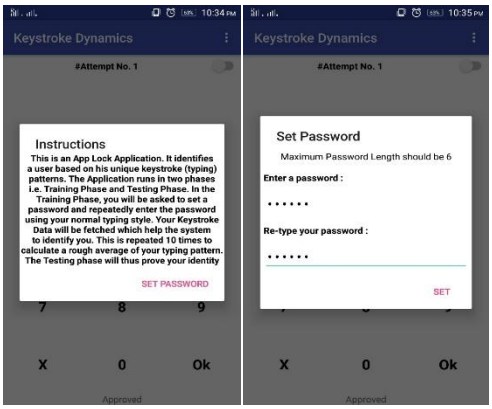
Most of the keystroke mechanism depends on password authentication via calculating the time interval between the single keystroke press. This parameter is one of many that can be used for keystroke dynamics and measuring and setting the security parameters. But in addition to this we can also take the record of other parameters like time interval between two key presses. In such calculation four timestamps are associated namely first key press (P1), first key release (R1), second key press (P2) and second key release (R2). Thus, leading to six combinations of time differences of the above four timestamps, namely, d1: R1-P1, d2: P2-R1, d3: R2-P2, d4: P2-P1, d5: R2- R1, d6: R2-P1. Every user has his unique typing style. Typing styles are the most efficient way of collecting the data between user and system [2]. A lot of work has been done in terms of making the biometric authentication or reading the keystroke dynamics less costly for the end user. Over the years the study has advanced as technology has and the research has gone from reading keystroke dynamics from computer keyboards to reading it from the mobile devices using several pattern classifiers like artificial neural network. But there has never been a study or a case method to classify the results from the effectiveness of different models. The presence of such models would allow us to test the effectiveness of such algorithms and then improve them [3].

With the rise of computing and machinery handling data of people in the day to day life, the lives of people have been increasingly exposed to hacker who can penetrate system. One of the methods to make the system secure is to use biometric authentication. In order to guide the research of this technology in the future there needs to be a systematic review, to make the correct protocols to assess these researches as they move forward [4]. More than ever before the internet is changing computing and with it are all types of problems being faced by users across the globe. One of them is the stealing of personal data. One of the methods is to authenticate the user using biometric authentication. The method can access the user's information on keystroke dynamics and use artificial neural networks to train the data to authenticate the user [5].

4. ARCHITECTURAL DESIGN

Here we have designed an android application that consists of the ANN and various other components to both read keystroke values as well as authenticate the user. There are three functionalities that are provided to the user when using this android Application.

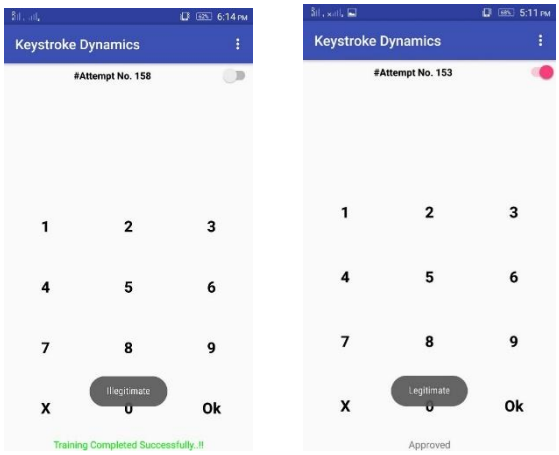
The first one is the training part. Here the user gets to type in his password to set it first and then is asked thirty times the same password in order of the system to capture the information on the user typing pattern (Keystroke Dynamics) and store that information in database.



This information is basically stored as 45 different datasets that mimics the users typing pattern. As the user is doing this he/she can decide to look at the values that are being recorded by opening the concerned page at the click of a button in the user interface.

The second functionality the user has is to access this information which is displayed in a separate page that shows all the values that are being recorded like pressure points, coordinates of the button, time taken to press single or multiple buttons and many more. The third functionality would be the ability for the android application to authenticate the user. Here the user enters the password and if the previous keystroke data saved matches the data recorded when the user types the password a token is released saying the user is legitimate. If the data is not matched then the user is deemed illegitimate. To do so there needs to be some training to be done on the typing pattern of the user. This is done using our artificial neural network and an algorithm that is applied on the network called Error Back Propagation algorithm. The data from the user is fed into our artificial neural network and then weight function is applied on the network.

Each time new value is generated on the single node in the output layer, it is matched with the already calculated value presented by the Error Back Propagation algorithm. Every time the data is sent back to the network the weights are self-adjusted till the output value is same as the calculated value. At this point the values of the trained weights are sent to another database system to be stored and when the user types his password the pattern in registered and the trained weight values are applied on it over the network and if the output value is same as the calculated value then the user is authenticated otherwise not.



We have used here three separate databases. One for the training values to be stored. Other for saving the password and a third for the purpose of storing the trained weights from the artificial neural network. The database was connected to the program using the SQLite database connectivity. The entire program was developed on the Android Studio. The program is divided into two parts, one is to implement the user interface part of the system and the other is to take the data, store it and then apply ANN and the algorithm to generate the trained weights. The major part of the program and almost all the logic was written in JAVA and the user interface was written in both JAVA as well as XML.

5. PROPOSED SYSTEM

We have used Neural Networks here for the training of datasets. SQLite databases are used in this application for storing keystroke values, training data and calculating weights. The database was connected to the program using the SQLite database connectivity API. The entire program was developed on the Android Studio. The program is divided into two parts, one is the user interface part of the system and the other is to take the data, store it and then apply ANN and the algorithm to generate the trained weights. The major part of the program and almost all the logic was written in JAVA and the user interface was written in both JAVA as well as XML. The application requires an Android 5.0 or latest. Integrated Development Environment (IDE) used here is the Android Studio with Nexus 5x API 24 emulator. You need at least 10MB of hard disk space and about 256MB of RAM.

6. WORKFLOW

The following workflow describes the functioning of the application:

1. Access the application on an android mobile device

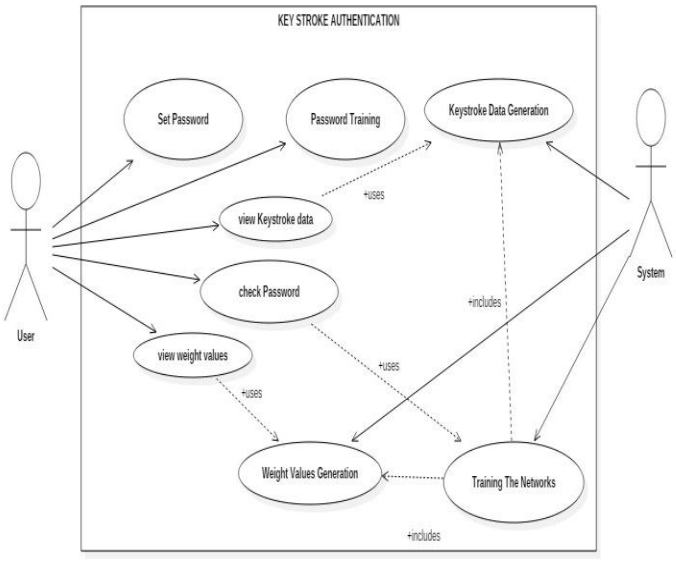


Figure 1: Use Case Diagram

2. On starting the android application user is shown the Instruction Layout with all the basic details on the usage of the application.

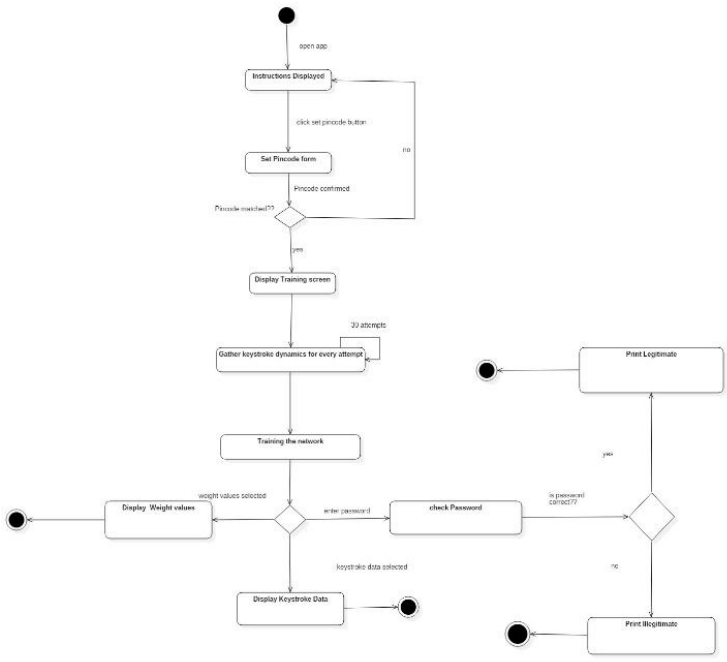


Figure. 2: Activity Diagram

3. Now the user is asked to enter the passcode of 6 digits that will be further used in training the data.
4. This is done thirty times in order to get the keystroke style and the typing pattern of the user.

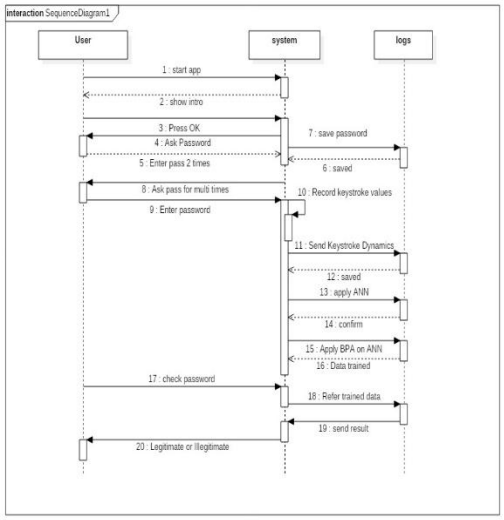


Figure 3: Sequence Diagram

5. The Keystroke data from above 30 attempts is calculated.
6. User can now choose to view the Keystroke data that is being calculated on every attempt made on setting the password as Test Cases.

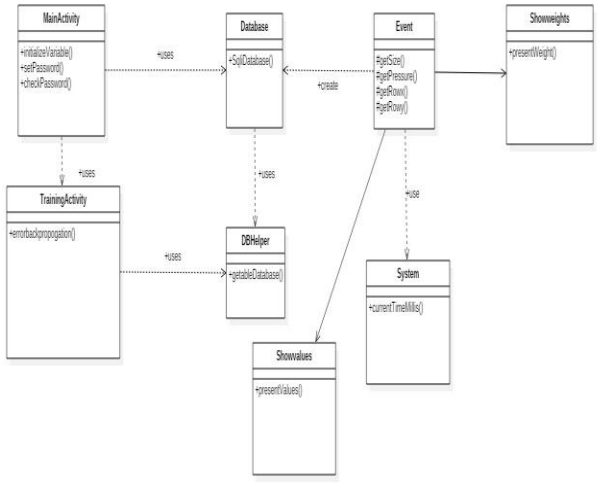


Figure 5: Class Diagram

7. After all the successful attempts weight values will be calculated for every attribute and will be feeding the data into the neural networks to train the data.
8. Data will be processed for the training and thus validation can be performed.

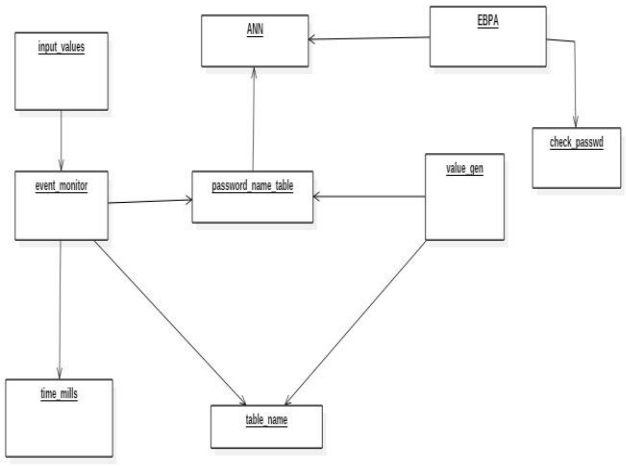


Figure 6: Object Diagram

7. MATH AND EQUATIONS

Range Upper Limit = Mean + (X * SD) (1)

Range Lower Limit = Mean – (X * SD) (2)

Deviation = (Test value of the feature-Mean value of the feature) ÷ Mean value of feature (3)

Absolute Distance = 1 – Number of similar diagraphs ÷ Total common diagraphs (4)

Calculation in ANN:

$Z_{in} = v_{0j} + \sum^{n}_{i=1} x_i v_{ij}$ (input layer function) (5)

$Z_j = f(z_{in\,j})$ (activation function) (6)

$f = 1 \div (1+e^{-x})$ (7)

$Y_{ink} = w_{0k} + \sum_{j=1}^{p} z_j w_{jk}$ (output layer function) (8)

SD – STANDARD DEVIATION

8. RESULTS

The result of the final development is an android application that has the ability to use keystroke dynamics the be able to authenticate the user. The user here has to enter the password once this is done they are asked for their more times to record in their dataset the keystroke of the person, then the user's dataset is trained accordingly and once this set of work is done the user is able to log into their system very easily.

9. CONCLUSIONS

Brain is an android application that is used to authenticate a user based on their keystroke dynamics, that is their pattern of typing. Once this information is recorded a certain number of times (thirty), the information can then be used to identify the user. The application has a artificial neural network with forty five neurons in the input layer and one neuron in the output layer that produces the value that is to be compared with an already calculated value that is generated by the Error back algorithm which is applied on the artificial neural network. This is done over and over till we get the right value and then the weights on the network can be used to authenticate the user next time the password is typed in, thus providing a more secure and authentic system to save your data.

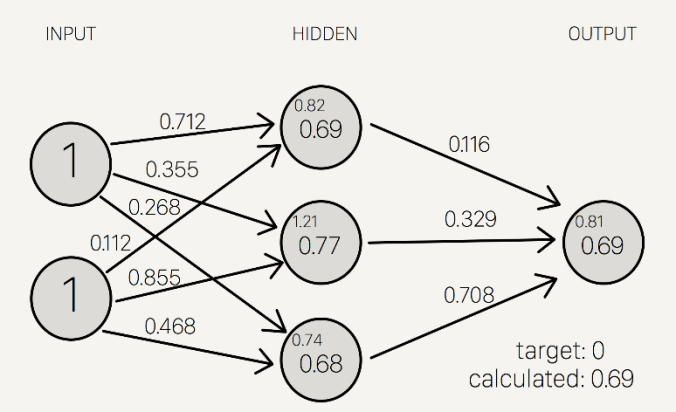


Figure 7: Artificial neural Network

10. FUTURE WORK

Suggested below are some suggestions as to what other features can be added to the system to make it more efficient:

1. **Encryption:** There are ways to steal the trained weights of the user from the application. This can be prevented by encrypting the data and only decrypting them when in use this allows us to make the system more secure.
2. **Hand written authentication:** The user is in this case using PINS or passwords to authenticate themselves but we can also use the handwriting of the person to make the system more complex for them to understand and use. This means that now we have to take more into account not just the existing parameters but also other parameters like the handwriting and the way in which the user makes strokes or how much pressure is applied by them while writing the password on the screen pad.
3. **Better Algorithm:** One of the things that can be done is to use better algorithms to train the Artificial Neural Networks thus allowing us to improve our accuracy.
4. **Multiple User Authentication:** There are sometimes when parents leave their mobiles for children to call them, other times you may want to access multiple devices without setting up the password. The problems here are different but the concept is the same, that is the ability of the user to be able to authenticate themselves over multiple devices just the same way google account allows us to do so over our laptop and desktop at the same times. Also, to authenticate multiple users on the same device requires us to save the images of several persons thus resulting in more databases and more training time and also the ability to differentiate one dataset from another.
5. **Better Accuracy:** There are cases where the user might be the person but due to certain reasons pertaining to their current situation like they might be in a hurry or something else might lead to then using a very different way of typing thus not authenticating them at all. This problem can only be solved with increase number of dataset and more and more training required.

ACKNOWLEDGMENT

We wish to express our deep gratitude to our guide Dr. J. C. Patni, for all advice, encouragement and constant support he has given us throughout our project work. This work would not have been possible without his support and valuable suggestions. We sincerely thank to our respected Program Head of the Department, Dr. Ajay Prasad, for his great support in doing our project in Keystroke Dynamics at CIT. We are also grateful to Dr. Kamal Bansal**,** Dean CoES and Dr. Manish Prateek, Director SoCS UPES for giving us the necessary facilities to carry out our project work successfully. We would like to thank all our peers and mentor for their help and constructive criticism during our project work. Finally, we have no words to express our sincere gratitude to our parents who have shown us this world and for every support they have given us.

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Abstracts

Involving Primary Students in Project-Based Blended-Learning Activities: Exemplary Practices in a Local School at Thailand

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Abstract-This paper reports on the authors' involvement in a primary school at Thailand to promote project-based science learning culture among students with very limited background knowledge especially in terms of Information and Communication Technology (ICT). Since this is a charity school, much support was needed to raise funds for the organization and implementation of school's curriculum and co-curriculum activities. The authors will share the experience in marketing and the management of school activities focusing on technology-enhanced project-based learning that also formed part of the life (work/entrepreneurial/ survival) skills programme to raise awareness on 'disaster risk reduction education' as well as promote sufficient economy that is currently being practiced across many schools in Thailand. The school has also registered as one of the SEAMEO's networking school since 2017 and participated in the 'Learning Science and Mathematics Together' (LeSMaT) project. Mixed-research methods were used involving school-based collaborative inquiry and case study during the implementation phase to pilot the curriculum supported by blended learning tools. The dissemination of information on LeSMaT sub-theme 'Climate Awareness and Disaster Risk Reduction Education' (CADRRED) through science project-based curriculum implemented leveraging on the use of blended-mode digital tools to strengthen the thinking and technological capabilities among the primary learners is illustrated. It is hoped that apart from minimizing the impact and consequence of disaster risks, this study has one way or another help in enhancing life skills through increase awareness, education, research and training activities. The challenges faced and suggested further research studies are also deliberated.

Keywords: Exemplary Practices, Project-based Activities, ICT integration, Primary Science Curriculum, Charity School Management and Marketing.

Enhancing Effective Science Learning through Augmented Reality: Challenges and the Way Forward

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Abstract **-** Students' motivation is important factor for effective science learning. In the advent of digital era, use of interactive technology such as Augmented Reality (AR) is revealed to be desirable tool to arouse students' learning interest for better understanding of the information presented especially on abstract science concepts. This study reviews pedagogical issues about science learning with discussion on challenges faced by educators to enhance students' learning motivation through use of Information and Communication Technology. Exemplary case will be reported on how the topic 'Influenza' could be introduced to promote effective science learning supported by AR tool with elaboration on the design of learning sequence incorporated following the Keller's 'Attention, Relevance, Confidence, Satisfaction' (ARCS) model. Pilot study was conducted in the school of the first author. Sample students' activities with evidences of how the AR tool promote ARCS in science learning are illustrated with suggestions for the way forward.

Keywords**:** Motivation, science learning, interactive technology, Augmented Reality, exemplary case

Learning Mathematical Concepts Contextually Supported by Digital Tool and E-platform

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Abstract - Solid geometry is one of challenging topic to be introduced in mathematics lessons. However, its teaching could be made interesting through the availability of visualization of three dimensions (3-D) models using interactive technological tools and e-platforms. This article explores ways in which solid geometry could be introduced at various levels using Augmented Reality (AR) technology with interactive sharing through social learning platforms and reports on two exemplary cases participated by groups of elementary students. The first case study examines how the AR feature android based applications have enhanced learning of solid geometry using AR by bringing up the 3-D visual objects such as cubes, rectangular solids, prisms, cylinders, spheres, cones and pyramids. The second case study explores the application of solid geometry in real life settings of which several buildings that were presented as 3-D models of ASEAN landmarks were posted on Edmodo e-platform for interactive discussions to facilitate contextual learning of shapes and structure. Implications of study will be reported with suggestions for the way forward.

Keywords: Solid geometry, mathematics lessons, technological tool, e-platform, Augmented Reality, contextual learning

Privacy Concern of Personal Information in the ICT Usage, Internet and Social Media Perspective

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Abstract- The evolution of information technology has rapidly increase the sophisticated online application where accommodates most activities of users. Information and communication technology nowadays has become the importance part of our life. Majority of us are depending on the technology. Agreed or not, we cannot denied that technology helps us a lots in our daily activities. Besides the usage of Information and Communication Technology (ICT), another thing that we need to know is about the privacy concern especially when it comes to the personal information. Nowadays, we used an online transaction for the daily life operation. Online banking, online games, social media networking such as facebook, instagram, twitter and so on are an example of social networking that we used in our daily life with the help of ICT. In fact, we actually expose our personal data by our own without prejudice. This article will identify the use of ICT, internet and social networking that affect the privacy concern of personal information

***Keywords*:** Social Media, ICT, Virtual reality, Cyber Security

STEAM Teaching Strategies in Related Subject

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Abstract -A reform STEM (Science, Technology, Engineering, and Mathematics) education has become the guiding principle of science education in many countries and a focus of research efforts. This is including Malaysia country. Meanwhile, the STEAM (Science, Technology, Engineering, Arts and Mathematics) education is still new and lacking in literature review writing. In Malaysia, the government not yet fully introduce in education system but have suggested the features of STEAM education focus on combining an art skill in STEM education. The focus on combine the art's skill in STEM education is one of the way to attract students to pursue or increase students interest and motivation in science stream. It is also aimed to create a new generation of multi-skilled professionals that capable creatively integrating knowledge from different fields of study to solve problems effectively and create an innovation. An effective STEAM education requires teachers to have a correct method in enhancing student's ability. High school teaching strategies based upon 21st century teaching and learning have become the suitable methods for STEAM education. The development of various scientific models and theories play a central role in scientific inquiry and enhancing student's thinking ability. Model-based inquiry would be important in improving the learning of STEM subject. Thus, the role of teacher as an implementer of the new innovation in education should be taken seriously. This study aims to explore teacher's STEAM teaching strategies in new curriculum. This qualitative study was conducted using semi-structured interview questions to explore the practice and conception of secondary school teacher on STEAM teaching strategies especially in model based inquiry. The participants were selected purposive sampling among teacher in Johor Bahru district that have experience in teaching the new KSSM curriculum in form 1 and form 2. The analysis was performed by using constant comparative method that was carried out simultaneously during data collection. Based on the findings, the participants carried-out the inquiry based learning as a teaching method selectively according to the topic. The participants also did not understand deeply about STEAM education. Thus, through the implementation of active teaching strategies, it was expected that students' interest in STEAM related field will be enhanced with limited teachers' understanding about STEAM education.

Keywords **-** STEAM Education Teaching Strategies Model-based inquiry Students' Ability.

Literature Review on Internet Benefits, Risks and Issues: A Case Study for Cyber Parenting in Malaysia

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Abstract - Internet has become an amazing potential for learning, entertainment and socializing gizmo. It has encouraged teenagers and children to participate and express themselves for extraordinary source of information and self-improvement. Understanding the responsibility that comes with technology is a key to safety. The study is useful because it enabled contrast between the views of children and the parents with regard to online risks and threats. Therefore, a literature review has been simplified and produced a proposed scope of this field which covers the benefits, risks and issues of on internet which combine, replicate and modify 2 surveys done by Sau et.al, (2014) and Wong and Lee (2017) who examined the issues of parental self-efficacy in controlling and monitoring technology. Estimated to be organized in December 2018 this research will also consist of a survey and a total of 12 tape-recorded semi-structured interviews with children and parents to discover how often children encounter disturbing or harmful content on the web and what kind of prevention and solutions made by parents.

Keywords: Cyber Security, Cyber crime, ICT, Parenting, Social Media

A Comparative Study of Crowd Counting and Profiling Through Visual and Non-Visual Sensors

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Abstract - Crowd density analysis is very imperative for intellectual video surveillance to help in management and control of crowds for safety. This paper presents comparative study of critical survey of crowd analysis techniques using visual and non-visual sensors. The visual sensors that have been widely used are wireless sensor network, computer vision, smart camera, sensor fusion and few more; and the non-visual sensors are Call-Data-Records, Wi-Fi Signals Measurement, Smart Evactrack, Social Network and Bluetooth etc. Automatic crowd understanding has a massive impact on several applications including surveillance and security, situation awareness, crowd management, public space design, intelligent and virtual environments. Study shown that Video imagery based crowd analysis for population profiling and density estimation in public spaces can be a highly effective tool for establishing global situational awareness. Different strategies such as counting by detection and counting by clustering have been compared.

Keywords: Video Surveillance, Crowd Density, Crowd Analysis, Counting by detection, population profiling.

Corporate Governance and Sustainable Development in Nigeria: A Conceptual Discourse

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Abstract **-**The ultimate economic goal of a nation is development, having achieved growth. However, countries have moved away from mere economic development to sustainable development. This, however, is a function of so many factors, among which corporate governance is germane, as the running of the affairs of companies in a country goes a long way in the sustainability of its economy. It is against this backdrop that this paper was initiated to consider the theoretical relationship between corporate governance and sustainable development in Nigeria. The paper discovered that there is multiplicity of codes of corporate governance in Nigeria, which are both general and industry-specific, and that they are sufficient and suitable for the economic situation of the country. The paper recommended that, the regulatory authorities in both the real and financial sectors of the country should enforce the application of the respective codes of corporate governance.

Keywords: *Economic goal, economic growth, economic development, corporate governance and sustainable development, sustainability.*

Achieving Sustainable Developmental Goals on Poverty and Hunger Reduction through Increase in Agricultural Productivity in Nigeria (2000-2016)

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Abstract **-** This study examines sustainable development goals on poverty and hunger reduction through agricultural productivity in Nigeria covering the period of 2000-2016. It also examines financing as determinants of agricultural productivity in Nigeria. Secondary data sources were employed for the study and the data were sourced from CBN statistical bulletin, annual abstract of statistics and World Bank Development Indicators. The study employed human development index to proxy poverty and hunger, food production index was employed to proxy agricultural productivity while determinant of financing was proxy by recurrent budget allocation to agricultural sector, commercial banks credit to agricultural sector and microfinance banks credit to agricultural sector. Estimation techniques such as Unit root test, Johansen co-integration test, Pair wise granger causality test and multiple regressions were employed. The study revealed that all the determinants of financing are positively signed with only recurrent expenditure to agricultural sector being statistically significant while food production index is positively signed and statistically significant to poverty and hunger reduction. The study concludes that agricultural productivity positively and significantly impacts on poverty and hunger in Nigeria. The study therefore recommends that government should develop policies that will encourage commercial banks and micro finance banks to conveniently without fear provide funds to farmers for planting and irrigating their crops as this will go a long way in enhancing increase in agricultural productivity and subsequently reduce poverty and hunger in Nigeria

Keywords**:** Poverty, Hunger, Agricultural Productivity, Sustainable Development Goals

Vocational Education Training: A Means of Achieving Sustainable Development Goals on Poverty and Unemployment in Nigeria

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Abstract **-** In most countries of the world, vocational education training serves as an integral part of national development strategies, enhancing productivity, economic growth, employment and favorable standard of living in an economy. However, despite its proven contributions in developed economies of the world, Nigeria seems not to give vocational educational training the attention it deserves. Unfortunately, Nigeria educational system gives premium to academic certification rather than vocational education training and this stands as one of the reasons for the high rate of unemployment and persistence of poverty in Nigeria. This paper examines vocational education training as a means of enhancing sustainable development goals on unemployment and poverty in Nigeria. The study relied on primary sources of data which were sourced through the use of structured questionnaire from the sample size of 150 students of wish, 50 copies each were administered to the Federal Polytechnic Ado Ekiti, Ekiti State University and Afe Babalola University entrepreneurial students. The institutions were selected using purposive sampling techniques as they are institutions situated in Ado Ekiti with center for entrepreneur development. Data were analyzed using ANOVA and chi-square. The study revealed that, vocational education training serves as a catalyst to unemployment and poverty in Nigeria. Therefore, the study recommends that, vocational education training should be given the rightful place in the Nigerian educational system, so as to enable government solve the problem of unemployment and poverty in Nigeria.

Keywords**:** Sustainable Development goals, Vocational Education Training, Unemployment, Poverty

Alternative Energy Sources in an Emerging Economy

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Abstract **-** The importance of energy to our everyday livelihood cannot be ignored, especially for emerging economies like Nigeria. Energy crisis has continued to affect millions of people in African countries though ignored largely, Nigeria inclusive. However, due to the increasing demand for energy and the shortfall in the supply dynamics, the need has risen to look inwards for alternative sources which are readily available but underutilized. In the quest to achieve this, there is need to apply caution on the effect such energy generation may have on the environment through the emission of greenhouse gases (GHGs). The study therefore proffers possible ways in which energy sources can be harnessed, while environmentally friendly and sustainable, especially in an emerging economy. The study observed the need for consumer education on renewable energy sources and strong advocacy/policy for low carbon emission as the key drivers to energy supply mix solutions in an emerging economy such as Nigeria.

Keywords**:** Energy Generation, Environment, Nigeria

Study of Quality Testing of Milk Powder in Sterling Agro Industries Limited – Nova

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Abstract – Quality assurance of food items is very important parameter of acceptability of as per food safety standards at international level. This study is focused on testing of various milk powders produced at Sterling Agro Industries Limited, Gwalior (India). In this paper, we have presented and analyzed various tests of milk powder for quality control. We performed fat percentage test, moisture percentage test, acidity test, bulk density test, sediment test and maltose test. We observed through standard quality assurance test that in dairy whitener fat was found 6.8% (in ideal case it is up to 20% max.), the moisture contents were found 3.53% (in ideal case it is between 3-4%), acidity test was found 80% successful, bulk density was found 0.625 g/cm^3 (in ideal case it is 0.44-0.88 g/cm^3), sediment test was found 92% successful (2% A-grade, 90 % B-grade, and 8% rejected) and, maltose test was found 98% successful. Germer centrifuge was used to determine the fat content of the sample, Precisa moisture balance was used to determine moisture content of the sample. Sediment tester was used to determine the sediments in the sample.

***Keywords*:** Dairy products, quality assurance, skimmed milk powder, bulk density, maltose test

Biometrics Physiological Traits identification using Convolutional Neural Network

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Abstract **-** Convolutional neural networks (CNNs) are very powerful in extracting general descriptors. Seeking this capability of CNNs, a graphical user interface (GUI) has been developed to recognize the physiological biometric traits like face, iris, fingerprint, footprint and palmprint. A dataset of 20 images for each of the trait has been trained for this study and CNN has been used to identify the image of the trait that have been uploaded on the GUI. An end user needs to upload the image of any of the trait and the identification process of the trait can be started in background after pressing the PROCESS button on the GUI. At background, CNN has been used to identify the trait and the result has been shown on the GUI. The GUI and the identification process has been developed using Python.

Keywords**:** CNN, Python, Biometrics, object detection, identification

An Effective Feedforward Neural Network Approach for Fast DCT Image Compression Algorithm using Strassen's Technique

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Abstract- An artificial neural network (ANN) approaches use for the initial recognition of images. This research considers the initial compression of an image and optimizes the result. It is analogous to the classification problem in image processing and requires that feature images signature are identified. Now days Multimedia like text, images, video, audio plays important role and it is part of every field in present scenario like internet, mobile, medical, fashion designing, crime, and military. JPEG (Joint Picture Expert Group) is the best known lossy compression standard and extensively used to compress still images stored on compact manner. Discrete Cosine Transform (DCT) helps in compressing the image data to a high extent. Discrete Cosine Transform (DCT) used to compress small blocks of an image. The data sharing, uploading - downloading or can say file transferring will be possible in a fraction of second irrespective of the size of data, it can be resolved by either increasing communication bandwidth or by decreasing the data size. The first approach i.e. to increase bandwidth which is not possible, our first priority is to use the limited bandwidth on the other hand we can decrease the size of data in such a way so that no loss of information, the only possible way of obtaining this is to transfer the data by compressing it.

Index Terms**:** Image, DCT, JPEG, Compression.

Optimized Neural Network Architecture for the Classification of Voice Signals

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***Abstract*:** In this paper, the performance of optimize feed-forward neural network has been evaluated for the classification of voice signals of English alphabets. There are various feed forward neural network models have been used earlier but the selection of optimize architecture is a challenge. In this presented work we are implementing a optimize architecture which is best suitable for the classification of voice signals. Digital signal processing operations are applied on analog speech signals to convert them into digital form and then to make them suitable for further processing by neural network models.

***Keywords*:** Digital signal processing, Optimize neural network, Pattern classification

Performance Analysis of an Integrated Cellular and Ad Hoc Relay System

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Abstract **-** In this paper, we propose a new wireless system architecture based on the integration of cellular and modern ad hoc relaying technologies. It can efficiently balance traffic loads and share channel resource between cells by using ad hoc relaying stations to relay traffic from one cell to another dynamically. However, the application demand and allocation could lead to congestion, if the network has to maintain such high resources for quality of service (QoS) requirements of the applications. In our system, handoff area and queue are taken into consideration and new and handoff calls are given priority, respectively. We analyze the system performance in terms of the call blocking probability and queueing delay for new call requests and call dropping probability for handoff requests. Numerical illustrations are provided with the help of Successive Overrelaxation Method (SOR). In order to improve the performance of base station, the trade-off between number of services channel and QoS of base station must be considered.

Keywords**:** Ad Hoc networks, Cellular architecture, Relaying, Markovian model, Integration, Blocking probability, Queueing system modeling.

Electromyographic Activity of the External Rotator and Trapezius Musculature in Shoulder Exercises

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Abstract **-** Masonry workers engaged in overhead work-activities have high risk of shoulder injury that often develops to functional loss and disability. Selected rehabilitative exercises, referred to as shoulder rehabilitative exercises (SRE), in this paper, have potential for slowing this development. Electromyography provides an effective way of introducing the complex shoulder muscle activity associations. We selected two SRE to strengthen external rotator muscles (posterior deltoid, infraspinatus, teres minor) and trapezius muscles using integrated electromyography (iEMG) activations. Eight male subjects performed two SRE: (1) Prone ER at 90º abduction with elbow at 90º while upper arm is resting on the table and (2) Standing ER at 0º abduction with 90º elbow flexion. Results indicate that Middle trapezius has the highest level of activation in exercise 1. Middle trapezius and lower trapezius presented significantly higher activations in exercise 1. But, posterior deltoid presented significantly higher iEMG activity in exercise 2.

Keywords**:** masonry workers, trapezius, rotator cuff, posterior deltoid, EMG.

Software Reliability Modeling Using Neural Network Technique

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***Abstract* -** Software reliability is defined as the probability of failure-free software operation for a specified period of time in a specified environment. Software reliability modeling has gained a lot of importance in the recent years. Criticality of software in many of the present-day applications has led to a tremendous increase in the amount of work being carried out in this area. The use of intelligent neural network and hybrid techniques in place of the traditional statistical techniques has shown a remarkable improvement in the development of prediction models for software reliability in the recent years. Among the intelligent and the statistical techniques, it is not easy to identify the best one since their performance varies with the change in data. In this paper, we propose an artificial neural network-based approach for developing the model for software reliability estimation. We first explain the neural networks from the mathematical viewpoints of software reliability modeling. That is, we will show how to apply neural network to develop a model for the prediction of software reliability. The implementation of proposed model is shown with real software failure data sets. From simulation results, we can see that the proposed model significantly outperforms the traditional software reliability models.

***Keywords*:** Software Reliability model, estimation of software reliability, Artificial Neural network, Reliability Prediction.

Integrating Indigenous Knowledge and Skills in Technology Enhanced Science Project-based Activities: Exemplars, Issues and Challenges

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Abstract **-** The world is full of abundant resources that are untapped. This is especially pertinent during the pre-digital era in the countries that emphasize on agriculture including the products that are produced by indigenous groups. This study aims at exemplifying methodologies with evidences of transfer of knowledge and enhanced thinking/technology/life skills among science learners and community members involving indigenous groups through technology-enhanced learning (TEL) project-based activities (PBA) and/or other strategies in selected schools in Ubon Ratchthani, Thailand. Literature review is also made on trans-disciplinary approaches and other cases or lessons learnt. Mixed-research methods were used involving case study and documentary analysis on the output of collaborative inquiry through technology-enhanced PBA. The analysis of document was made on archival records, portfolios including journals and diagrams/photos of activities posted on Edmodo e-platform sub-themes entitled 'Conservation Wise Use of Resources' (ConWUR) and 'Learning Transdisciplinary Science integrating Mathematics/ Arts-Language- Culture/Engineering-Environmental Education-Economics/Technology' (LearnT-SMArET). In addition, videos recorded on the technology-enhanced science PBA integrating indigenous knowledge and skills were also analyzed. The findings revealed that among the useful indigenous knowledge and skills that could be transferred through TEL include preservation of food, producing agricultural products, finding crabs in rice fields, etc. The issues and challenges addressed in this study as well as implication and numerous further research activities that could be implemented are elaborated. The administration of on-line survey entitled 'Attitudes Towards the Use of Digital-tools and Application of Philosophy of Sufficient Economy' (ATUDAPOSE) through Google form is also discussed.

Keywords**:** Exemplary Practices; Project-based Activities; ICT integration; Primary Science Curriculum; Indigenous knowledge and skills; Technology-enhanced learning.

Part – B
Management

Microfinance Services and Income Allocation of Retail Entrepreneurs in San Pablo City, Laguna Philippines

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Abstract **-** Efficient allocation of resources is a challenge for entrepreneurs. Income generated by entrepreneurs are used to finance both business and personal needs. At times, these needs exceed income generated and entrepreneurs seek financial assistance from microfinancing institutions. This paper looks at the significant influence of microfinance services extended to retail entrepreneurs of San Pablo City, Laguna and the extent retail entrepreneurs improve income generation from business operations. From the responses of the 100 selected entrepreneurs, answers for the following were drawn: (1) microfinance services offered to and availed by retail entrepreneurs; and (2) how income or operations have been improved. Correlation analysis revealed that microfinance services have significant influence on income generation. Furthermore, it is imperative that an active educational campaign on proper income management should be implemented in the locality.

Keywords**:** Microfinance, income allocation, retail entrepreneurship, lending institutions

1. INTRODUCTION

In the course of business activities, while it is assumed there is proper management and economical, efficient, and effective operations, the business organization can grow and prosper-without it the organization perishes (Reider and Heyler, 2003). Having efficient management means having sufficient funds that can sustain the cost of business operations. Entrepreneur's income generation must be focused on continuous cash conversion and proper allocation. Otherwise, the company needs to look for alternatives of other resources in aim of satisfying both personal and business necessities.

Efficient allocation of resources like business income is challenging to entrepreneurs. Funds generated, from regular business activities and other investments, serve as the fuel of day-to-day business and household expenditures. The most basic concept in accounting is the entity concept where business organization stands apart from other organizations and individuals as a separate economic unit (Ballada, 2009). Strategic techniques in intelligently planning on how to spend these resources should be employed aside from further development of self-discipline in money management.

Growing demand of retail entrepreneurs of immediate financial assistance paved the way of lending institutions' growth as well. Formal and informal lending institutions like commercial and rural banks, private individuals, and microfinance institutions have active participation in entrepreneurs' lives. Wide range of loan facility are being offered to retail entrepreneurs. With reasonable interest rates and flexible payment terms and schedules, entrepreneurs tend to avail of their services with the hope that these may aid them in their financial journey.

Researchers aimed to identify the significant influence of microfinance services offered and availed by retail entrepreneurs in San Pablo City and how income operations have been improved with these services. The study gives a backgrounder on different microfinance services present in the locality and how income allocation works for these retail entrepreneurs.

As such, this will aid in the development of comprehensive programs educating them to be better entrepreneurs. While the study reveals some of the grey areas in the income management, the formulation of intervention programs are necessary outputs.

2. METHODOLOGY

This study was developed using the descriptive research method. From a sample size of one hundred public market retailers/entrepreneurs in San Pablo City Laguna, the researchers used systematic random sampling with self - made questionnaires and interviews provided to the respondents. Respondents were approached personally and requested to answer the survey questionnaires. Statistical computations were used in analyzing the relationships of factors presented. The following tables present the demographic profile of the entrepreneur-respondents.

Majority of the entrepreneur-respondents' age are within the range 41 – 50 at 34%. Most of them are female (72%), married (61%), and are high school graduates (41%). These demographic profiles present an assumption that due to insufficient formal education and different concerns in raising own family, income allocation becomes more challenging to retail entrepreneurs. And most of the time tend to rely on immediate financial assistance of different lending institutions.

3. RESULTS AND DISCUSSION

Many of the entrepreneur-respondents availed micro insurance services offered with a mean of 3.96. Availing different types of loan with a mean of 3.54 ranked second. Attending seminars, trainings, and several exposure trips and programs has the lowest mean of 2.90. The result is due to entrepreneurs' immediate need of loan assistance for business operations and belief that their time should be focused in the day-to-day management of their business. Time for business is being prioritized over MFIs efforts in bringing awareness that their services do not focus solely on loan assistance to entrepreneurs.

Income being generated by entrepreneurs from their business operations are allocated to loan obligations which yields the highest mean of 3.84. Understandably, these entrepreneurs prioritize spending their income for additional business capital for them to continuously operate (3.04) over satisfaction of all personal obligations (3.00).

Due to different microfinance services being offered and availed by entrepreneurs, their financial position has generally improved with the highest mean of 4.60. Second, amount of loans being extended to them are sufficient to start or further finance the business with a mean of 4.45. It is followed by an overall progress in their general living (4.42), entrepreneurs' appreciation that loan repayment schedules are convenient (4.41), and entrepreneurs' access to health services has also improved (4.39). Evidently, other factors also showed favorable results which mean that microfinance services have generally been helpful in their business operations. Consequently, uplifting entrepreneurs' way of lives in many aspects.

4. CONCLUSION

Entrepreneurs are primarily focused on availing insurances and loans from microfinance institutions. Although there are available seminars, trainings, and exposure trips, entrepreneurs tend to neglect these opportunities believing these will not bring utmost benefits to them. Mostly spending full time in business operations leaving no spare in attending such activities.

Income allocation requires a lot of discipline to have an effective income management per se. With the presence of formal and informal lending institutions, changing market demands, and increasing personal obligations like education, health, and household expenditures, entrepreneurs are greatly challenged to satisfy both personal and business obligations. Somehow, it is fulfilling to know that these entrepreneurs are responsible debtors to their creditors in paying their obligations before satisfying additional business capital and personal obligations.

Lastly, microfinance services positively influenced income operations of retail entrepreneurs in many aspects. Microfinance practices in extending loan assistance and other microfinance services clearly showed favorable feedback from entrepreneurs making their financial position in a better advantage.

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No Poverty vs Reduced Inequality: Partnerships to Achieve the Goal

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Abstract **-** In September 2015, the United Nations established the Sustainable Development Goals toward eradicating world poverty by 2030. The 17 SDGs agenda adopted a 'holistic approach' in achieving them, which is a daunting task. The ultimate result of development is ensuring that people are pulled out of poverty and remain sustainable. To achieve this overall goal requires partnerships on the part of national governments and the people, international organizations and agencies to eradicate poverty. Against the backdrop, the questions this paper would address are: Can poverty be eradicated to reduce inequality? Focusing on social inequality in Nigeria, can balance be attained to guarantee social justice in which poverty is no longer the norm? From several theoretical perspectives, the structural analytics is here adopted, without disregarding individual choices within a given society. With concerted efforts, much can be achieved within the timeframe and beyond provided the momentum thus gained is sustained.

Keywords**:** Sustainable Development Goals; World Poverty; Poverty; Social Inequality; Nigeria; Structural Analytics.

1. INTRODUCTION

On September 25, 2015, the UN's 193-member states adopted new global goals for 15 years (2016-2030) at the UN Sustainable Development Summit in New York. "Transforming our world: The 2030 Agenda for Sustainable Development" encapsulates 17 Sustainable Development Goals (FAO, 2015). Issues related to poverty and inequality and the necessary partnerships to achieve the goals are comprehensively integrated among the 17 SDGs and 169 targets. SDG1, No Poverty, includes targets related to social protection, land rights and resilience, while SDG10 is focused on reducing inequality, ensuring accessibility to opportunities, eliminating most forms of marginalization, including gender discrimination. The link between no poverty and reduced inequality deserves serious attention in partnerships to achieve the goals as subsumed in SDG 17. To clearly analyse the identified and interconnected variables in the SDGs, the paper is structured into five parts, beginning with this introductory part, taking a cursory look at the background and theoretical perspective, poverty and inequality contrasted, combating poverty and inequality in Nigeria, the necessary partnerships, and the conclusion.

2. BACKGROUND AND A THEORETICAL PERSPECTIVE

Development had always been the quest of the world society, even before the end of World War II in 1945, when it became pivotal focus of the United Nations as part of its mandate to ensure international peace and security. In 2000, the UN General Assembly adopted the Millennium Development Goals (MDGs), under the *Millennial Declaration,* aimed at putting an end to poverty, hunger, disease, gender inequality, and access to water and sanitation. The MDGs 15-year operational period (2000-2015) was partially successful, but 'the indignity of poverty has not been ended for all' by 2015 (GLOBAL IMPACT, 2018). The inadequacies inherent in and the unfinished mission of the MDGs occasioned the need to negotiate a new set of global Sustainable Development Goals as a roadmap to guide development in the world after 2015, invariably setting another 15-year timeframe. Understandably, the SDGs took into account the inherent flaws that hampered the actualization of the MDGs. Thus, it was determined that the designated goals of the SDGs should be "action-oriented, concise and easy to communicate, limited in number, aspirational, global in nature and universally applicable to all countries, while taking into account different national realities, capacities and levels of development and respecting national policies and priorities (GLOBAL IMPACT, 2018).

Poverty and inequality are universal realities and applicable in all countries and the goal of eradicating them poses a great challenge and aspirational at the minimal effort. The questions are, can poverty be eradicated? To what extent can inequality be reduced to attain a just society? The Nigerian state is of peculiar interest given its inherent contractions as

a rich and yet a poor county. Therefore, in Nigeria, efforts are being made to take concrete actions in partnership with the rest of the global community, in particular, the UN where 'there is the need to promote effective and transformation of implementation of SDGs at national and sub-national levels' (PM News, 2017).

3. SOCIAL STRUCTURE THEORIES

As the structure of the international system is unequal, so much so are social relations within the system. Poverty and inequality are just two of many socio-economic issues that have everything to do with every aspect of human relations in structural terms. In concrete terms, the task of structural analytics has to do with the rates of poverty and the several aspects of inequality. In this sense, the analysis focuses on empirical data that include the patterns of and access to land use, the shifts in educational achievement, changes in occupational structure, the increase in collaboration between institutions, the existence of networks among groups, and individual choices (Encyclopedia Britannica, 2014).

Two perspectives are worth considering, individual poverty and structural poverty. On the view that poverty is an *individual* phenomenon, a choice so to say, assumes that "people are in poverty because they are lazy, uneducated, ignorant, or otherwise inferior in some manner" (Bruenig, 2014). If this were the case, it is submitted that a program of 'paternalistic' lifeline to sustain this category of underclass might conceivably 'end or drastically reduce poverty.'

The other perspective is that poverty is a *structural* phenomenon, which contends that people are in poverty because they find themselves in holes in the economic system, which confine them to inadequate income level. It is further stressed that others 'inevitably find themselves in that hole because it is a persistent defect in the economic structure' (Bruenig, 2014). However, because individual lives are not static, the same people do not remain in those holes perpetually. Nevertheless, while some are moving out of the hole because they gained employment or were promoted, others would find themselves in it because of the persistent defect in the economic structure. It then follows that the only way to end poverty and reduce inequality is to restructure the social and economic system.

4. POVERTY AND INEQUALITY CONTRASTED

The World Bank contends that there will be "no end to poverty without reducing inequality" (Paulson, 2016). A World Bank senior economist, Jose Cuesta, believes poverty and inequality is not the same thing, but they are very much interlinked. Cuesta concedes, "There is a global consensus on the need to reduce poverty," however, he says, "I don't think there is such consensus on the need to reduce inequality" (Paulson, 2016).

Frankly, there is outright resistance to combating wealth inequality as a means to reduce poverty. Aside from the opposition from mainstream upper high classes to main the status quo, there are other voices who disagree with the notion of reducing poverty instead of inequality. Martin Feldstein believes that "inequality as such is not a problem and that it would be wrong to design policies to reduce it. What policy should address is not inequality but poverty" (Feldstein, 1999). The thesis here is that sources of poverty should be identified such as unemployment, lack of earning ability, and individual choices and policies should be put in place for their mobility.

When concrete policies are enacted to create jobs and fiscal accessibility, this would mitigate unemployment; quality and functional education would increase skill, ability, and earning capacity. The argument follows that when poverty is reduced by these means, it would enhance social mobility and invariably reduce poverty and social inequality. Socio-anthropologically, poverty is part of the social problem while inequality is nature-structured; however, a certain aspect of inequality is human-engendered, such as rigid hierarchical status and conditionality attachment to opportunities. From this perspective, the questions follow: Are poverty and inequality the same? Can poverty be eradicated? Can inequality be eradicated?

While World Bank asserts that poverty could be eradicated by reducing inequality, Feldstein, writing in *The Public Interest (Number 137, Fall 1999),* believes in the reduction of poverty and not inequality. In other words, inequality is not the problem but poverty in the drive to achieve sustainable development goals. In fact, poverty and inequality are not the same. While measures can be put in place to eradicate poverty, inequality can only be reduced. Society is anthropologically structured; social stratification is natured-structured. In every society, there will always be leader/follower; strong/weak; old/young; fat/thin; tall/short; master/servant, and so on. When it comes to poor-rich differentials, "poor people" are not the same people perpetually but social inequality remains (which can only reduce as people move from one status to another).

To illustrate, take a manufacturing industry, for example, the organogram is more or less administratively structured---the Chief Executive Officer (CEO) at the apex and the messengers and cleaners at the bottom. Or, take a military command structure, the "officers and men" expression would always remain, even though the low-cadre officer may rise through the ranks to become General or Field Marshall, the Private is at the base of the structure. Nevertheless, the

structured positions remain and people will always occupy them while their material well-being could be enhanced appreciably out of poverty.

The battle against poverty and inequality is age-long and victory is far-fetched because of the dynamism of social flux. The social dynamics involved in poverty tracking has been demonstrated by the *World Poverty Clock* barometer. A device of the World Data Lab, the World Poverty Clock tracks poverty outcomes in about 99.7 percent of the nations of the world "using data obtained" from the International Money Fund, World Bank, United Nations, and national governments (Ventures Africa, 2017). With the obtained data, WPC estimates the rate at which poverty is being reduced worldwide, and how many people are becoming "extremely poor" in these nations.

Living in extreme poverty is defined by the World Bank as someone living under $1.90 per day. People living in extreme or abject poverty find it very difficult to meet their minimal basic needs for survival. In effect, SDGs Goal 1 as set by the UN in 2015 is to "End Poverty," or, put differently, "eradicate extreme poverty for all people everywhere by 2030." As WPC data reveals, to achieve that goal globally, in statistical terms, "90 people need to leave poverty every minute to eradicate poverty totally by 2030" (Ventures Africa, 2017). However, currently, the WPC calculus predicts

> That for the 2030 SDG target to be met in Africa, 57 people have to leave extreme poverty every minute. However, that is not the case, as on the average, 9 people rather than leaving, enter extreme poverty every minute. Nigeria and the Democratic Republic of Congo are both responsible for the 9. Nigeria needs 11.9 people per minute to escape extreme poverty, but presently has a deficit of 6.8 people every minute, i.e. 6.8 people enter into poverty every minute" (Ventures Africa, 2017).

In real life, people or persons cannot be decimalized, as the above statistics do show. Nigeria, for instance, will need 12 people or persons (not 11.9 people) in real terms to escape extreme poverty, but currently has a deficit of 7 people or persons (not 6.8 people) every minute, that is 7 persons slump into poverty every minute. The socio-economic dynamics of people in-and-out of poverty, especially sliding into the poverty hole, are due to a number of factors that exist within and outside the society. In the case of Nigeria, as will be demonstrated shortly, factors feeding poverty include resource mismanagement, corruption and uncontrolled population growth, which will require concerted efforts to mitigate. In Nigeria, poverty and inequality are not due to lack of resources but largely to prodigality in the use and greedy attitude in the management of the resources. It is a culture of corruption combined with kleptocratic ruling elites oblivious to the daily struggles of the mass of Nigerians.

What the SDGs are demanding from every nation is to take drastic actions to pull people out of poverty and inequality. The State and corporate organizations are required to ensure that a *Private* within the military command structure, for example, should have access to credit facilities to own car, decent housing, quality education, health care for members of his family. The same argument is made for the *Cleaner* at the lowest rung of the organizational structure. In recent times, steps have been taken to change status nomenclature in some Nigerian universities where "Cleaners" are no longer so-called but "Campus Keepers" or "Sanitation Assistants." In some government departments, "Messengers" are "Office Assistants." Nevertheless, the change has not affected their economic wellbeing.

These categories of people in Nigeria and other developing nations do not have access to about $2 per day nor basic needs such as decent food, housing, healthcare and quality education for their families. These are the daunting challenges the partnerships to achieve the SDGs must confront headlong. In Nigeria, in some universities, campus keepers or sanitation assistants earn about N15, 800 ($43.9) per month, which translates to about $1.57 per day, which still falls below $1.90 for people living in extreme poverty. Moreover, the job is not secured and the position is not pensionable as required by international labour standards, even more, skilled workers are not. Our finding showed that more than 90 percent and in some places 100 percent of these campus keepers are women; some of them are widows with more than five children on the average.

The facts that these categories of workers are women and have children as primary dependents, both governmental and non-governmental efforts are needed to introduce some fiscal policy in terms of social safety nets. Farther inland, in the rural areas, the majority of the agricultural workers are also women. For these people to come out of poverty, they need assistance that will take care of the education of their young children (either formal or vocational, or both). Alternatively, fiscal incentives for lending institutions (banks) can encourage them to lend money to poor people, providing guarantees of payment and creating funding programs targeted to the poorest deciles (Bonilla, 2018).

5. COMBATING INEQUALITY AND POVERTY IN NIGERIA

In line with the Sustainable Development Goals agenda, it is clear that the number one goal (SDG 1) of the international community is to end poverty by the year 2030. However, it has been acknowledged that a great threat to progress around the world is inequality (World Bank, 2016). According to the Cambridge English Dictionary, inequality is the unfair situation in society when some people have more opportunities, money, and so on, than other people. It is also seen as a difference in social or economic status and or differences in opportunities between people and groups of people. At its most basic, it refers to the hierarchical distribution of social, political, economic and cultural resources (Habibis and Walter, 2015). A closely related concept is that of stratification, a more specific and technical term that refers to a model of social inequality that specifies the relationship between particular variables, such as wealth and social standing (Habibis and Walter, 2015).

Inequality is different from poverty, although there exists a correlation, as earlier alluded to. Inequality concerns variations in living standards across a whole population (McKay, 2002). Poverty whether defined in absolute or relative terms 'focuses only on those whose standard of living falls below an appropriate threshold level (such as a poverty line) (McKay, 2002). Absolute poverty is concerned with when people's income is so low that they cannot obtain the minimum needed to survive. In other words, people experience absolute poverty when their income is insufficient to obtain the basic needs to survive. Relative poverty is when people's income is well below average, to the extent that they are poor, compared with others in their society and they cannot afford to have the general standard of living that most other people in their society enjoy. For example, increased inequality in income will usually imply higher levels of both absolute and relative deprivation. Intuitively, relative poverty is more closely related to inequality in that what it means to be poor reflects prevailing living conditions in the whole population, even though the degree of inequality will have implications for both conceptions of poverty (McKay, 2002).

To make the concept less ambiguous, 'scholars have tried to make the meaning more specific.' For instance, "economic inequality", mostly meaning "income inequality" have been distinguished from more broad inequalities in "living conditions", "in opportunities", "inequalities in outcomes" and legalistic approach to inequality, which refers to inequality of rights and associated obligations (example, when people are not equal before the law, or when people have unequal political power) (Afonso et al, 2015).

Inequality of outcomes occurs when individuals do not possess the same level of material wealth or overall living economic conditions (Afonso et al, 2015). Inequality of opportunities exists when life outcomes depend on attributes outside the individual's own control or when circumstances determine life outcomes. For example, opportunities related to education and employment should not be determined by gender, ethnicity or family background. According to Afonso et al (2015), equality of opportunity exists when life outcomes depend only on factors for which persons can be considered responsible, and not on disadvantageous attributes outside of their control. It is argued that gender, ethnicity, family background, and so on should not determine outcomes (Afonso, et al 2015).

In combating inequality in Nigeria, two aspects of inequalities are considered, and these are, inequality of opportunity (such as education, employment) and inequality of outcome (with specific reference to income). The first aspect deals primarily with the inequality of opportunities such as unequal access to employment or education; and the second deals with the inequality of outcomes in material dimensions of human well-being such as the level of income. The two aspects of inequalities in Nigeria, which are considered in this work, seek to answer two basic questions: inequality between whom and inequality over what? To address the first question, the inequality between whom, the paper looks at gender inequality (inequality between men and women in Nigeria employment space). There is no doubt that opportunities are many times affected by different factors (ethnicity, geography, and so on) and one of them is gender. Inequalities could arise due to circumstances that are beyond the control of individuals. Gender inequality, for example, remains a major barrier to human development in many countries of the world, Nigeria inclusive.

There is no gainsaying that Nigeria is a highly patriarchal society, where gender discrimination abounds. Studies have attributed the causes of discrimination and marginalization of women not only to the historical legacy of patriarchal influences but also to culture, tradition and the form of socialization received from homes to public settings (Osondu-Oti, 2017; Osondu-Oti, 2016; Raffa, 2016; Osondu-Oti, 2015; Agbalajobi, 2010; United Nations Population Fund, 2008; Nnaemeka and Ezeilo, 2005: Johnson-Odim, 2004; Anunobi, 2002). Nigeria, the 'giant of Africa' never featured among the world leading countries in gender equality promotion (World Economic Forum, 2015), and is not among the 20 leading countries in Africa. Gender inequality remains deeply entrenched in Nigeria and the rights of the women continue to be 'strongly' violated and trampled on.

It should be recalled that in April 2016 the first Gender Equal Opportunity Bill presented to the Nigerian Senate was rejected and the argument of the Senators was that the country's culture and religion do not support women equality with men (Osondu-Oti, 2016). Although the modified version of the Bill (where the language of equality has been removed) got to the Chamber's second reading in September 2016, the Bill is yet to be finally passed into law. Cultural and traditional practices such as female genital mutilation and early marriage are still prevalent in the country, without adequate measures or law by the government to address them (Osondu-Oti, 2015). For example, the issues of girl-child marriage, deprivation of educational opportunity for girls and other opportunities that are deprived women such as land ownership in Nigeria do not portend well for women's development and cannot guarantee sustainable development for Nigeria.

According to a recent Oxfam (2018) report, over three-quarters of the poorest women in Nigeria have never been to school and 94% of them are illiterate. Women represent between 60 and 79 percent of Nigeria's rural labour force but are five times less likely to own their own land than men (Oxfam Report, 2018) are. Men dominate the formal sector and have a better income than women have. According to the United Nations Development Programme (2010), over 50 percent of women are in the informal sector engaging in agricultural activities and petty trading that provide lesser income. For Nigeria, achieving equitable distribution of income and alleviation of poverty is a critical development issue (Okoronkwo, 2011) that must be tackled in the country's 2030 Sustainable Development Goals agenda. A just society is an equal society and Nigeria's inequality problem has continued to exacerbate poverty and social injustice. At the end of 2017, Nigeria's Human Development Index was put at a low category of 0.527, and the country's position was at 152 out of 188 countries (Olawoyin, 2017). Nigeria retained its 2015 status with a computation of 0.527 (UNDP, 2015). Gender discrimination ordinarily implies structural deprivation (sometimes interpreted as relative poverty) or a culture of poverty in Nigeria. While the international community has continued to push towards equality, gender mainstreaming and progress to sustainable development remains uneven among countries. While countries like Rwanda, in Africa, have made remarkable progress in gender equality, especially in political representation, the progress towards equal treatment of men and women in policies, laws and programs exists only in a paper in Nigeria, with little done in practice.

Concerning the second aspect of inequality that is addressed in this work (inequality over what), there is no gainsaying that income inequality persists in the country. Despite being the largest economy in Africa, economic inequality in Nigeria has reached extreme levels (Oxfam, 2018). Nigeria is one of the poorest and most unequal countries in the world, with over 80 million or 64% of her population living below poverty line and the situation has not changed over the decades, rather it is increasing (Opejobi, 2016). In rural areas, poverty and hunger have remained high. Income is distributed in an even manner not only among families, households, communities, professions but also among groups.

In Nigeria, educational qualification does not guarantee a better pay. Politicians and members of parliament are about the highest income earners in the country while a renowned university professor even earns less than a local government chairman who has little or no skill (Okoronkwo, 2011). More than 50 years after Nigeria's independence, the gap between the rich and the poor have continued to widen. It is evident that income inequality has contributed to unrest and deep-rooted envy against the upper class who are often perceived to be exploiting the lower class. A good example is the Niger Delta militancy, where the people protested for years on the deprivation and inequalities in the share of the region's oil wealth. High levels of inequality create a sense of envy and resentment within communities, which leads to criminal behaviour as this is a way that excluded groups can achieve material success (Merton 1968, cited in Habibis and Walter, 2015). Large income differences affect how people relate to one another and create 'broken societies' (cited in Habibis and Walter, 2015).

There is a growing evidence that inequality is a major issue driving poverty. If the issue of inequality is not addressed, it is predicted that 'Nigeria may become the poverty capital of the world' (Eweniyi, 2017), and such prediction is not unrelated to its rising population, rising unemployment and uneven distribution of income. According to Oxfam (2018) report the combined wealth of Nigeria's five richest men, $29.9 billion - could end extreme poverty at a national level yet 5 million face hunger. More than 112 million people are living in poverty in Nigeria, yet the country's richest man would have to spend $1 million a day for 42 years to exhaust his fortune (Oxfam, 2018). It is a common knowledge in Nigeria that the rich are getting richer and the poor are getting poorer.

Inequality and poverty in Nigeria are not due to a lack of resources ('Nigeria has abundant resources'), but due to the ill-use, misallocation and misappropriation of such resources (Oxfam, 2017). At the root, is a culture of corruption combined with a political elite out of touch with the daily struggles of average Nigerians (Oxfam, 2017). One major consequence of the mismanagement of the nation's resources is the high rate of unemployment, which often translates into poverty. In 2016, more than 21 percent of Nigeria's youth were without a job (Oxfam, 2018). Various surveys by the National

Bureau of Statistics show that the unemployed constitute a critical component of the core poor (Okoronkwo, 2011). It is estimated that an annual average of about 2.8million graduates enter the labour market, with only about 10 percent of them securing employment (Okoronkwo, 2011). Without a source of income and adequate means of livelihood, people find it difficult to attend to their basic needs. It has been estimated that 57 million Nigerians lack safe water, over 130 million lack adequate sanitation and the country has more than 10 million children out of school (Oxfam, 2018).

While educated ones could at some point be opportune to get a job, it is not the same for the uneducated and the people in rural communities. According to Okoronkwo (2011), poverty in Nigeria is concentrated among persons with no education and those with only primary education. Also, the upper class of the Nigerian society have continued to enjoy great wealth and are in better positions. It is also a common knowledge that children from affluent homes in Nigeria have easy access to gainful employment as their parents provide the needed links, and children from poor background are often left in the dark in pursuit of a decent job (Okoronkwo, 2011).

Thus, to combat inequality and poverty in Nigeria, or to make appreciable progress towards the world's 2030 Sustainable Development Goals agenda, the country must take adequate steps to address group inequality (especially in relation to gender) and income inequality. A society can be said to provide equal opportunities when circumstances do not determine the differences in life outcomes (Ferreira et al 2009 cited in Afonso et al 2015). Also, equal opportunity exists when people can boast of a good source of income needed to survive, and where people can afford to have the basic standard of living that most other people in the society enjoy.

6. PARTNERSHIPS TO ACHIEVE THE GOAL

The link between poverty and inequality and all other aspects of the SDGs and 169 targets to be achieved are subsumed under SDG 17, underscoring the important role of partnerships to achieve the goal. The centrality of partnerships in every area of human endeavour cannot be overstated in the efforts to achieve the ambitious goals set for the development of every nation of the world. As contained in a U.N. report, "In addition to eliminating poverty, the new framework (the SDGs) must address the drivers of change, such as economic growth, job creation, reduced inequality and innovation that makes better and more careful use of natural resources. Industry will surely play a prominent role in advancing all these drivers" (GLOBAL IMPACT, 2018).

Global Impact, a non-governmental international organization, is championing the initiative captioned "IMPACT 2030," is essentially a collaborative effort. It is a "collaboration of international leaders from the private sector, non-profits and governments that are working towards the success of the SDGs exploring specifically what can be done to mobilize corporate volunteers to contribute directly to the success of the UN's SDGs." No one is in the delusion that achieving the SDGs would mean safer, cleaner, more peaceful and egalitarian world for all.

However, that success requires unwavering commitment, participation and coordination from all segments of the society-national governments, foreign governments, domestic non-governmental organizations, international non-governmental organizations, international governmental organizations, private sector corporations and individuals. While the next 12 years will bring challenges, they will also bring changes as the world work together to surmount barriers and achieve the goals.

It is worthy of note that Global Impact's areas of expertise are focusing on SDG 17: Partnerships for the Goals with the Private Sector. We concede that a successful sustainable development agenda will require partnerships with every segment of society, 'partnerships that are inclusive, built upon principles and values, and with a shared vision.' In this endeavour, each country must take responsibility to ensure the implementation of each goal and should not hesitate to call for assistance when and where necessary from more advanced development partners.

Many people would like to see a world free from abject poverty and inhumane inequality. As a fighter against poverty, Muhammad Yunus dedicated the Grameen Bank and affiliated institutions to providing opportunities that can help improve the socioeconomic condition of people living in abject poverty. Yunus strongly believes that not only does "microcredit has a key role to play in reducing poverty," but also the "access to credit for microenterprises is important by itself in improving the lives of the impoverished," and "complemented by other strategies." (Encyclopedia Britannica, 2014). Parts of these other strategies include "partnerships between microcredit programs and technology-oriented institutions" which "will help reduce discrepancies in the opportunities available to the poor and nonpoor."

As information and communications technology (ICT) has revolutionized human interaction globally, Yunus and well-meaning others "would like to see all information available to all people everywhere (including the poorest, the ignorant,

and the most powerless) at all times, almost cost-free" (Encyclopedia Britannica, 2014). Then, Yunus posed the challenging question: "Why cannot we create a poverty-free world before the new century (21st century) crosses the halfway mark?" that is, by 2050. Indeed, the SDGs sunset is 2030 but if by that date not all the goals have been achieved, the goal post can be extended to 2050. Eradication of poverty is feasible but the reduction is the first step toward that end, and as success is recorded in poverty eradication, there will be a drastic reduction in inequality. ICT has done a lot to reduce social inequality in almost two decades in Nigeria since 1999. While most African academics cannot afford to attend international conferences, due to air transportation costs, in some cases they could send their papers for presentation via the internet, for example, the 2018 SRD Indonesia Conference. Similarly, the cellular phone has broken the barrier in communication, even the ignorant, the uneducated and old people have access to mobile phones. Thus, communication (verbal telephoning) is no longer the exclusive of the rich only as was the case 20 years ago in Nigeria. With concrete actions in partnerships with corporate organizations, much can be achieved in the end.

7. CONCLUSION

The 2015 U.N. Sustainable Development Goals was established to build on the progress made under the Millennium Development Goals (2000-2015). It realized that despite the success recorded during the MDG years, "the indignity of poverty has not been ended for all." Therefore, this paper has focused on SDG 1, End Poverty, SDG 10, Reduced Inequality, and SDG 17, Partnerships to achieve the Goals. Partnerships in achieving the SDGs are a critical goal on its own, bearing in mind that no single country nor organization can do it alone. Therefore, the partnership must be all-encompassing, inclusive of governments, NGOs and individuals.

Poverty and inequality in Nigeria have been used as a case study to illustrate the centrality of partnerships in the possibility of achieving the goals. We concede to Oxfam's position that Nigeria can close the poverty and inequality gap because "Nigeria is not a poor country yet millions are living in hunger. The government must work with the international community to get food and aid to hungry people now. But it can't stop there. It must free millions of Nigerians from poverty by building a new political and economic system that works for everyone, not just a fortunate few" (Oxfam International, 2018). In addition, the government must work with relevant stakeholders like the labour unions to enact a market-oriented minimum wage for workers. In furtherance of this, national budgeting in the next 12 years must make adequate provisions for affordable and quality education, good health care facilities, and decent housing, constant electricity supply and transportation systems. These measures would, largely, mitigate extreme poverty and inequality and enhance the living standard of the people. In this way, there is assuring hope that the SDGs will be achieved by 2030 and beyond.

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Human Resource Accounting: Its Constraints and Limitations in the Philippines

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Abstract **-** This study is a sequel to the article previously written on awareness of Human Resource Accounting Practices and Costing (HRAC) of companies located in the Philippines. This study aims to find out if the recommended accounting system is acceptable by companies and its constraints and limitations in adapting HRA in the Philippines. The researcher used questionnaire/interview to collect the data from respondents representing forty (40) companies in Metro Manila. The results showed that companies were not interested in adapting any accounting system for human resources at this time. Constraints include no law recognizing humans as assets, no clear guidelines, lack industry standards and lack of universal acceptable human valuation. Limitations in adapting HRA are problems in measuring and amortizing value of employees, the need for more time and resources, morale problems in considering employees as assets, which may dehumanize them, and the need for more time and planning to get used to the accounting system. Some companies, however, are open to the idea of using HRA if given proper guidelines, standards and rules. It is recommended that Philippines companies focus on making HRA an organizational goal and to have standardized procedures to measure human capital.

Keywords: Human Resource Accounting, HRA Constraints and Limitations, HRA in the Philippines

1. INTRODUCTION

Are human resources assets? There has been a development of the human capital theory in response to this question. Human capital theory changes the notion that capital is restricted to the physical capital. Thus, asset is defined as any asset that contributes to the revenue stream of the company that could require the intervention of human capital. At a certain extent this definition of asset, that mostly involved non-market activities, constitute returns and costs (Mincer, 2016). This concept of human capital theory, therefore, becomes an area where economic analysis is necessary, even though specific measurements are not necessarily existing yet. Although not a prevalent notion, it is important that accounting records take note of human resources as valuable assets for the company.

Flamhoitz (1975) defines Human Resources Accounting (HRA) as accounting for people as an organizational resource. It involves measuring the costs incurred by organizations to recruit, select, hire, train, and develop human assets. According to the American Accounting Association (AAA), HRA is the process by which the data referring to human capital are identified, measured, and communicated (Hossain et al., 2014). The method is designed to report investments incurred in human resources, which is overlooked in the conventional accounting systems. This type of accounting system is not new. Its emergence in the 1960s was caused by the demand to recognize people among company's assets. Even though the conceptualization of HRA is not new to the industry, very few companies have followed this accounting system. There is an outcry to properly account for human asset in financial accounting. Many models were created by professionals and practitioners, but they were not widely accepted due to their limitations and possible misrepresentations.

The development of a current accounting system for human resource has been agreed by countless literatures by Pyle, Brummet & Flamholtz (1968), Stanko, Zeller & Melena (2014) and Ganta & Geddam (2014) to name a few. An accounting system recognizing human resources as assets was recommended in a recent paper by Ibarra & Cosico (2016). It was recommended for use by companies in the Philippines after finding out that companies in the Philippines are not aware of Human Resource Accounting. It is the objective of this study to determine if the proposed Human Resource Accounting system is acceptable and possible in the Philippines at this time. This study will focus on the following questions:

1. Will companies in the Philippines use the proposed HRA system?
2. What are the constraints and limitations in adapting the HRA system in the Philippines?

The Proposed HRA System (Ibarra & Cosico, 2016)

Once the human resource is hired by the company, the value of the human resource should be assessed using ratings and ranking based on the following criteria: educational attainment, work experience, and skills acquired. The entry salary package of newly hired human resource will depend on the criteria. The amount/percentage corresponding to each criterion will be at the discretion of the company based on the company's policy and standard. This tantamount to human resource valuation as reflected in the human resource salary package. The following accounting entries will be used:

Dr. Salaries and Wages Expense
  Cr. Cash/Cash in Bank
To record salaries of human resource

All cost incurred by the human resource associated with training, development, and learning costs will be capitalized and amortized over the expected useful life (retirement age) of the human resource. If the human resource leaves the company due to resignation, death or dismissal, the whole amount not written off is charged to the current revenue as impairment loss. The following accounting entries will be used to record training development and learning cost incurred by the human resource, amortization of HR investment, and impairment loss.

Dr. Human Resource Investment
  Cr. Cash/Cash in Bank
To record training and development, learning cost of human resource

Dr. Amortization of Human Resource Investment
  Cr. Human Resource Investment
To record yearly amortization of human resource investment

Dr. Impairment Loss
  Cr. Human Resource Investment
To record amount written off due to resignation, death or dismissal

The job design (job description, specification, and qualification), awards, and recognitions received by the human resource from various professional affiliations/social and civic organizations will be used to value the human resource. The company can give incentive bonus or fringe benefits to the human resource. The accounting entries to be used:

Dr. Human Resource Investment
  Cr. Cash/Cash in bank
To record human resource investment (job design, awards and recognition).

Performance and productivity rating resulting from the performance and productivity evaluation of the human resource immediate supervisor will be the basis for the performance/productivity bonus of the human resource. The accounting entries to be used:

Dr. Human Resource Investment
  Cr. Cash/Cash in bank
To record human resource investment (performance/productivity bonus)

All expenses are shown in the income statement. The account "Human Resource Investment" will be shown in the balance sheet under assets and classified as "Other Investments". In order to contextualize the proposed accounting system for human resources, representatives of companies coming from varying industries were interviewed from April to October 2016. The respondents were 18 accountants, 11 human resource managers, 7 managers, 2 owners**,** 2 presidents, 1 finance officer, and 1 controller, representing forty (40) companies in Metro Manila. While the number of respondents surveyed/interviewed does not give a representative sample of all companies in the Philippines, it will provide an insight on how companies in the Philippines perceived human resources as an asset. This study has important implications to generally accepted accounting principles and concepts. It advocates changes in the preparation of financial statements. It will add to the literature in the field of accounting and human resources.

2. REVIEW OF RELATED LITERATURE

This paper studied and evaluated relevant literatures, researchers, and practitioners' experiments to measure the value created by human capital, as well as constraint and limitations in considering human resources as assets. The following related literatures will contribute in understanding the constraints and limitations in using any HRA system.

According to Lee (1981) an organization utilizes two types of resources vital for the organization's existence – physical and human resources. Physical resources refer to machines, materials, money, and methods required that help the organization achieve the objectives of providing goods and services, while human resources or humans employed in the organization indicate its overall stature. The accounting function normally provides financial information concerning the utilization of the physical assets. The study argued that a logical extension of a company's services is to have an HRA system.

The purpose of Md. Amirul Islam et al. (2013) paper is to review the current methods of HRA, explain the significance of HRA in business, and suggest ways to devise methods for business practices. We believe that human resource should not be recorded as a expense because the value of developing the skills of an employee has long-term benefits. Companies should recognize humans as an integral resource of the company by capitalizing them.

Narayan (2010) discussed several issues and challenges regarding the development of HRA in the global setting. Since traditional accounting procedures have long since been practiced and standardized, the introduction of a new accounting system, such as the HRA, is met with criticism and objections. One of the main criticisms is the lack of a standard approach, which contributed to the slow development of the concept of HRA. There are too many factors that could potentially influence the values in HRA, which make the system very subjective and up to the discretion of the company. This lack of objectivity has long since been a hurdle in the advancement of HRA. Individuals grow at different rates and as a result, it is difficult to accurately determine their values. There is also no model for valuation of human assets. The paper noted that there is an outcry of a need to properly account for human asset in financial accounting, and that valuing human resource may be a problem since there is no actual method to measure the value of a person. There has been apprehension and concerns raised regarding the negative impact of HRA on the employees. They might not react well as they might feel like they have been reduced to a mere asset. There will also be a new hierarchy borne out of this system, as employees will have a more concrete way of comparing their own worth against their colleagues. We think that physical assets are technically owned by the company, opposing recording human resources as assets. Ownership of assets implies that it can be traded, which is something impossible for human resources. Narayan discussed the fact that HRA is not recognized by tax authorities. As a result, HRA solely serves the purpose of being a basis for decision-making, standards, and precise measures for the amortization of human assets which still has a long way to go.

Gates (2002) came out with various factors and deterrents to the application of HRA. These limitations are as follows: sensitive data that cannot be shared externally, measurement not a first priority for the company, not enough time and resources, human resource professionals unaware of value or no clear return on investment, lack of clear guidance, universal practice and industry standards, global differences in the valuation of human resources, lack of awareness and acceptance of HRA, and need for extensive research to adapt the system.

From another perspective, Jasrotia (2004) looked at the trends in the field of HRA and came up with some factors that deter the progress in the use of the concept, these are as follows: low level of awareness and acceptance of HRA, absence of an industry standard, extensiveness of the research involved, dynamism of some industries like the information technology due to frequent discoveries, and technological advancement.

According to Arkan (2016), there are a lot more limitations and criticism of HRA and it is still struggling for international acceptance. HRA has been dominated by two main questions. Firstly, how could human assets be defined as assets on the balance sheet and secondly, and on how it can be valued in a satisfactory way. This leads to the dehumanization of people where there are viewed as physical assets, or where their value might be publicly perceived to be low with serious psychological consequences. The lack of a clear-cut procedure in allocating costs and value, the lack of empirical evidence to support its use as a management tool, and some vagueness regarding exactly how the value should be presented in the financial statement all represent significant problems for its wider adoption and use. Legislatively, it is also not clear how tax laws recognize humans as assets, nor is there an accepted method of valuation, confounded further by the abstract, qualitative nature of people where bias might influence objectivity and preciseness that cannot be viewed in monetary terms. We believe that only time will tell how HRA will develop and if ever it will be internationally standardized and implemented.

Likewise, Hoque (2010) also believes that HRA is still struggling for acceptance. He noted that it is still extremely difficult to determine the actual value of the human resource of any organization. Accounting standard committees have not given any proposal. As a result, any organization has the chance of manipulating the accounting system.

Fleming (1977) in his survey asked the question on how to measure the value of employees beyond their compensation. Survey respondents were conflicting at some points since there is no consensus as to how the valuation should be done. Respondents believe that valuations can be affected by personal feelings and some employees would not want to be ranked lower than someone where they feel that they perform just as well as another and that assuming the same value for people with the same rank, title, salary, and experience is considered as objectionable.

Vohra's (2015) case study presented current HRA practices within Kochi Refineries Limited (KRL) and examined the different factors that affected the valuation of the organization's human resource to derive conclusions and recommendations to improve HRA practices within KRL. The case study shows that HRA is still in its developing stages and there is no standard HRA model that is being accepted all over the world. This makes HRA confusing for companies and will cause critical problems in India.

Rahaman, Md, et al. (2013) presented the limitations to the three different models of valuating human resources. The Present Value of Future Earnings Model ignores the probability that an employee may advance in his position and ignores the probability that they will stay in the company and will be alive for the whole duration. The Acquisition Cost / Replacement Cost Model measures only the costs to the organization, ignores completely the value of the employee to the organization, and lacks independent validation for the amount while the Replacement Cost Model adds additional subjectivity to the valuation.

Baker (1974) aknowledges the need for HRA but the current available literatures do not properly define the limits and standards for it. The measurements available in the current literature are very subjective, which can then be abused when presenting the value of business' assets. He believes that further research is needed so that standards and guidelines can be properly set in place. In a similar literature survey by Johanson et al. (1998) several difficulties or limitations with regards to human resource cost were presented. Limitations include quantifying the value of a human resource material, calculating on the job training an employee receives, valuating intellectual and physical values of the employee, determining future incomes related to a certain employee, and ethics in attaching a physical value to a person.

Akrani (2011) article specified the certain limits of HRA, which focused on the uncertainty of the employees' lifespan and stay in the company. Another limitation mentioned was the lack of guidelines and standards for HRA, assignment of cost and valuation of an employee. Sasirekha (2008) also discussed the same concerns, namely the lack of standards, guidelines and the uncertainty of employee lifespan or stay with the company. In addition to that, we also discussed the possible reduction of employee morale if an employee gets low valuation. Likewise, human resources are not capable of being owned, retained, and used unlike physical assets. Another problem mentioned is the lack of empirical evidence that supports HRA as an effective tool in HRA and lack of tax laws that recognizes human beings as assets. Singh (2012) also discussed the same subjects and included the problem on how persons are to be amortized, whether it is decreasing or increasing method.

Human beings are extremely difficult to account for in a scientific and mathematical way but they are key assets to a company, Jac Fitz-Enz (2000) said in his award-winning book, The ROI of Human Capital. We emphasized that the capability information technology puts at the disposal of organizations can be a barrier to understanding human value as economic units and as spiritual beings. He believes that people generate value through the application of their instrinsic humanity, motivation, learned skills, and tool manipulation. He thinks that applying the same double-entry bookkeeping procedures that we use for assets and liabilities for human resources is worth trying but caution that there are not enough studies and researches to prove if this is an effective accounting system or not.

3. METHODOLOGY

In order to substantiate the inference of HRA, its acceptance, constraints, and limitations, the researcher conducted a survey/interview to several companies in the Philippines. Selection of the companies was done out of both convenience and structural reasons. The paper chooses to tackle the insights of different industries to provide a more comprehensive report on the companies in the Philippines. Respondents came from different industries such as telecommunications, education, IT startups, stores, real estates, retailers, an airline, and a business process outsourcing

(BPO) company, specifically Convergys. Such companies are a combination of various types and sizes including old, new, small, and large.

Questions/interviews are mostly designed to gather their inputs on the acceptance, constraints, and limitations of the proposed accounting system. Respondents were asked to rank the constraints and limitations to find out which are their major concerns. These constraints and limitations were derived from the previous review of literatures. In the absence of better definitions, lacking in rules, standards, concepts or guidelines are considered as constraints in using the accounting system; while limitations are internal problems that deter the use of HRA system.

4. RESULTS AND DISCUSSION

While human resource accounting expands the view of an accounting system and provides a fuller picture of a company's activities, there are constraints, limitations or even difficulties in adapting HRA.

Awareness and Adapting the Proposed HRA system

Table 1: Awareness to HRA and Adapting the Proposed HRA System

	No.	%
Awareness to HRA		
Yes	3	7.5
No	37	92.5
Total	40	100.0
Adapting the proposed HRA System		
Yes	4	10.0
No	33	82.5
Not Sure	3	7.5
Total	40	100.0
Adapting the proposed HRA System if given proper guidelines		
Yes	21	52.5
No	16	40.0
Not Sure	3	7.5
Total	40	100.0

As shown in Table 1, thirty-seven (37 or 92.5%) of the respondents attested that their companies are not aware of any HRA. Only three (3 or 7.5%) believe that their companies are aware of HRA, however, they are not using any accounting system to record human resources as assets. None were knowledgeable about the different methods of doing HRA. All 40 companies use the conventional accounting system which records costs incurred relating to HR as expenses. Wages and salaries are normally considered as expenses to the company rather than an investment in human capital. An interesting point was also raised that even if there is no definite value of the HR, a manager still has the grasp of his employees' skills and can use these in making managerial decisions.

Respondents are not particularly interested in using the proposed accounting system for human resource at this time. Only four (4 or 10%) out 40 respondents will use the system. Thirty-three (33 or 82.5%) will not want to use it because their companies are comfortable with their current system and do not wish to alter it unless necessary and three (3 or 7.5%) are not sure if they will want to use the proposed HRA system due to the lack of information available about it and its corresponding effects.

Respondents are open to the idea of adapting the proposed accounting system if proper guidelines, standards, and rules are given. More than one-half (21 or 52.5%) of the 40 respondents will use the accounting system. Sixteen (16 or 40%) will not want to use it even if guidelines will be provided because it would disorganize their previous years of

accounting records and three (3 or 7.5%) are not sure if they will want to use any HRA system because they still believed that the conventional way of taking accounting records is already perfect as it has been established for a long time.

All companies do not have HRA system. This shows that HRA is not included in their company's accounting structure. The unawareness of the interviewed employees indicates that the companies do not see any room for HRA in their system as of this time, and they would still resort to what is already proven and established, that is, the conventional accounting system that does not directly record human capital as an asset.

5. CONSTRAINTS AND LIMITATIONS IN ADAPTING HRA

Lacking in rules, standards, concepts or guidelines are constraints in using the accounting system. Human resource accounting entails a standardization of processes and methods without sacrificing accuracy in order for it to be adapted well despite the vast differences in management styles among companies. Table 2 shows the constraints in using HRA.

Table 2: Constraints in Using Human Resource Accounting

Constraints	Rank
No laws recognize human as asset	1
No clear guidelines	2
Lack of industry standards	3
No universally accepted method of human valuation	4

Tax laws do not recognize human beings as assets was ranked 1. Most respondents believe that each individual has his own knowledge, skills, and attitude (KSAs) that would be extremely complex to quantify in accounting terms. There are no specific procedures or guidelines for finding cost and value of human resources of an organization was ranked 2. Ranked 3 was lack of industry standards, which will make comparison difficult. There is no universally accepted method of human asset valuation was ranked 4. Limitations are internal problems that deter the use of HRA system. Limitations in using HRA are shown in Table 3.

Table 3: Limitations in Using Human Resource Accounting

Limitations	Rank
Problem in measuring value of employees	1
Problem in amortizing value of employees	2
Need more time and resources	3
Employees may demand more compensation	4
May dehumanize employees	5
Need training and planning to use it	6

Problem in measuring value of employees was ranked 1. Recording employees as assets or investments would be very misleading on a financial statement according to the respondents. The period of existence of human resource is uncertain; amortization will be a problem was ranked 2. The need for more time and resources to learn about a new system particularly on human resource was ranked 3. More values indicated for employees in the financial statements might lead to employees demanding for higher compensation was ranked 4. Ranked 5 is about labelling people in monetary terms and objectifying them, as assets of a company are behaviorally unacceptable in terms of cultural norms. HRA may dehumanize employees. Respondents believe that human resources are not capable of being owned, retained, and utilized, unlike the physical assets. To adapt a new accounting system will entail a lot of training and planning before it can be used perfectly. This limitation was ranked 6.

6. CONCLUSION AND RECOMMENDATIONS

The results of this study are clear indication that companies in the Philippines are not aware of HRA, since old or new companies whether large or small are not knowledgeable about it nor do they apply it. There is no indication of any innovation to record human resource as an asset in the accounting system of the companies in the Philippines.

Companies relied on generally accepted practices due to lack of human resource accounting procedures. The chances of adapting a new accounting system to record human resource as an asset is almost nil. Human resource accounting is still at its developmental stage in the Philippines. It will require a tremendous effort to radically change the perspective of accounting practitioners and firms. Some companies do not put too much emphasis on intangible assets, which makes HRA difficult to introduce at this time. HRA needs international regulations and standards in measuring human resource. HRA also needs more time, planning, and training before it can be understood and used in the Philippines.

However, the results of the study have given hope in adapting an accounting system for human resource in the future. Some companies are open to the idea of using HRA if given proper guidelines, standards, and rules. With its steady economic growth, the companies in the Philippines would have to look at human resource accounting to cater to the international growth of the company. Taking human resources as a valuable asset to the company does not in any way disrupt, disorganize or even not align the previous accounting records of the company. Furthermore, it adds more area for economic analysis to exist, which definitely gives more insights regarding the company's sustainability and growth. HRA gives more to what the conventional accounting method provides.

Philippines companies should focus on making HRA an organizational goal, to have standardized procedures to measure human capital the way financial capital has been measured for the past decades. If HR is able to accomplish this, then they will be able to have a more accurate estimate of the real value of their current human inventory and assets. They will be able to determine how their talent capital can be best deployed and utilized for the business. Human assets have a potentially high return on investment and it would make sense for a company to be more precise with the measurement of their exact contribution to the profit of the company. Compensation, benefits, training, and retirement are some of the biggest expenses of an organization which make it a necessity for Human Resource Departments to make sure the company is getting good returns on the money invested on employees.

Thus, Philippines companies should be more open to changes in their accounting system. The HRA system in the previous pages provides an idea on how these companies could manage their human resources in such a way that they would be considered assets to the company**.** Additional research is necessary for effective application of human resource accounting.

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Abstracts

Exploratory Study on the Entrepreneurial Skills of Business Administration and Computer Science Students of MSEUFCI

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Abstract **-** This study evaluates the entrepreneurial skills of business administration and computer science students enrolled in the Special Project subject. This specifically appraises the readiness and know-how of the students to start a business, evaluate their innovativeness to develop a product or service, and ability to produce capital and resources to start a business. The descriptive research will be used in the study. A survey instrument adapted from Velasco, Salvacion and Tagalog (2016) will be the primary means of gathering data. Convenience sampling will be used due to students' attendance during the conduct of the survey. Analysis of Variance (ANOVA) will test the significant difference in the response of the two (2) sets of respondents. The result of the study is an initial step in developing the potential of students to become an entrepreneur utilizing the Special Project Papers as potential business venture.

Keywords**:** Entrepreneurial skills, Entrepreneurship, Business Administration, Accountancy

Evolution, Implementation and Effects of International Accounting Standards in the Philippines

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Abstract - This paper will discuss the evolution, implementation and effects of international accounting standards in the Philippines. The rule and standards governing the accountancy profession in the Philippines is under Republic Act 9298, or the Accountancy Act of 2004. Historically, Philippines accounting system, rules and practices were based on the established Generally Accepted Accounting Practices (GAAP) initiated by the United States. In 2005, the country decided to shift to European accounting standards better known as International Financial Reporting System (IFRS). Implementation of the new accounting standards emphasizes accuracy, transparency, and error free financial reporting. The new accounting standards also expect to make it easier for foreign investors to analyze the financial reports of companies and gauge their financial standing. In the Philippines, implementation of these standards is under the Philippine Financial Reporting Standard (PFRS) which is the local version of IFRS. This paper will be useful to under develop and developing countries that are challenged to adapt financial accounting standards that will assist them in analyzing financial statements to be able to make better business decisions.

***Keywords*:** Accounting standards, PFRS, IFRS, International accounting standards

Best Practices in Strategic Management in Selected Secondary Schools in Surin Province, Thailand: Basis for ASEAN Integration Plan

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Abstract **-** The descriptive-exploratory study sought to determine the strategic management practices implemented in government secondary schools with the objective of developing an enhanced model for strategic management. In particular, it sought to determine how effective the strategic management practices being implemented in the secondary schools were in the areas of Internal and External Assessment, Strategy Formulation, Implementation, Evaluation and Sustainability. It also aimed to investigate whether there was a significant difference in the level of effective implementation of strategic management when respondents were grouped according to school size. Moreover, it sought to find out the issues and concerns that influenced the effective implementation of strategic management in schools, as well as how strategic management has contributed to the ASEAN Integration program of the school.

The study was conducted in the secondary schools in Surin Province, Thailand. Stratified sampling technique was used to choose the frequency of the samples of administrators and teachers from the ten best government schools.

Study results show that in the identified areas, the strategic management practices being implemented in government secondary schools are all highly effective. Also, there is a significant difference in the assessment of the respondents on the level of effective implementation of strategic management when respondents are grouped according to school size. In the interview with respondents, several issues and concerns that influenced the effective implementation of strategic management in schools were identified. Also, the best practices in strategic management were identified as useful tools to the ASEAN integration program of the school. An enhanced model for strategic management was recommended as output.

Keywords*:* Best Practices, Strategic Management, Secondary Schools, Asean Integration Plan, descriptive-exploratory study, Evaluation, Sustainability, Assessment.

Institutional Quality Assurance Practices of a University in Thailand: Development of an Action Plan for Accreditation

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Abstract- The descriptive-exploratory study aimed to design a model for accreditation for the Mahachulalongkornrajavidyaolaya University. In particular, it sought to determine the University's rate of compliance in the areas of Philosophies, Commitment and Objectives, Teaching and Learning, Student Development Activities, Research, Academic Services, Preservation of Art and Culture, Administration and Management, Finance and Budgeting, and Internal Quality Assurance System and Mechanisms. It also sought to investigate whether there is a significant difference in the assessment of the level of compliance of the University by the three groups of respondents. Moreover, the study also aimed to identify the issues and concerns encountered by the University in complying with the policy guidelines of accreditation, as well as the strategies being implemented to address such. Respondents of the study were 30 administrators composed of 8 Deans, 4 Vice Presidents, 8 Department Heads and 10 Directors; 50 teachers and 50 students. The researcher used cross-sectional survey to collect the data. Study results show that in terms of compliance with the requirements of accreditation in the areas previously mentioned, the overall assessment was that the University is moderately compliant. In the interview with respondents, several issues and concerns were raised, as well as the strategies employed to address them. As output for this research study, an action plan for accreditation was established to properly address the found weaknesses.

Keywords: Quality Assurance, Institutional, Student Development Activities, Action Plan, Accreditation, Administration, Management, Mechanisms.

Impact of Social Media Advertisement to the Customer Brand Awareness of Selected International Coffee Shop Companies in Muscat, Oman: An Inquiry to the Customer

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Abstract- The purpose of this study is to examine the impact of social media advertisement to the customer brand awareness of the selected coffee shops in Muscat, Oman namely: Starbuck Café, Costa and Tim Horton's. Likewise, it will explore how social media advertisement platforms utilized by the company deliver the accurate information of the firm to its target customer and how those advertisements create an appeal to its customer using the platform. It will also measure the degree of customer brand awareness and how likely the customers were persuaded to patronize the brand base on what is seen in the advertisement. The empirical part of the study consists of a quantitative consumer survey among social media users at the same time patronizing coffee shops, between the ages of 18 and 60. The results of the study serve as a backgrounder on the effectiveness of social media advertisements in reaching right customers with the right information and brand awareness.

***Keywords*:** Social Media Advertisement, Coffee Shops in Oman, Customer Brand Awareness

Corporate Memory: A Memory Compaction Apparatus Towards Malaysia's Prominent Companies Transparent Governance

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***Abstract*-** This study significances to analyze the twosome relationship between Corporate Memory (CM) and Information Communication Technology (ICT) among most prominent companies in Malaysia. It also provides empirical evidence and confirms the results of past researchers that CM practices such as knowledge sharing are positively and significantly related to ICT. This research implies that when companies apprehend the significance of CM, there is a great possibility for it to flourish in harvesting the full value of transparent governance. Survey data from four diverse companies were obtained to examine the relationships between CM and ICT facilities and its impact in conveying daily tasks.

***Keyword*:** Corporate Memory, Information Communication Technology, Knowledge Management, Knowledge Sharing & Transparent governance

Entreprenuerial Readiness of the Business and Management Students of Gulf College Oman

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Abstract **-** This study looks into the preparedness of students to venture into a small business enterprise. A descriptive method of research will be employed. Specifically, it will describe how prepared are the students if given the chance to venture into small business enterprise that would help their individual economic achievements and the economic growth of the Sultanate of Oman, in general. The researchers will use the Enterprising Management students as the main respondents to greatly ensure that the data gathered answers to the objective of the study. The researchers will employ a modified questionnaire that will specifically look into the students' personal characteristics, conditions, skills and experiences as the main instrument to gather important data for this research work. Personal information of the respondents like age, sex, occupation, and highest educational attainment will also be gathered.

Keywords**:** entrepreneurial readiness, enterprising management, entrepreneurial profile

Deepening Poverty Reduction in Rural Nigeria: Implications for the Small and Medium Enterprises (SMEs)

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Abstract - Poverty is endemic Nigeria, and has assumed a worrisome dimension in Nigeria. The National Bureau of Statistics (NBS, 2010) reveals the poverty headcount ratio in rural areas at 52.8% in 2009, down 6.71% in 2003. The rate remains troubling, however, undermining socio-economic development in rural areas across the country. The development has been blamed, in large part, on the dearth of physical and social infrastructure. However, various studies reveal that the development of Small and Medium Enterprises is a pathway to sustainable poverty reduction in rural areas. SMEs have the potential to increase the standard of living of those who are engaged in such activities, although policy inconsistencies and government bureaucratic bottlenecks, lack of access to modern technology are major challenges. The study then concluded that the establishment of fiscal incentive, national entrepreneurial institute can help spur the growth in of SMEs in rural areas. Therefore, government is advised to provide qualitative and sustainable infrastructure in the rural areas as there are in the urban areas, so that output in such areas can be geometrically improved. They should also engage in capacity development in SMEs through the establishment and funding of entrepreneurial initiatives.

***Keywords*:** Poverty, Rural, SME, Humanity, Economy

Imperatives of Database Services: Basic Stakeholders' Extent of Satisfaction Level in an Organization

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Abstract- Promoting college access and building an educational foundation for success is through a widely acceptable educational goal. One of these goals can be attributed to the institution's Database as part of its service to stakeholders. This study garnered important information from the stakeholders of Gulf College in terms of the extent of satisfaction level. Specifically, this study had proven the following objectives: demographic profile of the respondents in terms of gender, age and employment designation; extent of satisfaction level of respondents in general tasks and tasks on special environment; and measure of significant difference between the respondent's extent of satisfaction levels when grouped according to employment designation. Findings revealed that academic and non-academic respondents are equally alike in their extent of satisfaction level regarding the services rendered by the DBA at Gulf College. Since there is a slight significant difference in the view of the respondents as to the vitality of DBA's responsibility, it means that accountabilities and expected tasks of the personnel were slightly administered improperly. Therefore, the job designation has proven as operant variable as end-users' satisfaction level is measured. Further, the DBA's functions are imperative spots for organizational database system and virtual performance.

***Keywords*:** Database, Management Information System, Database Administration, extent of satisfaction

Recognizing the Personal Competencies of Future Information Professionals

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***Abstract*-**Information agency basic responsibility focuses on the creation, acquisition, organization, storage, dissemination and maintenance of information in whatever format, printed or digital. They required all related knowledge and skills to perform their roles in this emerging world of technology. Personal competencies are essential skills requirement seek by employer in selecting their employees. Personal competencies of students are considered greatly important for the effectiveness of learning process. It is also important skills for students to acquire for their future career. This concept paper aims to investigate the personal competencies of future information professionals. The nine (9) domains of personal competencies (critical thinking, interaction skills, relationships skills, leadership skills, presentation skills, media literacy skills, and written skills) in this paper was determined based on the selected literature on communication and personal competencies. This paper would bring benefit to all future information professional as it can view future graduate preparedness to enter the industry.

***Keywords*:** Personal competency, communication skills, information professionals

The Impact of Attitude, Subjective Norm and Safety on Consumer' Purchase Intention in Johor, Malaysia

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Abstract- The cabinet of Malaysia has acknowledged the Halal master plan that addressed the issue of halal development such as certification, integrity, implementation, responsibilities and timeframes around May 2008. Halal products and services could be a new sector that might help Malaysia's economic growth. Apparently, products that are permissible to be used by Muslims, or categorized it with Halal's products are dependent on manufacturers who must follow several requirements that are restricted mostly from the ingredients until the packaging of the products. Thus, the objective of this paper is to identify the predictors that influence the intention to purchase halal cosmetic products among consumers. In this research, data was analysed using Partial Least Squares Model Analysis (PLS). Findings indicated that these three predictors have influenced the intention to purchase halal cosmetic products among consumers in Johor, Malaysia.

Keywords: Halal, Cosmetic Products, Attitude, Subjective Norm, Safety

Measuring Students' Attitude Towards Behaviour in Doing Information-Related Business

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Abstract **-** This paper presents part of a study on students' entrepreneurial intention in doing information-related business when they graduated from their studies. It presents the findings of two objectives of the study: 1) To determine the level of students' attitude towards behavior in doing information-related business, 2) To compare students' attitude towards behavior in doing information-related business in terms of gender, roles of family background, and students' family income. Questionnaires were distributed randomly to 175 postgraduate students of Faculty of Information Management, Universiti Teknologi MARA (UiTM), Malaysia. In general, students are quite positive about their attitude towards behavior to start a business venture. However, there were no evidences of differences regarding students' attitude towards behavior in doing information-related business in terms of gender, role of family background and family income.

Keywords**:** Entrepreneurship, Entrepreneurial intention, information-related business.

The Development of Regional Curriculum Standards in the Case of Southeast Asia Ministers of Education Organization (SEAMEO) in Mathematics

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***Abstract*-**This is the case study to show the roles of various agents to design the framework and development of the ASEAN regional curriculum standards. In this research, there are four questions to be answered in relation to the roles of the agents: Q1. How the agents set the format of the standard document?; Q2. How was the content of teaching chosen?; Q3. What are the principles applied in choosing the contents and writing the standards?; Q4. What issues and challenges among the agents were solved? The method used were the following the mathematics curriculum of ASEAN countries were compared and mapped to find the minimum essential contents. Secondly, the union of the mappings was benchmarked with the curriculum standards of developed countries. Thirdly, the framework for the 21st-century curriculum was established with emphasis in competencies, values and contextual learning with the local and global collaboration of various agents.

***Keywords*:** Education, ASEAN, Curriculum, Learning

The Challenges of Public Health Expenditures and Maternal Mortality Rates in Nigeria: Meeting the Sustainable Development Goals

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***Abstract*-** In many developing African countries, the state of maternal health status has remained worrisome when measured by the maternal mortality ratio (MMR). According to the World Health Organization (WHO, 2015), maternal death refers to the number of women who die from pregnancy-related causes while pregnant. In Sub-Saharan African countries, this particular health indicator appears to have performed poorly when compared to other developing regions of the world. For instance, between 1999 and 2015, maternal death per 100,000 live births declined from 95 to 25 (about 72%) for Eastern Asia, 538 to 176 (67%) for Southern Asia, it merely declined from 987 to 546 (45%) for Sub-Saharan Africa (WHO, 2015). At the country level, Nigeria is reputed to have the highest maternal mortality rate in the world, representing about 19 percent of global maternal mortality deaths of 303,000 (WHO, 2015), a development that poses severe challenges to the nation's policy makers. Among the myriad of factors militating against the performance of the health care system in Nigeria, poor health care financing has been identified as a major challenge. This consistently poor state of health care financing has been partly blamed for the high incidence of maternal mortality recorded over the years, a development that poses a major constraint to the realization of the sustainable development goal by 2030. In view of the foregoing, this paper attempts to empirically investigate the nexus between public health and health outcomes in Nigeria with particular focus on maternal mortality ratio (MMR) as a proxy for health outcome for the period of 1981 to 2016.

***Keywords*:** WHO, Health, Sustainable Development, Maternal Modality

Part – C
Humanities

Gift-giving in Chinese Culture

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Abstract- To understand gift giving behavior is beneficial for retailers to increase sales. Various studies focused on dyadic relationship between gift givers and recipients. However, the extant literature ignores that gift giving behavior might be observed by other people in some public occasions, such as birthday party. This study therefore investigates whether gift givers take other observers into account to have different purchasing decisions for gifts because of impression management in the public setting. Especially, the Chinese style of impression management, *mianzi*, is a critical factor of Chinese interpersonal relationships and communication styles and thus is treated as the main viewpoint in this research. Furthermore, the marketing promotion (i.e., sales volume) that makes products to be more attractive may positively influence consumers' perception of *mianzi*, which in turn affects the gifts purchasing decision. This research conducts one lab experiment to investigate the effect of marketing promotions on consumers' perception of *mianzi* and purchasing decision in the public setting. The results show that consumers choose the product with high sales volume in the public gift giving occasion. Furthermore, the factor of *mianzi* plays the role of mediator in this research.

Keywords: Impression management, Gift-giving behavior, Product promotion.

1. INTRODUCTION

Gift purchasing decision is a critical issue in consumer behavior field, because it is a major revenue source for retailers (Segev, Shoham, & Ruvio, 2013). The extant literature has focused on various topics on gift giving behaviors. However, most studies ignored that not only gift givers and recipients can see the gifts, but also the third-party observers will see the gifts on the gift-giving ritual or demonstrating by gift recipients, such as a birthday party. In the case, the assumptions that only focusing on the dyadic relationship between gift givers and recipients may be insufficient (e.g., Baskin, Wakslak, Trope, & Novemsky, 2014). Accordingly, this research fills this academic gap from the viewpoint of impression management.

Gift giving behavior is essentially involved in some level of impression management (Albright, Forest, & Reiseter, 2001). Therefore, it is reasonable to adopt the perspective of impression management to investigate the gift giving behavior. Furthermore, consumers will concern impression management in a public group setting to make purchasing decision (Peloza, White, & Shang, 2013). Especially, gift giving behavior is an important approach for Chinese people to save and demonstrate *mianzi* (Yang & Paladino, 2015). Therefore, this research focuses on the influence of impression management by Chinese style (i.e., *mianzi*) on gift givers' purchasing behaviors in the public setting. The objectives of this study are to understand how the consideration of gift giving occasion influences consumers' gift purchasing behavior and investigate whether the sale volume of product positively influences consumers' perceptions of *mianzi* (also named *Mien-Tzu*, or face) and gift purchasing behavior.

2. LITERATURE REVIEW AND HYPOTHESES DEVELOPMENT

Gift giving and impression management

Gift giver usually engages in some level of the perception for impression management (Albright, et al., 2001). Gifts and gift giving rituals imply important meanings for interpersonal and social relationship to create and maintain the relationships, communication and emotions between the gift giver and recipient (Taute & Sierra, 2015). To build the positive images, gift giver will adopt various tactics to show their thoughtfulness, such as selecting gifts that differentiate recipients from each other (Steffel & Le Boeuf, 2014). These studies highlighted the importance of impression management in gift giving context, but only addressed on the relationship between gift giver and recipient. There is an academic gap to explore the gift giver's impressions among other observers as well as gift recipient.

There are many gifts giving occasions and rituals for gift givers to build the impressions, such as birthday party. To consider the impression management in these public gifts giving occasions, gift givers might have different purchasing decisions. For the consumer behavior, Peloza, White, and Shang (2013) showed that consumers will concern impression management in a public group setting to have different purchasing choice. Besides, in the context of gift

giving, consumers would depend on the different gift giving occasions to made the purchasing choices (Baskin, et al., 2014). Although previous research confirmed that the public/private setting and gift giving situation can affect consumers' purchasing behavior, few studies focused on the effect of public/private gift giving occasions on consumers' gift purchasing behavior. Therefore, this research intends to investigate the how the public/private gift giving occasions affect consumers' purchasing decision. Gift givers have the motivation and tendency to engage in impression management, because other people have positive impressions on them can be beneficial for them to achieve some goals, such as facilitating the interactions with other people in the future (Segev, et al., 2013). Therefore, gift givers intend to create or enhance a positive impression by giving gifts perceived as better than others' (Segev, Shoham, & Ruvio, 2012). Especially, the giver's positive impression not only is formed by gift recipients but also evaluated by other people in the public occasion because of the visibility of gift giving behavior. In Chinese culture, gift giving behavior is closely associated with the social goal to build the public impressions (Yang & Paladino, 2015). Giving gifts to other people in the public occasion may also create the generous and fervent impressions of the gift givers in the social networks. Especially, when gift giving behavior is performed in public occasions that many people can see the gifts, such as birthday party, it is a valuable opportunity for the gift givers to develop the positive impression. Therefore, we assume that this motivation of developing positive impressions via gift giving in the public occasion may affect gift purchasing decision.

Since *mianzi* is the focal point of impression management in Chinese culture (Liu, Lu, Liang, & Wei, 2010), the concern of *mianzi* might be the determinant for Chinese gift giver's purchasing decision (Qian, Abdur Razzaque, & Ah Keng, 2007). The extant literature showed that brand-name gifts and luxury branded gifts are more attractive in the eyes of others (Park, 1998; Qian, et al., 2007), so gift givers have higher willingness to buy branded gifts to build positive impressions. Yang and Paladino (2015) found that the gifts with better perceived product image are well liked by Chinese consumers due to demonstration of the fine *mianzi* (good face). Although we know that brand image is a critical determinant for gift consumers, marketers need more understandings about how to use marketing promotions to affect gift consumers. The attractive product within marketing promotions might become a special topic for gift giver and other attendees in a party. The discussion and appreciation of attractive product could facilitate gift giver's positive impression in this public occasion. However, few studies addressed on the relationships between marketing promotions and gift givers' purchasing decisions. This research therefore intends to obtain more understanding about how marketing promotions affect gift givers' perceptions of *mianzi* and purchasing intention.

3. MARKETING PROMOTION: SALES VOLUME

Gift givers may base on the popularity of product to make gift purchasing decision, because people tend to discuss and have interests in popular products rather than less popular products (Zhu & Zhang, 2010). Furthermore, people usually have higher perception of quality for popular products (Jeong & Kwon, 2012). Therefore, the popular products may help gift givers to build a positive self-image to others in the public occasion. People believe that popular products are likely worth to buy because of the influence of observational learning (Chen, Wang, & Xie, 2011). The concept of observational learning is derived from social learning studies in psychology (Bandura, 1977). Observational learning is that people observe the actions or decisions of others and make the same selection that others have done, and this imitational behavior is also called herding effect (Banerjee, 1992). People tend to observe the previous consumers' purchasing behavior and base on the publicly observed information to shape their beliefs and make decisions (Chen, et al., 2011). In the marketing field, observational learning has been adopted to explain consumer purchasing decision. Lu et al. (2014) stated that observational learning information (i.e., the high sales volume) can increases sales. Chen et al. (2011) claimed that positive observational learning information is more influential than negative observational learning information in purchase decision-making. Zhang (2015) found that consumers will observe the behaviors of both friends' and strangers' networks on the online social media to made purchasing decision and quality judgment.

Sales volume of product is a common information of product popularity (Chen, et al., 2011; Zhu & Zhang, 2010) and thus is adopted as one marketing promotion in this study. Accordingly, consumers that intend to give the gift in the public occasion might have high needs of impression management. That is, consumers would evaluate the popularity of potential options to choose a gift that other people will be impressed by. The consumers with high needs of impression management might have the behavior of observational learning in purchasing decision and buy a gift that they believe others would like. Therefore, the following hypotheses are proposed.

H1: People in public gift giving occasion will have higher intentions to purchase the product with high sales volume than in private gift giving occasion.

H2: The effect of sales volume on purchasing intention is mediated by the perception of *mianzi*.

4. METHODOLOGY

Experimental design and procedure

We conducted a 2-occasions (i.e., occasion of gift giving: public vs. private) with product sales volume between-subjects design. Participants were instructed to read the description that helped them to imagine that they intend to buy chocolate as the gift for one friend's birthday. We demonstrated two different chocolate products (one is this friend's most favorite) and measure participants' purchasing intention for the two chocolate products. Participants were further randomly assigned to one of two scenarios (i.e., 2 occasions of gift giving) with product sales volume and answered their purchasing intentions for the two chocolate products. Finally, participants were required to fill the questionnaires of *mianzi*, personal data, measurements for the manipulation check of gift giving occasion and perceived sales volume of product.

Stimuli

The manipulation of occasion for gift giving was divided into public and private. For public case, participants were informed that they will participate in a birthday party and they bought chocolate as the birthday gift. For private case, participants were informed that one friend's birthday was coming and they bought chocolate as the birthday gift. Because this friend lift in the distance, the mailing parcel was suitable for gift giving.

Measures

Gift giving occasion: we predict that observers would be more likely to see the gift in the public condition as compared to the private condition. Therefore, one item adapted from Berger and Ward (2010) was used to evaluate participant's perception of observation by other people. Perceived sales volume of product: one item adapted from Ho et al. (2014) was used to measure the sales volume of product. Perception of *mianzi*: A nine-item scale adapted from Bao, Zhou, and Su (2003) and Li and Su (2007) was used to measure participants' perception of *mianzi* consciousness in the gift giving occasion. Purchasing intention: A three-item scale adapted from Peloza, White and Shang (2013) was used to measure participants' purchasing intention for two targeted gifts respectively. A sample question is "How likely would you be to purchase the product?"

5. DATA ANALYSIS

We verified reliability and validity for variables of *mianzi* and purchase intention. Reliability was examined using Cronbach's α and the values for *mianzi* and purchase intention were .98 and .92 which both met academic criteria (Hair, Black, Babin, Anderson, & Tatham, 2006). Furthermore, validity is examined by Confirmatory Factor Analysis (CFA) and all the factor loadings of factor analysis were significant and exceeded .7 for *mianzi*, and purchase intention, respectively (Fornell & Larcker, 1981). One-way ANOVA was used to test H1. The result showed that giving gift in public occasion would choose the product with high sales volume ($M_{\text{public occasion}} = 4.30$ vs. $M_{\text{private occasion}} = 3.56$; $F(1, 97) = 24.65$, $p < .01$). Therefore, H1 was supported. For H2, we followed the mediation analysis procedures suggested by Hayes (2013) to perform a bootstrapping mediation with 5,000 samples to test the mediator role of *mianzi*. The indirect effect of high sales volume in the public occasion on purchase intention through *mianzi* was significant (CI = .0209, .9980). Thus, H2 was supported.

6. CONCLUSION

This research contributes to literature on gifts purchasing by introducing the gift giver's perspective in an effort to evidence a relation between product choice and impression management, especially by Chinese style (i.e., *mianzi*). For academic implications, this study adopts the perspective of impression management in Chinese style to explore how marketing promotion activity (i.e., product sales volume) influence consumer's purchasing behavior because of gift giving occasions. The findings show that consumers choose the product with marketing promotion of high sales volume in the public gift giving occasion. The product with high sales volume imply that this product is popular, and this popularity may cause the normative influence to affect consumers' purchasing decision (Kuan, Zhong, & Chau, 2014). Furthermore, the results also are helpful to clarify how Chinese consumers choose the gifts that are beneficial to save their *mianzi*. The findings show that the factor of *mianzi* plays the role of mediator in the three studies. To choose the product with high sales volume induces consumers' perception of saving *mianzi*. In brief, this study bases on the viewpoint of impression management to provide comprehensive insights about the factors for the purchasing behavior for gifts.

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The Psychological Well-Being of The Left-Behind Children of Immigrants of the Laguna State Polytechnic University

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Abstract- The study aimed to determine the psychological well-being of left-behind children of immigrants. It made use of twenty college students whose parents are working abroad. Majority of respondents are 18-20 years old, male, middle born, family monthly income of Php 20,000-30,000, most mothers are working abroad and working abroad for 1-3 years. Majority of respondents have average level of intellectual functioning, have emotional conflict with their mothers, fathers, family unit, fear, guilt feelings and own abilities and have high scores in deviation, persecutory ideas, thinking disorder, and social introversion. Results show significance between intellectual functioning and age, gender, birth order, family monthly income and parent working abroad, significance between emotional status and age, gender and parent working abroad and significance between personal maladjustment and age, gender, and parent working abroad. Further, personal maladjustment is significantly related to intellectual functioning and emotional status.

***Keywords*:** Left-behind children, Immigrants, Intellectual Functioning, Emotional Conflict, Personal Maladjustment

1. INTRODUCTION

According to Reyes (2008) cited from "Moving Out of Poverty – Making Migration Work Better for Poor People", Department for International Development (DFID), March 2007 "People have been on the move since human life began. Migration is neither a new phenomenon, a failure of development, nor a substitute for development… individuals move as part of their effort to improve their lives and the lives of their families, to learn new skills, to gain new experiences, to find a job or to flee insecurity, disaster or famine. Migration is an economic, social and political process that affects those who move, those who stay behind, and the places where they go." And with the advent of globalization, labor migration has become a worldwide phenomenon. People are crossing borders to search for better job opportunities and to provide a better future for their families. Along this development is the plight of more children being left behind by either one or both parents, leaving them to the care of extended family members or friends.

Experience has shown that children are affected by migration in different ways: children are left behind by migrant parents; they are brought along with their migrating parents; and they migrate alone, independently of parents and adult guardians. Other children do not move, but are nevertheless affected because they live in communities that send or receive large numbers of migrants. Some children are return migrants or have been repatriated (https://www.unicef-irc.org/knowledge-pages/Migration-and-children).

Children left behind may benefit from having migrant parents. Innocenti Social Monitor (2004) reported that remittances sent home by parents can increase consumption, finance schooling, buy health care and fund better housing. Whether children benefit depends on their access to those extra resources, which may depend partly on sex, age and the context of care when left behind. The involvement of substitute care or the lack of care causes difficulties for some children's emotional well-being and psychological development. Adults and children are affected by the loss of working-age community members in high out-migration communities (but others may come to replace them) (https://www.unicef-irc.org/knowledge-pages/Migration-and-children).

A common feature of all such migrations is the creation of a transnational family where children are geographically separated from one or both parents over an extended period. It is likely that several million children in the region are currently growing up in the absence of their mother or father, or both, and there is an urgent need for a better

understanding of the impacts of family separation on the health and well-being of children left behind (Graham and Jordan, 2011). The aim of this paper is to extend understanding of the psychological well-being of left-behind children of Laguna State Polytechnic University, San Pablo City campus by investigating the intellectual functioning, emotional status and personal maladjustment of children in transnational households.

2. STATEMENT OF THE PROBLEM

The study aimed to determine the psychological well-being of the left-behind children of immigrants of the Laguna State Polytechnic University, San Pablo City campus. Specifically, it sought to answer the following questions: 1) What is the profile of the respondents as to age, gender, birth order, family monthly income, parent working abroad, and number of years working abroad? 2) What is the level of intellectual functioning of the respondents as measured by the Raven's Progressive Matrices? 3) What is the emotional status of the respondents as measured by the Sacks Sentence Completion Test? 4) What is the personal maladjustment of the respondents as measured by the Basic Personality Inventory? 5) Is there a significant relationship between the profile of the respondents and each of the following variables: Intellectual Functioning, Emotional Status, and Personal maladjustment? 6) Is there a significant relationship between the personal maladjustment of the respondents and each of the following variables: Intellectual Functioning, and Emotional Status?

3. METHODOLOGY

The study used a descriptive design. It made used of 20 college students of the Laguna State Polytechnic University, San Pablo City campus. The respondents were selected through purposive sampling technique. The criteria set include he or she must be a student in the said institution and he or she should have a least one parent working abroad. To achieve the stated goals of this inquiry, the researcher used four (4) instruments namely Information Sheet, Raven's Progressive Matrices, Sacks Sentence Completion Test and Basic Personality Inventory. Further, it made use of the following statistical tools: Frequency and Percentage to describe the respondents' profile data and Pearson Product Moment Coefficient of Correlation to find correlation between variables.

4. RESULTS AND DISCUSSION

4.1 Profile of the Respondents

As to the age of the respondents, majority of the respondents belonged to age group 18-20 years old with 17 or 85%, few belonged to aged 21-23 with 2 or 10% and only 1 respondent or 5% is age 27 years old. This implies that the typical college students in the Philippines are ages 18-21 years old.

As to the gender of the respondents, majority of the respondents are male with 12 or 60% and the rest are females with 8 or 40%. As to the birth order of the respondents, most of the respondents are middle born with 9 or 45%, followed by last born with 7 or 35% then first born with 3 or 15% and only 1 respondent or 5 % is an only child. As to the family monthly of the respondents, most of the respondents have a monthly income of Php 20,001 – Php 30, 000 with 10 or 50% followed by Php 10,001 – Php 20, 000 with 7 or 35% and few only have above Php 40, 000 with 3 or 15%. As to the parent working abroad of the respondents, most of the respondents have mothers working abroad with 10 or 50%, followed by fathers with 9 or 45% and only 1 respondent or 5 % has both parents working abroad. As to the number of years working abroad of the respondents' parents, most of the respondents' parents have been working abroad in 1-3 years with 8 or 40%, followed by 4-6 years with 5 or 25% and few of the parents have been working for 7-9 years with 3 or 15% and 10 and above with 4 or 20%.

4.2 Intellectual Functioning of the Respondents

Using the Raven's Progressive Matrices to determine the level of intellectual functioning of the respondents, majority of the respondents only have an average level of intellectual functioning with 16 or 80%. Few of them have above average level with 3 or 15% and only 1 respondent or 5 % has a below average level of the intellectual functioning. This implies that these left behind children by parents who are working abroad may develop only an average level of intelligence. It can be implied that due to the absence of the respondents' parents the intellectual development of the respondents could have been impeded because there might be no reinforcement given and no follow up encouragement were given to the respondents to their learning.

According to Lui, M.D., Yang, M.D., Yan, M.D., Fu, M.D., Du, M.D. (2015), researchers have found that children who have been left without direct parental care for extended periods of time show larger gray matter volumes in the

brain, according to a new study. The researchers found larger gray matter volumes in multiple brain regions, especially in emotional brain circuitry, in the left-behind children compared to children living with their parents. Since larger gray matter volume may reflect insufficient pruning and maturity of the brain, the negative correlation between the gray matter volume and IQ scores suggests that growing without parental care may delay brain development (Retrieved from https://www.sciencedaily.com/releases/2015/11/151130084008.htm).

4.3 Emotional Status of the Respondents

Based from the Sacks Sentence Completion Test, the results show that most of the respondents have emotional conflict with their mothers, fathers, family unit, fear, guilt feelings and own abilities. As to attitude towards mother, many have mild disturbance with 8 or 40% which implies that they see mother's fault but accept and tolerate their differences, few have severe disturbance with 6 or 30% of the respondents which implies that they completely reject and depreciate mother when they consider overdemanding.

As to attitude towards father, many have severe disturbance with 9 or 45% of the respondents which implies that they feel extreme hostility and contempt with overt death wishes, few have mild disturbance with 5 or 25% which means that they admire their father but wishes that their relationships were closer. As to attitude towards family, few have mild disturbance with 5 or 25% of the respondents which implies they are aware that family does not recognize them as a mature people but feel no difficulty in identifying with them and severe disturbance with 4 or 20% which means they feel rejected by family which always lacks solidarity and which has constantly contented with difficulties.

As to attitude towards fear, few have mild disturbance with 5 or 25% of the respondents which implies that there is fear of self-assertion which is fairly a common and not pervasive and severe disturbance with 5 or 25% which means that they are disturbed by an apparent fear of losing identity or consciousness and possibility to control their impulse. As to attitude toward guilt feelings, many have mild disturbance with 7 or 35% of the respondents which implies they have regret over past and seem mildly disturbed by their failures to control their trouble. Few have severe disturbance with 4 or 20% which means that they are concerned with spiritual feelings and physical sex drive. As to towards own abilities, few have mild disturbance with 5 or 25% of the respondents which implies they feel they have specific ability and existence but tend to fear difficulty.

4.4 Personal Maladjustment of the Respondents

Using the Basic Personality Inventory, results show the respondents have high scores in the following scale: deviation, persecutory ideas, thinking disorder, and social introversion. As to deviation, majority of the respondents have high score with 13 or 65% which means they display behavior patterns very different from most people's and admit to unusual and pathological characteristics. As to persecutory ideas, majority of the respondents have high score with 12 or 60% which means they believe that certain people are hostile and are trying to make life difficult and unpleasant and are inclined to brood. As to thinking disorder, many of the respondents have high score with 9 or 45% which means that they are markedly confused, distractible and disorganized and cannot remember even simple things from day to day. They report feeling that life is dream-like, and that there is a marked difference between self and others. As to social introversion, some of the respondents have high score with 4 or 20% which means they avoid people generally and have few friends and do not say much even to them and seem to be uncomfortable when around others and prefer asocial activities.

4.5 Significant Relationship between Profile and each of the following variables

Table 1: Test of Relationship between Profile and Intellectual Functioning

Variable	r-value	p-value	Interpretation
Age	0.568	0.00	Significant
Gender	0.290	0.03	Significant
Birth Order	0.282	0.02	Significant
Family Monthly Income	0.233	0.01	Significant
Parent Working Abroad	0.249	0.02	Significant
# of years abroad	0.049	0.09	Not Significant

Table 1 presents the test correlation between profile of the respondents and their intellectual functioning. Factors such as age, gender, birth order, family monthly income and parent working abroad are significant which it can be implied that these factors affect the intellectual functioning of the respondents.

According to Arguillas and Williams (2010) in their study entitled the impact of parents' overseas employment on educational outcomes of Filipino children, family structure, household resources, numbers of siblings competing for those resources, and parents' own educational attainment are often important predictors of children's education outcomes. overseas migration of parents from the Philippines has resulted in increasing numbers of long-term separations of parents from each other and from their children. western-based analyses might predict negative education outcomes for children as a result of parental absence. they find that separations caused by overseas migration often are either neutral or can have positive effects on schooling outcomes, at least among older children. girls fare better in terms of educational attainment than do boys overall. boys are often more affected by background variables, including parents' international migration.

Table 2: Test of Relationship between Profile and Emotional Status

Variable	**r-value**	**p-value**	**Interpretation**
Age	0.370	0.00	Significant
Gender	0.580	0.01	Significant
Birth Order	0.142	0.08	Not Significant
Family Monthly Income	0.140	0.10	Not Significant
Parent Working Abroad	0.229	0.03	Significant
# of years abroad	0.140	0.10	Not Significant

Table 2 shows the test correlation between profile of the respondents and their emotional status. Birth order, family monthly income and number of years parents working abroad are not significantly related to emotional status of the respondents which means that the emotional disturbance of the respondents are not affected by these factors. On the other hand, age, gender and parent working abroad are significant which means that the emotional disturbance of the respondents is affected by these factors.

According to Pescaru (2014) in her study entitled *Consequences of parents' migration on children rearing and education,* the family is the institution that has suffered greatly due to migration, because the migration of one of the partners sometimes damaged the intra-family relationships severely. Children were the most affected in the family, but also their educational status, their public perception and more than that, their emotional state.

Also according to Hiew (1992) in his study entitled *Separated by their Work: Families with Fathers Living Apart, r*esults indicated that father absence which produced a loss of perceived social support by their wives was negatively correlated to behavioral adjustment and academic performance of their children. Children reported the most stress during actual father absence and emotion-focused coping was most commonly used. Interestingly, children who also used more social support seeking to cope with father absence were observed to show less acting-out behaviors in the classroom. Implications of work-related father absence as mediated by family coping resources and cultural factors were discussed.

Table 3: Test of Relationship between Profile and Personal Maladjustment

Variable	**r-value**	**p-value**	**Interpretation**
Age	0.285	0.02	Significant
Gender	0.239	0.01	Significant
Birth Order	0.042	0.07	Not Significant
Family Monthly Income	0.144	0.09	Not Significant
Parent Working Abroad	0.282	0.03	Significant
# of years abroad	0.023	0.10	Not Significant

Table 3 presents the test correlation between profile of the respondents and their personal maladjustment. Factors such as birth order, family monthly income and number of years parents working abroad are not significant which means

that these factors do not influence the personal maladjustment of the respondents. Whereas factors such as age, gender, and parent working abroad are significant which it can be implied that these factors affect the personal maladjustment of the respondents.

According to Hiew (1992) in his study entitled *Separated by their Work: Families with Fathers Living Apart,* children reported the most stress during actual father absence and emotion-focused coping was most commonly used. Interestingly, children who also used more social support seeking to cope with father absence were observed to show less acting-out behaviors in the classroom. Implications of work-related father absence as mediated by family coping resources and cultural factors were discussed.

4.6 Significant Relationship between Personal Maladjustment and Each of the Following Variables

Table 4: Test of Relationship between Personal Maladjustment and Each Variable

Variable	r-value	p-value	Interpretation
Intellectual Functioning	0.494	0.02	Significant
Emotional Status	0.267	0.01	Significant

Table 4 presents the test correlation between personal maladjustment and intellectual functioning and emotional status of the respondents. Both variables are significantly related to personal maladjustment although both have weak relationship but then their relationship is significant which means that the intelligence and the emotional states of the respondents were influenced by their personal maladjustment. This implies that the respondents' occurrence of behavior such as deviation, persecutory ideas, thinking disorder and social introversion affected the respondents' average level of Intelligence quotient and the respondents' emotional disturbance. According to Pescaru (2014) in her study entitled *Consequences of parents' migration on children rearing and education,* the family is the institution that has suffered greatly due to migration, because the migration of one of the partners sometimes damaged the intra-family relationships severely. Children were the most affected in the family, but also their educational status, their public perception and more than that, their emotional state.

5. CONCLUSION

Based on the foregoing findings, the following conclusions were drawn: 1) Age, gender, birth order, family monthly income and parent working abroad are significantly related to intellectual functioning. 2) Age, gender and parent working abroad are significantly related to emotional status. 3) There is a significant relationship between personal maladjustment and age, gender, and parent working abroad. 4) Personal maladjustment is significantly related to intellectual functioning and emotional status.

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English Language Competency: Need & Challenge for Enhancing Employability in Indian Graduates

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Abstract- In the age of global communication English is more universally and widely circulated among the masses and is accepted as universal language which can connect people in every corner of the world. Article 343 declares Hindi as an *official language,* in a country of 125 crore population more than 50 % speak Hindi and 17% of the world's population resides in India whose 25% of the language constitutes the world language, so overcome the language barrier of language diversity English is used as a common language of communication. The English language competency in Indians varies because of the indifferent educational background and the socio-economic circumstances which obstructs the use and interest in the language. Though English is taught as a mandatory subject from primary level to the secondary and even in higher education still, it is a challenge of developing proficiency and interest which is the primary need of a time. To quote Pandit Nehru, ***"English will inevitably remain an important language because of our past association and because of its present importance in the world".*** The paper aims to justify the need and highlight the challenges faced by students in developing English language competency in India, despite recognized exigent for the development of economical and intellectual growth for self and country for accessing opportunities in an increasing global world.

Keywords: Language learning, Universal language, Proficiency, Education, Communication

1. INTRODUCTION

English language has been adopted as a common medium of communication in India despite having 22official languages and 1652 mother tongue spoken on the basis of regional distinctness. In 1835 Lord Macaulay, through his famous 'Minute on Education', inflicted English on Indians without an indication that its roots will be deeply ingrained and would become a primary language in a country where Sanskrit, the language of God is a pride of every Indian. The British left long time back, but their contribution in Indian education system cannot be completely overlooked. It was heartfelt need of a common language which could connect the people across globe and can be acclaimed as Universal Language. English because of historic reasons became universal and circulated widely, as Secondary Official Language.

Having recognized the importance of English as an instrument of knowledge dissemination as well as commerce as well as maintenance of international relations, a provision was left to extend the use of English language in the Article 343 on 'Official language of the Union, ***"for all the official purposes of the Union" even after "a period of fifteen years," with a proviso that "the President may, during the said period, by order authorize the use of the Hindi language in addition to the English language and of the Devanagari form of numerals for any of the official purposes of the Union****"* [1] with the view that millions of people could not be educated in a completely foreign language 'English' which was a magical and mystical word for the people who fail to communicate in foreign language. Graddol per**ceived**, ***"In 1700s, English became the official language of administration and many educated Indians learnt the language as it helped them to go up the career ladder. The influence of English grew unabated even after the British left India in 1947. Today, English language plays a vital role in higher education, media and administration of private and government organizations. English has become a powerful agent for change in India"*** [2]

It is recognized that learning and education should be conducted in a regional language as an individual can work effectively and fulfill their aspiration in their native language i.e. their mother tongue. India houses about 1.1 billion people with a population growth rate of 1.6% a year. As per Census 2001 statistics, India is administratively organized into 35 entities, each as big as many independent nations. There are 28 States and seven Union Territories, broadly set up on the linguistic principle. Currently, India has 51 Cities, 384 Urban Agglomerates and 5,161 Towns (2,843 in

1951) in India, with about 26.1% of its total population. However, most Indians still live in rural areas and in small towns with different linguistic practices, and with scanty knowledge of English. Indian languages are linguistically categorized into primary branches:

- Indo Aryan Language family (Hindi, Bengali, Gujarati, Marathi)
- Dravidian Language (Telgu, Tamil, Kennada, Malayalam)
- Austroasiatic Language (Laddakhi, Several NE languages)
- Tibeto Burman Language (Khasi, Munda)
- Andamanese language (Onge-Jurawa) [3]

Each family is diversifying from each other and transition is difficult so, to connect generations for 400 years learnt English which is contracted as ***universal language*** as is spoken by 1000 million people of the world either as *native language*, as *secondary language* or as a *foreign language*.

After the world has dwindled and become global village it becomes prerequisite to develop competency in English language, which holds the feature of connecting people to bridge the gap for those who endeavor to settle in other countries and supports international commerce, of science, and of technological advancement. In the present scenario competency in English language and employability equate to each other. The demanding job market looks for the competent candidates who possess communicative skills along with qualification, aptitude and personal attitude while appearing for job interviews. Proficiency in English language upgrade the student's eventuality for employment retention and career enhancement and perceived as a tool to produce positive business outcome around the world. ***While educational opportunity and literacy have long been key elements in programmes committed to human development (e.g. Street 2001, UNESCO 2005), the increased status of English within a global economy of languages has meant that English language education has also begun to be promoted as an important factor in international development programmes*** [4].

2. ENGLISH COMPETENCY- NEED FOR SOCIO ECONOMIC GROWTH

In recent works exploring the relationship between development and language education, development is defined as the process of reducing poverty while also expanding people's choices, with its ultimate aim being to increase participants' control over their own development. The precise nature of this conviction appears to be that English language education will provide skills which will allow both individuals and institutions to engage actively with the type of contemporary society which is emerging in this current era of globalization [5]. Globalization is the reason of providing unmatched opportunities to the students, focusing more on developing skills along with the subject knowledge. Education is a process of empowerment and enlighten, focusing on the growth of body, mind and soul of a learner, instead of making them acquainted merely with the theoretical concepts. It is important to upgrade the teaching pedagogy to meet the requirement of the job market. English has left indelible print on the Indian psyche to felicitate the understanding of the global market.

With the advent of industrialization, the perception of society has changed, people are demarked in a class as elite, middle and weak class on the basis of their educational background. It is presumed that people who opt English medium private schools are elite or middle class and economically weaker section of the society opt for local regional schools. The similar situation is well portrayed in a Hindi-language comedy-drama film directed by Saket Chaudhary ***Hindi Medium.*** The film tells the story of a couple who aspire to give their daughter the best education. The plot deals with social themes including education, parenting, class, social mobility, and language.

The 8th Schedule recognized Hindi and English and other 21 languages as the official language. According to 2001 Census, 2.3 lakh Indians took English as their primary language, more than 86 million listed it as their second language and another 39 million as their third language. The data indicates English speakers in India at the time to more than 125 million and Hindi was the most spoken language 551.4 million [6].

English Proficiency is a need of an hour to meet the societal and professional requirements. India has initiated a prodigious task of developing the economy, for which it is essential that the youth of the nation must possess the knowledge of scientific branches as without scientists, engineers and technicians progress is impossible. It is important that the young generation should be capable of contributing in making India a developed nation, in which English language play a major role, being the store house of scientific knowledge. The entire spectrum of science and technology can be better understood through this language. India is expanding rapidly and to keep pace with the adventurous period of globalization necessity in English Language is indelible.

Now, at every nook and cranny, people connect the objective of learning English with Self Esteem & Employability and to make the essentiality of English language accepted by the people movies are directed that highlight the similar issues. A movie directed by Gauri Shinde ***English Vinglish*** where, a housewife and caterer Shashi is usually mocked by her family for not knowing English. Her attempt to learn the language helps her rediscover herself and reassert her value as a mother and as a wife. In the present society an individual's status is in line with the fluency in English language.

A Yash Chopra film '***Jab Tak Hai Jaan***' projects an ever-increasing need of English language skill for being employable. Katrina Kaif learns to play guitar from Shah Rukh Khan in exchange of English lessons. His career ascends from selling fish in a South London market to becoming a waiter, and finally a bomb disposal expert in the Indian army.

From movie to real life, English language competency is a status symbol and requisite for improving employment prospects. It is the language of better education, more exciting opportunities and competitive advantage across the world. Chakraborty and Kapur (2008:21) found that individuals who were more likely to have training in English earned significantly higher wages and gained better occupational outcomes than those who did not, even when the level of overall education was controlled for [7]. Riding the crest of globalization and technology the global language of communication or the 'lingua franca' of the world, English dominates the world as no language ever has. English competency is essential for any country to benefit from commerce, access the science, technology, and innovation and exert influence in world. English has gained the status of influential factor of socio economic transformation of an individual and society.

3. ENGLISH PROFICIENCY: MAJOR UNEMPLOYABILITY FACTOR

English can undoubtedly be treated as a tool of development. It is considered as a crucial, vital element in deciding employability quotient of an individual. Employability is related to the attributes of an individual required to enter, stay and progress in the world of work ensuring that ***'key competencies'***, careers advice and an understanding about the job are embedded in the education system to remain employable. In most surveys conducted among the employees, communication skill in English has been identified as one of the primary set of youngsters of India in finding job. Between 2017-2018 country witnessed marginal increases in unemployment signaling stagnation in job creation from 17.7 million last year to 17.8 million in 2017 and 18 million next year. In percentage terms, unemployment rate will remain at 3.4 per cent in 2017-18. It is impossible to imagine a better India with such a big number of unemployed youth in the country [8].

- > 60% of the 8 L engineers graduating from technical institutions across the country every year remain unemployed (Source: AICTE)
- ~39% employers state that attracting and finding quality talent is one of the most challenging aspects
- ~90% of jobs are skill-based, only 2% of the population (in the 15-25 age group) is currently enrolled for vocational training (vs.60-80% worldwide).

The data reveals that an enormous gap exists between required skills and employability parameters in Indian graduates. It is the high time to believe that employability does not stand for getting job, but it is the possession of relevant skills required to be in market demand. Academically and technically efficient graduates fail to qualify job interviews or could not opt foreign universities for further studies merely because of lack of linguistic aptitude in expressing thoughts effectively. The employability studies of India indicates the alarming critical situation of the Indian workforce. "*The Skill Map – India, 2017 is an endeavor to identify the skills most in-demand in order to work towards a robust employment ecosystem in the country"*

TOP Skills in Demand	**%**
• English Comprehension	18.71%
• Quantitative Ability	2.83%
• Deductive Reasoning	11.66%
• Inductive Reasoning	8.56%
• Agreeableness	6.42%
• Information Gathering and Synthesis	6.31%
• Extraversion	5.28%
• Emotional Stability	4.28%

The analysis unveils that top eight enviable skills and traits include 1 soft skill, 4 cognitive skills and 3 personality traits :

- English Comprehension has topped the chart with 18.71% demand. This signifies that English language communication is a much-needed skill across job sectors
- Fairly high demand is observed for deductive (11.66%) and inductive (8.56%) reasoning
- Out of the personality traits, Agreeableness tops with a demand of 6.42%

The statics of English speaking ability in Indian graduates is generally accepted in the range of 30% capable of speaking English in a varying degree [9].

1	Lack of Spoken English Understanding	70.44%
2	Poor Communication Skills	47.18%
3	Lack to Comprehend Basic Level Of Spoken English.	58.27%

In 21stcentury English language competency is undoubtedly a core and the most demanded employability skill or a "survival skill' for students to sustain in the job world. Narayanan, Vice Chairman of Cognizant Technology Solutions and Chairman of the NASSCOM, in an interview (Warrior, 2007) stated, *"Communication and soft skills and ability to learn on their own and work in teams are very important for those who join the industry".* "*Most students are not industry ready because they lack communication skills*."(Infosys, 2008). The latest report has frequently quoted, *47% graduates in India are not employable for any industry role. Their lack of English language and cognitive skills were identified as the major obstacles to their suitability in the job market* [10].

English language helps in participating in global trade and supporting the world and economy through establishing call centers in India. "India is expanding rapidly and to communicate with the world. Any meaningful development must aim at *'the full realization of the human potential and a maximum utilization of the nation's resources for the benefit of all'* [11]. The contribution of people in making socio economic growth requires communication, dissemination of information, sharing of knowledge, acquisition of skills for which. It is significant to observe that language is a major contributory factor for the socio-economic growth of an individual and nation.

4. ENGLISH COMPETENCY: THREAT FOR EMPLOYABILITY

India has a large, young population in a growing economy: which is a strong combination for ensuring continued development for the country. However, Research conducted by the National Skills Development Corporation indicates skills gaps in functional, vocational and workplace skills, as well as soft skills, with English featuring as a core skill. "One of the 5 Indians report having the ability to speak English comprised of 40%who can converse fluently in English and 16% who can converse little in English.89% of individuals having bachelor's degree can speak English as compared to 56% of those who have completed secondary schooling (10-14) years schooling 11% who have completed 5-9 years and less for those who have less schooling" [12]. Despite the fact that proficiency in English language is the only medium of connecting people around the globe or making progress in the life there are significant challenges faced by the learners in developing competency in English language. English is inseparable part of Indian curriculum, still the deteriorating level of English proficiency is seen among Indian students. According to the Census 2001 reported 0.2% Indians English as their mother tongue or as Secondary Language. Developing proficiency in English language is a biggest challenge for the Indian students because they are not ready to abandon their native language, which maintain their identity related to their background that results in that they fail to develop their acceptability and interest while learning and adapting English language. India's asset, that is, its young population - is in danger of becoming a liability. A survey conducted for 303 employers across the country by the Federation of Indian Chambers of Commerce and Industry (FICCI) in 2010 found that a majority of graduates lacked adequate "soft skills" necessary for their employment in the industry (Kavita, 2011) [13]. By a conservative estimate, more than one-third of the millions that graduate each year are unemployable and hence, there is an urgent and growing need for social skills, leadership skills, team playing skills and multi- tasking skills in the field of engineering. There is a growing mismatch between the required labor force and the available skill set. Research in ELT methodologies is a new phenomenon in India as British Council has introduced professional development programs for English teachers working in schools [14] (Padwad & Dixit, 2011). Though there have been many conferences and workshops on new methodologies of language teaching, the reality of classrooms presents a different picture:

- Lack of training for English professors.
- Students of different levels in the same class.
- Number of students in each class (60 per class).

- Lack of time to complete the prescribed syllabus.
- More importance on written exams (traditional method in India).
- Pressure on teachers to produce high pass percentage in final exams.
- Lack of quality text books.
- Use of workbooks that compile the exercises from previous university question papers.
- Lack of support from college managements.
- English being treated as yet another subject to study.
- Irrelevant syllabus design.
- Lack of relevant methodologies (P'Ryan, 2008 [15]

English cannot be considered native language, despite the fact that appx. 99.8% of Indians are familiar of the language either through the medium of instruction or as the subject taught in school. In secondary schools 65% English is taught either as First/ Secondary Language, which ends at making students least interested towards English, as many courses are offered in Hindi or regional language, and students are given choice of language to appear in examination. It is essential that teachers need to be proficient in teaching and developing interest in English, a secondary language.

It is widely reported that students do not attain knowledge and proficiency in English at school and college level so they fail to express themselves effectively or which they could not grab job opportunities. The prime responsibility lies with the teacher to make student capable and competent to communicate effectively and could retrieve information of the world. English as a second language gives wider exposure to various experiences. Teachers transfer their limited knowledge of English language to the learners with limited understanding. Through conventional methods of teaching emphasis is laid only on practicing grammar rules which focuses on developing writing skill, and pronunciation checked during classroom teaching works on developing reading skill ignoring speaking and listening proficiency which is the utmost demand of the present world. **Prof. Jacob Tharu** says, "***English is no longer some remote but a powerful mystery, lying hidden in the world of textbooks and examination***." [16]

Certain forms of discourse in higher education are commonly viewed as a sign of preparation and analytical skill, and students may be misjudged as underprepared, linguistically or cognitively limited. The presumption of deficit in human beings who fail to conform to expectations and standards that are commonly associated with a dominant culture is one of the key factors accounting for dropout rates from kindergarden through postsecondary education. ***It is believed that educators who seek to support learning among diverse groups of students need to be increasingly imaginative about instructional practice.*** [17] ***(Ginsberg &Wlodkowski, 2009)***

Traditional methods of teaching learning obstruct student's interest towards English language learning. Teachers are not aware enough to practice effective strategy of teaching English to the students of diverse level of understanding. **Bilingual method** of teaching is adapted in teaching that spoils the fluency and continuity of the language, as more emphasis is laid on the mother tongue with the objective to make the content easier for the learner. The alertness of the learner towards the mother tongue destructs the sounds of the English words which end in poor pronunciation. Robert Bellarmine observes, ***"The most serious problem in the teaching of English in our country is the appallingly small quantity and atrociously poor quality of English to which our learners are exposed."*** [18]

Grammar Translation Method is opted to make students understand the content in native language. The student's power of thinking and the proficiency in communicative skills get obstructed because the student becomes used to of translating the information and then transferring. ***In the light of the value attached to the ability to use English in the era of globalization, more importance should be given to speaking, an aspect that has received the least systematic teaching in many language curricula.*** [19] (Goh 2007).

Direct Culture is used while teaching English language in private schools where on English is used as a medium of communication. Many times, students face difficulty in understanding words and their meanings. But this method encourages the students to create English learning environment and develop interest for the language. Another problematic issue that may have potential contribution to the poor performance of the students in learning English is that the teachers are not familiar with the latest developments in **ELT pedagogy**. The English teachers are not aware of the concept of CALL (Computer Aided Language Learning) which could support in making learning of language interesting. It is surprising that since childhood student learn English in the form of subject with the aim to qualify marks still most students cannot speak the language with intelligible accuracy. In schools/ colleges teachers focus on completing the syllabus in a defined time focusing on the result instead of developing skill. Since, childhood from primary to secondary to higher education could not continue giving the potential undergraduate an adequate foundation in the use of English. Earlier English was treated as a library language but now the perception has completely changed,

which dropped many challenges before the learners and educators of diverse culture. It is essential to overcome them and shape them accordingly to make students global market ready.

5. SUGGESTIONS & RECOMMENDATION

P. Gurrey writes, ***"It is highly desirable to know exactly what one is hoping to achieve. If this can be clearly seen, then the best way of getting to work usually becomes evident. We ought, therefore, to consider carefully what we are trying to do when we are teaching English"*** [20]. Educators are puzzled by how pedagogically they could enact their respect for students of diverse educational background. It is essential to bridge the gap between the classroom based learning and the skills required to compete the competitive world. Need assessment is necessary in teaching English for specific purpose and to understand need and expectations of learners to enhance employability skills.

- The close observation suggests that the present students are digital natives. They are highly connected with technology in their routine life with the use of social networking tools and chatting software that connects them with their peers and teachers. Therefore, technology can influence and enhance students learning experience.
- It must be obligatory for the teachers to share facts about language proficiency required by the companies from the initial stage so that the students could generate their interest for the language.
- The prime duty of the teacher for creating intrinsic motivation in students which could not be avoided who need to have an attitude of teaching. It is important to have well organized programme, good textbooks, better students- teacher ratio which help in motivating students in developing skills required to fulfill the requirement to be employable continues to be a top concern among employers. Educators must boost the confidence of the students in participating in various activities to explore their speaking skills.
- Students must be evaluated not on the theory basis but should be assessed on the communicative skills as well which will develop confidence in students for getting job opportunities, which is the utmost essential ingredient to a successful career.
- In India there is no policy formulated towards the policy of teaching and learning of English. English is made a compulsory subject at school level but when the students seek admission in university; only pass marks in English are considered sufficient and English takes the place of optional subject.
- English curriculum must be upgraded time to time focusing on developing the employability skills. Language should be a compulsory part of English curriculum. Students must be trained to face the industry challenge. Along with the theory classes' students should be made participate in group discussions, debate, speech etc. English must be treated similarly as Science and Mathematics.
- ICT acts as a crucial means of educational enhancement. The access of technology appeals the context development and the teaching pedagogy. 'Technology holds the allure not only of improving education and economic competitiveness, but also of allowing a nation to leapfrog to modernity' (Warschauer 2004:378). [21]

"It appears that the actual problem leading to these challenges may have its roots from primary through secondary school levels. One would think that with a good primary level background, the secondary school level. A mastery of written and spoken language is highly desirable, yet its teaching and learning is beset by a myriad of problems at the secondary school level." [22] (Kolawole, 1998)

The mentioned observations will be more likely to result in empowering students and making teaching learning process interesting

6. CONCLUSION

To end the subject discussed here deals with the need of developing proficiency in English language in a multilingual country-India where students are used to of their mother tongue, as it gives them comfort in sharing their information. English is treated as the subject which they have to study as part of curriculum but, they do not get enough opportunities to speak English in or outside the classroom which results that students do not feel the necessity of learning English. The paper reassessed approaches used to teach students, which need to be changed as per the need of the time. To meet the requirements of the global market English should be opted actively as a medium of communication throughout the world. Instead of focusing Reading and Writing in conventional method of teaching students must be trained for effective Listening and Speaking Skills.

English language is not only the vehicle of our heritage it is the greatest jewel in that heritage. If we celebrate the English language, we do not do so with any sense of its superiority to other languages spoken in our community but only to recognize that English is the foundation of our heritage and the one language that we all have in common. It involves us all. It is a heritage so rich and diverse that is not possible to sum it up, but the English language is important

for everyone. Salman Rushdie puts it best, ***"What seems to me to be happening is that those people who were once colonized by the language are now rapidly remaking it, domesticating it, becoming more and more relaxed about the way they use it-assisted by the English language 's enormous flexibility and size they are craving out large territories for themselves within its frontiers."*** [23]

On the basis of the above observations, it can be safely stated that English has a bright future in India. Generations will come and generations will go, but English will live in India. Before it is too late it is essential to rethink and revise our educational policy as par the requirement of the industries so that more number of students could be employed, and India could be counted as the Developed Skilled Nation.

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Abstracts

Global Competency Skills and Attitudes of College Students of Gulf College, Oman

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Abstract- Global competency is acquiring in-depth knowledge and understanding of world issues, appreciation and ability to learn and work with people from diverse cultural background in order to function productively in an interdependent world community. Gulf College is an institution of higher learning in Muscat, Sultanate of Oman catering to undergraduate college students that would be competing and working in other countries, hence a necessity to produce globally competitive professionals. This study aims to evaluate the global competency skills and attitudes of Gulf College students and generate proposals towards its improvement. One hundred twenty eight college students were made to respond to a survey questionnaire. The respondents' profile and their perceived global competency skills and attitudes were statistically evaluated and results were used as bases in formulating recommendations. Results showed that majority of the respondents were below 40 years old, mostly males, specializing in business and in Level 6. Perception of their skills with respect to global competencies showed no significant no significant association with their demographic variables, however in terms of attitude, significant association was observed between specialization and level. The data suggest that global competency is a time dependent maturation process borne out of sustained exposure to relevant programs in the college. Thus, college pedagogy that set global competency as key performance measure should consider continuous knowledge, skills and attitude development to have an impact on the students' global education.

***Keywords*:** global competency, time dependent maturation, attitude development

Oman as a Tourist Destination: An Exploratory Study of Visitors' Satisfaction

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Abstract-Visitor satisfaction is one of the most important concerns of competitive destinations as it considerably impacts on their choice of a tourist destination, and the decision to visit the destination in the future. As a result, visitor satisfaction is one of the most investigated topics in the field of tourism due to its role in the survival of a destination. Several studies were done on visitor satisfaction; however, there has been limited investigation of visitor satisfaction in Oman as a tourist destination. Making visitor's experience with full of adoration and ensuring the qualities whether leading to perceived value and satisfaction enhancement are important issues for tourism managers and destination managers when designating the sustainability strategies. Further, achieving visitor satisfaction has become one of the most important objectives for most tourism service businesses and organizations in today's intense completion of the tourism industry. Enhancing visitor satisfaction is believed to generate more profits and lowering marketing outlays. Thus, the higher the rate of visitor satisfaction with the service quality, the higher the probability to perform future social intentions, such as recommending the tourist destination to others, uttering positive things and revisiting the destination. Anent to this, this study assessed visitor's satisfaction with Oman as a tourist destination in relation to their visit to any of the five ecotourism attractions and tourist spots found in the country. A total of 100 respondents were randomly selected and were given questionnaires to assess their experience on the areas of study.

Keywords: Oman tourism, tourist destinations in Oman, visitors' satisfaction in Oman

Life Skills and Community Service Learning Towards the Development of a Sustainable Community in Thampla Wittayayon School: An Assessment

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Abstract-The descriptive-exploratory study sought to determine the level of attainment of life skills and community service abilities of students in Thampla Wittayayon School in terms of the following aspects: communication skills, social interpersonal skills, decision making, self-management skills, critical thinking skills, and team building skills. It also investigated whether there was a significant difference in the level of attainment of life skills and community service abilities when students were grouped according to gender and educational level. The study also investigated the factors that influenced the level of attainment of life skills and community service abilities of students from the point of view of the teachers. Moreover, it sought to determine how the school management implemented the development of life skills and community service abilities of students in the following areas: Curriculum, Teaching and learning strategies, Community service programs, and Environment preservation.

Purposive sampling technique was utilized to select one hundred fifty student respondents who belonged to Primary (grades 4-6), Secondary Level M1 (grades 9-10), and Secondary Level M2(grades 11-12) and sixteen teachers who had been in the teaching field for at least ten years. Questionnaires were administered to them. Ten directors who had been administrators for at least five years were likewise selected to participate in the focus group discussion. Study results show that in terms of social and interpersonal skills, respondents perceive that they are highly attained. However, in terms of communication skills, decision-making skills, self-management skills, critical-thinking skills, and team building skills, respondents perceive that these are only moderately attained. This is because the current curriculum is ineffective in developing these life skills and service abilities of the students. When grouped according to gender, there is no significant difference in the aspect of communication skills, social and interpersonal skills, and decision-making skills. However, there is a significant difference in the aspect of self-management skills, critical thinking skills, and team building skills. On the other hand, directors and teachers have different perspectives on the factors that influence the attainment of life skills. For the directors, the top influence is the parent's educational attainment and the least is teacher competency, while teachers perceive creativity as the foremost influencing factor and developing a positive mental attitude towards education as the least. An enhanced model for sustainable community was recommended.

Keywords: Life Skills Learning, Community Service Learning, Sustainable Community, Education Policy Plan, Curriculum, Perceive Creativity, Teaching and learning strategies, Assessment.

Development of a Strategic Plan Towards Quality Education in Primary Educational Service Area Office 3, Thailand

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Abstract **-** This study aimed to find out the current level of the quality of education in the Primary Educational Service Area Office 3, Thailand and to propose a strategic plan based on the findings of the study. Specifically, the study sought answers to the following questions: 1) What is the current level of quality of education in primary education schools in Kalasin Primary Educational Area Office 3, in terms of the following components: 1.1) Student Outcomes; 1.2) Learning and Teaching Strategies; 1.3) School Facilities; 1.4) Instructional Materials; 1.5) Financial Support; and 1.6) Learning Technology (ICT)? 2) Is there a significant difference in the perceived level of the quality of education when the respondents are grouped according to school-size? 3) How do the problems and concerns related to school administration affect the attainment of quality education in terms of the following aspects? 3.1) Academic Planning; 3.2) Implementation of OBEC and School Goals and Targets; and 3.3) Evaluation of Key Result Areas? and 4. How are the problems and concerns being addressed? This study utilized the quantitative method of research particularly the descriptive survey design. The qualitative method was also utilized, particularly the one-on–one interview with 40 randomly selected school administrators. The data gathered were used as basis for the development of a strategic plan that would help improve the quality of education in primary educational service area office 3, Thailand.

The findings showed that there is a manifestation of these components: a) Learning and Teaching Strategies; b) School Facilities; c) Instructional Materials; d) Financial Support; e) Learning Technology (ICT), relative to the current level of quality of education in primary education schools in Kalasin Primary Educational Area Office 3. But the component Student Outcomes was being moderately manifested only in their current level of quality education. There is no significant difference in the perceived level of quality of education in the examined components as reflected in the responses of the school administrators from the small-sized, medium-sized and large–sized schools. However, the findings also revealed that the school administrators from the medium-sized schools perceived that ICT was not fully utilized particularly in the teaching–learning process. Further, the findings showed that the extent of effects of the problems and concerns related to school administration in the attainment of quality educations in terms of the aspects investigated was to a moderate extent only. The one-on–one interview with selected school administrators from the small-sized , medium-sized and large–sized schools showed that the problems and concerns related to school administration were being addressed as evidenced in the following extracted themes: a) On the aspect of teacher's qualification particularly on the required competencies and skills – provide trainings and workshops to enhance the competencies and skills of teachers; b) On budget allocation – allocate budget for educational materials , ICT, school building and infrastructures, and compensation and benefit of teachers; c) On student's achievement – provide nurturance/intervention programs to uplift and enhance the quality of student outcomes and scholastic performance;

d) On the proficiency in the use of the English Language – hire native speakers of the English Language to teach the language to the students. Non-English speaking teachers could also enroll in a short- term course to acquire English Proficiency certificate; e) On Education Policy Plan – review, evaluate and make necessary and appropriate modifications relative to educational policy plans; f) On the socio-economic status of students and their parents- the government officials, alumni, benefactors and other generous people could extend financial support to poor students and their families and those who live in far communities; and g) On Lack of monitoring and evaluation of educational tools and output- school officials should make regular assessment and evaluation of evaluation tools.

Keywords: Quality Education, Strategic Management, Primary Educational Service Areas, Education Policy Plan, Primary education schools, Evaluation, ICT integration, Assessment.

The Development of Teachers in Teaching and Learning-Based Management in the Classroom: Mukdalai School, Mueang District, Mukdahan Province

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Abstract- Project-based learning is a learning model that is consistent with the educational approach in the National Education Act, 1999. It is a learning activity that allows learners to choose and create learning processes. One of the most interesting topics to be learned by the students is the focus from the media and learning resources stimulate closely. This study aims to develop teachers in Mukdalai School, Mueang District, Mukdahan Province. Provide participants with knowledge and understanding and can teach the project. The results of the project-based teaching approach were used in classroom research using three strategies for developing the project-based learning activities. Workshop and supervision teaching effectiveness do the research in the classroom. Use relevant study documents. Experts and supervisors use the principle of operational research in two circles, each of which consists of a cycle and a four-step process, based on the Kemmis & McTaggart concept. The data were collected by interview, questionnaire, and note taking. Data collection and analysis using Triangular techniques to monitor data centers and offers analyzes data analysis development.

The study found that before the development the teachers in the study had a low level of knowledge and understanding about teaching and learning project management. The implementation of the strategy has made the researcher more knowledgeable about the project-based teaching and learning and the problem of teaching everyone. Each problem is different according to the course and even if the researcher has been trained a bit. However, it is not possible to bring problems to the classroom. The lack of knowledge and skills in classroom research led to the development of three strategies, namely, the study of relevant documents, expert discovery and supervision to solve the problem of teacher development around the circle.

Before the development of the second round, the study found that the teachers in the study had a low level of knowledge and understanding about classroom research. The implementation has implemented the strategy set. Researchers can apply the problems of project-based teaching and learning through classroom research and satisfaction in the development process at a high level. The problem can be solved by designing innovative solutions for problem solving in the classrooms. In addition, two authors were unable to apply the innovations designed to solve the problem and to summarize and write the research report because of the mission and workload. The development of teachers in teaching and learning management using classroom research at Mukdalai school. Using strategies to organize learning activities, project-based learning, relevant documentation, workshops and supervision. The study of the related documents, the presence of the supervisors, the researcher's knowledge, experience and the ability to manage the teaching and learning by using classroom research. In addition, teachers have invented methods or

innovations to use in various teaching and learning. The issue that needs to be further developed is the school administrators and teachers in the school should exchange knowledge, understanding and opinions in the management of learning by using classroom research in order to develop the learners to the quality standards and teacher development to become a professional teacher forever.

Keywords: Classroom Management, Workshops and Supervision, Learning Activities, Learning Processes, Curriculum, Quality Standards, Teaching and learning strategies, Assessment.

A Comparative study of Ancient & Present Education System

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Abstract- **E**ducation is not simply imparting knowledge in a particular faculty or subject or making one fit for securing jobs or fair well in exams, but at the same time is also a training in logical thinking which helps the coming generations adjust to the ever-changing environment. It also means opening the doors of the mind, cleansing the soul and realization of the self (Pabla, 2011). The quality of education greatly influences the quality of manpower for the societal benefits. This paper presents comparison between the ancient and present education system. It highlights the basic structure of ancient education which contributed quality manpower imbibing moral, social and civic values to the society. The present education system is weighed down by several reasons as a result of which the outcome is becoming self centric. This calls for several reforms in present education system which can be implemented from ancient education for overall development of students as a human being.

Keywords- education system, ancient, present, spirituality, values, development, society, veda

Transforming Public Libraries into Digital Knowledge Dissemination Centre in Supporting Lifelong Blended Learning Programmes for Rural Youths

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Abstract - Purpose of this research is to examine the commissioning, transforming and maximum utilization of the digital technology infrastructure in public libraries into blended mode digital education platform to support open and distance lifelong blended learning in upgrading knowledge, livelihood and human capital for the constant improvement and upgrading among village youths. Mixed-method research design was implemented including survey, interviews and observation. The five dimensions of enhancing the innovative blended open and distance digital platform to support a blended dissemination of knowledge namely demographic, digital technology availability, Open Education Resources in public libraries, learning culture and corporate support were examined. Findings show that there are significant differences among factors stated above which will upgrade the potential of village youths technical and livelihood knowledge to be relevant and competitive in building human capital. the use of a blended digital education platform in public libraries could be beneficial to village folks in upgrading their knowledge and skills. this model could be used as framework of practice for life skills development in developing and under-develop countries. the skills development could be implemented from earlier stages in educational settings, more skills workers could be produced to raise the performance in the workplace and contribute to the worldwide improvement of human capital. legal and policy issues on digital facilities will also be discussed as to advocate lawful and ethical application of them.

Keywords: Blended mode, Open and Distance Learning, village youths, Lifelong learning, Legal issues

Promoting LearnT-SMArET through Managing Blended-Mode Competitions: A Reflective Study with Exemplary Output From Criterion-Reference Assessment

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Abstract - Managing innovation and resources has been the concerns of many educational settings especially in the digital era with swift industrial 4.0 movement. These are also part of the aspects emphasized in the SEAMEO Education Agenda that includes seven priority areas for training and R&D activities in line with Sustainable Development Goals (SDGs). This paper reports on the authors' involvement in reflective cycles to manage innovation processes and human resource development through organizing blended-mode training programmes and competitions that promote 'Learning of Transdisciplinary Science incorporating Mathematics/Arts-language-culture/Engineering-Environmental Education/Technology' (LearnT-SMArET) as part of SEAMEO networking project initiative. The authors were involved as event organizer(s), reviewer(s) and/or coordinator(s) during the first, second and/or third cycles. Criterion-reference assessment (CRA) using rubrics as scoring method was piloted and implemented. Exemplary output related to Augmented Reality (AR) and e-platform selected from cycle 3 of study based on CRA will be illustrated. The implications and suggested studies are also deliberated.

Keywords: Managing innovation processes, Criterion-referenced assessment, blended-mode competitions, reflective study, Augmented Reality, exemplary output

Women Empowerment-An overview of the Global Context

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***Abstract*:** Empowering women economically is not only the "right thing" to do to honor the world's commitments to human rights. It is also the "smart thing" to do for development, economic growth and business'. It is well recognized that societies which discriminate by gender tend to experience less rapid economic growth and poverty reduction than societies which treat men and women more equally. Ending of gender based inequities, discrimination and all forms of violence against girls and women has been accorded primary priority for catalyzing women empowerment for an equalitarian society. This is fundamental to enabling women to participate fully in development processes and in fulfilling their economic, social, civil and political rights, for more inclusive growth. The paper has attempted to find out the importance of women empowerment, effort to identify those loopholes or limitations which are observing the realization of empowerment of women, women economic empowerment in global context and How to secure progress on women's economic empowerment.

***Research methodology*:** The study is carried out based on existing research, and secondary data from various sources.

***Keywords*:** Inequality, women, empowerment, economic, Awareness,

PROCEEDINGS OF THE INTERNATIONAL CONFERENCE ON
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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.

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He has published two monographs from **Lambert Academic Publishing Germany** entitled Latent Fingerprint Matching, and Instruction Level Parallelism. He has guided six M. Tech. dissertations. His research area interest includes Theoretical Computer Science, E-Services, Biometric Systems, Compiler Design, Multimedia Systems, and Software Engineering.

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