Contents

Chapter: 12
Consumers' Perception towards Artificial Intelligence in Banking Sector

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Abstract: The paper is an attempt to study the consumer perception towards Artificial Intelligence in banking sector. In the paper, we analyze the impact of artificial intelligence (AI) on banking development. Banks implement AI to provide digital assistance and financial advice to clients, measure their financial standing etc. The paper also includes cases of the AI solutions marketing and some ideas of brand-new banking AI-based services. Despite the rapid spreading of AI across the different spheres, its efficiency is based, primarily, on consumers` attitude and loyalty to this technology.

Keywords: Consumer Perception, Artificial Intelligence

[1] Introduction

Artificial intelligence (**AI**) is intelligence demonstrated by machines, as opposed to the **natural intelligence** displayed by animals including humans. Leading AI textbooks define the field as the study of "intelligent agents": any system that perceives its environment and takes actions that maximize its chance of achieving its goals. Some popular accounts use the term "artificial intelligence" to describe machines that mimic "cognitive" functions that humans associate with the human mind, such as "learning" and "problem-solving", however, this definition is rejected by major AI researchers.

AI applications include advanced web search engines (e.g., Google), recommendation systems (used by YouTube, Amazon and Netflix), understanding human speech (such as Siri and Alexa), self-driving cars (e.g., Tesla), automated decision-making and competing at the highest level in strategic game systems (such as chess and Go). As machines become increasingly capable, tasks considered to require "intelligence" are often removed from the definition of AI, a phenomenon known as the AI effect. For instance, optical character recognition is frequently excluded from things considered to be AI, having become a routine technology.

[2] Installation of AI in Banking

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Routledge Taylor & Francis Group

CRC Press Taylor & Francis Group

AI-Centric Smart City Ecosystem Technologies, Design, and Implementation

Manuscript Acceptance Letter

Date: 22 March, 2022

To Whom It May Concern!

This is to certify that the book chapter manuscript entitled "**The IoT-based Estimation of Human Heart State for the Smart Health Care System**" is contributed by

- Mr. Abhishek Vishnoi, Assistant Professor, Department of Electrical & Electronics Engineering Kanpur Institute of Technology, Kanpur, Uttar Pradesh, India
- Mr. Vikas Verma, Assistant Professor, Department of Electrical & Electronics Engineering Kanpur Institute of Technology, Kanpur, Uttar Pradesh, India

Has been ACCEPTED and ADDED to the book title of "**AI-Centric Smart City Ecosystem: Technologies, Design, and Implementation**" ISBN: **978-1-032-17079**, and it will be published by CRC Press (Taylor & Francis Group).

The book chapter manuscript is of great importance for our book and it is firmly believed that it will be attracted general attention from the international reader's community.

On behalf of the editor team, I'm so thankful for everything you bring to the book chapter manuscript. I believe that our collaboration will help to accelerate global knowledge creation and sharing to the new height.

Sincerely

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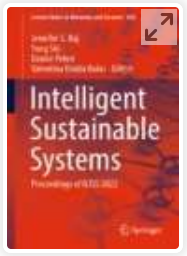
📖 Book Information: https://easychair.org/cfp/aicscetdi2022 - http://gritex.org/aicscetdi-2022.htm



Intelligent Sustainable Systems pp 167–178

High Accuracy for Hyperspectral Image Classification Using Hybrid Spectral 3D-2D CNN

Mohini Shivhare & Sweta Tripathi

Conference paper | First Online: 23 August 2022

Part of the Lecture Notes in Networks and Systems book series (LNNS,volume 458)

Abstract

HSI characterization is broadly utilized for the investigation of remotely detected image. HIS incorporates changing groups of images. CNN is perhaps the most habitually utilized profound learning-occupying techniques for visual information handling. The utilization of CNN for HSI characterization is additionally apparent in ongoing works. These accesses are generally founded on CNN_2_D. Then again, the HSI characterization execution is profoundly reliant upon both contiguous and spectral data. Not many strategies have utilized the CNN_3_D as a result of expanded compurgation intricacy. This paper introduce a hybrid spectral CNN (HybridSN) for HSI arrangement. As a rule, the HybridSN is a spectral contiguous CNN_3_D

pursue by contiguous CNN_2_D. The CNN_3_D works with the collective contiguous–otherworldly component portrayal from a pile of phantom groups. The CNN_2_D on dominant of the CNN_3_D further learns more dynamic level contiguous depiction. In addition, the utilization of cross breed CNNs diminishes the intricacy of the model contrasted with the utilization of CNN_3_D unattended. An exceptionally acceptable exhibition is gotten utilizing the proposed HybridSN for HSI characterization.

Keywords

Hyperspectral image (HSI) **2D** **3D**

Convolutional neural network (CNN) **HybridSN**

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About this paper

Cite this paper

Shivhare, M., Tripathi, S. (2022). High Accuracy for Hyperspectral Image Classification Using Hybrid Spectral 3D-2D CNN. In: Raj, J.S., Shi, Y., Pelusi, D., Balas, V.E. (eds) Intelligent Sustainable Systems. Lecture Notes in Networks and Systems, vol 458. Springer, Singapore. https://doi.org/10.1007/978-981-19-2894-9_13

.RIS .ENW .BIB

DOI
https://doi.org/10.1007/978-981-19-2894-9_13

Published	Publisher Name	Print ISBN
23 August 2022	Springer, Singapore	978-981-19-2893-2

Online ISBN	eBook Packages
978-981-19-2894-9	Intelligent Technologies and Robotics Intelligent Technologies and Robotics (R0)

An Efficient and Reliable Optimized Routing Protocol for IoT Network in Agriculture

Kratika Varshney ; Sweta Tripathi ; Vaibhav Purwar All Authors

Abstract: The Internet of Things (IoT) is a popular technology where Smart Devices and sensors enable the delivery of data and communication. Internet of Things is the concept of W... **View more**

Metadata

Abstract:

The Internet of Things (IoT) is a popular technology where Smart Devices and sensors enable the delivery of data and communication. Internet of Things is the concept of Wireless Sensor Networks (WSNs). The primary motive of this research analysis is to ensure data reliability and accuracy during communication. This proposed work has implemented the energy-efficient Pegasis routing protocol in WSN. The proposed Ant Lion Optimization (ALO) algorithm is implemented to calculate the optimal path to ensure high-speed data transfer. The proposed model has minimized the energy consumption, End to End Delay (E2D), overhead, and increased the packet delivery rate compared with current routing protocols like Rendezvous Protocol in WSN. The average packet delivery rate of the proposed model is 95%, with 0.0127 joules energy consumption on an Intel Core i3 processor with 4GB RAM.

Footnotes

Published in: 2021 International Conference on Advances in Electrical, Computing, Communication and Sustainable Technologies (ICAECT)

Date of Conference: 19-20 February 2021

INSPEC Accession Number: 20840472

Date Added to IEEE *Xplore*: 06 April 2021

DOI: 10.1109/ICAECT49130.2021.9392553

ISBN Information:

Publisher: IEEE

Conference Location: Bhilai, India

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Vaibhav Purwar
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Contents

WSN is a technique used to sense the change outside the world and transmit it to the base station. The transmitted information is used to process and check agricultural land qualities. The recent research done by using wireless sensor networks has brought up many improvements in the area such as environment, precision agriculture, and medicine, etc. Precision agriculture (PA) is defined as the art and science of using technology to enhance crop productivity by attaining the data pertinent to agriculture parameters and making decisions accordingly. In this research, Pegasis with ALO(Ant Lion Optimization) algorithm is implemented to make agro-business more energy efficient. Various IoT devices are connected to the platforms and processed to predict future possibilities. This new User Interface provides user-friendly access, at a minimum cost linked object [2]. Agricultural product demand is growing day by day because of tremendous development in the world populace. In India, agriculture is the most crucial sector; however, it is the area that is faced with problems [3]. So, the central idea behind the research is to bring transformation to the Farming sector. The gathering of data regarding agricultural areas with sensors helps us to extract a lot of information, as explained in fig 1(i). The IoT network with Big Data and Cloud Computing gives a better resolution in the analysis of agriculture parameters.

Authors

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Keywords
Metrics
Footnotes

Investigation of In0.53 Ga0.47 As -Based Buffered Step Doping (BSD) LDMOS

Varsha Diwakar ; Nitish kumar ; Himanshi Awasthi ; Vaibhav Purwar ; Rakesh Kumar P… All Authors

Abstract: In the modern applications of domestic and industrial devices, the demand for high-frequency switches with smaller on-resistance (R on) and high breakdown voltage (BV) h... **View more**

Metadata

Abstract:

In the modern applications of domestic and industrial devices, the demand for high-frequency switches with smaller on-resistance (R_{on}) and high breakdown voltage (BV) has increased dramatically. To achieve lower resistance (R_{on}) with high breakdown voltage (BV) has always been a great challenge for scientists as both parameters are contrary to each other. The laterally diffused (LD) MOS structures have shown better performance in support of the above requirement. An attempt to investigate the performance of a buffered step doping (BSD) LDMOS with high mobility material $In_{0.53}Ga_{0.47}As$ has been performed and presented in this paper. The parameters such as drain-current (I_d), output conductance (g_o), and breakdown voltage (BV) have been examined using ATLAS (2D) device simulator and compared with $In_{0.53}Ga_{0.47}As$ based LDMOS.

Published in: 2021 International Conference on Advances in Electrical, Computing, Communication and Sustainable Technologies (ICAECT)

Date of Conference: 19-20 February 2021

INSPEC Accession Number: 20840420

Date Added to IEEE *Xplore*: 06 April 2021

DOI: 10.1109/ICAECT49130.2021.9392552

ISBN Information:

Publisher: IEEE

Conference Location: Bhilai, India

Contents

The advance appliances used for domestic and industrial applications require efficient power converters incorporated with high frequency switches with smaller on resistance for superior performance. The utilization of conventional power switches such as SCRs, Thyristors, IGBT, etc is limited due to their lower power handling capacities and efficiencies with restricted operating frequencies. The superior switching frequency, larger voltage, and current range with lesser turn-off -loss makes power MOSFETs the first choice for solid-state switches being used in various power electronics gadgets [1]-[2].

Noise Reduction for Hyperspectral Image Classification using Deep Learning Technique

Publisher: IEEE

Mohini Shivhare ; Sweta Tripathi All Authors

Abstract: Hyperspectral remotely sensed images generally contain hundreds of contiguous spectral bands, which can precisely discriminate the various spectrally similar land cover c... **View more**

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Abstract:

Hyperspectral remotely sensed images generally contain hundreds of contiguous spectral bands, which can precisely discriminate the various spectrally similar land cover classes. The presences of irrelevant and highly correlated spectral bands make a significant reduction in the classification accuracy of the hyperspectral images. Therefore, the process of dimensionality reduction is more demanding in improving the classification accuracy of the HSI. Image de-noising technique is used to improve the appearance of the image or to extract the fine details in the degraded image. The purpose of image denoising is to process an image whereby the resulting output image will be clearer than the original image. Noise reduction for HIS using deep learning

References
Keywords
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is present in this paper. The presented model is simulated MATALB and analysis MSE and PSNR.

Published in: 2021 2nd International Conference on Smart Electronics and Communication (ICOSEC)

Date of Conference: 07-09 October 2021

INSPEC Accession Number: 21360438

Date Added to IEEE *Xplore*: 12 November 2021

DOI: 10.1109/ICOSEC51865.2021.9591950

Publisher: IEEE

ISBN Information:

Electronic
ISBN:978-1-6654-3368-6
DVD ISBN:978-1-6654-3367-9
Print on Demand(PoD)
ISBN:978-1-6654-3369-3

Conference Location: Trichy, India

Contents

Distant detecting is one of the significant sources out of all the information sources accessible to geological data framework (GIS). Far off detecting is characterized as the assortment of the data about Earth's surface without being there. It estimates transmitted and reflected radiations recorded ordinarily from sensors mounted on an airplane or a satellite. The significant goals of far off detecting are: to show and screen the cycles on the Earth's surface and to perceive materials on the land cover by breaking down the unearthly attributes caught by sensors. By and large, there are two sorts of distant detecting: dynamic far off detecting and aloof far off detecting. Dynamic distant detecting utilizes own wellspring of light and measures reflected energy [1], [2]. Then again, detached distant detecting estimates reflected energy radiated from the sun. A few instances of inactive sensors are accelerometer, radiometers, hyperspectral radiometers, spectrometers and spectrora diameter. Latent distant detecting can be separated further into multispectral and hyperspectral information. The distinction between hyperspectral information and multispectral information lies in the high dimensionality or the quantity of unearthly groups. With the fast advancement of imaging innovation, the hyperspectral sensors would now be able to catch many restricted discrete ghostly groups over a wide electromagnetic range going from noticeable reach to infrared reach [3].

Authors
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Keywords

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IOT Based Transformer Health Monitoring System: A Survey

Publisher: IEEE

K. Hazarika ; Gauri Katiyar ; Noorul Islam All Authors

Abstract: The transformer is playing a vital role in the electrical power grid. As it deals with high voltage and current which can greatly affect the functioning and physical cond... **View more**

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Abstract:

The transformer is playing a vital role in the electrical power grid. As it deals with high voltage and current which can greatly affect the functioning and physical condition of the device, continuous monitoring has become an integrated part of its operation. This paper presents a review on IoT (Internet of things) based electrical parameters monitoring and controlling technology to avoid its successive catastrophic failures. Here, different sensors and server models are used for communication, mostly used is GSM-GPRS. In case of some abnormality, this advanced monitoring system will deliver a message to a dedicated device for further course of action. The work done in recent few years in the field of parameter monitoring using the internet is discussed here.

Published in: 2021 International Conference on Advance Computing and Innovative Technologies in Engineering (ICACITE)

Date of Conference: 04-05 March 2021

INSPEC Accession Number: 20632465

Date Added to IEEE *Xplore*: 20 April 2021

DOI: 10.1109/ICACITE51222.2021.9404657

Publisher: IEEE

ISBN Information:

Electronic
ISBN:978-1-7281-7741-0
Print on Demand(PoD)
ISBN:978-1-7281-7742-7

Conference Location: Greater Noida, India

Contents

I. Introduction

The transformer plays an important and crucial role in the network of the electrical system. In every area, we can see at least one transformer. We are in an era where it is impossible to live without electricity even for a minute. Every core activity whether it is residential or for plants and factories is dependent on the power supply. Without them, every business will come to standstill and may face huge financial consequences.

An Analysis of Si-tube Based Double-Material Double Gate-All-Around (DMDGAA) MOSFETs

Publisher: IEEE

Nitish Kumar ; Himanshi Awasthi ; Vaibhav Purwar ; Asheesh Gupta ; Abhinav Gupta All Authors

Abstract: In this paper, The gate-material engineering technique is used on double gate all around (DGAA) MOSFET. The gate material engineering technique has two dissimilar materia... **View more**

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Abstract:

In this paper, The gate-material engineering technique is used on double gate all around (DGAA) MOSFET. The gate material engineering technique has two dissimilar materials with dissimilar work functions. The different materials have combined to make a single gate MOSFET. The silicon-tube double-gate-all-around MOSFET have two gates. There are one gate (inner gate) inside of silicon-tube and one gate (outer gate) outside of silicon-tube. ATLAS device simulation based comparative study of double material double gate all around (DMDGAA) and double gate all around (DGAA) Junction based MOSFETs have been performed. The simulation results express that this modification of MOSFET enhanced the ON-OFF current (I_{ON}/I_{OFF}) ratio, greatly reduce the

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OFF current (I_{OFF}). The introduced modification also improves short channel effects (SCEs) compared to DGAA MOSFET. DMDGAA MOSFET provides high-speed and ultra-low power operation for Ultra large-scale integration (ULSI) applications.

Published in: 2020 International Conference on Electrical and Electronics Engineering (ICE3)

Date of Conference: 14-15 February 2020

INSPEC Accession Number: 19744489

Date Added to IEEE *Xplore*: 23 June 2020

DOI: 10.1109/ICE348803.2020.9122851

Publisher: IEEE

ISBN Information:

Electronic
ISBN:978-1-7281-5846-4
USB ISBN:978-1-7281-5845-7
Print on Demand(PoD)
ISBN:978-1-7281-5847-1

Conference Location: Gorakhpur, India

Contents

Over the last few years, several of researchers are using advance technology for innovative multi-material gate MOSFET architectures. Such as double material gate all around (DMGAA) MOSFETs and Triple-material-gate all around (TMGAA) MOSFETs with down scaling Integrated circuits (IC) technology [1]–[5]. The down scaling MOSFET devices technology has been liable for having many features upgrading in integrated circuits (IC) together with improved functionality, Ultra large-scale integration (ULSI) and High speed [6]–[8]. However, the continuously downscaling of MOSFET has reached to the bottleneck due to equable short channel effects (SCEs) [9]–[10]. Lately, Silicon-tube based double gate all around structure has pursued with improved short channel effects (SCEs) immunity [7]–[8]. The silicon-tube based double gate all around structure have two gates. There is one gate inside of silicon-nanotube, i.e. called inner core gate and one of another gate outer side of Silicon-nanotube, i.e. called outer shell gate. Both gates are controlling silicon-tube channel and thereby increases device performance [11]–[13]. The MOSFETs with better ON-OFF current (I_{ON}/I_{OFF}) ratio for cylindrical hollow topologies along with improved SCEs has been innovated with different device structures called as silicon-tube DGAA MOSFET with the Inner-outer gates [7]–[13]. The DGAA MOSFET idea introduced by Fahad et al. [7]. The fabrication process of DGAA MOSFET has elaborated by Teaklab et.al. [8]. A. kumar et. al. [11]–[13] presented the detailed study of Threshold voltage of the DGAA MOSFET.

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Figures

Figures

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Keywords

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A Blue Emissive 2-(2-Hydroxy Phenyl) Benzimidazole: Synthesis, Charactrization and Spectroscopic Studies

Sattey Prakash
Kanpur Institute of Technology
Kanpur, India

Abstract

2-(2-Hydroxy phenyl) Benzimidazole was prepared[1] and characterized for its application in organic light emitting diodes[2]. The compound absorbs at 333 nm (band gap=3.72) and Photo luminescence spectra[3] of this compound emit in blue region at 457nm in solid state and 460nm in $CHCl_3$ solution. More recently molecular derivatives benzimidazole came to prominence because of their use as highly luminescent molecules owing to their π - π* and n-π* transitions which contribute to the enhanced efficiency. The compound has an intense fluorescence in the blue region with full width at half maxima (FWHM) ~63 nm, with no considerable shift in solid and solution form indicating the molecule is the planar symmetry. DFT calculations show that the electron density distribution in the filled π- orbital (HOMO's) and the unfilled orbital (LUMO's) of the compound is uniform[4]. This compound emitting in blue energy region, can be used as electron transport and emissive layer in the organic light emitting diodes.

Keywords: A: organic light emitting diodes (OLED's), B: Blue emission materials C: DFT calculation Author for correspondence: sprakashg.meena@gmail.com (Sattey Prkash)
Mobile Number: 7738956964

I. INTRODUCTION

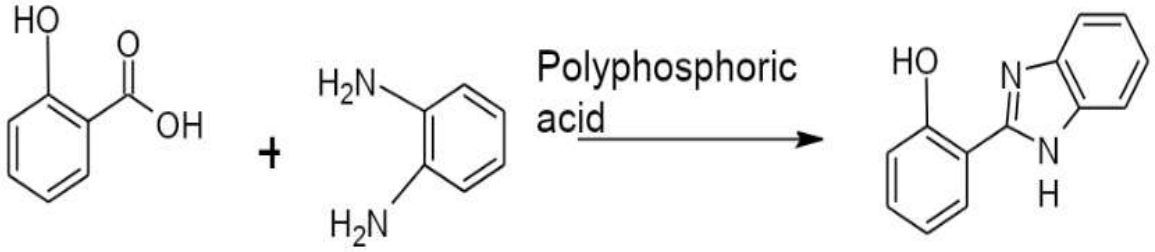
The application of organic light emitting diodes (OLEDs) [2] in flat panel displays using small organic molecules or organic polymers has been intensively pursued after the works by Tang et al. in 1987 and Friend et al. in 1990. OLEDs are considered to be the emissive display technology and most competitive with the liquid crystal display (LCDs) [2-5]. For full color display applications, efficient blue, green and red emitters with excellent color purity are very important. Our strategy to construct amorphous materials for OLED applications is to encapsulate the emitting π- conjugation benzimidazole. The benzheterazoles are excellent candidate for effective full color emissive material in organic LED[6-8]. A spectroscopic study showed that an intense fluorescence in the blue region in solution and in the solid state.

In this study, Benzimidazole is blue- emitting characteristic molecules. Imidazole and its derivatives were found to have a broad scope of biological activity. For example, they were found to be essential in the biosynthesis of purine nucleotides and DNA binding studies of their complex[5a]. Here, we have successfully synthesized a molecule containing benzimidazole ring. It is used as electron transporting layer as well as emissive layer in organic light emitting diodes (OLED's). The intrinsic electronic and optical properties of a material are governed by the band gap (3.72) of the compound. The energies of the highest occupied molecular orbital (HOMO) and lowest unoccupied molecular orbital (LUMO) were calculated using square wave voltammetric measurement and the optical properties were

studied using molecular orbital calculation. The geometry of the 2-(2-hydroxy phenyl) benzimidazole in solid state was optimized using the density functional theory (DFT) Method contained in the molecular orbital package. DFT is widely applied to the structure determination and electronic structure calculation of small and large organic molecule. Thermal properties of these molecules were studied by thermogravimetric (TGA) and differential thermal analyses (DTA).Compounds showed high stability and good solubility in common organic solvent, such as acetone, chloroform, DMF, acetonitril, DCM, DMF etc. Physical properties of this molecule would be discussed.

II. RESULTS AND DISCUSSION

1-Synthesis and optical properties



The synthesis of 2-(2-hydroxy phenyl) benzimidazole by Polyphosphoric acid act as the solvent and catalyst. Stoichiometric amount of Salicylic acid and o-phenylenediamine were taken in Polyphosphoric acid (20ml), the mixture was heated in oil bath, vigorously stirred at 200^0C for 2 hours. Then the hot mixture was poured into vigorously stirred cold water (500ml). The bulky pale blue precipitate obtained was slurried in cold water (200 ml), and sodium hydroxide solution (5M) was added until the pH of the mixture was brought to 7. Recrystallization of the crude product from ethanol (charcoal) gave white crystal, yield 70% mp. 232^0C. ^{1}HNMR (400MHz): (t = 7.37, J=1.68Hz), (tm = 7.018, J = 4.8Hz), (d = 7.972, J = 8Hz), (dd = 7.265-7.242, J = 3.6Hz) (NH = 7.620). Elemental analysis of $C_{13}H_{10}N_2O$: C = 74.27%, H = 4.79%, N = 13.33%, O = 7.61%. FTIR: OH = 3244.23cm^{-1}, Ar-H stre=3053.73cm^{-1}, C=N stre=1628.59cm^{-1}, Ar-H vib=1592cm^{-1}, N-H stre=1498.33cm^{-1}, O-H bend=1394cm^{-1}, C-N stre=1256.68cm^{-1}, Ar-H bend =592-906cm^{-1}. The Sample was characterized by powder X-ray diffraction employing CuKα radiation using Ni filter. X-ray pattern (Fig.1) shows prominent peaks, this sample showing crystalline nature. The absorption spectra were recorded in Perkin –Elmer UV-visible spectrometer and the photo-luminescence (PL) spectra were recorded on Spex Flourolog spectroflourometer. The absorption and luminescence spectra of the molecule are shown in Fig.2 and Fig.3. The absorption of molecule covers the entire UV-visible region (250-350nm). This molecule is absorbing around 333nm. In this case all peaks are comparable except CH3CN peak. This is because of the interaction of lone pairs of electrons in the solvent with the compound. Photo-luminescence spectrum[5, 11, 12] with emission wavelength ranging from UV to blue green. This compound is giving emission around 457 nm in solid state. There is no considerable shift in $CHCl_3$ solution (460 nm) and in solid state.

2-Theoretical calculation

The ground state (S_0) geometries of the molecules have been optimized using the DFT method. Subsequently, Gaussian methods has been performed to get the ground state energy (Eg) and excited states the transition energies (Ei.j) to different excited electronic states. Gaussian methods are used in the electronic part of the calculation to obtain molecular orbital, the heat of formation and its derivative with respect to molecular geometry. The geometrical of the molecules in the ground state were optimized with the DFT method. DFT calculations (Fig.4) show that the electron density distribution in the filled π- orbital (HOMO's) and the unfilled orbital (LUMO's) of the compound are uniform. The optimized structure of 2-(2-hydroxy phenyl) benzimidazole (HBI) shows that there is a strong electron delocalization in the ground state as well as in excited state, making the molecule planar. The frontier orbital electron density distributions in the excited state are show in Fig.4 with respect to the ground state distribution. The peaks in the emission spectra LUMO, LUMO-1 and LUMO-2 are 446nm, 457nm and 477nm. The observed emission spectrum is in good agreement with the result obtained from DFT calculations.

3-Square wave voltammetry

Square wave voltammetry Measurements[21, 22] were performed in N, N'-dimethyl Formamide using standard calomel electrode (SCE) as standard electrode.Fig.5 shows one fully reversible reduction peaks –0.75nm ,one electron transfer steps, indicating the ability of the molecule to undergo reduction easily, making good electron transporting material. The energy of the LUMO of (HBI) is determine according to the equation [$E_{LUMO} = -4.8-E_{red}$] eV. Where E_{red} = Potential at the onset of reduction. The HOMO level is determined by subtracting band gap from LUMO level. The energy of the HOMO and LUMO level of the compound is –7.75eV and –4.05eV respectively.
Band gap= LUMO –HOMO=3.7

4-Termal properties

Thermal properties of the material were studied by thermo gravimetric (TGA) and differential thermal analyses (DTA). The TGA was carried out between 25°C and 300°C in the nitrogen atmosphere at a heating rate of 10K/min and the spectrum is shown in (Fig.6). DTA trace is also presented in the same figure. The material exhibits single sharp weight loss starting at 240°C and below this temperature no significant weight loss is observed. Hence the compound is stable up to 300°C. This type of weight loss illustrates volatilization rather than degradation. In order to confirm melting and subsequent volatilization of this material without decomposition, DTA analysis was undertaken. The analysis was carried out between 25 and 300°C in the nitrogen atmosphere at a heating rate of 10K/min and the resulting spectrum is shown in Fig.6 along with TGA curve. There is a sharp endothermic at 240°C, which is assigned to melting point [23]. Below this endothermic there is no exothermic or endothermic peak. This confirms the absence of any isomorphic transition. It also shows the absence of lattice water. After melting, no characteristic exothermic or endothermic peaks were observed which indicates that there is no degradation of the compound above the melting point. Sharpness of the endothermic peaks observed in DTA indicates good degree of crystallinity of the sample, which is in tune with the results obtained from XRD.

5-Summary

We have synthesized most stable blue light emitting amorphous material, which can be used as electron transport layer as well as emissive layer in organic light emitting diodes. The band gap of this compound is 3.72eV. The HOMO and LUMO states of the compound were calculated from square wave Voltammetry and absorption spectra.

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Legend to Figures

Figure1: The powder X-ray diffraction pattern of 2-(2-Hydroxy phenyl) benzimidazole.

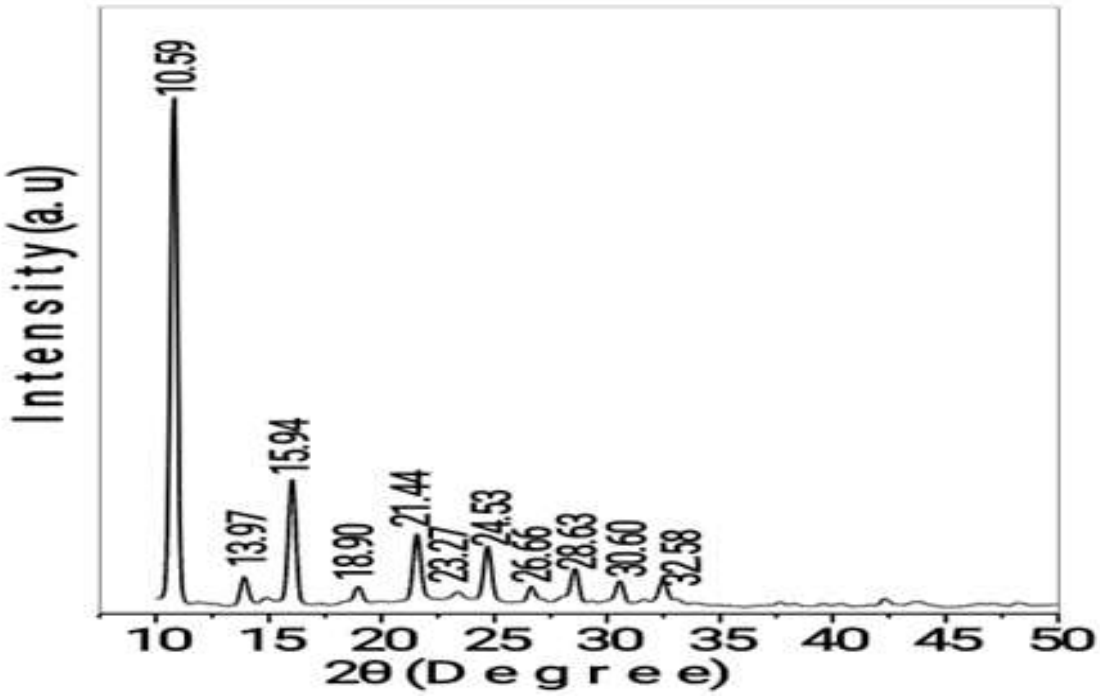
Figure2: The absorption of molecule covers the entire UV-visible region (250-350 nm). This molecule is absorbing around 333 nm. In this case all peaks are comparable except CH3CN peak. This is because of the interaction of lone pairs of electrons in the solvent with the compound

Figure3: This is PL spectra excitation at 350 nm compound is giving emission around 457 nm in solid state and (3a) the photoluminescence with emission wavelength ranging from UV to blue green. This compound is giving emission around 457 nm in solid state. There is no considerable shift in $CHCl_3$ solution (460 nm) and solid state.

Figure 4: The density functional theory (DFT) of the 2-(2-Hydroxy phenyl) benzimidazole. Electron density is delocalized over all the rings in HOMO and LUMO but it is delocalized in LUMO+1 and LUMO+2 states.

Figure 5: Square wave voltametry of 2-(2- hydroxy phenyl) benzimidazole in N, N'-dimethyl formamide.

Figure6: TGA - DTA curve of 2-(2-hydroxy phenyl) bennzimidazole.



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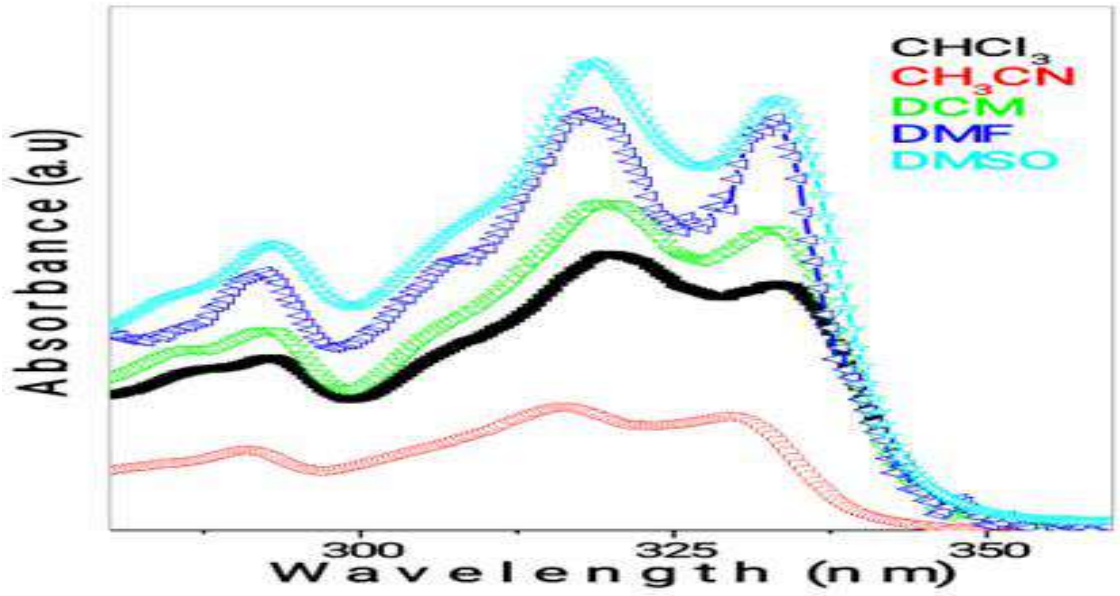

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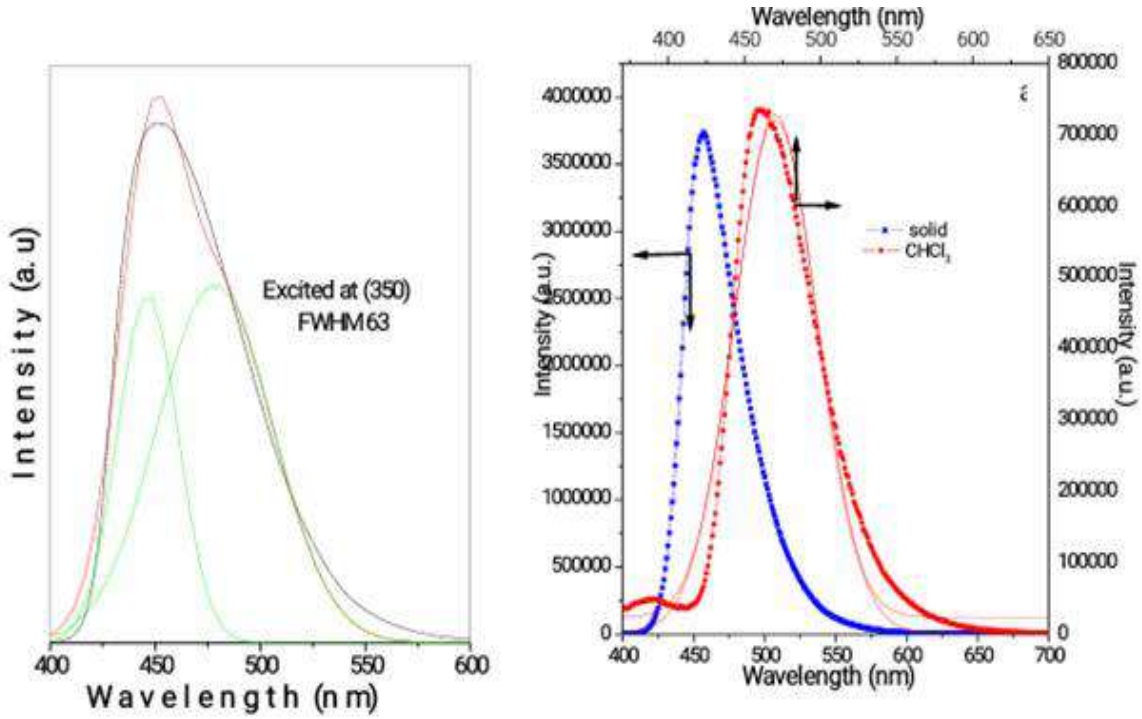

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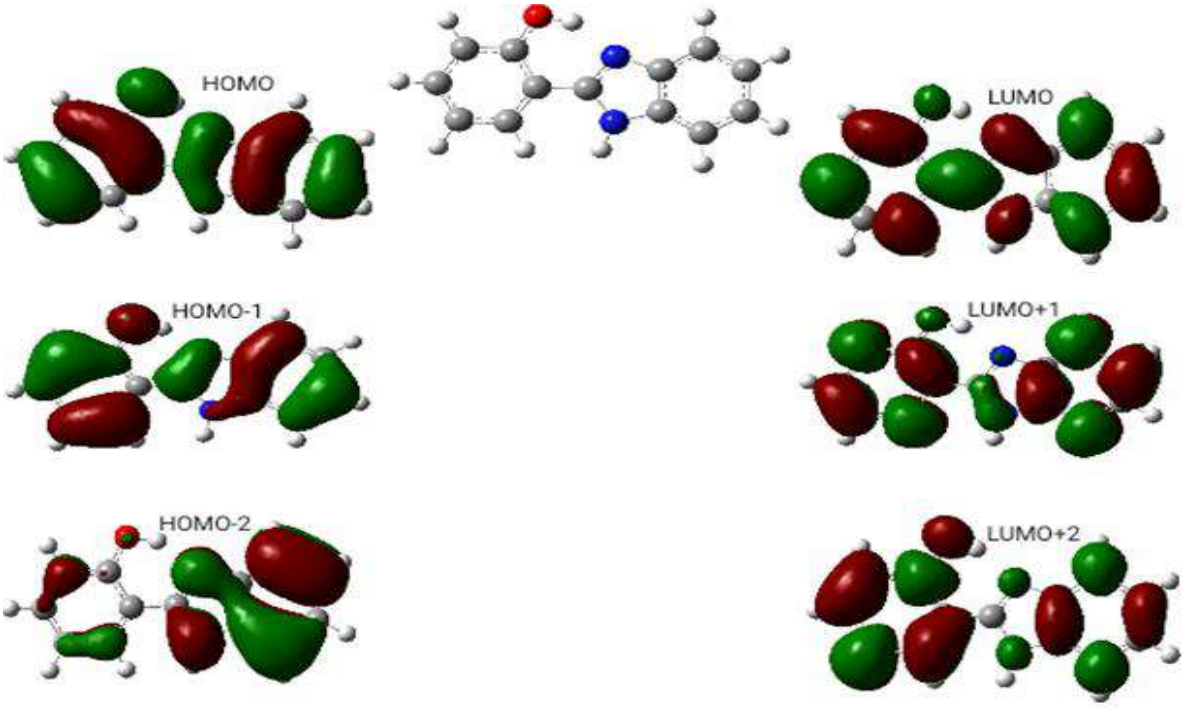

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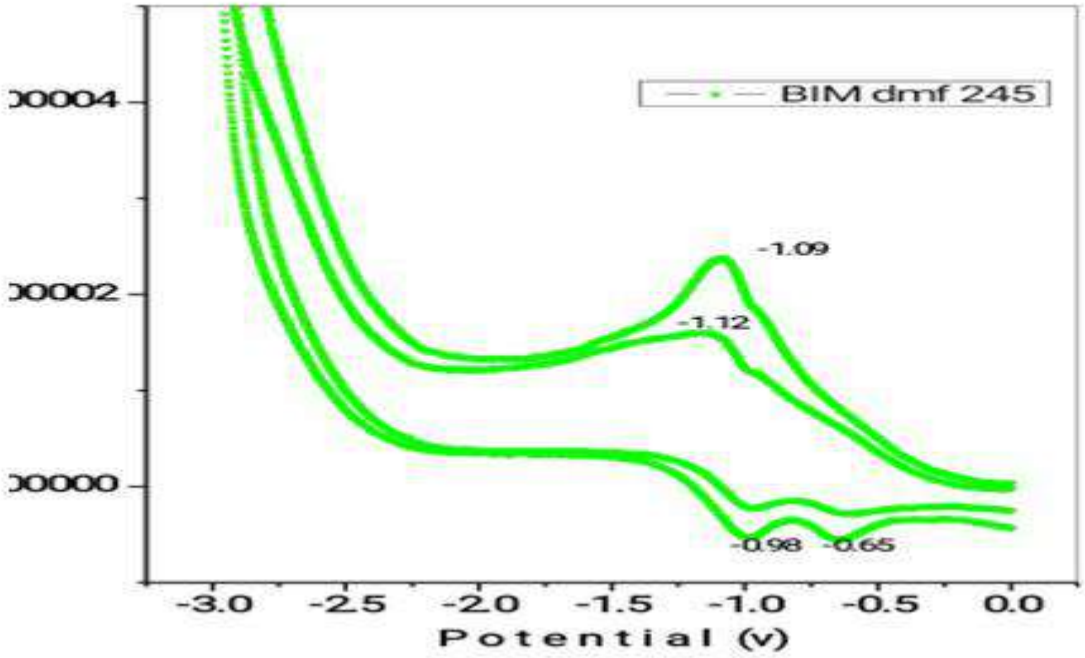

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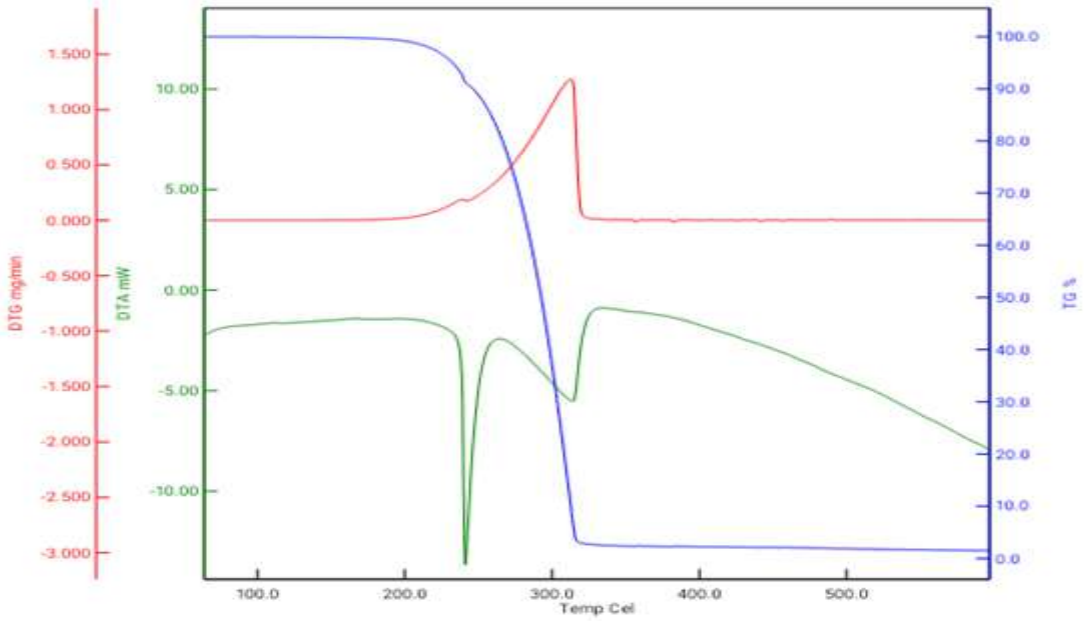

Figure 6: TGA - DTA curve of 2-(2-hydroxy phenyl) benzimidazole

Modeling and Analysis of Variable Frequency Transformer for Power Transfer in Between Power System Networks

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Abstract

A new power transmission techonology has been developed. The variable frequency transformer (vft) is basically a controllable, bidirectional transmission device that can transfer power between asynchronous networks .Functionally the VFT is similar to a back-to-back HVDC converter. The core technology of the VFT is a rotary transformer with three phase windings on both rotor and stator. amotor and drive system are used to adjust the rotational position of the rotor relative to the stator, thereby controlling the magnitude and direction of power flowing through the VFT. The world first VFT was recentaly installed in Hydro-Quebee's langlois substation, where it will be used upto 100 mw of power between the asynchronous power grids of Quebec(Canada) and New York(USA).this paper describes the VFT equipment installed at langlois substation.Results of commissioning test are also included.HVDC link requires very costly converters plant at sending end and recieving end. Alternatively recently a new technology known as variable frequency transformer (VFT) has been developed for transmission interconnection. By adding different devices with it power transmission or power flow can be controlled within and between powersystem networks in a desired way.

Index Terms: Flexible ac link, Interconnection, MATLAB, Power System networks, Power transmission, Variable Frequency Transformer (VFT).

I. INTRODUCTION

The world electric power supply system are widely interconnected. This is done for economic reasons, to reduce the cost of electricity and to improve the realiability of power supply .there are two way of transmission interconnection. one is Ac interconnection, just connected the two synchronous network with ac transmission lines. IT is simple and economic but increases the complexity of power system under some serious faults. Another is Back-to-Back HVDC is a asynchronous interconnection, which is impleted via HVDC for most cases at present. It is easy for bulk power transfer and also flexible for system operation. but the design of HVDC system is quite complicated and expensive. The HVDC link requires a very costly converter plant at sending end and an inverted plant at recieving end. Alternatively a recent technology known as variable frequency transformer (VFT) has been developed for transmission interconnection. By adding different devices with it, power transmission or power flow can be controlled within and between power system in a desired way.

II. VFT CONCEPT AND COMPONENTS

A variable frequency transformer (VFT) is a controllable bidirectional transmission device that can transfer power betweeen asynchronous network.

The construction of VFT is similar to conventional asynchronous machines where the two separate electrical networks are connected to the stator winding and the rotor winding respectively. One power system is connected with rotor side of the VFT and an other powersystem is connected with the stator side of the VFT. The electrical power is exchanged between the two networks by the magnetic coupling through the air gap of the VFT and both electrically isolated.

The VFT consist of following core components

1. **A rotary transformer** - for power exchange.
2. **A derive motor**- to control the movement or speed of the rotor and to control the transfer of power.

A derive motor is used to apply torque to the rotor of the rotary transformer and adjust the position of the rotor relative to the stator, thereby controlling the magnitude and direction of the power transmission through VFT. The first VFT WAS manufactured by GE istalled and commissioned in Hydro-Quabecc's langlois substation,where it is used to exchange power upto 100 mw between asynchronous power grids of Quebec(Canada) and New York(USA). A stable power exchange between the two asynchronous system is possible by controlling the torque applied to the rotor, which is controlled externally by the drive motor. when the power systems are in synchronism, the rotor of VFT remains in the position in which the stator and rotor voltage are in phase with the associated systems.IN order to transfer power from one system to other the rotor of the VFT is rotated. If the torque applied is in one direction, then the power transmission takes place from stator winding to the the rotor winding. If the torque is applied in the opposite direction, then the power transmission takes place from rotor winding to the stator winding. and direction of the power transmission through the VFT [5]. The world's first VFT, was manufactured by GE, installed and commissioned in Hydro-Quebec's Langlois substation, where it is used to exchange power up to 100 MW between the asynchronous power grids of Quebec (Canada) and New York (USA) [6].

A stable power exchange between the two asynchronous systems is possible by controlling the speed and torque applied to the rotor, which are controlled externally by the drive motor. When the systems are in synchronism, the rotor of VFT remains in the position in which the stator and rotor voltage are in phase with the associated systems. In order to transfer power from one system to other, the rotor of the VFT is rotated. If torque applied is in one direction, then power transmission takes place from the stator winding to the rotor winding. If torque is applied in the opposite direction, then power transmission takes place from the rotor winding to the stator winding. The power transmission is proportional to the magnitude and direction of the torque applied. The drive motor is designed to continuously produce torque even at zero speed (standstill). When the two systems are no longer in synchronism, the rotor of the VFT will rotate continuously and the rotational speed will be proportional to the difference in frequency between the two power networks (grids). During

this operation the power transmission or flow is maintained. The VFT is designed to continuously regulate power transmission even with drifting frequencies on both grids. Regardless of power transmission, the rotor inherently orients itself to follow the phase angle difference imposed by the two asynchronous systems.

III. VFT MODEL AND ANALYSIS

A. **VFT Model:** In the model, the VFT is a doubly-fed wound rotor induction machine (WRIM), the three phase windings are provided on both stator side and rotor side. The two power systems (#1 and #2) are connected through the VFT as shown in Fig. 1. The power system#1 is connected to the stator side of the VFT, energized by voltage, VS with phase angle, θS. The power system#2 is connected to the rotor side of the VFT, energized by voltage, VR with phase angle, θr. A drive motor is mechanically coupled to the rotor of WRIM. A drive motor

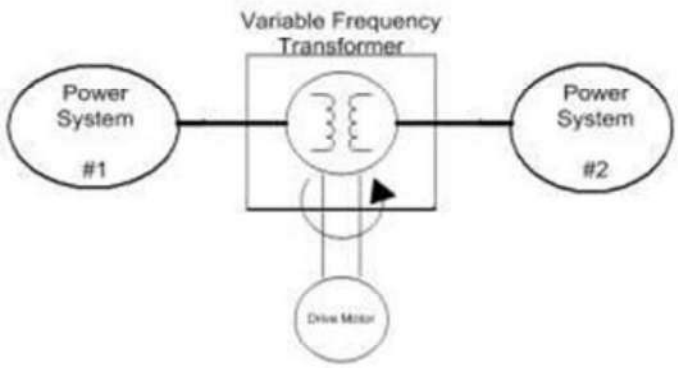

Figure 1: The VFT model representation

one direction then power transmission takes place from power system #1 to power system#2. If torque is applied in opposite direction then power transmission reverses. Here, in the power transmission process, only real power transmission or real power flow, is being discussed.

B. **VFT Analysis:** The power transmission through the variable frequency transformer (VFT) can be approximated as follow:

$$P_{VFT} = P_{MAX} \text{ Sin } \theta_{net} \quad (1)$$

where,

P_{VFT} = Power transmission through VFT from stator to rotor,

P_{MAX} = Maximum theoretical power transmission possible through the VFT in either direction which occurs when the net angle θ net is near 90˚. The P_{MAX} is given by:

$$P_{MAX} = Vs\ Vr / X_{sr} \quad (2)$$

where,

Vs = Voltage magnitude on stator terminal,

Vr = Voltage magnitude on rotor terminal and

Xsr = Total reactance between stator and rotor terminals.

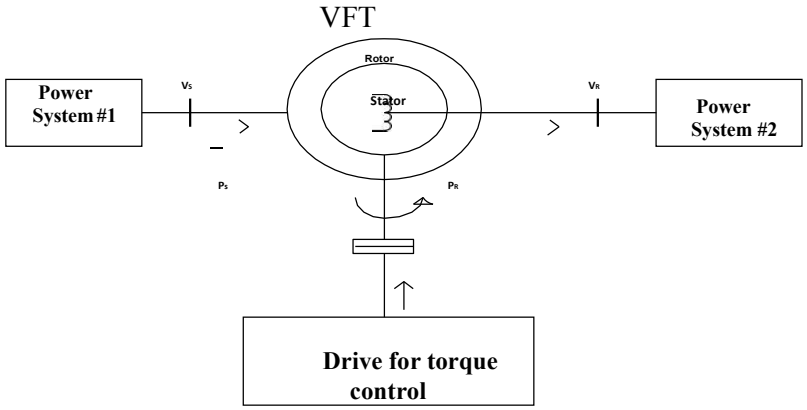

Figure 2: Power transmission from power system #1 to power system #2 using

Also $\theta_{net} = \theta_s - (\theta_r + \theta_{rs})$ (3)

where,

θs = Phase-angle of ac voltage on stator, with respect to a reference phasor,
θr = Phase-angle of ac voltage on rotor, with respect to a reference phasor and

θrs = Phase-angle of the machine rotor with respect to stator.

Thus, the power transmission through the VFT is given by:

$P_{VFT} = ((Vs\ Vr/\ Xsr)\ \sin(\theta s - (\theta r + \theta rs))$ (4)

The phasor diagram showing reference phasor, Vs, Vr, θs, θr, θrs and θnet is shown in Figure 3.

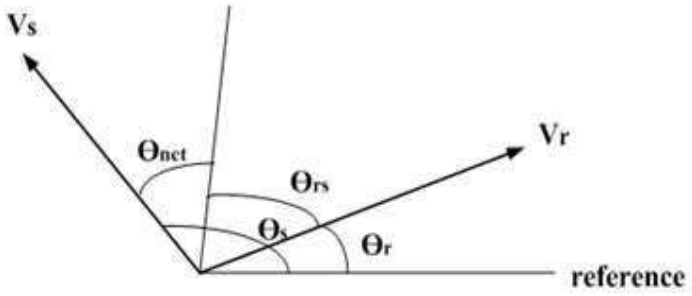

Figure 3: The phasors of VFT

For stable operation, the angle θnet must have an absolute value significantly less than 90˚. The power transmission or power flow will be limited to a fraction of the maximum theoretical level given in (2). Here, the power transmission equations are analyzed based on

assumption that VFT is an ideal and lossless machine, with negligible leakage reactance and magnetizing current. The power balance equation requires that the electrical power flowing out of the stator winding must flow into the combined electrical path on the rotor winding and the mechanical path to the drive system, i.e.

$$Ps = PD + Pr \quad (5)$$

Where,

Ps = electrical power to the stator windings,
Pr = electrical power to the rotor windings and
PD = mechanical power from the torque-control drive system.

Since the machine behaves like a transformer, the ampere- turns must balance between rotor and stator:

$$Ns*Is = Nr*Ir \quad (6)$$

where,

Ns = number of turns on stator winding,
Nr = number of turns on rotor winding,
Is = current out of the stator winding and
Ir = current out of the rotor winding.

Both the stator and rotor windings link the same magnetic flux but their frequency differs such that the voltage will also differs by the same ratio, therefore

$$Vs = Ns* f s*\psi a, \quad (7)$$
$$Vr = Nr* f r *\psi a, \quad (8)$$
$$Vr/ Nr = Vs/ Ns * f r/ f s \quad (9)$$

where,

functions, discrete Fourier and other blocks are used. Then this simulated model, as shown in Fig. 4, is used to solve electric power system using VFT [7].

Under different torque conditions, the power transferred from the stator to the rotor side of VFT and between power system networks is simulated. The simulated results of waveforms of stator voltage, rotor voltage, stator current, rotor current, speed and torque are shown in Figures. 5 – 16.

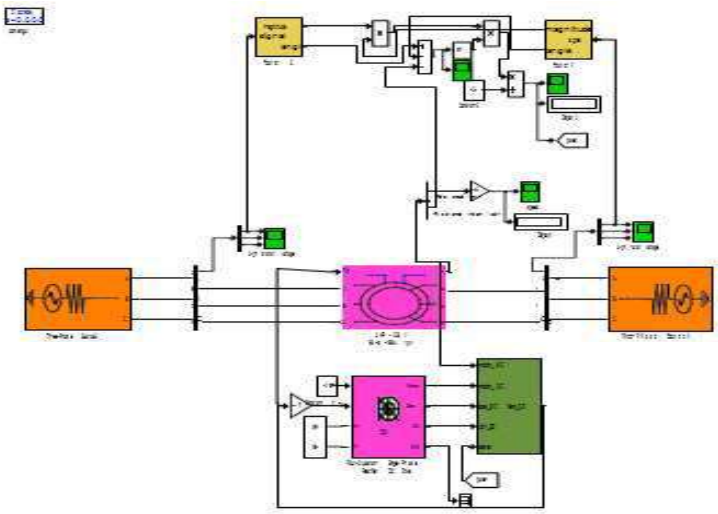

Figure 4: MATLAB Simulation model of VFT based power system networks

B. MATLAB Simulation Results

a) For T_D = 0 Nm, Fig.5 and Figure 6 shows the relevant waveforms.

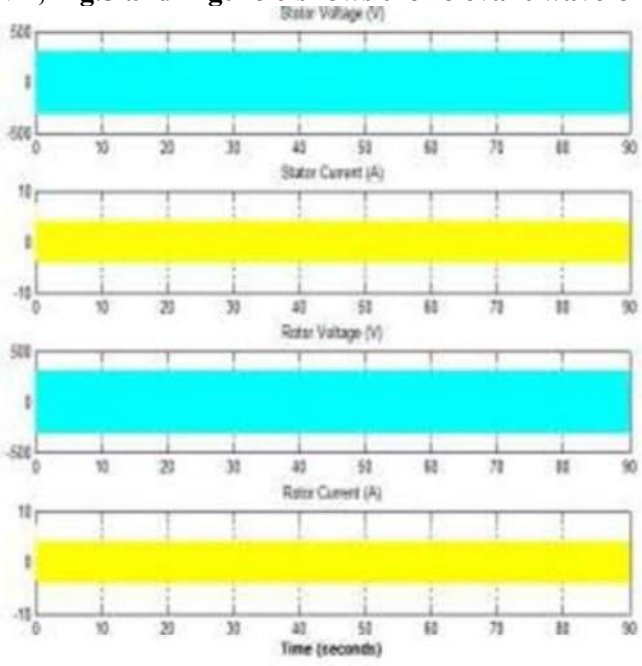

Figure 5: Voltage and current waveforms of stator and rotor of VFT.

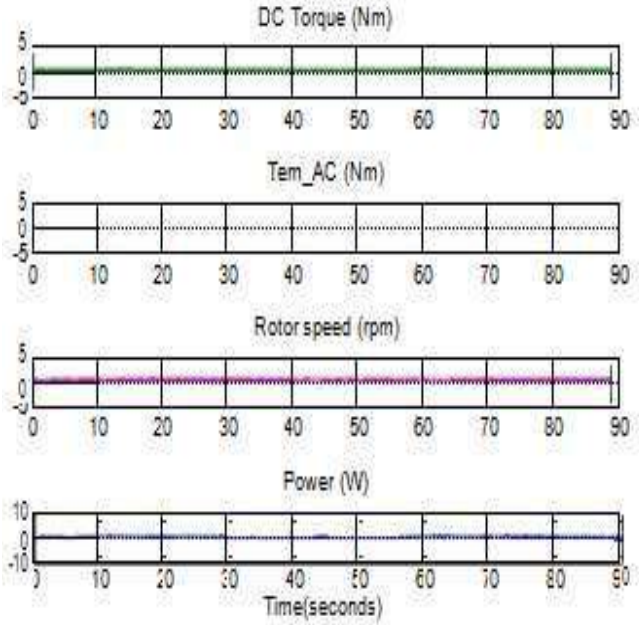

Figure 6: Waveforms showing torques, speed and power transfer capability

It is evident from the simulated results that under different external torque condition, the power transmission through the VFT is not zero. The magnitude and frequency of voltage are kept same for all operating conditions (Figure.5) and the power transmission through VFT under different torque condition are shown in Figures. 6-9.

b) For TD = 1 Nm, Figure 7 shows the relevant waveforms.

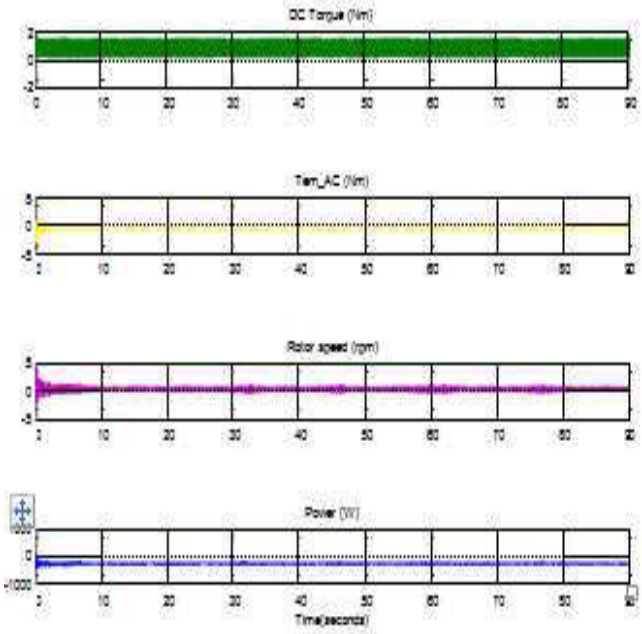

Figure 7: Waveforms showing torques, speed and power transfer capability

c) For TD = 2 Nm, Figure 8 shows the relevant waveforms

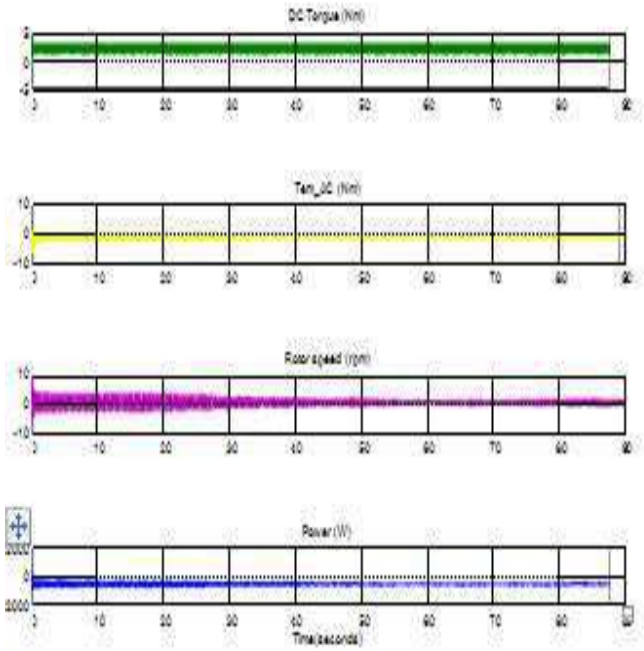

Figure 8: Waveforms showing torques, speed and power transfer capability

d) For TD = 3 Nm, Figure 9 shows the relevant waveforms.

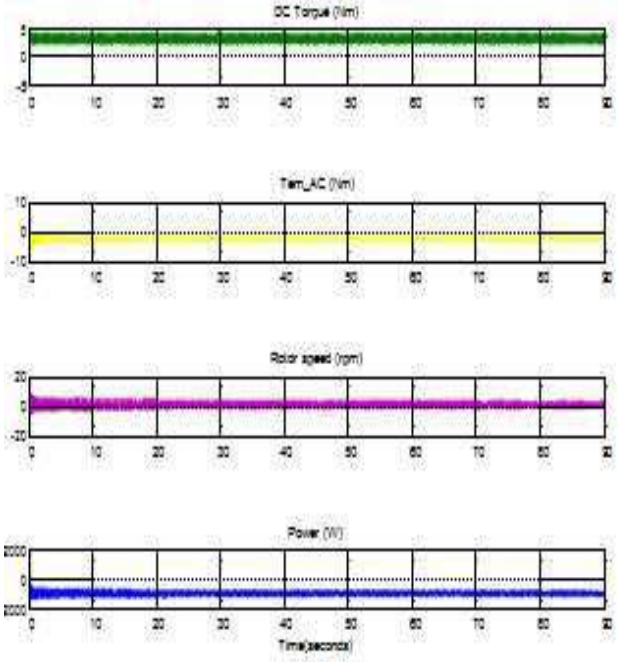

Figure 9: Waveforms showing torques, speed and power transfer capability

e) For TD = 4 Nm, Figure 9 shows the relevant waveforms

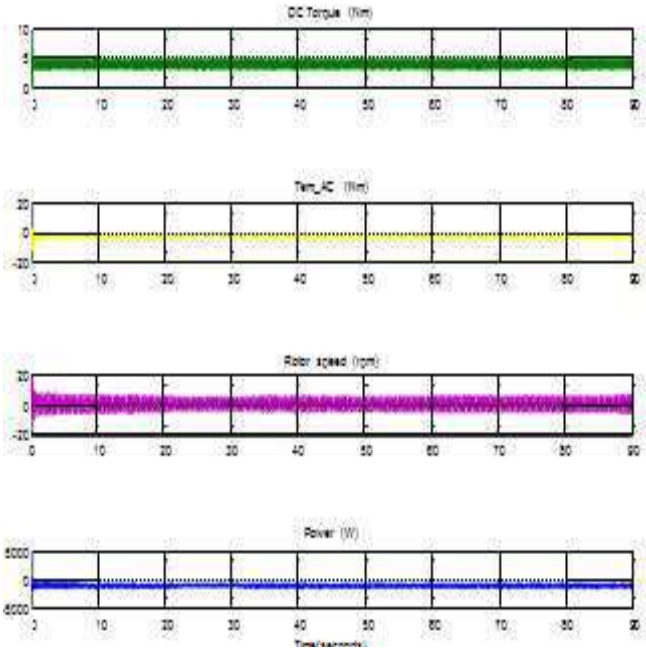

Figure 10: Waveforms showing torques, speed and power transfer capability

f) For TD = 5 Nm, Figure 9 shows the relevant waveforms.

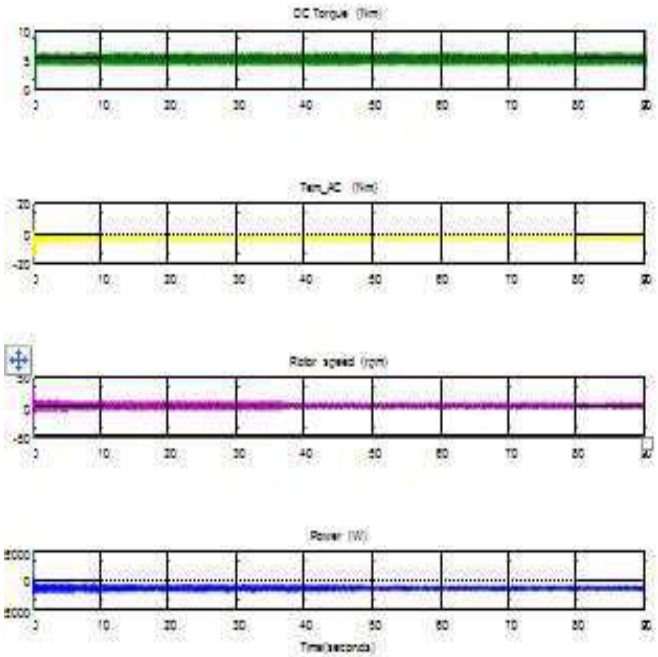

Figure 11: Waveforms showing torques, speed and power transfer capability

When the applied torque is in opposite direction then power transmission direction reverses as shown in Figures. 12-16.

g) For TD = - 1 Nm, Figure 7 shows the relevant waveforms

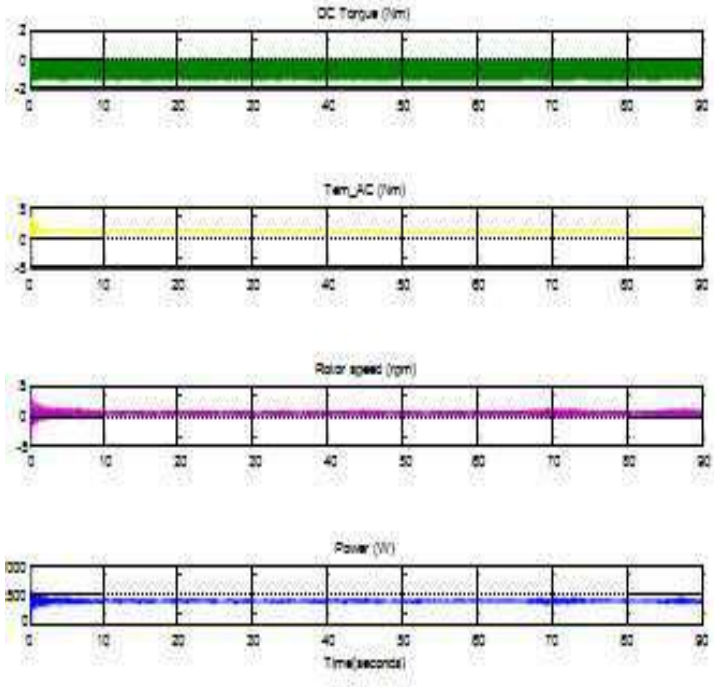

Figure 12: Waveforms showing torques, speed and power transfer capability

h) For TD = - 2 Nm, Figure 8 shows the relevant waveforms.

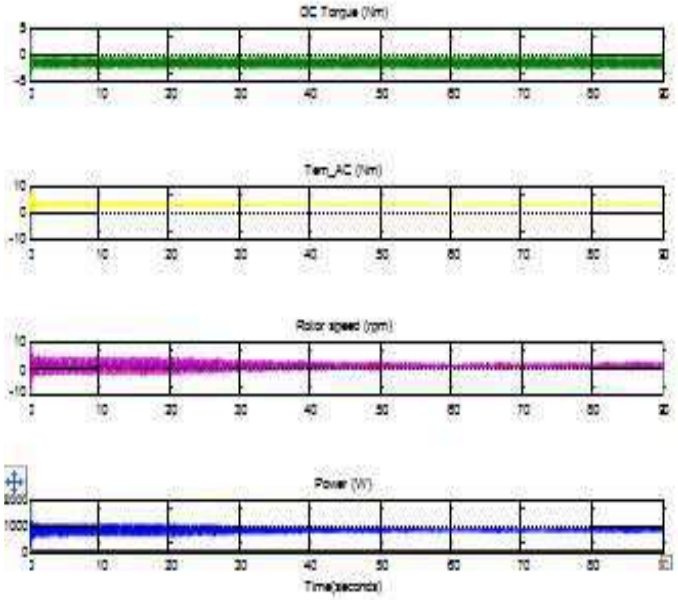

Figure 13: Waveforms showing torques, speed and power transfer capability

i) For TD = - 3 Nm, Figure .9 shows the relevant waveforms.

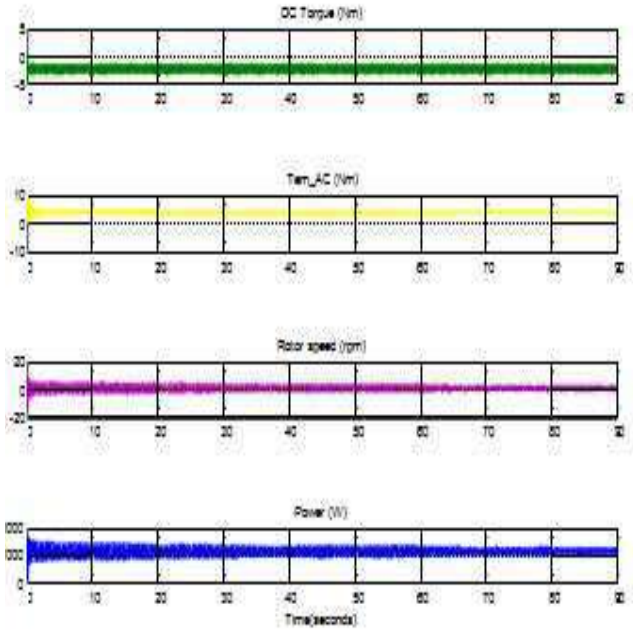

Figure 14: Waveforms showing torques, speed and power transfer capability

j) For T_D = - 4 Nm, Figure 9 shows the relevant waveforms

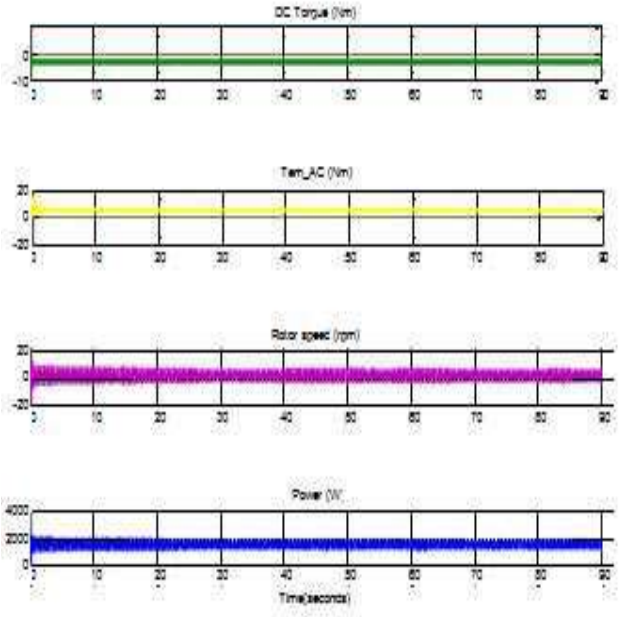

Figure 15: Waveforms showing torques, speed and power transfer capability

k) For TD = - 5 Nm, Figure 9 shows the relevant waveforms.

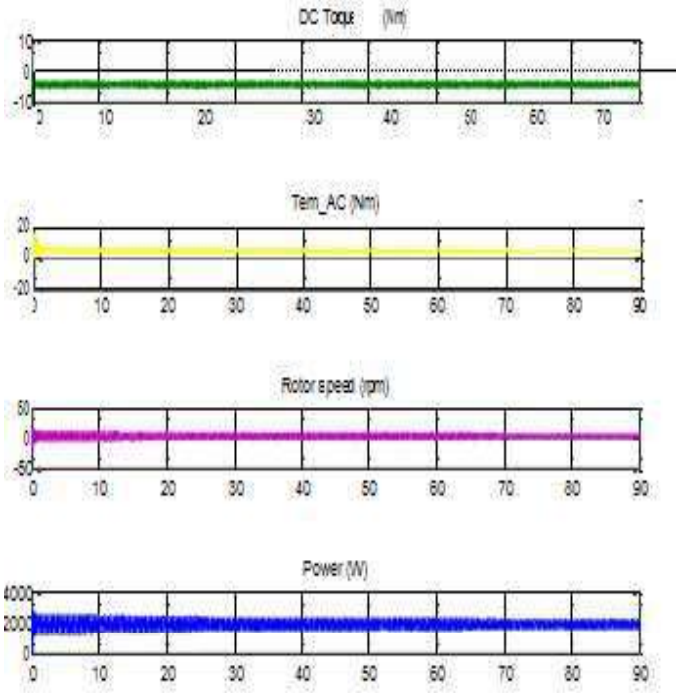

Figure 16: Waveforms showing torques, speed and power transfer capability

The power transferred with the applied torque achieved is shown in Fig. 17.

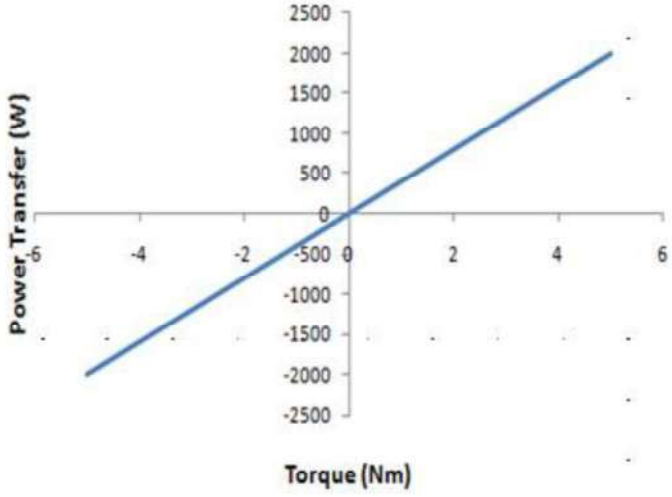

Figure 17: The power transferred with the applied torque.

V. CONCLUSION

From the simulated result it is evident that power transmission is directly proportional to the applied torque. Moreover, both the magnitude and direction of the power transmission through VFT, are controllable by the torque and speed of the rotor. Hence VFT technology provides an option for achieving real power transmission or power flow control in-between two or more power systems. The model developed is successfully used to demonstrate the power handling capability of the VFT. The direction and the magnitude of power transmission control are achieved. The voltage, current, torque and speed plots are also obtained. Thus, the VFT concept discussed and its advantages are verified by simulation results. It has distinct advantages in terms of controllability over conventional phase angle regulating transformers and does not inherently produce harmonics in case of many HVDC and FACTS technologies.

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Palladium (Ii) Complexes with 5- Methyl Uracil as Highly Antitumor Agents

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Abstract

A new co-ordination compound of Palladium having square planner stereochemistry, around the metal ion with the general formula [PdL_2Cl_2] where L= 5- methyl uracil have been isolated in the solid state by the interaction of with the aforesaid ligand. The synthesized co-ordination compound has been characterized by elemental analysis, electrical conductance, magnetic measurements, molecular weight determination, electron spin resonance, infra red spectral measurements and NMR studies. A square planner structure has been proposed for complex. It is observed that the synthesized compound is light brown in colour, non hygroscopic, soluble in DMF, DMSO, slightly soluble in acetonitrile and sparingly soluble in other solvents. It is thermally stable and do not decomposed up to 260^0C. The compound has d^8 configuration. The complex has anti tumor activity. The palladium(II) complex showed superior cytotoxic effect compared with the platinum(II) complex .

Key words: Co-ordination chemistry, 5- methyl uracil, palladium, Anti tumor activity

I. INTRODUCTION

Considerable attention has focused on 5- methyl uracil palladium complex and their rearrangement mechanisms because they are postulated intermediates for certain homogeneously catalysed reactions . Co-ordinatiom of a reactive organic moiety to the transition metal often allows a configuration to be assumed which leads to stereoselectivity in the reaction products .Presumable , studies of these complexes will lead to a greater understanding of the factors which influence these stereo selective reactions. Recent investigations have shown that PMR spectroscopy is a facile diagnostic tool for the elucidation of the mechanisms by which different configurations of these complex may interconvert.

The substitution reaction of the palladium (II) complex have been reviewed in the past. Some recent literatures concerning the kinetics , thermodynamic and structural features are presented in chapter I and II with the titles.

Ligand substitution reactions of square –planner Palladium (II) complex occur with th retention of configuration. The kinetics of substitutions reactions of square –planner complex (equation 1) follow a two term rate law,

$$MA_3X + Y^- \rightarrow MA_3Y + X^-$$
$$(M = Pd^{II})$$
$$Rate = \{k_1 + k_2 [Y^-]\}[MA_3X]$$

Where k_1 is the first order rate constant and k_2, a second order rate constant, and [Y] represents the concentration of the entering ligand. Both routes are thought to involve an associative (A) mechanism. The kinetics of solvent exchange and displacement by monovented ligands on cis- [Pd $(L_2)(Cl)_2$], L = 5-methyl uracil complexes have provided a clear cut example of ligand dissociation as the dominant step in substitutions reactions of square planner complexes . It is therefore thought worthwhile to synthesized and characterize d^8 complexes are Palladium with 5-fluoro uracil and 5-methyl uracil.

Experimental

A. Materials and Methods: Uracil and 5-methyl uracil were procured from Aldrich Chemical Company, U.S.A. and used as such.$PdCl_2$ 5-fluoro uracil and 5-methyl uracil were obtained from TOKYO KASEI Organic Chemical, Japan and B.D.H England. Distilled water used in all the operations.

Preparation of the ligand, Uracil: The classical and primary synthetic route to uracil from Formalaceticacid (made in situ from malic acid) and urea in sulphuric acid is still important(1). Some alternative syntheses use malic acid, urea, and PPA(2) or maleic/ fumaric acid , urea, and poly phosphonic acid (PPA) (2).The reaction of formyl acetate with thiourea is convenient for the synthesis of 2-thio uracil. Another main synthesis involves the reaction of ureas with β-keto esters diketene or acid anhydride (3). Orotic acids are synthesized from oxaloacetate and ureas in the presence of hydrogen chloride via ring transformation of hydantoin into the uracil ring system. Treatment of the easily obtainable 2-thio uracil with chloro acetic acid followed by acid hydrolysis or by oxidation with dimethyl sulphoxide (DMSO) in conc. Sulphuric acid(4) are alternative pathways .1,3- dimethyl uracil is transformed with urea in ethanolic sodium ethoxide in to uracil. Some more recent uracil syntheses start with propanoic acid and urea in PPA (or conc. sulfuric acid and benzene as solvent.A broad choices of hetrocondensed uracils are easily and generally accessible from heterocyclic β- enamino esters and isocynates.(5).the mixed urea intermediate is smoothly cyclized with 5% aq.NaOH; the whole procedure cab be carried out in a one step reaction, when pyridine serves as solvent and base catalyst for the ring closure. The condensation of urea with protected β-keto esters gives 6- or (di)substituted uracils (6) by means of retro Diels Alder splitting, nonbornene condensed tricyclic dihydrouracils , accessible from aminononbornene carboxylic acid and 1,1 –carbonyl di imidazole , afford ,upon heating ,uracils (7) in good yield Substituted uracils are obtained from imido esters, isocyanates, and malononitrile. Similarly N-substituted N-cyanoacetyl ureas cyclize in an alkaline medium. Hetrocondensed uracils are easily accessible from acyl lactones, lactums, and thio lactones(8), and heterocyclic β-enamino esters, especially .The later gives a broad range of novel types of condensed systems . With the aid of the hexamethyldisilazane trimethylchlorosilane (9) (HMDS/TMSCl) technique or the use of NaOH and halo sugars, respectively , simple approaches have been developed to obtain unusual nucleosides[10].

B. Preparation of the co-ordination compound:

Preparation of [Pd (5 – methyl Uracil)$_2$ Cl_2]: A mixture of $PdCl_2$ (500mg) and ligand 5-Methyl Uracil (1gm) in water and methanol (50ml) was refluxed at 80^0C 6-7 hours until it become a clear yellowish colour solution .This volume was reduced to 5ml and

treated with methanol . The resulting gray white crystals were collected and washed well with ethanol and acetone . The analytical data is given in the table 3.4

The General reaction for the preparation of coordination compound of palladium is as follows:

$$[Pd(Cl)_2] + 2L \xrightarrow[H_2O]{CH_3OH} [Pd(L_2)(Cl)_2]$$

Where L = 5-Fluoro Uracil and 5-Methyl Uracil Carbon , hydrogen, nitrogen and oxygen present in the investigated complex were estimated micro analytically. For the estimation of Palladium as Palladium 1, 2, 3 benzotriazole, the synthesized compound solution were mixed with 10ml of 2M. acetic acid- sodium acetate buffer and 5ml of 4% EDTA solution.. Then 2.5 % acetic acid, was added with shaking . Digest the solution between 60^0C-90^0C, are 20 minutes. The resulting precipitate was filtered (G 3), washed several times with very dilute HCl (1:100), finally with distilled water and dried to a constant weight at 110^0C.Molecular weight determination of the synthesized complex was made by Rast's method.Magnetic susceptibility measurement were made at room temperature by Gouy method. A magnetic field strength of 8500 gauss was employed. The apparatus was calibrated using cobalt mercury thiocyanate Hg [$Co(NCS)_4$]. The diamagnetic corrections were computed using Pascal's constant. For calculation of effective magnetic moments, following equation has been used.

Effective magnetic moments (μeff) $= 2.84 (x_m^{corr} .T)^{1/2}$

Where T = temperature in absolute scale , and x_m^{corr} = corrected molar susceptibility Conductance's was measured in analytical grade Methanol using dip type cell with the help of a Philips Conductivity Bridge.

Infrared spectra (4000-600cm^{-1}) of the uncoordinated ligands and the synthesized complex was recorded in nujol mulls supported between sodium chloride platex(rock salt region) on Perkin Elmer Spectrum(RXI) spectrometer .

^{1}H NMR spectra of the synthesized compound will be recorded on AC 300F spectrometer (300MHz) using TMS as an internal standard.

Electron spin resonance spectra of the complex was recorded at room temperature on a VariumE-3 spectrometer using powdered sample at the microware frequency 9.53GHz. The 'g' values were calculated using the given equation.

$$G = \frac{714.44 \text{ X } \sqrt{(GHz)}}{H(G)}$$

Where $\sqrt{(GHz)}$ = microwave frequency in GHz at which sample operated , and H(G) = field in Gauss for the sample.

The analytical and physical data of the ligand and its metal complex are given in table 3.3 .The complexes are non hygroscopic and stable at room temperature. The solubility of

complex are given in table 3.5. They are soluble in DMF and DMSO, slightly soluble in acetonitrile and insoluble in other organic solvent. The colour of complex given in table 3.4. They do not possess sharp melting points.

II. RESULT AND DISCUSSION

The magnetic values of the synthesized complex measured at room temperature. The magnetic moment values of all the complex are zero. Hence, they are diamagnetic. The square planar geometry of the complex is evident from their diamagnetic nature.

The Analytical and physical data of the ligand and its metal complex are given in table I

Table 1: Analytical Data of the Complexes

Compound	% Pd Found (Calc.)	% C Found (Calc.)	% H Found (Calc.)	% N Found (Calc.)	% Cl Found (Calc.)	% F Found (Calc.)
[Pd(5-Methyl Uracil)$_2$Cl$_2$]	24.34 (24.56)	21.94 (21.46)	1.37 (1.36)	12.80 (12.81)	16.23 (16.26)	8.68 (8.60)

The value of molar conductance are in the range 0.052-0.058 Ω^{-1} cm^{-1} mol^{-1} suggesting non electrolyte nature of the synthesized complex.

The details of infrared spectral bands of the synthesized complex containing coordinated 5-methyl uracil possesses 3 possible donor sites , (i) Two cyclic nitrogen and (ii) oxygen of the ketonic group in ring respectively. Out of these two the cyclic nitrogen of ring system is supposed to be involved in coordination through the Nitrogen atom . In the IR spectra of the synthesized complex of 5-methyl uracil studied here , the IR frequency of cyclic nitrogen of ring has been changed , thereby ,suggesting that the cyclic nitrogen has been participate in the coordination.

In the IR spectra of both the complexes with 5- methyl uracil the bands at 640cm^{-1} suffered a lower shift of 640$cm^{-1,}$ indicating that metel nitrogen coordination present in the synthesized compound. Hambright et al. confirmed metal nitrogen co-ordination in the large series of the complex of Zn(II), Cu(II), Ni(II),Co(II) and Pd(II). Recently, Pennell and co-workers have experimentally confirmed the metal – nitrogen co-ordination in the complexes.

The electronic spectral bands of the complexes (table II) were assigned according to the literature.

Table 2: Important IR spectral bands and their assignments (Reported Compounds)

Sl. No	Compound	ν_{M-C} (cm^{-1})	$\delta_{Me(sym)}$ (cm^{-1})
1	$[(PEt_3)_2Pd(CH_3)X]$		
	X=Br	510	1162
	SCN	526	1180
	CN	502	1161
2	$[(PEt_3)_2Pd(CH_3)_2]$	491, 457	1164
3	$[(AsEt_3)_2Pd(CH_3)_2]$	498, 479	1152,1124
4	$[(PPh_3)_2Pd(CH_3)_2]$	529, 482	1129
5	$[(bipyr)Pd(CH_3)_2]$	534, 522	
6	$[MeS(CH_2)_2(SMe)Pd(CH_3)_2]$	525 ,512	1168

The molecular orbital approach was used to explain the structure of square –planar complexes of the d^8 elements. The metal orbital's involved in σ bonding in square planer complexes are the ndz^2, $ndx^2\text{-}y^2$, $(n+1)P_x$ and $(n+1)P_y$. Nevertheless, judging from the values of the overlap integrals, $nd_{x2\text{-}y2}$ (n+1)s, $(n+1)P_x$ and $(n+1)P_y$ account for most of the σ – bonds and ndz^2 makes only a minor contribution of π- orbital's of the ligands.

The correlation of the bands observed in the electronic spectra for the studied complexes with those of $[M(CN)_4]^{2-}$ [M= Pd^{II}] prompted us to assume the following assignments (Table 4.12)

$$^1A_{1g} \longrightarrow {}^1A_{2g}\,[b_{2g}(\pi^*) \longrightarrow b_{1g}(\sigma^*)\,],$$

$$\text{(d-d): } {}^1A_{1g} \longrightarrow {}^1B_{1g}\,[b_{2g}(\pi^*) \longrightarrow a_{1g}(\sigma^*)\,],$$

$$\text{(d-d); } {}^1A_{1g} \longrightarrow {}^1E_g\,[e_g(\pi^*) \longrightarrow b_{1g}(\sigma^*)],$$

$$\text{(d-d); } {}^1A_{1g} \longrightarrow {}^1B_{1u}\,[b_{2g}(\pi^*)$$

$$a_{2u}(\pi^*)],\text{(C.T) } {}^1A_{1g} \longrightarrow {}^1E_u\,[e_g(\pi^*)] \longrightarrow a_{2u}\,(\pi^*)],\text{ (C.T).}$$

The relation between the bands in the present complex and the described for the typical complexes $[M(CN)_4]^{2-}$ leads to the conclusion that all the new complex has the same square planer geometry.

The analytical data and all the evidences presented above suggest the formulation of these complex as. The mixed ligand complex $[PdL_2Cl_2]$ where (L = 5-methyl uracil), have been prepared by the interaction of parent compound $[PdCl_2]$ with ligand. The complexare characterized by elemental analysis, magnetic measurement, electron spin resonance and infrared spectral studies containing Pd (II) d^8 configuration. Finally, the **Conclusion:** All the complex is diamagnetic suggesting square planner geometry. It is observed that the complex has anti tumor activity. Research has proven that the most effective and widely used metal-containing chemotherapy anticancer drugs are cisplatin ([cis-PtCl(2)(NH(3))(2)]) and many

platinum complexes, however, these compounds have significant disadvantages including poor water solubility and serious side effects. Thus researches in order to overcome these shortcomings have never interrupted then Many non-platinum complexes have been synthesized and tested, in which palladium complexes show significant antitumor activity in normal tumor cells and lower resistance of tumor cells to clinical treatments as well as lower side effects. some palladium complexes possess interesting steric structures and good antitumor activity; a try to modify natural medicines with Pd(2+) leads the research to a new route. In this review, medicinal chemistry, the development status and interactions of palladium complexes with antitumor activity relationships for continuing studies of these systems. Several strategies have been utilized in order to design a better antitumor drug. Studies of platinum and palladium compounds with biologically active carriers have yielded promising results in the field of anticancer chemistry. In the present study, we showed that the biologically active compound, palladium (II) complexes with 5- methyl uracil and with high cytotoxic activity.

Acknowledgement: Dr.Anshu is grateful to the Department of chemistry Atarra P.G.Colllege Atarra Banda. The author wish to thank CDRI, Lucknow, India, for providing Analytical data and Dr .Avadhesh Chandra Nigam for kind cooperation.

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Advances of Deep Learning in Business Activities

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Abstract

A large improvement of computation technology deep learning have a large area application in the business field. Getting data from many companies deep learning play a great role to reduce the expanses of companies activities and getting unexpected profit.

In this article point out the basic principle of deep learning, analyze it's application also explore it's application in business.

This article explain the mathematical equation for deep learning and also discuss Neural Network including Feed- forward and Recurrent Neural Network. Based on the types of deep learning model in this article explain the utilization of deep learning method in business activities on factual examples. Through the related queries, this article found the lot of authentic data and illustration to prove that deep learning in business activities has good effect.

Keywords: Deep Learning, Business , Neural Networks

I. INTRODUCTION

Deep learning is a model that is also known as Deep structured or hierarchical learning. It is a structure of machine learning that set up computers to learn from experience and understand the world in term of hierarchical approach.

Deep learning term first introduced by Rina Dechter in the field of Machine learning in 1986.

As a member of machine learning, deep learning has it's own definite loss(demerits). One of it's outstanding advantages is that it can properly dealing with complicated work that may be hard to achieve by other manners. Another things that it requires huge sets of data and advance computer hardware to operate.

While in many area nowdays, huge data is easy to obtain, mean while improvement of technology gives more powerful computers. Therefore, overcoming the shortcoming of deep learning, remarkable outcomes czan be created in many fields utilizing its qualities.

As specified above, deep learning can be applied in difficult models which cannot be obtain by any other learning algorithms. it is generally used in area like image identification, Driverless driving and natural language acceptance. In the main concept of deep learning use large of data as simple to train the model to perform predictions. Therefore, it is noticeable that deep learning has a trusting application expectation in many fields.

In modern business activities, companies always face limitless and irregular data in their day to day activity while large business opportunities may be hidden behind. Either companies do not know how to excerpt useful information out of such data, or employees waste their time on some replicated work. Both of the problem can be solved by deep learning. It can evaluate historical data to assume new context or replace human in recreative work to lower human cost. In other words, deep learning implant vigor into business activities, and some accomplishment can already be seen.

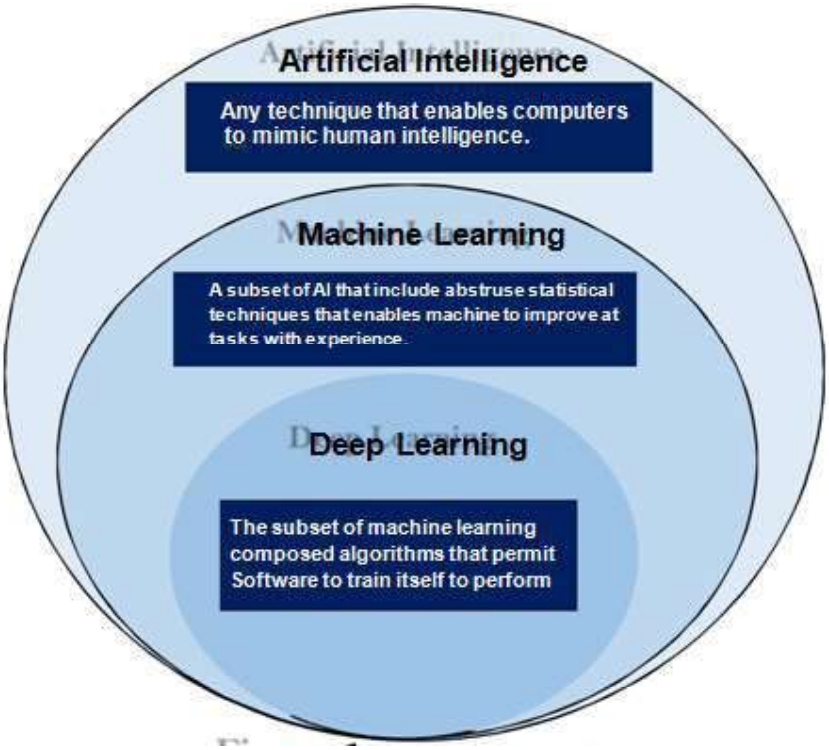

Figure 1: Deep Learning Category.

Framework of Deep Learning

To learn the frameworks of deep learning, artificial neural network (ANN) is obiviously starting point. Artificial neural network is one of the important tools to achieve machine learning. Artificial neural network is a brain-activated system created by human to imitate the way that animals learn, it has main three layers First layer (input data), hidden layer converting the input data into the output data, while output data is given in the third layer. By these three layers, neuron is the functional foundation.

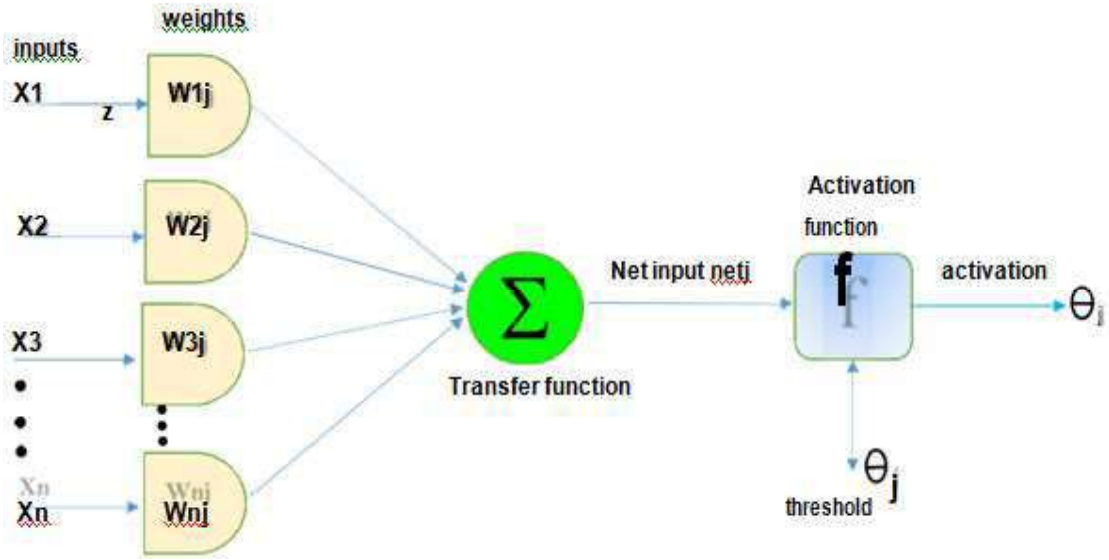

Figure 2: Deep Learning and model

The neuron model receives n input signals x1 ,x2,x3… Xn, which is multiplied by a analogus weight ω1,ω2, ω 3……ωn and summed. Result is then handled by the activation equation, Sigmoid function in the typical case. The result can be get in the interval (0, 1), then outputted based on its unique parameter, threshold θ. The process can be written by the equation below:

$$f\left(\sum_{\cdot 1} x \quad \theta\right)$$

In the process of neural network training, the two parameters are adjusted to fit the continuous inputted data. A single neuron model can be tested to simple problem operating only AND gates, OR gates and NOT gates. However, when it comes to more complicated problems, other operations may be needed, XOR gate for instance. Now this time, one layer of neurons may not be able to solve it, and therefore, multiple layers of neurons are required in order to fit arbitrary complex continuous functions. So this is known as"deep learning", the system calls for multiples film(layers) of neurons.

Framework of Deep Learning:

Deep neural network with various layers of neurons comes with distinct ways of combinations of layers. Different types of neural networks are applied to distinct tasks and complexity. Let us we consider the first case in which each layer is fully associated to its adjacent layers and has no peer or cross-layer connections. Data only flows from input to output directly. This types of neural network is known as "Feed-forward Neural Networks" (FNN). In such condition, an input x passes through equation and gets the output. Weight and threshold of every neuron are adjusted to fit the situation. [9, 10]

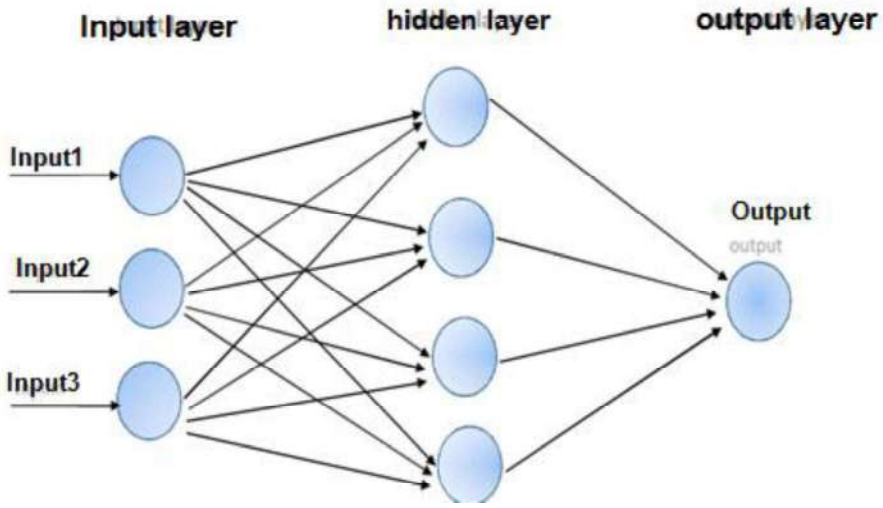

Figure 3: Feedforward Neural network.

When obervation is extended to FNN, it turns to a more prevailing type, "Recurrent Neural Network" (RNN). Distinct from FNN, RNN remember the previous data inputted and makes forecast for future data. Sometime it happen that initial data is may be wrong and therefore makes wrong prediction.it will affect the parameters to change.To avoid these types of situation, neural network can back propagate such data to the previous layer and adjust the weight for it to decrease the effect carry by it for the final result. This action is known as gradient descent. With such types of system, Recurrent Neural Network can be applied to more situations.

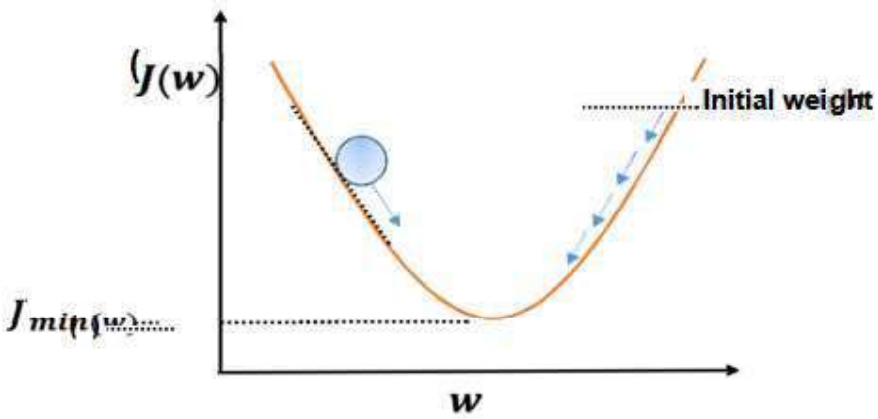

Figure 4: Gradient Descent.

II. APPLICATION OF DEEP LEARNING IN BUSINESS:

The existence of large amounts of data in daily business activities is a perfect opportunity to utilize deep learning models. As explained above, there are different types of eural Networks which can be tested to different cases in business area. The given section will explain five perspective of how deep learning can solve some problem in business and other applications in business.

Customer Service: It is known that customer service is a important part in providing customers great experience of purchasing and growing company's profit. Inversely, the cost of a unsatisfied customer service is expensive. U.S. companies lossed their $62 bilion dollar due to their poor customer service. To managing the loss of customer service is not easy work. Businesses spend $1.3 trillion on customer service calls each year. Such a big amount of money goes to the salary and training fee for customer service staff. But such job is actually related to the mechanical department, staff spend their lot of time on the answering simple and repeated question. By understanding the all deep learning, it makes people think that deep learning training model can replace the staff. By using this way, companies are able to minimized the cost, and artificial model has greater efficiency than human which improve consumers' experience and in turn increases companies' profit.

Now a days come in which some company started using deep learning model and applied it in real life. For instance, Digital Genius founded in 2013 focuses on using deep learning model to customer service. Digital Genius developed the "the first solution to enable end-to-end case resolution of your general repeatative journeys without human interference." which is km=nem"AutoPilot". During the customer service this auto pilot reply all the simple question asking by the customer. Based on the development of Auto Pilot, Digital Genius after some time launched a more advanced new product CoPilot. After receiving huge historical data, CoPilot can basically be qualified for the job of human staffs. In practice, after consumers raising a question, Co-pilot first analyze the problem and giving out to the the answer. Then it will calculate the confidence level of customer. If co-pilot able to reply the answer then it give out otherwise, the answer will be sent as an advice for human staff who can choose either to approve the answer or to reedit it.

Sales: Selling job is closely related to the profit of a company. In order to let more purchaser to pay for the product, besides devloping products quality and customer service, appropriate sales effort is also essential. Outstanding sales tools can aim at consumers who are more willing to purchase, and increase the total profit. While in real life, there are some difficulty for human staffs to recognize the best sales tool for buyers, introducing deep learning models can help out. Data of potential can be easily access by companies, such as income level, education background and hobbies. On that same time, the historical record of successful sales is available. Important information is actually hidden behind those massive data. For a general sales person, it is difficult to combine messy data together and get the useful part. Therefore, here the assist of deep learning model is necessary in order to filter the potential customers. In modern marketplace, one company is doing exactly the same job. Salesforce devlope intelligence -Sales Cloud which assists salesman for better performance. It is consist of three distinct parts that is Einstein Lead Scoring , Einstein Opportunity ands Account Insights and Einstein Activity Capture. Firstly, Einstein Lead Scoring plays an significant

role: determine the buyer. It get and analyzes the past data of the companies to build a model for identifying the cutomer. On the result provided by Einstein Lead Scoring, salesman can select the potential of consumers with higher priority which increases the rate of success. After setting up the customer list, company can start continue using Einstein Opportunity & Account observation which also analyzes based on past data. It finds the best sales way that is best fitted to the companies and provides instant news for the company, like customer opinion or competitor involvement. Finally, Einstein Activity Capture it connects to salesmen's emails and calendars and include emails and events directly which saves their times. Customers of Salesforce report 39% that increase in sales productivity. Such correct forecast of potential customers brings advantage to salesman and profit to corporations at the same time.

Marketing: In today business activities, the main complication is the selection of marketing approach. One types of product always faces distinct groups of objective audience, while a single marketing method does not work well for all the people. The presence of huge unstructured trading records will be an ideal place for deep learning model. A company that is known by named Persado has a great progress in this field. [14]Persado target on building Language Cloud which is to design language that resonates with every buyers and achieves better marketing outcome. In October 2017 Persado released their brand Persado One for the first time. Persado One learned from the past data to interpret both language components and emotions for customers. Persado One authorize profiles for every customer to record individuals' condition, like age, income and education background. After gathering these data, Persado One will choose the most applicable one for every customers. Then, the model will be modulated based on the actual response from customers to certain language and emotions. It provide more benefits compared to the traditional way of marketing. First, this brand-new way of marketing target more on customers' personal emotion which can lead to higher engagement of buyers. For the same product, because of the physical avoidence, traditional way can only emphasize one context or a brief over-all introduction of the product when facing many groups of potential customers. While different groups of person value different aspects of the product, it is not easy to attract all the groups. On the other hand, Persado one takes target at every individual to customize marketing language which closely connected with every purchaser who will be more willing to purchase. On the top of that, Persado One insert photos with their language. Once the model combined words and pictures, an essential marketing content will be displayed. Second, the marketing language build by Persado One can be tested to different area, like advertising with emails, website and social media. Finally, deep learning model will both save the expenditure the companies invest into marketing and enhance efficiency.

Daily Operation: There are many areas in daily operations, the given lines will mainly focus on human resource management and internal communications. These jobs can be less significant for small companies, while with the devlopment of companies, these jobs become harder and harder. Therefore, In the deep learning model can lower the error rate and human cost. Three examples are given illustrate the application of deep learning model in daily operations. [1] The first task is the prepration of regular meetings. Dealing with complicated meetings is a dreary work, while a product (called x. ai) based on the theory of deep learning can solves the problem adequately. x. ai gives trained deep learning model as virtual assistant. It can understand the Email content of client and help them to do the schedule. The action behind it is that when clients sending email to others to construct work, they need to

copy one to the virtual assistant and give assess rights at the same time. x. ai can then manage all the meetings for customer with detailed places, time and people and reminds customer when the times come. In other words, x.ai as a particular virtual assistant does not changes other's jobs while it offers benefit for people who need to communicate a lot with others but without a personal assistant. Enrollment event is the second task for deep learning model, reading resumes and having interviews. Mya, a A. I. appoint assistant, can help to pre-screen applicant. It is capable to collect the basic information about and preparatory assess client by communicating with them. Meanwhile, it also answers some questions from candidates like managing interview. Based on Neuro Linguistic Program (NLP), it effectively lower work intensity of HR people. According to the official website of Mya, there is a 79% loss in the time to hire when a recruiter works with Mya. Final one is the documenting during meetings. For meetings , businesss is one of the important parts of the works. Human resources are always needed to record the content of meetings, while committing flaw is inescapable for humans. However, Clarke, as a professional assistant experienced by deep learning, can he deal with this problem. Only by calling or emailing Clarke to it to attend the meeting, it can record the audio of meetings and compile a note silently and automatically. It helps the business workers to a great expansion.

Risks Management: Risk management is the important part in business activity as it goes through all event when a project is carrying on. Because business activity is always follow by risks, knowing and allay risks is important. In conventional commercial pattern, risk management includes identify the condition and circumstances of the occurrence of risk and finding the optimal method to restricted it. The ambiguity in task makes it difficult for analyze to the human even with experience and exact economic theory. However, deep learning model can still do a better job dealing with risks. One typical example of risks is customer defection. Controlling and Predicting the customers lost is vital as those customers is possible to flow into its competitors' hand. Studies by the Bain & Company, along with Earl Sasser of the Harvard Business School have measure that five percent increase in purchaser detainment can go to an increase in profits somewhere between 25 and 95 percent. Deep learning can arrange abundant non structural data. By Using this feature, Federico Castanedo advertised a paper called "Using Deep Learning to Predict that Customer Churn in a Mobile Telecommunication Network" on Wise Athena using the theory of deep learning. Castanedo points out a custom churn prediction model. When huge past client's information is inputted, this model can predict the actions of clients in every event of business activity, including future actions. By this deep learning model can analyze information involved different layers of information and statistics, which can rarely be done by human work. Mentioned by Castanedo in the article that We use billions of call records from an business enterprice intelligence system and presently our current work going towards using deep learning for forecasting churn in a prepaid mobile telecommunication network. To the best of our ability this is the first work reporting the use of deep learning for forecasting customer churn. On average , our model gets 77.9% AUC1 on after validation of data , generally better than our prior best performance of 73.2% obtained with random forests and an huge custom feature engineering tested to the same datasets." Deep learning model like a black box operation, which can not gives the reasons for the result, it still has a important meaning in real applications. Moreover, inspired by this problem of buyer(customer) churn, we can predict that many business risks can be controlled by using deep learning. For example, if the ownership between enterprises breaks down and has a massive effect on both sides, can a deep learning model control it?

Conclusions: Deep learning can be applied to different field of business activities, in customer service can help practitioners more acceptable and efficient communication with customers, in sales and marketing can raise profits, boost sales, in day to day operations, can improve efficiency, save human resources, facilitate each practitioner, in the wind, in terms of risk management, there are also applicable models for user behavior prediction.

In the Deep learning model has more applications in business activities besides from five perspectives mentioned above. More significant, this article discusses the basic theory of deep learning, which assign to the best application of deep learning in what types of data sets and actual scenarios. It is point out that deep learning is very suitable for business activities. At the same time, this article discusses the significant and successful application of deep learning in business activities, which will give every practitioner motivation and inspiration. People can use the tool of deep learning in their work, very well and get good results. Deep learning will has a considerable outcome in this "Big Data Time". It not only replace the human some repeatating or time wasting work, but also can analysis the trend that human work cannot get. Deep learning has only been grown through the recent years, but the achievements are incredible. On the other hand, deep learning creates unemployment. It is tough to predict that what will deep learning gives us in the future since in a fast-changing time, but it will absolutely have great impacts on us – with both positive side and negative side effects. People should have to find a balance point to the usage of deep learning.

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Significance of Customer Care Department in Telecom Industry

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Abstract

Indian Telecom industry is emerging day by day as the fastest booming telecom market in the world. The breach of the telecom sector to the foreign investors has not only led to rapid growth in subscriber base but also assisted a great deal towards maximization of consumer benefits, particularly in terms of price sighting following the moderate approach in tariffs. The success of the Indian telecommunications sector has made the country a truly eye-catching investment destination for the MNCs .The reduction in churn has been the serious problem and companies are going for various measures to handle such vital problems.

Customer care can be a decisive success mantra for a company to edge its competitors. The consumer preferences are changing day by day so challenging job is to address customer concerns. Customer care role should be instrumental in eliminating Service Gap.

I. INTRODUCTION

A customer is an important factor and plays a crucial role in any process of marketing. That's why customer are suppose to be a king of the market i.e. the concept of customer preference and their behavior become so important because customer is suppose to makes the market and compels the supplier to retain and redesign the product. They have to think about the market segmentation, market strategies, consumer behavior, consumer's tastes, consumer's lifestyle etc for the satisfaction of needs and wants of the customer. Many marketers are smart enough to understand consumers' needs, wants and demands and perform beyond their expectations i.e. they delight them. It provides them growth, profitability and creativity with lot of innovation.
With increasing number of telecom service providers, the competition is increasing day by day and to attract and retain the customer, customer care services has become very crucial that's why the researcher has thought that the study of customer care services in the Indian telecom sector will be a good subject for research

II. THE RESEARCH STUDY (OBJECTIVE AND SIGNIFICANCE)

Objectives of the Study

- To identify the critical success factors that are vital for success of Telecom Industry
- To identify the reasons for Churn reduction in the telecom industry and measures adopted by Customer Care to address such serious concern.
- To provide awareness of Customer Care role in providing good service to achieve the organization objectives.

Significance of the Study: This research helps to understand the importance of customer care in the telecommunication industry. As it is well known that "customer is king", therefore it is necessary to keep him happy. The importance of customer care in the telecommunication industry is Customer care handles the queries of customer about the services of the respective service providers. Customer care is helpful in retaining the customers from switching the operator. It is the effort of customer care that reduces the churn in the industry and makes the customers loyal towards their organization.

III. RESEARCH METHODOLOGY

Here, we'll present the methodology which we adopted for answering our research questions which we have formulated and presented. Furthermore, we'll explain that how main topic was selected, how we formulated the research questions. We'll enlighten the way that how we collected the data concerning our research. We will also describe the frame work which we followed during our research and analysis. For the proper analysis of data simple statistical techniques such as percentage, SPSS analysis of Mean, Median, Standard Deviation and Skewness were used. It helps in making more generalization from the data available. The data which will be collected from a sample of population was assumed to be representing entire population was interest. Demographic factors like age, income and educational background was used for the classification purpose.

Sample Summary

Area:	KANPUR
Size:	50 Respondents
Technique:	Convenient Sampling
Selection:	The respondents were selected at Random and were approached mostly in public places, offices, residential in various areas of Kanpur such as Kidwai Nagar, Yashoda Nagar.

IV. PROBLEM SELECTION

Telecom sector has changed the ways of communication of people around the world and it has shown vigorous growth in India during past few years. As these services and facilities have penetrated into lives of people, so they are also interfering with the social and cultural setups. For these reasons we thought to choose the topic and our main emphasis was to analyze Customer care services in accordance to marketing and a business strategy as understanding of local consumer is very important for doing a business in a new place.

V. COLLECTION OF DATA

The data is collected randomly irrespective of the category of the people in the form of questionnaire and the sample size is 50 respondents. Because it is a pilot study and due to time constraint the sample size is small. For conducting a research, two types of data is used I.e. Primary and secondary data. We used a combination of primary and secondary data for our research area.

VI. LIMITATION OF THE STUDY

Every study has some limitations; similarly this study has also the following limitation. The limitations for this study are discussed below:

- The study is based only on geographic area of Kanpur, which is very small for this type of study and the sample size for this study is 50, which is too small for the study like this.
- Shortage of important aspect such as time, financial problem, and complete size prevented research from detailed study, while in the main cause of limitation of report.

VII. CONCEPT OF CUSTOMER CARE

Customer care is a crucial element of business success. Every time you have contact with the customers you have an opportunity to improve your reputation with them and increase the likelihood of further sales. There are also specific programmed you can put in place to increase the levels of customer care. Customer care involves putting systems in place to maximize the customers' satisfaction with your business. It should be a prime consideration for every business - your sales and profitability depends on keeping your customers happy.

Customer care is more directly important in some roles than others. For receptionists, sales staff and other employees in customer-facing roles, customer care should be a core element of their job description and training, and a core criterion when you're recruiting. But don't neglect the importance of customer care in other areas of your business.

VIII. DATA ANALYSIS AND INTERPRETATION

Attributes Of Service Providers for Encouraging Customer Purchase

The companies are encouraging the customers by providing various attributes to retain them. There are two aspect of analysis one is based on companies and other one is based on attributes. The researcher will analyze the study by assuming the attribute basis.

- **Talk Time And Validity-:** Considering the attribute the researcher found that BSNL is the leader in providing the best talk time and validity schemes. Schemes such as Recharge with Rs. 200 and get Rs. 225, that is more than what is paid to company are been offered to customers in the past.
- **Call Charges-:** Considering the call charges, again BSNL is the market leader. As responded by the respondents, BSNL offers best call charge plans like 10 paisa per minute etc.
- **Quality of Services-:** In this attribute the best quality service is been provided by AIRTEL. The quality of service is determined as an important factor while customer churn and retention is concerned.
- **Special Offers/ Schemes-:** Considering this attribute again BSNL is found as the attribute leader in this section. As responded by the respondents, BSNL has best in providing special offers and schemes.

- **Voice Clarity-:** Voice clarity refers to the clarity of voice while making call, this attribute is very important and if the voice is not clear the message is not clear and it may be called miscommunication. AIRTEL is found as the best in this attribute.
- **Network Connectivity-:** This attribute is also known as Network Congestion that is while making call either the call is dropped or it is connected to some other person. It is found in the study that Airtel is the best as far network connectivity is concerned.
- **Tariff-:** When talking about tariff, it comes in mind the vouchers such as reducing call rates, providing free time to customers, or SMS packs. It is found in data collection that BSNL is the best in providing the tariff.
- **Availability of Service-:** Availability of services refers to how easily service is available in the market. It includes availability of recharge coupons, Sim cards etc. In this section it is found that the services of BSNL are easily available in the market.
- **Value- Added- Service-:** Value- added- services as referred by name that additional valued services provided by the service providers to the customers. As per the respondents opinion BSNL was found the best among the service providers under this category.
- **Billing System-:** Billing Systems includes many service related to bill such as correct bill generation, timely bill dispatch etc. it was found as per the opinion that Airtel is the attribute leader.
- **Customer Care Services-:** Customer care services are those services that are provided by companies for resolving customer queries. These queries includes- complain resolution, billing disputes, new connection query etc. it is found that best customer care services are provided by Airtel. It is also one of the important factors in calculating the customer satisfaction.

SPSS Analysis of Impact of Customer Care on Customer Satisfaction.

Statistics		
Is customer care significant in determining customer satisfaction?		
N	Valid	50
	Missing	0
Mean		3.6400
Median		4.0000
Mode		5.00
Std. Deviation		1.17387
Skewness		-.273
Std. Error of Skewness		.337
Kurtosis		-1.118
Std. Error of Kurtosis		.662

Is customer care significant in determining customer satisfaction?					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	strongly disagree	1	2.0	2.0	2.0
	disagree	9	18.0	18.0	20.0
	neutral	13	26.0	26.0	46.0
	agree	11	22.0	22.0	68.0
	strongly agree	16	32.0	32.0	100.0
	Total	50	100.0	100.0	

Analysis: In the sample size of 50 respondents. The Mean and Median Values are 3.64 and 4.00 respectively which show that considerable number of respondents agree that Customer Care is contributing to Customer Satisfaction. Even the Kurtosis Value of -1.118 suggests that majority of the respondents agree Customer Satisfaction is driven by Customer Care.

Reliability Test through Cronbach Alpha

```
RELIABILITY
 /VARIABLES=Talktime Service Quality Offers
 /SCALE('ALL VARIABLES') ALL
 /MODEL=ALPHA.
```

Scale: ALL VARIABLES

Case Processing Summary

		N	%
Cases	Valid	49	100.0
	Excluded[a]	0	.0
	Total	49	100.0

Listwise deletion based on all variables in the procedure.

Reliability Statistics

Cronbach's Alpha	N of Items
.836	3

Analysis: Cronbach's alpha is a measure of internal consistency, that is, how closely related a set of items are as a group. It is considered to be a measure of scale reliability. A "high" value for alpha does not imply that the measure is unidimensional. If, in addition to measuring internal consistency, you wish to provide evidence that the scale in question is unidimensional, additional analyses can be performed. Exploratory factor analysis is one method of checking dimensionality. Technically speaking, Cronbach's alpha is not a statistical test – it is a coefficient of reliability (or consistency). The value of Cronbach alpha

is 0.836 considering variables as Talktime, Service Quality and Offers which indicates measure of internal consistency.

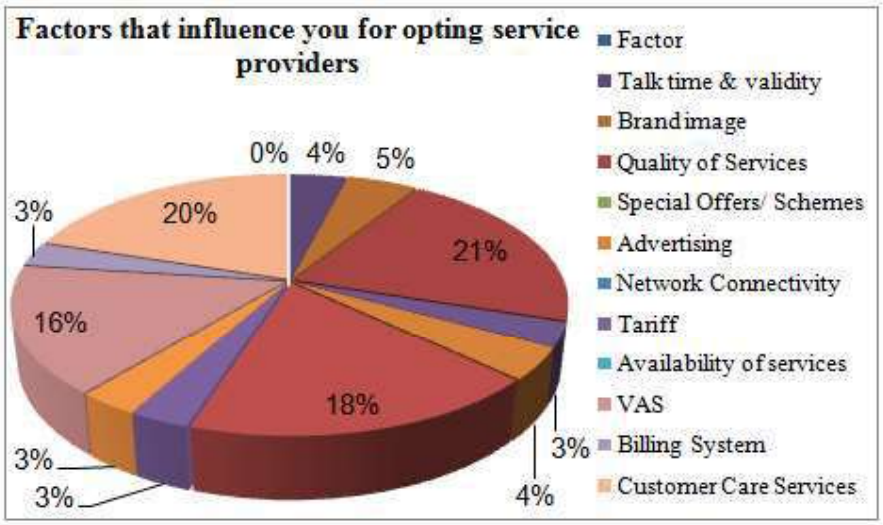
IX. FACTORS THAT INFLUENCE YOU FOR OPTING SERVICE PROVIDERS

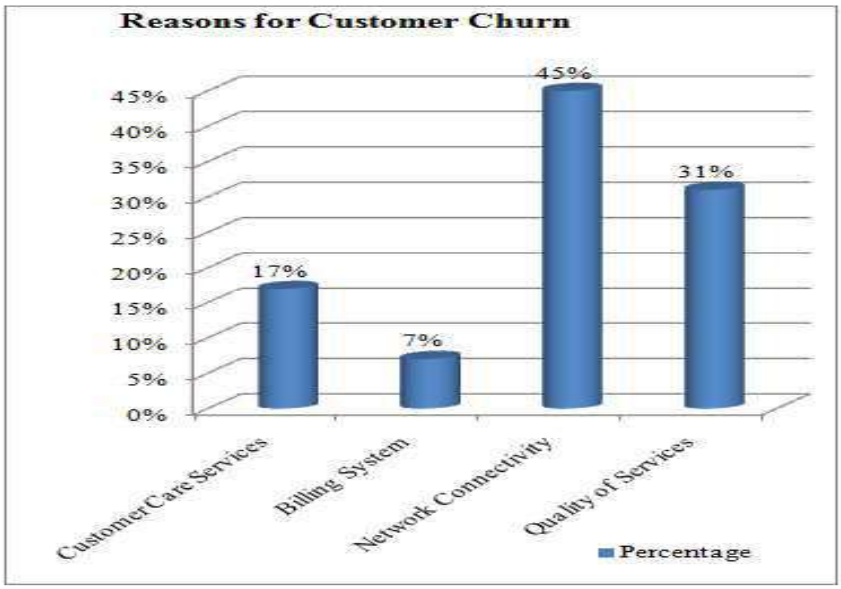
Here are few factors that influence the respondents to choose the service provider. The researcher will now analyze that which is the most influencing factor that influences the respondents in selecting the service provider

As per the data collected, researcher found that 21% of respondents look forward for Quality of Services while making the selection of service provider. 20% of respondents prefer Customer Care Services as important factor for making selection of service providers. 18% respondents prefer Network Connectivity as selecting factor for service provider. VAS is preferred by 16% of respondents as important factor of selecting service provider. Whereas contribution of other factors in selecting service providers can be Special Offers/ Schemes 3%, Brand Image 5%, Advertising 4%, Tariff 3%, Availability 3%, Talk time & validity 4%, Billing System 3%.

X. ANALYSIS OF THE SERVICES OF CUSTOMER CARE EXECUTIVE

The customer care executives and their services play an important role in retaining the customer and decrease the customer churn outs. Here the researcher analyzed that how the customer care executives deal up with the customers. The researcher interviewed the respondents about the services provided by customer care executives to the respondents. The researcher analyzed that:



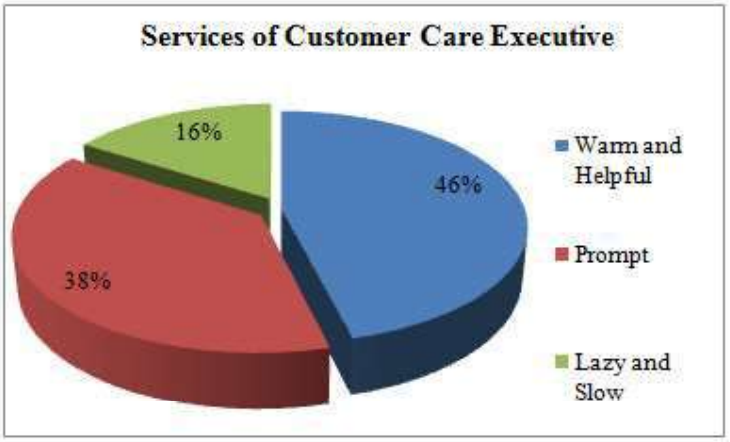


- 46% of respondents told that the customer care executive's services are warm and helpful in solving their queries and providing them the feasible resolution for their queries.
- 38% of respondents told that customer care services are prompt and they get the resolution promptly.
- 16% of respondents told that the customer care service are lazy and slow, that is they do not take much interest in providing the solution to the customer.

If the services of customer care executives are improved it may help the companies to decrease the customer churn outs.

XI. REASONS FOR CUSTOMER CHURN

The researcher was required to find out the biggest reasons for customer churn. The researcher asked the relevant question from the respondents to find out why they leave their service provider. The researcher found that:



- 31% of the respondents preferred leaving the service provider because of the Quality of Services.
- 45% of the respondents go with the network congestion and call drops for switching to other service provider.
- 17% of the respondents leave the service provider because of delay response from customer care.
- 7% of the respondents leave the service provider because of Billing System.

H0:- Courteous Language and knowledgeable person are not the most influencing factors for resolving the grievances of the customer

H1:- Courteous Language and knowledgeable person are the most influencing factors for resolving the grievances of the customer

Interpretation: Above data analysis shows that most of the users of all companies found their customer service provider courteous and knowledgeable. But the result of BSNL is not good as the users say that they have not talk to their customer care service provider even for a single time. Some of them have talk but after a lot of waiting time. So they are found not satisfied and rated this question also as dissatisfied. So after studying their views with a personal discussion we can say that the customer care representatives of BSNL are not courteous and knowledgeable.
Out of total 50 respondents more than 60% are concerned with Courteous Language and Knowledgeable person. Because they opted somewhat agree and strongly agree option. Therefore we can say that majority of the respondents are with the Courteous Language and knowledgeable Person are the most influencing factors for resolving the grievances of the customer

XII. CONCLUSION AND RECOMMENDATIONS

As a result of the liberalization, privatization, and de-monopolization initiatives taken by the government of India, the telecom sector is experiencing a historical growth. The trend is expected to continue in the segment, as prices are falling as a result of competition in the segment. The beneficiaries of the competition are the consumers, who are given a wide variety of services. In the years to come the country is predicted to witness a communication revolution, which would increase the tele-density to match that of the developed world. The need of the time is a new revolution in mobile telephony and it is imperative that service providers work towards the same and make it a reality. The number portability issues will solve many problems and will help the end users, which will change the whole scenario of competition and will make the game tougher for the service providers.

Telecom majors should think to launch the product according to the needs of customers to satisfy them and make them brand loyal .They should also think for searching new space or we can say either creating a new blue space to sustain their growth in long run. There is more room for data analysis but the rest of the part is beyond the scope of this project report. According to the results, the most important determinant for consumers are service quality, Network Coverage, value offered and brand image.

Retaining customers in the service industry has become a major objective of customer care. Customer care tactics are considered to be essential for building long-term relationship with customers in order to achieve mutual benefits of all parties. Although customer care tactics has been widely implemented by service providers, customers still tend to switch to competitor. Therefore, this study was conducted to exam the impact of customer care tactics (service quality, Network Coverage, value offered and brand image) on relationship quality (trust and satisfaction), and in turn effect the customer loyalty within on mobile telecommunication industries.

The final conclusion made out of the research is that, nowadays any firm offering service may lose their customers because of the poor customer service. Studies have shown that firms can boost their profits by almost 100% by retaining 15% more of their customers than their competitors retain. This is because the cost of acquiring new customers is much higher than the costs associated with retaining customers. Firms with loyal, long time customers can financially outperform competitors with higher customer turnover, even when their costs in limit.

XIII. RECOMMENDATIONS ON THE BASIS OF RESEARCH

- All the providers need to gear themselves on their approach. As the market is going to get more competitive, service will be the only key differential factor.
- Immediate improvement plan for all service providers with full action planning is required so as to gap whichever loopholes prevalent in the system. They should have a look at their attributes in totality to give an overall delight feel towards their customers.
- Providers should immediately prepare a action charter as to how they are going to save such a huge base from churning out. Providers like BSNL needs some heavy improvement is terms of process and transactional analysis.
- Providers need to ease out the documentation and address verification system which unnecessarily takes time during initial activation phase.

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Review Paper of Medical Image Processing

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Abstract

Over the recent years, Deep Learning (DL) has had a tremendous impact on various fields in science. Medical image processing is a subset of image processing, so one sees three main like MRI, X-ray, ultrasound, etc.

Index Terms: MRI, Ultrasound, Image Processing, Machine Learning, Neural Network

I. INTRODUCTION

Over the recent years, Deep Learning (DL) has had a tremendous impact on various fields in science. It has lead to significant improvements in speech recognition and image recognition, it is able to train artificial agents that beat human players in Go and ATARI games, and it creates artistic new images, and music. Many of these tasks were considered to be impossible to be solved by computers before the advent of deep learning, even in science fiction literature.

Obviously this technology is also highly relevant for medical imaging. Various introductions to the topic can be found in the literature ranging from short tutorials and reviews over blog posts and jupyter notebooks to entire books. All of them serve a different purpose and offer a different view on this quickly evolving topic. A very good review paper is for example found in the work of Litjens et al., as they did the incredible effort to review more than 300 papers in their article. Since then, however, many more noteworthy works have appeared – almost on a daily basis – which makes it difficult to create a review paper that matches the current pace in the field. The newest effort to summarize the entire field was attempted in listing more than 350 papers. Again, since its publication several more noteworthy works appeared and others were missed. Hence, it is important to select methods of significance and describe them in high detail. Zhou et al. Do so for the state-of-the-art of deep learning in medical image analysis and found an excellent selection of topics. Still, deep learning is being quickly adopted in other fields of medical image processing and the book misses, for example, topics such as image reconstruction. While an overview on important methods in the field is crucial, the actual implementation is as important to move the field ahead. Hence, works like the short tutorial by Breininger et al. are highly relevant to introduce to the topic also on a code-level. Their jupyter notebook framework creates an interactive experience in the web browser to implement fundamental deep learning basics in Python. In summary, we observe that the topic is too complex and evolves too quickly to be summarized in a single document. Yet, over the past few months there already have been so many exciting developments in the field of medical image processing that we believe it is worthwhile to point them out and to connect them to a single introduction.

Readers of this article do not have to be closely acquainted with deep learning at its terminology. We will summarize the relevant theory and present it at a level of detail that

is sufficient to follow the major concepts in deep learning. Furthermore, we connect these observations with traditional concepts in pattern recognition and machine learning. In addition, we put these foundations into the context of emerging approaches in medical image processing and analysis, including applications in physical simulation and image reconstruction. As a last aim of this introduction, we also clearly indicate potential weaknesses of the current technology and outline potential remedies.

II. ORIGIN OF THE RESEARCH PROBLEM

- Gone are the days, when health-care data was small. Due to the tremendous advancement in image acquisition devices, the data is quite large (moving to big data), that makes it challenging and interesting for image analysis. This rapid growth in medical images and modalities requires extensive and tedious efforts by medical expert that is subjective, prone to human error and may have large variations across different expert. Alternative solution is using machine learning techniques to automate diagnosis process however, traditional machine learning methods are not sufficient to deal with com-plex problem. Happy marriage of high performance computing with machine learning promise the capacity to deal big medical image data for accurate and efficient diagnosis. Deep learning will not only help to not only help to select and extract features but also construct new ones, furthermore, it does not only diagnose the disease but also measure predictive target and provides actionable prediction models to help physician efficiently.

- Machine Learning (ML) and Artificial Intelligence (AI) have progressed rapidly in recent years. Techniques of ML and AI have played important role in medical field like medical image processing, computer-aided diagnosis, image interpretation, image fusion, image registration, image segmentation,

- Image-guided therapy, image retrieval and analysis Techniques of ML extract information from the images and represents information effectively and efficiently. The ML and AI facilitate and assist doctors that they can diagnose and predict accurate and faster the risk of diseases and prevent them in time. These techniques enhance the abilities of doctors and researchers to under-stand that how to analyse the generic variations which will lead to disease. These techniques composed of conventional algorithms without learning like Support Vector Machine (SVM), Neural Network (NN), KNN etc. and deep learning algorithms such as Convolutional Neural Network (CNN), Recur-rent neural Network (RNN), Long Short term Memory (LSTM), Extreme Learning Model (ELM), Generative Adversarial Networks (GANs) etc.

III. OBJECTIVES OF MEDICAL IMAGE PROCESSING

- Medical image processing is a subset of image processing, so one sees three main objectives:

- Better image capture (Image capturing equipment (MRI, X-ray, ultrasound, etc.), noise removal during capture, enhanced resolution or contrast, image compression, data bases, etc.)
- Better image processing (diagnostics, object identification, object segmentation, search, etc.)
- Better image display (3D viewing, volumetric display, generating 3D from 2D slices, etc.)
- All these have one single goal, help medical image processing be a better diagnostic tool.

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A Project to Improve Efficiency of Pneumatic Engine by Using Air Suspension System

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Abstract

Due to scarcity of fuel resources, the prices rises rapidly. So it is required to find alternatives of fuels. There are different alternatives like solar energy, wind energy, geothermal energy, etc. The efficiency of these sources are low. Hence the efficiency optimization is required. Pneumatic engine[1] uses the compressed air to generate power for the vehicle. Here we are improving the efficiency by using air suspension system (ASS[2]) to regenerate the compressed air. The air suspension system converts the jerks[3] and bumps[4] into pressure energy. By this pressure energy the air is compressed and stored in the pneumatic cylinder. This regenerated compressed air optimizes the efficiency of the engine. By using air suspension system there are two advantages first one is optimized efficiency and second in cushion effect[5].

Key Words: [1]Engine that takes compressed air as fuel, [2]A piston cylinder attachment which reduces the fluctuating energy coming to driver, [3]Energy produced to vehicle due to irregularity of road, [4]Energy produced to vehicle due to road damage, [5]Energy produced due to jerks and bumps are absorbed in suspension system, it is called cushion effect.

I. INTRODUCTION

Air is present in excess amount in our environment. This air is used as energy source by compressing it at high pressure. This air is compressed and stored in cylinder at high pressure. This pressurized air is allowed to flow in pneumatic cylinder. This air expands in the chamber and produces reciprocating motion of piston. Reciprocating motion is converted into rotary motion to power up the vehicle. During running of vehicle, due to road surface irregularity and road damage, an uneven pressure is exerted over the vehicle. This produces unwanted energies. This energy is absorbed by suspension system. In this vehicle, air suspension system is used to absorb this energy which produce compressed air

II. OBJECTIVES

Bifurcation of name itself defines its objective. 'Regenerative' defines that retaining some energy of the source energy and 'Pneumatic' means it works from air. Following are the main objectives of this vehicle:

- To minimize the fuel usage
- To increase the pneumatic vehicle efficiency
- To decrease the pollution of environment
- To utilize the bump and jerk energy
- To reduce the running cost

III. VEHICLE WORKING PRINCIPLE

The vehicle consist of a pneumatic cylinder, air tank, air suspension system, rack & pinion and controller. The air tank holds the highly compressed air. The highly compressed air flows inside the pneumatic cylinder. The pneumatic cylinder has piston in an air sealed chamber. When the highly compressed air comes in the chamber it starts expanding and pushing the piston. This movement of piston generates the reciprocating motion. This reciprocating motion is converted into rotary motion which is used to provide the motion to vehicle.

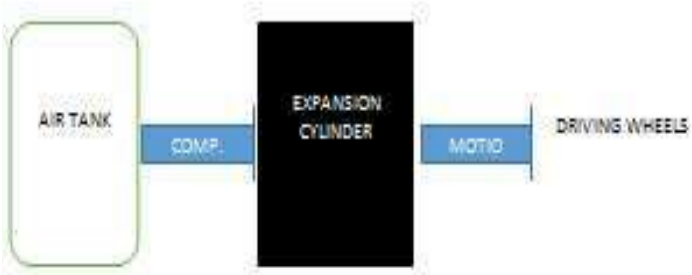


Figure 1: Flow chart of vehicle working

IV. SUSPENSION SYSTEM WORKING PRINCIPLE

The running of vehicle over road surface and road damage, some unwanted energies (due to bumps and shocks) are produced. The suspension system absorbs these energies and gives smooth driving. When the energy strikes the suspension system rod, piston attached to the rod goes inward and starts compressing the air in the cylinder. The compressed air is stored in the cylinder attached for powering the pneumatic engine. The air suspension system gives the cushion effect as well as regenerate some energy. The filtration of polluted air is it's another advantage.

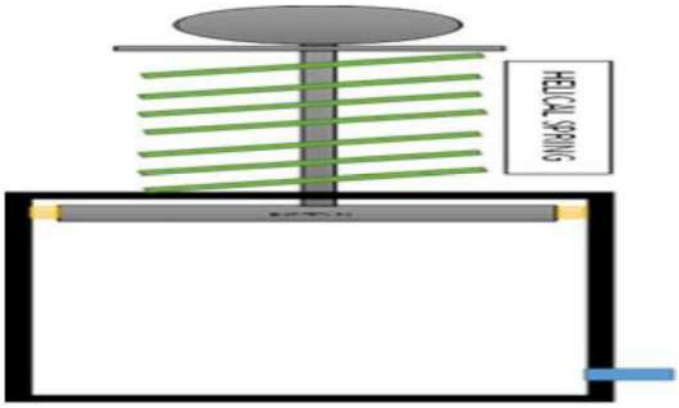


Figure 2: Schematic diagram of air suspension system

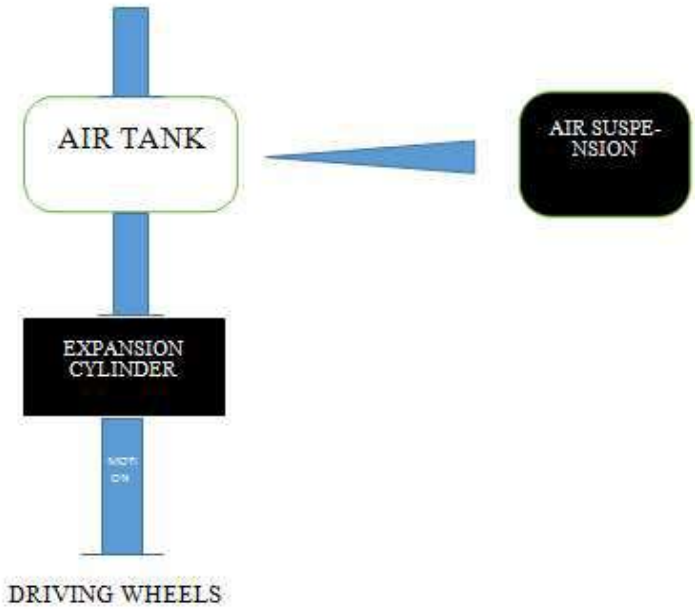


Figure 3: Working diagram of pneumatic vehicle with ASS

V. CONTROLLER

The feeding of highly compressed air should be as per requirement of vehicle. For the constant speed, the flow rate should be directly proportional to the load and surface inclination. So the controller is used which provides the variable flow rate to the cylinder and maintains the speed with the required speed and load. Also the pneumatic cylinder requires more flow arte at initial stage and lower flow rate at last stage of expansion. For this purpose an electromagnetic flow rate controller is used to provide the required flow at required time. A small 12 volt battery is used to make the controller. Controller takes a small amount of electric energy so the battery gives a long time backup.

VI. OBSERVATION

Pulling force calculation for pneumatic cylinder

$$F = \frac{P \times \pi \times (D_1^2 - D_2^2)}{4}$$

Where,

P = Air pressure at inlet
D1 = Bore Diameter
D2 = Piston Rod Diameter

$$\text{Air Consumption} = \frac{\pi \times (D_1^2 - D_2^2)}{4} \times l \times P \times s$$

Where,

L = stroke length
S = stroke/sec

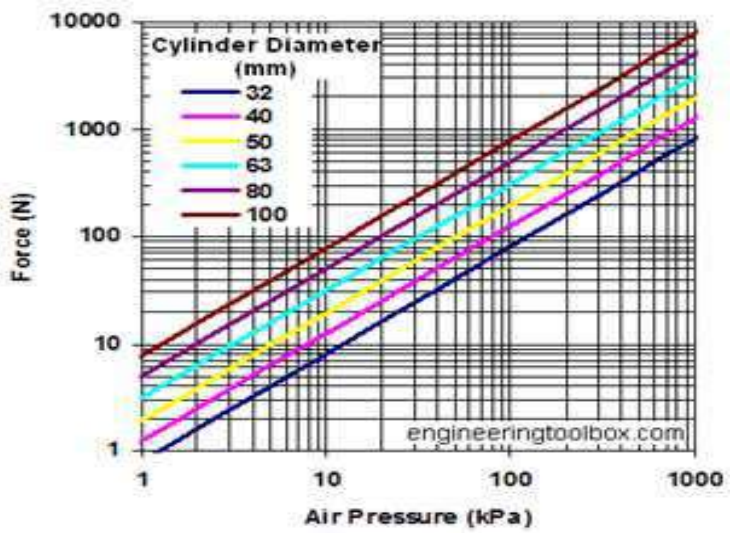
Power $= F_t \frac{\pi \times d \times N}{60}$ (Jule/Sec)

Where,

F_t = Thrust force
D = wheel diameter
N = Revolution per minute

VII. RESULTS

The outcome from these arrangements is the result of project. The result is of two types as one theoretical other one is practical. Following are the result based on calculations:
Specification of pneumatic cylinder
Bore Diameter (D) = 50 mm



Stroke length (L) = 160 mm
Rod Diameter (d) = 16 mm
Air Pressure (P) = 15 bar

Figure 4: Force – Air Pressure plot based on Diameter of Pneumatic Cylinder

Force exerted on piston in forward stroke

$F1 = \pi D2P/4$
$= 3.14 \times (50/1000)2 \times 15 \times 105/4$
$= 2943.75$ N (Newton)……... (1)

Force exerted on piston in forward stroke

F2 = π (D2 - d2) P /4
= 3.14 × {(50/1000)2 - (16/1000)2} ×15×105/4
= 2642.31 N……... (2)

Average force on crank

= (2943.75 + 2642.31)/2 = 2793.03 N…… (3)

The air flow in cylinder in one revolution of crank

AFR per Rev. = Volume of cylinder in forward stroke + Volume of cylinder in return stroke
= π{D2 + (D2 - d2)}L/4
=3.14{502 + (502 - 162)} 160 / 4
= 595846.40 mm3
= 595.85 cm3 (at atmospheric pressure)……(4)

Before expansion the air was compressed hence volume was less so

AFR per Rev before expansion = 595.85(pressure after expansion / pressure before expansion) (1/1.4)
= 595.85(1/15)0.714
= 86.11 cm3 (at 15 bar pressure)…….(5)

The air tank used is 60 ltr and of 80% maximum filling so 48 ltr is maximum filling.

Hence after full tank the vehicle will perform the revolutions of crank as follows:
Total Revolution = Total air vol. / Air req for one revl.
= 48 ltr / 86.11 cm3
= 48000 cm3 / 86.11 cm3
= 557 Revolutions

The vehicle wheel is rotated by a chain drive from crankshaft. The crank shaft sprocket has half of the teeth as the driven wheel sprocket. So for one revolution of crank shaft the wheel shaft rotates half revolution. So the wheel will rotate 278 revolutions……...(6)

Hence total distance travelled by the vehicle

= 2π ×Radius of wheel × total revol
= 2×3.14×0.254×278
= 443 metre……. (7)

Total weight carried by the vehicle with self weight is 100 kg or 1000 N

So work done by the vehicle
= 1000 × 443’

= 443000 N-m or Jule
= 443 kJ

The vehicle system has a suspesion system which compresses the air and refills into the system. This compressor has following specification:

Cylinder dia B = 70 mm
Stroke Length S = 110 mm
Outlet Pressure O = 10 Bar

This cylinder works only on bumps or jerks so for one bump the air delivered is as follows:

Air Delivered = π B2 S/4
= 3.14×70×70×110/4
= 423115 mm^3
= 423.115cm^3(At atmospheric pressure)

The delivery pressure is 10 bar hence the volume air at 10 bar
= 423.115 × (1/10) (1/1.4)
= 81.7 cm3……...(8)

Now for an average bump or jerk of count 25 for a whole ride, the compressed air will be delivered to air tank is 81.7 *25 = 2042.5cm3……(9)

For one stroke the air required is 86.11 cm3 hence due to the regenerated air the more strokes will be 2042.5/86.11 = 24 and total more distance travelled by the vehicle will be 12*2*3.14*0.254= 19.14 metre. Hence total distance travelled by the vehicle will be 19.14+443 = 462.14 metre.

Hence the percentage efficiency increased by

η = (Final Output – Initial Output)/Initial Output
….. (Since input is same for all)
= (462.14 – 443) / (443)
= 0.0432
= 4.32 %.....(10)

VIII. CONCLUSIONS

The output result of the overall system can be seen in equation no 10 as the efficiency increases by 4.32%. Without using the suspension system the efficiency was less and after using the system efficiency increases.

As the result describes the results and gives the difference between the both. The vehicle moves 443 meters in full tank of air compressed at 15 bar with a load of 100 Kg in which 60 Kg of person load and 20 to 25 kg of self vehicle weight and rest the margin for person load as every person does not have the same weight.

IX. DIRECTION FOR FUTURE RESEARCH

There are many modification can be performed in future in this project which are as follows:

- The suspension system can be modified by making the compressor tougher to be automatically pressed by weight of driver.
- Seats can be mounted directly on the compressors.
- The power generated by pneumatic cylinder can be varied by changing the transmission system.
- The requirement of air compressor can be avoided by utilizing any other mean of air.

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Emerging Technologies and Their Applications in Agriculture

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Abstract

Emerging technologies have already proven be a key driver in the future sustainability and profitability of agriculture. With the sector likely to continue to increase its reliance on new Production and its accountability. The opportunities for AI in farming will continue to evolve in areas of decision making, variable needs of plants and animals, that lead to maximise productivity and yields. The big link here to acceptance by.

- The consumer benefit of this is the opportunity for potential benefits around quality and volume of production that could see price benefits longer term as these costs savings are realised.

Keywords: Agrifood, precision farming, data ownership..

I. INTRODUCTION

Analysis was completed on different transformative technologies to identify any existing knowledge gaps, and develop strategies to discuss and address these issues. The extent to which profitability and production efficiency can improve in the next decade depends largely on the success of national efforts to reduce the ambiguity surrounding emerging agricultural technologies, and to constructively engage with consumers to identify possible concerns and overcome bottlenecks to adoption.

This report has been produced under National Rural Issues Program. It is an addition to AgriFutures' diverse range of over 2000 research publications and it forms part of our National Challenges and Opportunities arena, which aims to identify and nurture research and innovation opportunities that are synergistic across rural sectors.

Technology has transformed many of the industries around us, and agriculture, as the least digitised globally, has seen momentum for the development and commercialisation of agricultural technologies ("AgTech") growing. The sector is attracting new perspectives and capital, as well as emerging technologies. Though not the only innovators, start-up companies, often backed by venture capital investors, are leading the charge and attracting the attention of the agriculture industry, consumers, and investors.

Simultaneously, today's consumers are placing increasing demands on the global food and fibre system. Consumers want to know where and how their food is grown, processed, packaged, and transported. There is unprecedented concern for animal welfare, stewardship of natural resources, and working conditions for labourers along the supply chain. This is evidenced by, for example, the growth of the global organic industry7, as consumers often trust the organic certification as a proxy

II. ACCEPTANCE

Consumers: The general acceptance of Big Data and AI by consumers is evolving. Consumers are concerned about moving away from natural farming practices to solutions developed by AI and further research is required in this area. This concern around a move away from "natural" production towards more "industrial" systems does pose a risk of consumer backlash and is flagged as a potential concern. This concern will potentially evolve as a "medium" term risk to be monitored.

Farmers: The availability, quality and dissemination of data at an individual farm level that is robust and simple is still evolving. A critical issue for farmers is around ownership and security of data – farmers generally don't want to see third parties gain profits from their data. Understanding the value of data will be a critical area moving forward for all parties.

The opportunities for AI in farming will continue to evolve in areas of decision making, variable needs of plants and animals, that lead to maximise productivity and yields. The big link here to acceptance by farmers is cost of production. AI and Big Data can help farmers be more efficient, and in turn if production costs decrease, profitability will improve. There may also be benefits around improved environmental outcomes from efficiencies in production and where less productive land is identified and rehabilitated.

The evolution of AI is creating concerns around job loss in regional areas and safety aspects will play a part in farmers accepting the technology.

III. APPLICATION AND BENEFIT TO AGRICULTURE

The synthesis of Big Data and use of AI can help farmers gain access to complex information that can inform critical on-farm decisions. Big Data is required to enable AI and both technologies are integral to each other's success. The applications in agriculture offer huge potential for the industry. Although the technology can be applied in a wide range of settings, here are examples of just a few41:

- **Development of new plant seeds:** Huge developments in biological information collection and analysis have accelerated plant genomics. Research in laboratory settings is producing data that can be analysed to develop new hybrid seeds that perform across different ranges of environments.

- **Precision Farming:** New technologies and software that track yields, control equipment, monitor field conditions and manage inputs at precise levels across fields are substantially increasing productivity and profitability.
  Software with machine learning allow for smarter and more customized interactions which are creating opportunities for better decision-making on the farm.

- **Animal welfare:** Big Data and AI has the potential to help farmers manage their livestock efficiently with minimum supervision. New trials are being conducted where the technology is able to examine individual animals to determine their

condition and suitability for market, while in dairying, AI already has use in automated milking units that can analyse the milk quality and flag for abnormalities.

- **Reduced operating costs:** The opportunity that Big Data and AI offer to agriculture is the potential for better cost allocation and reduction in operating costs via targeted allocation of inputs such as fertilizer and chemical application. The consumer benefit of this is the opportunity for potential benefits around quality and volume of production that could see price benefits longer term as these costs savings are realised.

  "A recent study titled "Is big data for big farming or for everyone?" highlighted that there are key questions and issues that need to be addressed in further development of digital technology and Big Data in agriculture, specifically around trust, equity, distribution of benefits and access"""""

IV. KEY FACTS

In many cases, the technology for Big Data and AI applications on farms already exists. For example, it is now possible to combine large data sets and analyses including:

1. Long-range climate forecasts and local weather station data
2. Crop production models and sensors on farms -- Pest management data
3. GIS mapping technology -- Industry historical data (past yields, market data)
4. Current consumption data (supply chain logistics, prices, distributions, volumes)
5. Social media data (trends, events, political and social movements)

- An example of the emerging importance of Big Data in the agricultural supply chain is the Amazon acquisition of Whole Foods Market . Whole Foods Market aspires to several standards for many of their products; sustainability in seafood, antibiotics in meat, and pesticides in vegetables among others. To validate these claims, data on specific items need to be kept right through the production chain43.

- The use of Big Data in variable rate application (VRA) has become widely accessible however adoption from farmers is still slow. In the US, a recent survey of corn growers in VRA for planting. However in Australia, another survey of grain growers found that only 17% of respondents claimed to use VRA technology44.

- The global AI in agriculture market is forecast to be worth. The key factors driving the rise of AI in agriculture include the growing adoption of information management systems, advanced technologies for improving crop productivity, rising crop productivity as a result of deep learning techniques, and increasing initiatives by governments supporting the adoption of modern agricultural techniques.

V. BARRIERS TO ADOPTION

Connectivity: Connectivity will pose as a barrier particularly in Australia where poor mobile communication networks and data transfer ability are making digital agriculture technologies expensive. To fully utilise Big Data technology, regional Australia's mobile connection needs improvement as there is no doubt that the relatively low quality broadband coverage in rural areas has been a major reason for the slow adoption of internet functions.

Security: Loss of data to could undermine a grower's competitive advantage and may force producers opting to store their data locally rather than through a third party or in a cloud computing environment. The potential dispute between farmers and service providers may arise regarding data ownership as ownership rights vary depending on how data is being collected and who is performing collection.

Trust: As in many key business relationships "trust" is a key underlying factory in building and maintaining relationships. Whilst this potential barrier is linked to security concerns, the trust that farmers have in the systems and operators that are evolving will be a critical factor.

Quality of Data: The quality and veracity of data is a central theme to adoption – as an example, the loss of ear tags in animals has big impacts on data quality relating to livestock systems and processes. For agriculture, it is difficult to find structured, high quality data as records are being kept in different formats and are unable to unlock any value.

Regulation: Governance and systems will be needed around the use of AI and Big Data, for example regarding liability for accidents with autonomous equipment47. Farm insurance policies will eventually need to evolve to cover this aspect of new farming practices.

Safety: Especially, with respect to integration with autonomous equipment. Farmers and their advisory / representative bodies have procedures and protocols build around Safe Work Australia standards. This will need to evolve with AI-enabled equipment.
Usability: Need products and services that sufficiently abstract the complex technology to enable practical decisions. But, farmers also want to understand and be able to tweak, as needed, what's happening "under the hood". If they don't know what it's doing and trust it, they won't use the technology.

Cost, Value and Return on Investment: Business models are still evolving and require work to commercialise. The question of data ownership / sharing and sale is a critical

component – i.e. what is the value of a piece of data in the open market or what buying power can emerge from Big Data that delivers positive outcomes for farmers.

Data ownership: Regulations surrounding intellectual property rights is an issue as potential disputes between farmers and service providers may arise regarding the ownership of information. Ownership rights vary depending on how data are being collected and who is performing collection. For example, ownership and use of data generated using ground-based equipment owned by the farmer will be controlled by the farmer, except in the case of machinery operating data, which the equipment manufacturers may reserve ownership rights over.

Data Collection: Collection of data is still a key problem. The question on how to do it accurately and at scale along with who pays for and owns this service is a key issue.

VI. CONCLUSION

The integration of multiple sources of data such as weather, market data, agronomic data or benchmarks with other farms further enhances its effectiveness. With a multitude of sources, AI increases the value of data being collected by analysing and converting it into information to support farm management decision-making. It can be applied at a range of scales from converting data collected on individual animals and plants, to a whole farm level by presenting information for crop planning and monitoring.

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Challenges, Uncovered Research Issues and Tools for Big Data Analytics

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Abstract

Present day data frameworks and computerized advancements, for example- the Internet of Things and distributed computing produce an enormous vault of information every day. The investigation of these colossal figures requires a lot of exertion at a few levels to remove information to decide. In this manner, large information examination is an ebb and flow territory of innovative work. The essential target of this paper is to investigate the likely effect of huge information challenges, open exploration issues, and the different devices related with it. Subsequently, this article gives a stage to investigate huge information in a few phases. Moreover, it opens another skyline for scientists to create arrangements dependent on difficulties and open exploration issues.

Catchphrases: Big information examination and difficulties; Hadoop; Massive information; Structured information; Unstructured Data

I. INTRODUCTION

In the computerized world, information is produced from different sources and the quick progress from advanced innovations prompts the improvement of large information. It furnishes transformative achievement in numerous fields with an assortment of enormous datasets. When all is said in done, it alludes to an assortment of enormous and complex datasets that are hard to deal with utilizing conventional information base administration instruments or information preparing applications. These are accessible in organized, semi-organized and unstructured configurations of peta bytes and past. Officially, it is characterized from 3V to 4V. 3V alludes to volume, speed and variety. Volume alludes to the immense measure of information that is being created day by day while speed is the pace of development and how quick information is assembled for examination. Gives data about different kinds of information, for example, organized, unstructured, half circle and so on. The fourth V alludes to veracity which incorporates accessibility and responsibility. The primary goal of large information investigation is to handle information of high volume, speed, variety and veracity utilizing different customary and computational wise procedures [1]. A portion of these extraction strategies were talked about by Gandomi and Hyder [2] to acquire helpful data. The accompanying Figure 1 characterizes enormous information.

Anyway the specific definition for huge information has not been characterized and I believed to be issue explicit. This will assist us with being creative and practical, just as accomplish progressed dynamic, understanding disclosure and enhancement.

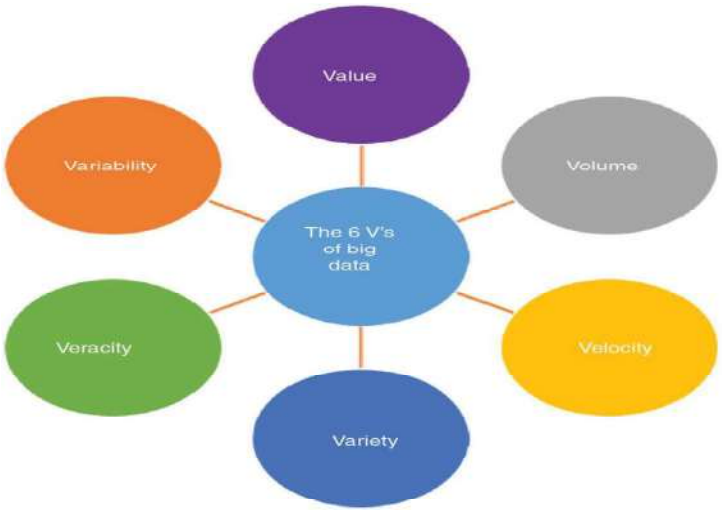

Figure 1: Big Data

It is normal that the development of huge information is projected to arrive at 35 billion by 2017. From the perspective of data and correspondence innovation, large information is a solid motivation for the up and coming age of data innovation industrialists [3], who are basically based on third stages, predominantly enormous information, distributed computing, Internet of Things, And social business. Regularly, information distribution centers are utilized to oversee enormous datasets. For this situation the main issue is to separate exact information from the accessible large information. The greater part of the introduced approaches in information mining is for the most part not equipped for dealing with huge datasets effectively. The serious issue in the investigation of large information is the absence of coordination with data set frameworks just as examination devices, for example, information mining and measurable investigation. These difficulties normally emerge when we try to speak to information for information and its pragmatic applications. A crucial issue is the manner by which to quantitatively depict the fundamental highlights of big data. Epidemiological implications are needed to describe the data revolution [4]. Additionally, studies on the complexity theory of big data will help in understanding the essential features and the formation of complex patterns in big data, simplifying its representation, achieving better knowledge abstraction, and computing models and algorithms on big data will guide the design [3]. There is a lot of research on big data and its trends [5], [6] by various researchers.

However, it should be noted that not all data available as big data are useful for the analysis or decision making process. The industry and academy are interested in disseminating the findings of big data. This paper focuses on the challenges in big data and its available technologies. Additionally, we state open research issues in big data. Therefore, to expand it, the paper is divided into the following sections. Section 2 deals with the challenges encountered during the tuning of big data. Section 3 presents open research issues that will help us to process big data and extract useful knowledge from it. Section 4 provides an insight to big data tools and techniques. Concluding remarks are given in section 5 to summarize the results.

II. CHALLENGES IN BIG DATA ANALYTICS

In recent years many data have accumulated in many domains such as healthcare, public administration, retail, biochemistry, and other interdisciplinary scientific research. Web-based applications often encounter big data, such as social computing, Internet text and documents, and Internet search indexing. Social computing includes social network analysis, online communities, recommender systems, reputation systems and forecasting markets where Internet search indexing includes ISI, IEEE Explorer, Scopus, Thomson Reuters and more. Considering this advantage of big data, it provides a new opportunity in knowledge. Processing work for upcoming researchers. However, persecution always faces some challenges. In order to analyze big data we face challenges to learn various computational complexities, information security and computational method.

A. Data Storage and Analysis

In recent years the size of data has grown exponentially by various means such as mobile devices, aerial sensory technologies, remote sensing, radio frequency identification readers etc. These data are stored on spending much cost whereas they ignored or deleted finally because there is no enough space to store them. Therefore, the first challenge for big data analysis is storage mediums and higher input/output speed. In such cases, the data accessibility must be on the top priority for the knowledge discovery and representation. The prime reason is being that, it must be accessed easily and promptly for further analysis. In past decades, analyst use hard disk drives to store data but, it slower random input/output performance than sequential input/output. To overcome this limitation, the concept of solid state drive (SSD) and phrase change memory (PCM) was introduced. However the available storage technologies cannot possess the required performance for processing big data.

Another challenge with Big Data analysis is attributable to the diversity of data. With the continued growth of datasets, data mining operations have grown significantly. Additionally data reduction, data selection, feature selection is an essential task especially when working with large datasets. This presents an unprecedented challenge for researchers. This is Bikuse, existing algorithms may not always respond in sufficient time when working with these high dimensional data.

The major challenge in this case is to focus on designing storage sytems and to upgrade more efficient data analysis tools that provide a guarantee on output when data comes from different sources. In addition, the design of machine learning algorithms for analyzing data is necessary to improve efficiency and scalability.

B. Computational Complexities and Knowledge Discovery

Knowledge discovery and representation is a prime issue in big data. It includes a number of sub fields such as authentication, archiving, management, preservation, information retrieval, and representation. There are several tools for knowledge discovery and representation such as fuzzy set [7], rough set [8], soft set [9], near set [10], formal concept analysis [11], principal component analysis [12] etc to name a few. Additionally many hybridized techniques are also developed to process real life problems. All these techniques are problem dependent. Further some of these techniques may not be suitable for

large datasets in a sequential computer. At the same time some of the techniques has good characteristics of scalability over parallel computer. Since the size of big data keeps increasing exponentially, the available tools may not be efficient to process these data for obtaining meaningful information. The most popular approach in case of large dataset management is data warehouses and data marts. Data warehouse is mainly responsible to store data that are sourced from operational systems whereas data mart is based on a data warehouse and facilitates analysis.

Analysis of large dataset requires more computational complexities. The major issue is to handle inconsistencies and uncertainty present in the datasets. In general, systematic modeling of the computational complexity is used. It may be difficult to establish a comprehensive mathematical system that is broadly applicable to Big Data. But a domain specific data analytics can be done easily by understanding the particular complexities. A series of such development could simulate big data analytics for different areas. Much research and survey has been carried out in this direction using machine learning techniques with the least memory requirements. The basic objective in this research is to minimize computational cost processing and complexities [13], [14], [15].

However, current big data analysis tools have poor performance in handling computational complexities, uncertainty, and inconsistencies. It leads to a great challenge to develop techniques and technologies that can deal computational complexity, uncertainty, and inconsistencies in an effective manner.

C. Visualization and Scalability of Data

The most important challenge for big data analysis techniques is its scalability and security. In the past decades researchers have followed Moore's law to accelerate data analysis and its speed processors. For the former, it is necessary to develop sampling, on-line and multi-diagnosis analysis techniques. Incremental techniques have good scalability in the aspect of big data analysis. Since data size is increasing at a much faster rate than CPU speed, there is a natural dramatic shift in processor technology embedded with increasing numbers of cores [16]. This change in processor leads to the development of parallel computing. Parallel computing is required for real-time applications such as navigation, social networks, finance, Internet search, timeliness, and more.

The purpose of visualizing data is to present them more adequately using some techniques of graph theory. Graphical visualization provides links between data with appropriate interpretation. However, online marketplaces like Flipkart, Amazon, eBay sell millions of users and millions of goods every month. This generates a lot of data. For this, some company uses a tool for big data visualization. It has the ability to transform large and complex data into seamless images. It helps employees of a company to visualize search relevance, get the latest customer fee refunds, and analyze their sentiment analysis. However, existing big data visualization tools have poor performance in functionality, scalability, and responsiveness over time.

We can see that big data has produced many challenges for the development of hardware and software which leads to parallel computing, cloud computing, distributed

computing, visualization process, scalability. To overcome this problem, we need to correlate more mathematical models to computer science.

D. Information Security

In enormous information investigation, huge scope information is dug for connection, examination and important examples. All associations have various approaches to secure their touchy data. Saving touchy information is a significant issue in large information investigation. There is an enormous security hazard related with large information [17]. In this manner, data security is turning into a significant information examination issue. The security of enormous information can be upgraded by utilizing strategies of confirmation, approval and encryption. Different safety efforts that large information applications face are network scale, wide range of gadgets, ongoing security observing and absence of interruption frameworks [18], [19]. The security challenge because of enormous information has pulled in the consideration of data security. Hence, consideration ought to be paid to creating staggered security strategy models and counteraction frameworks.

Albeit much exploration has been done to make sure about enormous information, it requires a lot of progress. The significant test is to build up a multi-layered security, protection ensured information model for enormous information.

III. OPEN RESEARCH ISSUES IN BIG DATA ANALYTICS

Large information investigation and information science are turning into the exploration point of convergence in businesses and the scholarly community. Information science targets investigating large information and information extraction from information. Uses of huge information and information science incorporate data science, vulnerability demonstrating, unsure information investigation, AI, factual learning, design acknowledgment, information warehousing, and sign handling. Compelling coordination of innovations and investigation will bring about anticipating the future float of occasions. Principle focal point of this segment is to talk about open examination issues in enormous information investigation. The exploration issues relating to enormous information examination are arranged into three general classes in particular web of things (IoT), distributed computing, bio motivated registering, and quantum figuring. Anyway it isn't restricted to these issues. More exploration issues identified with medical care enormous information can be found in Husing Kuo et al. paper [9].

A. IoT for Big Data Analytics

Web has rebuilt worldwide interrelations, the craft of organizations, social upsets and an inconceivable number of individual attributes. As of now, machines are getting in on the demonstration to control multitudinous self-sufficient devices by means of web and make Internet of Things (IoT). Accordingly, apparatuses are turning into the client of the web, much the same as people with the internet browsers. Web of Things is pulling in the consideration of ongoing specialists for its most encouraging chances and difficulties. It has a basic monetary and cultural effect for the future development of data, organization and correspondence innovation. The new guideline of future will be ultimately; all that will be associated and brilliantly controlled. The idea of IoT is getting more relevant to the

reasonable world because of the improvement of cell phones, installed and pervasive correspondence advancements, distributed computing, and information examination. Additionally, IoT presents difficulties in blends of volume, speed and assortment. From a more extensive perspective, much the same as the web, Internet of Things empowers the gadgets to exist in a horde of spots and encourages applications going from minor to the critical. Then again, it is as yet confusing to comprehend IoT well, including definitions, substance and contrasts from other comparable ideas. A few expanded advances, for example, computational insight, and enormous information can be fused together to improve the information the board and information revelation of huge scope computerization applications. Much examination toward this path has been done by Mishra, Lin and Chang [20].

Information securing from IoT information is the greatest test that enormous information proficient are confronting. In this manner, it is fundamental to create foundation to examine the IoT information. An IoT gadget produces persistent surges of information and the scientists can create apparatuses to extricate significant data from these information utilizing AI procedures. Understanding these floods of information produced from IoT gadgets and dissecting them to get important data is a difficult issue and it prompts huge information investigation. AI calculations and computational insight methods is the lone answer for handle large information from IoT planned. Key advances that are related with IoT are additionally examined in many examination papers [21].

Information investigation frameworks have begun from hypotheses of human data handling, for example, outlines, rules, labeling, and semantic organizations. All in all, it comprises of four fragments, for example, information securing, information base, information dispersal, and information application. In information procurement stage, information is found by utilizing different customary and computational insight strategies. The found information is put away in information bases and master frameworks are by and large planned dependent on the found information. Information dispersal is significant for getting important data from the information base. Information extraction is a cycle that searches records, information inside archives just as information bases. The last stage is to apply found information in different applications. It is a definitive objective of information revelation. The information investigation framework is fundamentally iterative with the judgment of information application. There are numerous issues, conversations, and investigates in this subject matter investigation. It is past extent of this study paper.

B. Cloud Computing for Big Data Analytics

The advancement of virtualization innovations have made supercomputing more open and reasonable. Registering foundations that are covered up in virtualization programming make frameworks to act like a genuine PC, yet with the adaptability of particular subtleties, for example, number of processors, circle space, memory, and working framework. The utilization of these virtual PCs is known as distributed computing which has been quite possibly the most powerful enormous information strategy. Large Data and distributed computing advances are created with the significance of building up an adaptable and on interest accessibility of assets and information. Distributed computing orchestrate gigantic information by on interest admittance to configurable figuring assets through virtualization methods. The advantages of using the Cloud registering incorporate contribution assets when

there is an interest and pay just for the assets which is expected to build up the item. All the while, it improves accessibility and cost decrease. Open difficulties and examination issues of large information and distributed computing are talked about in detail by numerous specialists which features the difficulties in information the executives, information assortment and speed, information stockpiling, information preparing, and asset the board [22]. So Cloud figuring helps in building up a plan of action for all assortments of utilizations with foundation and instruments.

Huge information application utilizing distributed computing should uphold information scientific and advancement. The cloud climate ought to give instruments that permit information researchers and business investigators to intelligently and cooperatively investigate information obtaining information for additional handling and removing productive outcomes. This can assist with settling huge applications that may emerge in different spaces. Furthermore, distributed computing should likewise empower scaling of apparatuses from virtual advancements into new advances like sparkle, R, and different sorts of enormous information handling strategies.

Large information shapes a structure for examining distributed computing alternatives. Contingent upon extraordinary need, client can go to the commercial center and purchase framework administrations from cloud specialist co-ops, for example, Google, Amazon, IBM, programming as an administration (SaaS) from an entire team of organizations, for example, Net Suite, Cloud9, Job science and so on Another favorable position of distributed computing is distributed storage which gives a potential method to putting away huge information. The undeniable one is the time and cost that are expected to transfer and download large information in the cloud climate. Else, it gets hard to control the dispersion of calculation and the hidden equipment. In any case, the significant issues are security concerns identifying with the facilitating of information on open workers, and the capacity of information from human examinations. Every one of these issues will take huge information and distributed computing to an elevated level of advancement.

C. Bio-inspired Computing for Big Data Analytics

Bio-propelled figuring is a method motivated ny nature to address complex true issues. Natural frameworks are self-coordinated without a focal control. A bio-motivated cost minimization system search and locate the ideal information administration arrangement on thinking about expense of information the board and administration support. These procedures are created by organic atoms, for example, DNA and proteins to direct computational estimations including putting away, recovering, and preparing of information. A huge element of such figuring is that it coordinates naturally inferred materials to perform computational capacities and get clever execution. These frameworks are more appropriate for large information applications. Tremendous measure of information is produced from assortment of assets across the web since the digitization. Breaking down these information and sorting into text, picture and video and so forth will require part of keen investigation from information researchers and huge information experts. Expansions of advancements are arising like huge information, IoT, distributed computing, bio propelled processing and so forth while balance of information should be possible simply by choosing right stage to examine enormous and outfit practical outcomes.

Bio-roused figuring strategies fill in as a critical job in wise information examination and its application to huge information. These calculations help in performing information digging for huge datasets because of its enhancement application. The most preferred position is its straightforwardness and their quick convergence to ideal arrangement [23] while tackling administration arrangement issues. A few applications to this end utilizing bio motivated registering was examined in detail by Cheng et al [24]. From the conversations, we can see that the bio-motivated registering models give more astute connections, inescapable information misfortunes, and help is dealing with ambiguities. Subsequently, it is accepted that in future bio-propelled registering may help in taking care of huge information to a huge degree.

D. Quantum Computing for Big Data Analysis

A quantum PC has memory that is dramatically bigger than its actual measure and can control an outstanding arrangement of information sources at the same time [25]. This outstanding improvement in PC frameworks may be conceivable. On the off chance that a genuine quantum PC is accessible now, it might have tackled issues that are especially troublesome on ongoing PCs, obviously the present huge information issues. The principle specialized trouble in building quantum PC could before long be conceivable. Quantum registering gives an approach to consolidate the quantum mechanics to handle the data. In conventional PC, data is introduced by long series of pieces which encode either a zero or a one. Then again a quantum PC utilizes quantum bits or cubits. The contrast among cubit and cycle is that, a cubit is a quantum framework that encodes the zero and the one into two recognizable quantum states. In this manner, it tends to be exploited the wonders of superposition and snare. It is on the grounds that cubits act quantumly.

IV. TOOLS FOR BIG DATA PROCESSING

Countless instruments are accessible to deal with huge information. In this segment, we talk about some current procedures for the investigation of enormous information with accentuation on three significant arising instruments, for example, MapRed, Apache Spark, and Storm. A large portion of the accessible instruments center around bunch preparing, stream handling, and intelligent investigation. Most clump handling instruments depend on Apache Hadoop framework, for example, Mahout and Dryad. Stream information applications are generally utilized for continuous logical. A few instances of huge scope streaming stages are Strom and Spunk. The intelligent investigation measure permits clients to communicate straightforwardly progressively for their own examination. Apache Hadoop and Map Reduce.

The most settled programming stages for large information examination are Apache Hadoop and Map diminishes. This incorporates Hadoop bit, Map decrease, Hadoop Distributed File System (HDFS) and Apache Hive and so on Guide decrease is a programming model for preparing enormous datasets that depends on the Divide and Concrete strategy. The gap and-vanquish strategy is executed in two stages, for example, map step and decrease step. Hadoop chips away at two kinds of hubs, for example, ace hub and specialist hub. The expert hub isolates the contribution to more modest sub issues and afterward conveys them to the specialist hubs in a guide step. The expert hub at that point consolidates the yield for all subtypes in a lower step. Furthermore, Hadoop and Map Reduce

fill in as a ground-breaking programming system to tackle large information issues. It is likewise useful in flaw open minded stockpiling and high throughput information handling

1. Apache Mahout
2. Apache Spark
3. Dryad
4. Storm
5. Apache Drill
6. Splunk

V. SUGGESTIONS FOR FUTURE WORK

The measure of information gathered from different applications everywhere on the world across a wide assortment of fields today is relied upon to twofold at regular intervals. It has no utility except if these are examined to get valuable data. This requires the improvement of methods which can be utilized to encourage large information examination. The improvement of incredible PCs is a help to actualize these procedures prompting robotized frameworks. The change of information into information is in no way, shape or form a simple errand for superior enormous scope information preparing, including abusing parallelism of current and forthcoming PC structures for information mining. In addition, these information may include vulnerability in a wide range of structures. Various models like fluffy sets, harsh sets, delicate sets, neural organizations, their speculations and crossover models got by joining at least two of these models have been discovered to be productive in speaking to information. These models are additionally a lot of productive for investigation. As a general rule, huge information are decreased to incorporate just the significant attributes important from a specific report perspective or relying on the application region. Thus, decrease methods have been created. Frequently the information gathered have missing qualities. These qualities should be produced or the tuples having these missing qualities are killed from the informational index before examination. All the more critically, these new difficulties may include, now and again even disintegrate, the presentation, productivity and adaptability of the devoted information serious registering frameworks. The later methodology in some cases prompts loss of data and consequently not liked. This raises many examination issues in the business and exploration network in types of catching and getting to information successfully. What's more, quick handling while at the same time accomplishing elite and high throughput, and putting away it proficiently for some time later is another issue. Further, programming for huge information investigation is a significant test in issue. Communicating information access prerequisites of utilizations and planning programming language deliberations to misuse parallelism are a quick need. Moreover, AI ideas and instruments are acquiring prominence among scientists to encourage important outcomes from these ideas. Examination in the territory of AI for large information has zeroed in on information handling, calculation usage, and advancement. Large numbers of the AI devices for enormous information are begun as of late requirements radical change to receive it. We contend that while every one of the apparatuses has their focal points and constraints, more effective instruments can be produced for managing issues innate to large information. The proficient apparatuses to be created should have arrangement to deal with loud and lopsidedness information, vulnerability and irregularity, and missing qualities.

VI. CONCLUSION

Information are created at a sensational speed lately. The investigation of these information is trying for an ordinary individual. Toward the finish of this paper, we study the different exploration issues, difficulties, and devices used to investigate these enormous information. From this review, it is perceived that each enormous information stage has its own particular core interest. Some of them are intended for group preparing while some are acceptable at constant examination. Each enormous information stage additionally has explicit usefulness. Different strategies utilized for investigation incorporate factual examination, AI, information mining, shrewd examination, distributed computing, quantum registering, and information stream preparing. We accept that later on scientists will give more consideration to these strategies to tackle enormous information issues adequately and proficiently.

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Different Software Tools Comparative Study for Microstrip Components Design

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Abstract

Size minimization of microstrip components is extremely desirable in present communications world. The Microstrip belongs to the group of parallel plate Transmission line consist of a single ground plane and an open strip conductor separated by a dielectric substrate. These components play a vital role in high frequency applications. Software tools are an important requirement for the design of microwave components. Microwave components are designed using many techniques and procedures. It is the main objective of this paper to offer a unique and comprehensive treatment of RF / microwave components software tool for microstrip structure and providing a link to applications of advanced technologies. A short description of the software used for the simulation and optimization of the microwave components structures is presented here. The use of computer-aided design tools prevent the process of redesigning and rebuilding prototypes and give a suitable design that gives an optimal performance. Available design software packages such as AWR, IE3D, HFSS, MW office, HSPIC are analysed here. For proper modelling main characteristics of analysed software tool is presented. The main points which are included are user-friendliness, price and range of vendor libraries. Thus, this paper provides a clear idea about which software tool is appropriate for getting required simulation results for the corresponding calculated design values. In general no particular software tools are used for microstrip component design. More or less all circuit reported in literature have been studied with the recognized software packages. It is clear that here the main software tools are overviewed in general sense with the benchmarks available in literature.

I. INTRODUCTION

The main requirement of simulation software tools arises for getting optimal performance of the designed circuit and also production cost is reducing. Computational design is the first step of component production process followed by fabrication & testing. After that tuning is the last step of component production process. Re-tuning process is also drastically reducing by selecting proper software tool [1]. The basic software packages incorporate with nonlinear and linear models including time domain modelling with electromagnetic (EM) simulation [2]. SPICE routine is used by time domain models [3]. Microstrip components designs also follow HSPICE.

HFSS and IE3D are basic 3D EM simulator, MOM (method of moments) applied to Maxwell's equations and 3D electromagnetic models are simulated. There are so many

software tools are available at present and this paper present those circuit design tools which are most suitable and sum up key characteristics of these software tools with respect to user friendliness, linear and non liner properties, 2D -3D layout, cost including modelling ability.

1. Microstrip component Design Software Packages for Microwave frequency range

Ansoft HFSS: High frequency structure simulator has ability for design of microstrip components. A filter structure simulated designed example result have been compared using Ansoft Designer RF from AWR Office and showed fairly good agreement [5]. The The output plots and charts are also intuitively straight forward to use. The software benefits from a wide range of parts in its built-in library models, good continuous support is also available from an Ansoft engineer. [6]. Designer RF features: linear/nonlinear circuit simulation with real-time tuning, optimisation and sensitivity analysis, frequency domain and transient analysis, digital and analogue systems simulation, IC and PCB layout with Java and Visual Basic and a full-wave 3D electromagnetic simulation.

Meshing and simulating the full layout is a straight forward procedure. The software benefits from a wide range of parts in its built-in library models, good continuous support is also available from an Ansoft engineer [8]. Designer RF, however, has some drawbacks: (1) the manufacturer's parts contain data files for Agilent ADS and MW Office only, which means that an equivalent circuit would have to be constructed to model each device, otherwise a Spice or S-parameter file would have to be used which can limit its accuracy, (2) the cost is high e.g. a commercial licence is, roughly, twice that of AWR MW Office and Agilent ADS for the full range of features.

HSPICE: It is similar to SPICE -3 (Simulation Program with Integrated Circuit Emphasis – 3) and used as analog circuit simulator. It's licensed for University only. This software is capable of doing transient, steady state, and frequency domain analyses [4]. It has no schematic capture features. It has poor speed and convergence.

Sonnet: It is 3D planar electromagnetic software and good choices of EM simulation tools for the modelling of microstrip passive microwave components. It has FFT based solver [11].

Microwave (MW) office: Microwave Office software includes the new characteristics such as the Network Synthesis Wizard, set up graphs with output power, voltage, or current as the x-axis, Linear and non-linear circuit simulator, improve the power amplifier design process, Layout view: 2D and 3D, PCB board designs for EM simulation, Relocating Edge Ports and a proprietary full-wave planar EM solver with advanced hybrid meshing.

IE3D (Zeland software): IE3D is a full-wave, method--of-moments based electromagnetic simulator solving the current distribution on 3D and multilayer structures of general shape. Rectangular and triangular meshes are used to model arbitrary shaped structures. It has been widely used in the design of MMICs, RFICs, LTCC circuits, model integrated circuits, components and antennas, microwave, millimetre -wave circuits, IC interconnects and packages, HTS circuits, filters and other components. The system then generates the necessary field solutions and associated port characteristics and S-parameters [7].

WIPL-D Microwave: For designing microwave components and circuit structure linear circuit simulator WIPL-D microwave can be preferred. It is user friendly. To define layered structure this software uses grids. The design of filters, antennas, resonators, Matching networks, phased arrays with feeding structures, directional couplers, Power dividers, connectors and other microwave components are preferred to design by using WIPL-D rather than simulation of active devices such as oscillators, transistor and amplifiers. This software is cheaper than software discussed above.

Pedasoft EM-Supreme: It performs the function of field solver and simulation in 3 D / 2 D time domain electromagnetic field. It also has the features of Radiation Patterns modeling, modeling of passive structures, active components, 3D EM Modeling of Filters. Follow the features of S parameter and large signal analysis.

Cadence RF Design: This software has limited modelling capabilities for microwave structure at for high frequency**.** It is a versatile RF design software suite with many applications and features. Cadence Virtuoso Spectre RF contains a SPICE-level analogue and RF modelling but this software has partial modelling capabilities for high frequency microwave circuit design [3].

Agilent ADS: Advanced Design System Agilent has various specifications including phase locked loops design, time domain and momentum simulator and it is a highly sophisticated kind of software. Various examples are explained with design guide. Due to its specific features of X parameter and models with vendor libraries ADS is one of the perfect tool for microstrip component design. It is least user friendly so it needs more training and exercise to get its complete use [8].

2. Specification summary including price of design software packages

Following Table gives the various features of microwave software for proper modelling and also gives the comparative outlines. It also gives an idea to combine two or three EM model instead of purchasing a single integrated package.

Table 1: Microwave design software main features assessment

Software Package	Features										
	Linear, S, Y, Z parameters etc.	Non-linear: Harmonic Balance	2D / 3D Layout	EM simulation/ efficient meshing	Example / tutorials	Transient simulator	Vendor library	Account for all MW component	Available support	Relatively low cost	User Friendly
Ansoft HFSS	✓	✓	✓	✓	✓	✓	✓	✓	✓		✓
HSPICE	✓		✓	✓	✓	✓				✓	✓
AWR Microwave Office	✓	✓	✓	✓	✓	✓	✓	✓	✓		✓
IE3D			✓	✓					✓	✓	
WIPL-D Microwave	✓		✓	✓	?	✓	?		?	✓	✓
Pedasoft EM Supreme	✓		✓	✓				✓		✓	✓
Cadence Spectre RF	✓	✓	✓	✓	?	✓			✓	✓	✓
Agilent ADS	✓	✓	✓	✓	✓	✓	✓	✓	✓		

3. A rough comparison of commercial costs

For any commercial product the qualities is based on its cost and play a major role and this thing must be taken in to consideration when choosing design software for microstrip components for microwave frequency. Ansoft HFSS has various features including user – friendly but it is most costly. As compare to AWR microwave office the cost of HFSS approximately double. HFSS also provide annual support and has facility of software up gradation with an annual chares of 15% of the cost price as compare to AWR and ADS which provides support without the annual fees.

The cost of ADS can considerably increase with the number of add-ons to the basic package e.g. the transient add-on will increase the cost by roughly 75%. The low cost option is AWR Office and ADS Agilent (basic) making this a low cost alternative whilst providing suitable design accuracy for microwave components. The add-ons to Alignte EM and synthesis do increase the cost, but is well below that of the basic costs of the other packages.

II. CONCLUSIONS

As per the requirement microstrip components are modelled using linear or non linear simulator. By the use of Electromagnetic simulator major advances in the development of microwave components is possible. Software packages have various features which are used for the accurate representation of microwave devices including surface mount or chip devices. A time domain and EM simulators also has its own importance.

Microstrip component desining packages have been discussed in this research paper. It has been observed that sonnet is a good EM solver. HSPICE is better for transient behavioural modelling and sophisticated models can be designed by the combination of these two programme. The well known, established, providers of integrated design packages are: Agilent, AWR and Ansoft providing the microwave design tools of ADS, Microwave Office and Designer RF. Both Designer RF and Microwave Office have a wide range of features to provide the capabilities for professional use [5] and they both have user-friendly interfaces. AWR's Office package however is less costly than that of Ansoft's Designer RF.

Agilent ADS is more costly and requires a lot of practice, but it does provide excellent modelling precision.

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Conventional, Renewable and Green Energy

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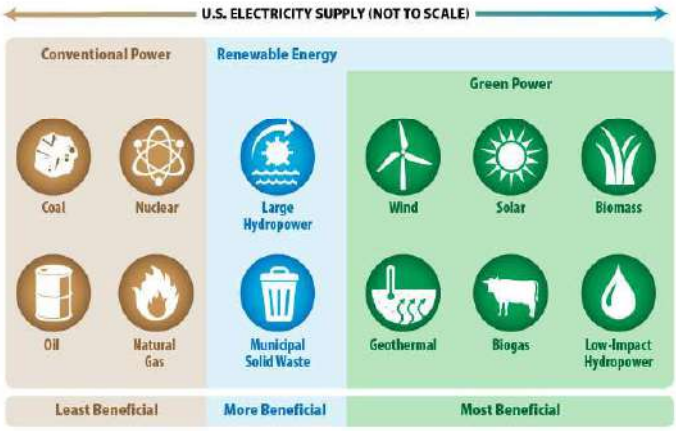
Abstract

In today's era we totally imply on the resources available for the fulfillment of the energy fetched from various resources environmental condition surpasses the combination of natural and resourceful elements. The nature is occupied with the parameters of the energy proposiytion of the elements which are resourceable and providing economical and healthy gallop of the natures environment The materials that can be replaced natural and human processes. Solar is very important of the resources. sources of energy are replenish themselves like wind and hydroelectric power. The conventional fuels are distnict area electricity generation ,hot, motor fuels and rural energy services. This paper is an example of conventional ,renewable and green energy .

Index Terms: fracking, renewable energy, green energy.

I. INTRODUCTION

This article guides a stepwise walkthrough as we know green power is the subset of the renewable energy and reparesents those renewable energy resources and technologies that provides the highest environmental benefits .Green energy is basically the combination from natural resources like tides, sunlight and geo thermal heat ,fossil fuels are finite resource and continue to diminish . Renwable energy comes from natural resoourcesalso have amuch smaller impact on the eenvironment than fossil fuels ,which produce polutnants such as greenhouse gases as by – product,contributing to climatic change .Gaining access requires drilling deep into earth often ecological sensitive locations.



1. Types of green energy

Solar Power: The most prevalent photovoltaic cells which capture sunlight and convert into electricity .Solar technologies become inexpensive and hand-held gadgets to entire

neighbours. It is derived by capturing power from sunlight and converting into heat. The benifites of solar sunlight is functionally endless. Solar power also eliminate energy cost and reduce energy bills. The limitations of solar energy tends a significant upfront cost and unrealistic expenses for household.

Wind Power:

Air flow on the earth surface can be used to push turbines with stronger winds, high altitudes and ares just offshore tend to provide the best condition for capturing the stronger winds. The solar power as produce from solar, geothermal, biogas and low- impact small hydroelectric sources.

Hydro power: Also to participation, in fall, force of running water produced significant amount of energy produced. It is a versatile. Hoover dam and underwater turbines are generated both large scale projects. The lower dams on small rivers and streams. It is need to use fossil fuel pump water. Most U.S. hydroelectricity facilities use more energy able to produce for consumption.

Geo-Thermal energy: Just under earth crust are massive both from original formation of the palnet. It being used to generate electricity. It is trapped beneath the earth's crust from the formation of the earth 4.5 billion year ago and radioactiv decay. The benefits of geothermal is not comman other types of renewable energy soures but it has significant potential for energy

supply. Geothermal energy captured and used to produced heated water pumping below the surface. cost plays a major factor when it comes are the limitations of geothermal energy.

Bio – mass: Recently living natural mineral, wood waste ,saw dust and combustible agriculture waste. The limitations of biomass need carbon dioxide to grow, plants take a time to grow. This technology also used biomass in lieu of fossil fuel. This energy come from wood, biofuels like ethanol and energy generated from methane captured from landfills. Bioenergy is a renewable energy derived from biomass. Using wood in your fireplace are the example of biomass.

Bio fuels: Ethanol and biodiesel, world transport fuel for road transport in 2010, Transportation fuels by 2050. Renewable energy resources are being replenished .Hydroelectric is also prevalent, ocean energy , biomass ,hydrogen .

II. KEY FACTS

Dirty energy: Every country has access to sunshine nad wind prioritizing the renewable energy can also improve national security.

1. A country reliance on exports from fossil fuel rich nations
2. Fracking can cause earthquakes and water pollution and
   Coal power plants

Selling energy you collect: Wind and solar energy powered .Homes can either standalone or get connected to the larger electrical guide as supplied by their power providers –Net Metering

III. CONCLUSION

Renewable energy and you Advocating the renewable or using them in your home can accelerate the transition towards clean energy nature. The renewable resource available

throughout the northest. The coal and petroleum are fossil fuels and quantity are limited. The fuels are highly polluting and cannot basic for completely sustainable socity. The resource of energy biomass, wind, hydro power and wave energy. Earth surface receives sufficient solar energy low temperature heating of water and buildings.

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National Conference on
Computing, Communication, Control,
Informatics and Pharmaceutical Sciences
***Organized by:** Kanpur Institute of Technology, Kanpur, India*

Object Recognition and Shape Matching and Using Shape Context

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Abstract

Recovery of shape and similitude fit as a fiddle both are significant in PC vision. Right now ongoing advancement has been driven by planning shrewd shape descriptor which give closeness between sets of shapes. This paper introduces a strategy for coordinating and perceiving objects with improved shape descriptor dependent on shape setting. The proposed technique is reasonable for proficient, ongoing coordinating of shut shapes. Results are introduced for manually written digits, letter sets, MNIST informational index and MPEG-7 informational index.

Keywords: Object shape, Object recognition, Shape context, MPEG-7 data set, MNIST data set.

I. INTRODUCTION

Shape matching/retrieval is a very critical problem of computer vision and pattern recognition which can be defined as the establishment of a similarity measure between shapes and its use for shape comparison. Any product of this task might also be a set of point correspondences between shapes. Application of shape matching include but are not limited to object detection and recognition, content based retrieval of images and image registration.
Shape matching involves the high-level understanding of shapes. In particular, there are many different kinds of shape matching methods and the progress in improving the matching rate has been substantial in recent years. Belongie et al. 2002 approach the problem of shape matching introducing the shape context, a local shape descriptor, that samples selected edge points of figure in log-polar space. The resulting histograms are compared using the $\varkappa$ 2 statistics. Matches between corresponding points are established by optimizing the sum of matching costs using weighted Bipartite Matching .Finally a thin plate spline (TPS) transformation is estimated, that warps the points of the first shape to the second, based on the identified Correspondences. This process is repeated for a fixed number of iterations, using the resulting deformed shape of the previous step as input for the next step.

In this work we are interested in the particular problem of recognizing and matching objects like hand-written alphabets, scanned alphabets and MPEG-7 data set/MNIST data set. The proposed method is based on improved shape context and the work of Belongie et al. 2002.

Several experiments have been carried out to assess the effectiveness of the proposed method on different images. The method of new shape descriptor applied to different shapes is quantitatively assessed. The proposed shape matching method has been employed to detect the original sample points of different shape and comparing it.

The experimental results demonstrate that the proposed method performs very satisfactory in diverse shape matching applications. The structure of this paper is as follows: In section 2, we briefly review some well-known shape matching. In section 3 we describe our shape matching method. Section 4 gives the experimental results on famous data sets to show the advantage of the proposed approach. Section 5 demonstrates our proposed measure on a variety of database including handwritten digits, alphabet and well known data sets. We conclude in section 6.

II. RELATED WORKS

The picture acknowledgment issue has pulled in an expanding measure of intrigue as of late, and a few novel methodologies have been proposed. The current methodologies could be separated into a few kinds, highlight based, splendor based, generative model, multi see learning, Transductive help vector machine (TSVM).

As of late there are some encouraging diagram based transductive learning approach proposed, for example, mark spread, Gaussian fields and Harmonic function(GFHF),local and worldwide consistency (LGC).This proposed work is driven by shape setting and Belongie's work. It is low computational multifaceted nature which makes it a decent competitor fit as a fiddle coordinating applications requiring continuous execution. Since an enormous number of shape comparability techniques have been proposed in the writing, we concentrate on strategy that detailed recovery results on the MPEG-7 shape informational collection, MNIST informational collection and manually written letter sets and digits. This shows recovery rate upgrades acquired by the proposed strategy and ongoing strategies gained some ground, the improvement isn't self-evident, as appeared in table 1.There are two primary reasons that breaking point the advancement fit as a fiddle recovery:

1. The case for huge twisting impediment despite everything can't be taken care of well.
2. The existing algorithms cannot distinguish the more relevant and less relevant shape difference pointed out in section1.
3. Our method aims at improving performance of image retrieval and matching shapes.

III. THE PROPOSED SHAPE MATCHING APPROACH

The proposed method utilizes shape contexts to describe selected points on a given shape. A fixed number of n points are sampled equidistantly on the contour of each shape. For each of these points; a shape context descriptor is computed. To compare two shapes, each descriptor of the 1st shape is compared using the $\varkappa^2$ statistics to all the descriptor of the 2nd, giving rise to pair wise matching costs.

The cost cij for matching points can include an additional term based on the local appearance similarity at point p_i and q_j.This is useful when we are comparing shapes derived from gray-level images instead of line drawing.

Calculate “cost“ of matching each point to every other point. Cost of matching point i to point j=chi squared similarity between row i and row j in shape context descriptor.

$$C_{ij} = C(p_{ij},q) = 1/2 \sum_{K=1}^{K} [h(k)-h_j(k)]^2 / h_i(k)+h_j(k) \quad \ldots\ldots (1)$$

Where, $h_i(k)$ and $h_j(k)$ denote the k-bin normalized histogram at p_i and q_j respectively.

A. Cyclic Matching

The comparison of a pair of shape contexts can be performed with a number of different histogram comparison methods based on equation (1).

$$\varkappa^2 (h1,h2) = 1\backslash 2 \sum [h1(k)-h2(k)]^2 / h1(k)+h2(k) \quad \ldots\ldots (2)$$

Where h1 and h2 are the compared histogram each having k-bins. The comparison of the two shapes is performed by considering a 2D matrix c.

B. Rotation Invariant Shape Contexts

Rotation invariance is a desirable property of shape matching. Since each shape context histogram is calculated in a log-polar space, rotation invariance can be achieved by adjusting the angular reference frame to an appropriately selected direction, in this work this direction is estimated using cubic spline interpolation. First, the 2D curve is fitted by a cubic spline model. Cubic splines inherently interpolate functions of the form $f:|R \rightarrow |R$. It is easy to extend this to interpolate parametric curves on the Plane (functions of the form $\varkappa: |R \rightarrow | R^2$), by concatenating two such models. The next step is to compute the derivatives of the two cubic spline models at each point of interest. For each such pair of derivatives, the local tangent is computed by taking the generalized arc tangent function with two arguments. The estimated local contour orientation is then used as the reference direction of shape contexts towards achieving description that are rotationally invariant.

C. Bipartite Graph Matching

Given the set of costs cij between all pairs of points Pi on the first shape and qj on the second shape, we want to minimize the total cost of matching,

$$H(\prod) = \sum c(p_i, q\prod(i)) \quad \ldots\ldots (3)$$

Subject to the constraint that the matching be one to one, i.e. $\prod$ is a permutation. This is an instance of the square assignment (or weighted bipartite matching) problem, which can be solved in $O(n^3)$ time using the Hungarian method. In our experiments, we use the more efficient algorithm. The input to the assignment problem is a square cost matrix with entries Cij.The result is a permutation $\prod(i)$ such that total cost of matching is minimized.

D. Thin Plate Spline Computation

The final step of the presented shape matching method is the computation of the planar deformation that aligns two shapes. The alignment is performed using thin plate splines.

The input is a set of pairs of correspondences between two 2D shapes. The output is a deformation of the plane, as well as a deformation cost. The cost can be properly weighted along with the cost of the previous step to form the final matching cost or distance between the shapes.

The regularized version of the TPS model is used, with a parameter λ that acts as a smoothness factor. The model tolerates higher noise levels for higher values of λ and vice versa. Since the scale of all shapes is roughly estimated at the first step of the method, the value of λ can be uniformly set to compensate for a fixed amount of noise. For all experiments, λ was fixed to 1 as in shape context of Belongie et al 2002.

Besides the warping between the compared shapes, a total cost matching cost sizes of 15,000 and 20,000.Results are shown on a

$$D = l_1 c_m + l_2 c_b \quad (4)$$

D is a weighted sum of the matching cost c_m and the TPS cost c_b .while c_b has the potential to contribute information not already captured by c_m, in practice it proved sufficient to ignore the c_b cost, and use only the c_m cost the distance D between shapes (i.e. l_1=1 and l_2=0).

Other than shape context functions, we also implemented the histogram cost and the points sampling function since they took the longest running time.

IV. EXPERIMENTS

A. Alphabet/Digit Recognition

Here we present results on the dataset of handwritten alphabets. In the experiments, we used 50 points sampled from the canny edges to represent each alphabet. Specifically, we defined the matching cost as

$$C_{ij} = (1-\alpha)\, C_{ij}^{sc} + \alpha\, C_{ij}^{tan} \quad \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots(5)$$

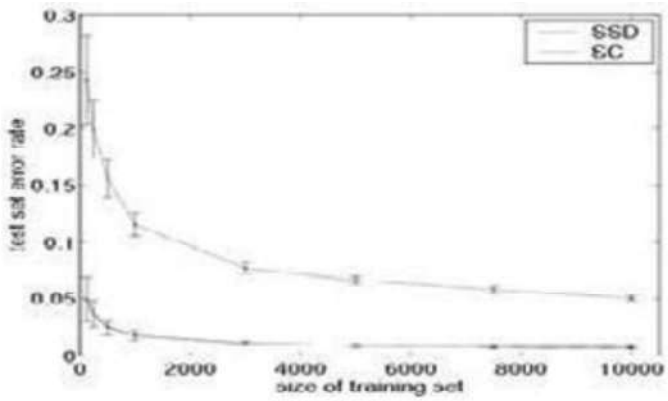

Figure 1: Handwritten digit recognition on the MNIST data set.

TABLE 1: The Bulls-Eye Score for New Data Set Based on Different Pairs of Parameter.

	$K=3$	$K=5$	$K=7$	$K=9$
$\alpha=0.1$	83.9%	88.11%	89.26%	89.84%
$\alpha=0.15$	84.33%	88.67%	89.66%	90.31%
$\alpha=0.2$	85.77%	90.29%	91.34%	91.84%
$\alpha=0.25$	88.71%	92.17%	92.57%	92.56%
$\alpha=0.3$	89.69%	91.16%	91.41%	91.16%
$\alpha=0.35$	89.03%	90.39%	90.3%	90.2%
$\alpha=0.4$	88.74%	89.99%	89.97%	89.84%

We make precise our definition of shape distance and apply it to several practical problems. We used a regularized TPS transformation model and three iterations of shape context matching and TPS re-estimation. After matching, we estimated Shape distance, including results with training set sizes of 15,000 and 20,000. Results are shown on a semilog-x scale for K= 3,5,7,,9 in table . (4)

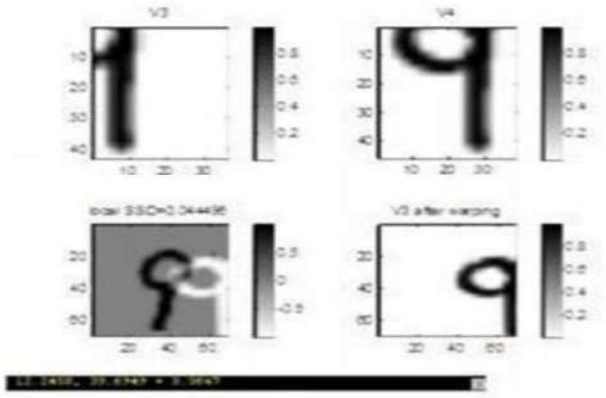

Figure 2: Result after warping and showing the sum of squared difference

V. CONCLUSIONS

We propose a new descriptor for shape matching method based on the shape context, which matches images by comparing edge feature distributions in a defined circular template.

In our approach, a shape is represented by a set of sample points drawn from the internal and external contours of an object. Operationally, one runs an edge detector on the gray-scale image and selects a subset of the edge pixels found. The selection could be uniformly at random, but we have found it to be advantageous to ensure that the sample points have a certain minimum distance between them as this makes sure that the sampling along the contours is somewhat uniform.

This method is invariant to rotation and scale, translation and local affine distortions. The proposed method is robust to noise, outliers and occlusion. It is applicable in a variety of domains. It can handle large shape variations from templates. Our approach is simple and easy to apply, yet provides a rich descriptor for point set that greatly improves point set registration, shape matching and shape recognition.

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Application of IoT in Agriculture

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Abstract

It is well known that technology upliftment can only be possible from the advances in research and development. Internet of things (IoT) has touched to almost every sector from smart home, smart kitchen, smart farming to industries and manufacturing sector and has really boost up the profit level. Now, time has come to do more research in agriculture sector as agriculture sector directly affects the economy of country. Application of IoT in agriculture means bringing the automation in agriculture and reducing labor cost that will help to enhance the productivity of the crops by saving the crops from loss due to extreme weather condition, overuse of fertilizers and water and attack of pest and can meet the growing needs of population.

Index Terms: Internet of things (IoT), Cloud computing, smart agriculture, sensor.

I. INTRODUCTION

Internet of Things or more commonly IoT is an emerging concept in the technical world. We want more comfort in our life. Internet has become a core part of our life. Anyone who is new to this topic is eager to know what is internet of things (IoT). Well, internet of things is network of physical devices connected to each other for exchange of data and information through sensors and actuators. These actuators and sensors are embedded on to these devices which allow them to exchange data with each other. In simple terms, IoT means letting the devices to connect to the internet to make our life much easier. The 'things' here refer to internet of things devices like chips, cameras, sensors or such other physical devices.

IoT is going to be an essential part of our life in near future. Through IoT, distant or remote objects can be controlled on this network. You might have heard about smart homes. The concept of smart homes is based on Internet of Things (IoT). But IoT is not limited to smart homes as there are various applications of IoT which will be discussed later in this article.

Internet of Things (IoT) covers a distinct number of protocols, domains, and applications. There will be more advanced communication between the devices with better connectivity and services. The embedded devices will provide advanced automation in almost every area ranging from homes to cities. These devices gather important information employing latest technologies and then transfer this information to other devices.
The term 'internet of things' was found by Kevin Ashton and Gamble in 1999

- **Communicate:** The collected data is transferred to the desired location through the network.

- **Aggregate:** The devices aggregate the collected data.
- **Analyse:** The aggregated data is analysed to generate some patterns.
- **Act:** Here, based on the information, suitable actions are performed.

IoT provides services at the global level by the interconnection of various physical device

II. CHARACTERSTICS OF INTERNET OF THINGS (IOT)

1. **IOT Dynamic Nature:** The IoT devices capture data from its surrounding environment. This is done by the dynamic changes that take place around these devices. The state of IoT devices change dynamically like connected or disconnected and also due to temperature, location and speed. Also, it can change due to person, place or time.
2. **IOT Enormity:** In the near future, the number of devices connected to the network for communication will be much larger than it is today. Also, it will become much more complex to manage and handle data from these devices. A statistics suggest that more than 5 million new devices are connected every day and the number is only going to increase.
3. **IOT Sensing:** Sensors are an important component in IoT without which the changes in the environment cannot be detected and measured. These sensors interact with the environment to detect and collect data. The information that is sensed by the sensor is basically the input from the environment that can provide some valuable information.
4. **IOT Diversity:** Diversity or heterogeneity is one of the main characteristics of IoT. The IoT devices have different hardware platforms and network and they are able to communicate with other devices through different net. The IoT network is able to support connectivity between distinct networks. The core requirements for this diversity is scalability, modularity, extensibility, and interoperability.
5. **IOT Security:** Currently there is some security and privacy issues with IoT network which with more development in this field will be vanished. It is very important to secure data while it is being transferred between devices.

III. IOT ARCHITECTURE AND WORKING

The architecture of IoT is mainly referred to as four-stage architecture. IoT architecture can be a IoT based thesis topic. Stage 1 includes the sensors and the actuators. Stage 2 includes the aggregation systems and analog-to-digital converter. In stage 3, processing of the data is done by some technology. In stage 4, the data is moved to data center systems.

Stage 1

In the first stage, the data is collected by the sensors from the surrounding environment or from an object and is converted into useful one. An actuator also act according to the change in physical conditions. The sensors and actuators are used in almost every field from industries to healthcare. The scope of IoT is increasing day by day according to the demands. The processing power of IoT devices is limited. The data can be processed at the sensor.

Stage 2

In the second stage, there is the internet gateway. The data collected by the sensors is in analog form. It is converted into digital format using data acquisition systems (DAS) for further processing. The DAS performs analog to digital conversions along with aggregation of data. The Internet gateway receives this aggregated and digitized data and provides routing for it over the wireless or wired network. The analog data is converted to digital one as the analog streams create large volumes of data. Also the analog data requires specialized softwares for processing based on its timings and structures.

Stage 3

After the data is digitized and aggregated, it enters the third stage for more processing. IT systems perform this processing through detailed analysis. These IT systems more commonly edge IT systems may be at off-site or at on-site.

Stage 4

It is the stage in which the data is stored at data centers and cloud. The data doesn't require immediate feedback and requires more detailed processing is transferred to data centers which have more advanced IT systems to perform in-depth analysis. This type of processing takes place on the location. Different IoT devices have different architecture. This was just an outline of the IoT architecture. You can get thesis guidance in Internet of Things for this architecture topic in order to know more.

IV. APPLICATION OF INTERNET OF THINGS

Take a glimpse at some of the real world applications of IoT that have transformed our daily life. If you wish to choose this topic for your thesis, then you can go for this subtopic of applications for thesis in IoT (Internet of Things). There are more surprises in this field in future. Check out some of the real world applications of IoT.

- **Smart Homes:** Smart Homes is the most trending feature of IoT. People are curious about this feature. They want their homes to be converted to smart homes in order to lead a more comfortable and convenient life. Who don't want a home in which air conditioner or heater automatically switch on and off sensing the temperature or switch off the light? Smart Home products are dedicated to save time, money and energy. Smart homes will soon become a common feature just as smart phones.
- **Wearable gadgets:** There is heavy demand of wearable IoT devices in the market. These wearable IoT devices have sensors and softwares installed in them that collect valuable information about the user and processing generates useful insights for the user. These devices are mainly for health, fitness and entertainment purposes. The main advantage of these gadgets are small size, highly efficient and low power.
- **Connected Cars:** These type of cars are able to operate and maintain on their own through sensors and internet connectivity for the comfort of the passengers. Major brands are working towards this to bring new revolution to vehicular systems.

- **Industries:** Industrial Internet is a hot discussion in the industrial world. It aims to empower industries with sensors, softwares and analytics to manufacture more advanced and brilliant machines. The major advantages of this will be quality control, sustainability, goods tracking and real time information exchange.
- **Smart Cities:** From smart homes, the applications of IoT now extends to smart cities. What all feature will be included in a smart city? Smart surveillance, automated transport management, energy management, water distribution, security and environment monitoring. IoT pledges to solve the problems that the people living in cities commonly face like traffic, pollution etc.
- **Agriculture:** The demand for food supply is increasing due to increase in global population. IoT tends to develop certain techniques in the field of agriculture to increase food production. Moreover, farmers can also get useful insights regarding the soil and moisture requirements etc.
- **Energy:** Smart grid concept is gaining attention all over the world. It aims to improve the efficiency of the electricity along with measuring consumer electricity consumption.
- **Healthcare:** Smart healthcare systems will be able to collect health information of an individual. It aims to provide healthier life to patients.

V. ADVANTAGES OF INTERNET OF THINGS

- **Communication:** IoT enables better quality communication between the devices known as machine to machine communication. Also, more transparency is there between the devices.
- **Automation and Control:** The machines communicate with each other without human intervention thus giving more automation and control. This will provide timely output and quicker response time.
- **Information:** With IoT we can collect valuable information through sensors and actuators from the surrounding environment.
- **Time and Money:** The biggest advantage of IoT is saving time and money. This will be beneficial to people in their daily life as the devices can communicate with each other on their own.
- **Efficiency:** It is also efficient therefore producing more accurate results. It will save time and will enable people to do some other creative work.
- **Better quality of life:** These devices are designed to provide a better quality of life for the comfort and convenience of the people.

Literature Review

1. Patil K. A et al. (2016) [6], proposes a wise agricultural model in integration with ICT. ICT have always mattered in Agriculture domain. Over period, weather patterns and soil conditions and epidemics of pests and diseases changed, received updated information allows the farmers to cope with and even benefit from these changes. It is really challenging task that needs to provide such knowledge because of highly localized nature of agriculture information specifically distinct conditions. The complete real-time and historical environment information helps to achieve efficient management and utilization

of resources. The issue is that the technique can achieve convenient wireless connection within a short-distance.

2. Joaquín Gutiérrez et al. (2014) [3], The paper aims at optimizing water use for agricultural crops. An algorithm was developed with threshold values of temperature and soil moisture that was programmed into a microcontroller-based gateway to control water quantity. The system was powered by photovoltaic panels and had a duplex communication link based on a cellular-Internet interface that allowed for data inspection and irrigation scheduling to be programmed through a web page. The issue is that the investment in electric power supply would be expensive.
3. Shakthipriya N et al. (2014) [7], As mentioned it reviews the state of art wireless sensor technology in agriculture. Based on the value of soil moisture sensor the water sprinkler works during the period of water scarcity. Once the field is sprinkled with adequate water, the water sprinkler is switched off. Hereby water can be conserved. Also the value of soil pH sensor is sent to the the farmer via SMS using GSM modem. The issue is that it provides only precision values that is not accurate and is not cost efficient
4. BezaNegashGetu et al. (2015) [1], It investigate the design and simulation of an electronic system for automatic controlling of water pumps that are used for agricultural fields or plant watering based on the level of soil moisture sensing. The speed of the motor is varied according to the level of the soil moisture content; the motor is OFF during maximum wet and is running with HIGH speed during dry soil conditions respectively. The duration of water pumping is controlled by a timer circuit. The system is tested using NI MULTISM simulation software. DIAC and TRIAC techniques are used. The issue is that it does not support several water levels and uses old techniques
5. Nikhil Agrawal et al. (2015) [5], It proposes a design for home automation system using ready-to-use, cost effective and energy efficient devices including raspberry pi, arduino microcontrollers, xbee modules and relay boards. Use of these components results in overall cost effective, scalable and robust implementation of system. Use of these components results in overall cost effective, scalable and robust implementation of system. Drip irrigation system makes the efficient use of water and fertilizer. Freeduino flavor of arduino is used in this design. To start the drip irrigation system an email is sent to a defined account .The issue is that the the failure of any particular part or device is not informed and has to be tested manually. not efficient for large agricultural fields.

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IoT Based Automation System to Prevent Crop Vandalization by Rain Water in Agricultural Regions

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Abstract

India's keystone is Agriculture. Around 70 percent of India's revenue comes from Agriculture. Conversely the population of India amplifies each and every day which requires efficient and well planned decision making techniques for the production of crops. In this research paper we find the intensification of the structures which prevent destruction of crops due to uneven and heavy rainfall. The goal is achieved by the concept of Embedded System design using IOT technology. This is done automatically without any human interference. Here we first identifies the water level in the agriculture field during rainfall by using water level sensors, if the water level exceeds there limit that will cause spoilage of crop then the device are automatically cover the agriculture field. It also identifies the temperature of the crops by using temperature sensor during the sunny days, if the heat causes spoilage of crops due to intensive sun rays then the device will automatically covers the agriculture field. After covering the agriculture field it will send the alert message using GSM module to the farmer and simultaneously the water of rain is collected through piles that will be reuse later for irrigation. To achieve this we use microcontroller , Solar panels, GSM module, DC motor, sensors, Switched-mode power supply (SMPS), Rechargeable battery.

Keywords: IOT, Sensors, Embedded System, Microcontroller, Solar panels, GSM module, DC motor, SMPS, Rechargeable battery, Agriculture.

I. INTRODUCTION

Agriculture is the foundation of India. It secures second position in global level in farm yield. Agriculture and other allied activities engaged around 50 percent of the Indian labor force and add 17 to 18 percent to India's Gross domestic product (GDP). In India, usual food utilization at present is 550 gram per capita per day, while in USA and China are 2850 gram and 980 gram , correspondingly[1,2]. The total gross irrigated area has in excess of quadrupled from 22.6 million ha in 1950–51 to 99.1 million ha in 2011-2012 [3]. Potential modification in Rainfall, Carbon dioxide concentration and temperature are likely to considerably impact crop intensification [4]. The data recorded according shows the relationship between rainfall and minimum water needed by crops [5].

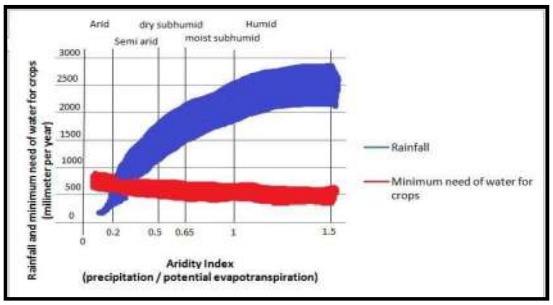

Figure 1: Rainfall and minimum need of water for crops comparison

The objective of this paper is to describe the Embedded System which Prevent Crop Vandalization by Rain Water in Agricultural Regions. Heavy rainfall and excessive sunlight are serious harm to crops, so preventive measures to protect field from such uncontrolled phenomenon are essential for not only protecting crops but also for the livelihood of farmers. Our IOT based embedded system is highly useful in this regards. Embedded system is a collection of a computer processor, computer memory, and I/O peripheral devices which has a committed function inside a superior mechanical or electrical system. Currently there is no proper protection of crops from vandalization by rain water, management of the rain water and protection of crops from access heat. This paper also explain some of the traditional methods that are used by agriculturists like making outlet in the field of crop in order to pass rain water through it but the method is not efficient enough to pass all rain water and hence the spoilage of crop may cause. The embedded system resolves the struggle faced by farmers due to the vandalization of crops due to excess rain water or due to excess heat. Rakhee Patil etc all [6] was proposed a embedded system model in which it uses a raspberry pi board, WIFI module and ARM7 LPC2148.

In this paper, we shows a cost effective system based on real world implementation which is simple to use and has simple equipments for the agriculturist and encompass a capability to defend crop field successfully.

II. SYSTEM ARCHITECTURE

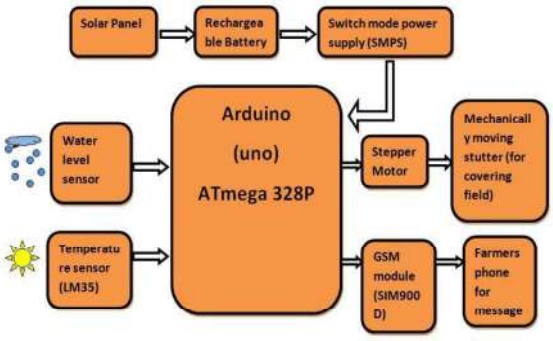

Figure 2: Block Diagram of System

A. Component Explanation

1) Water level sensor: It is the kind of sensors which detect the water level depth and generate signal accordingly.

Figure 3: Water level sensor.

2) Temperature sensor: It is a sensor that will detect the heat of the material and turns on but some temperature sensor are activated when they are in touch with the material and some uses convection and radiation to check changes in temperature.

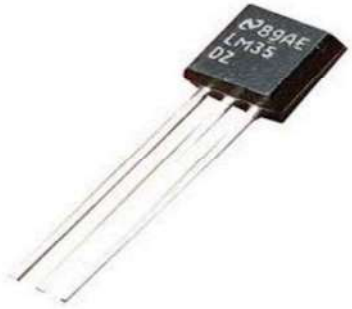

Figure 4: Temperature sensor.

3) Arduino uno: It is the microcontroller that is totally based upon the MicrochipATMega328P microcontroller. It is the brain of embedded system we use and control the other devices.

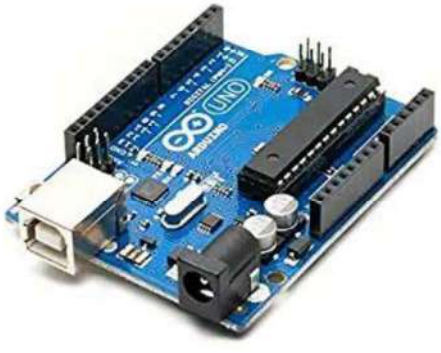

Figure 5: Arduino Uno.

4) **Stepper motor:** It is the kind of motor that rotate like normal motors but the difference is stepper motor divide the full rotation into a number of steps. These divisions are done in such a manner that in each rotation equal numbers of steps are present.

Figure 6: Stepper Motor.

5) **GSM module:** It is the kind of chip used to create the communication between the device and a GSM module. It is initially used for 2G and 3G cellular communication [7].

Figure 7: GSM Module.

B. Overview

This IOT based embedded system majorly consist of temperature sensor, water level sensor which collects the stimulus from external environment, based on such stimulus microcontroller (Arduino uno) decide to execute various functionalities such as automatic covering the field with mechanically operated Tarpaulin shed, to protect the field from heavy rainfall and excessive heat of sunlight. Moreover microcontroller is interfaced with GSM module, to inform the farmer about every action, which the controller is performing on the field shown above in figure 2.

III. FLOW CHART REPRESENTATION

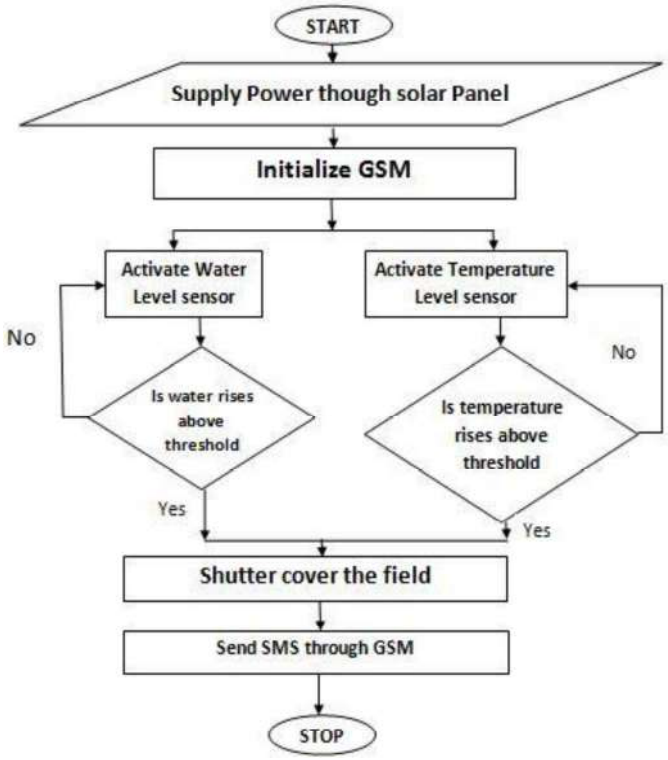

Figure 8: Block Diagram of System

IV. SYSTEM MODEL EXPLANATION

Solar power enabled IOT based system operates at 5 volts DC supply. For this purpose we are installing solar panel to capture solar energy and convert it to get electrical energy which is used to recharge the lithium rechargeable batteries, which along with 5 volts DC convertor provided regulated supply of 5 volts to arduino uno (AT mega 328P microcontroller) and GSM module[10].

Water level sensor were installed in the field to continuously measure the level of water in the field during heavy rainfall and microcontroller continuously analyzing the data obtained from sensor. As soon as the level of water reached above threshold value microcontroller will activate the robotic vehicle comprised of stepper motor mechanism to mechanically operate the Tarpaulin shed which is mount on a specially designed wooden or plastic structure.

The specially designed wooden or plastic structure consists of rubber wires whose tensile strength is good. They are mounting on the strong plastic or wooden base. The

structure is designed in such a manner that the two plastic or wooden rods have equal height while third rod has larger height than the other two. The all three rods are placed in one two dimensional plane as shown in figure 9.

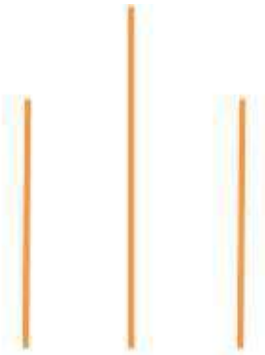

Figure 9: 2D Plane Structure

Similarly the other three rods are placed opposite to the given 2D plane and formed the three dimensional plane structure and then join each of the end corresponding to similar other end as shown in figure 10.

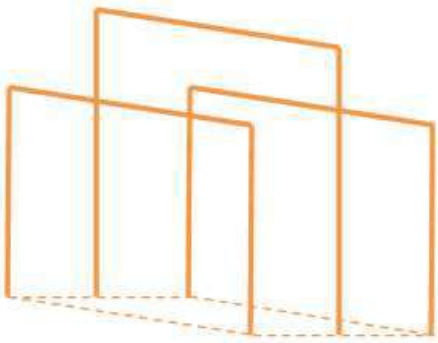

Figure 10: 3D Plane Structure

Now the rubber wires are connected in this structure as shown in the figure 11.

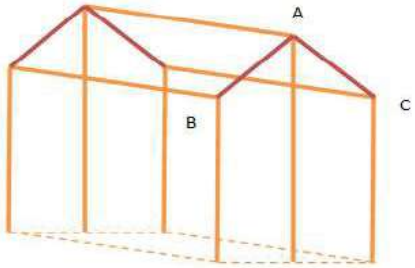

Figure 11: Complete 3D Plane Structure

Now the tarpaulins are installed at the two edges shown by brown color in figure 11. The tarpaulin will be pulled up until it reaches the point A (figure 11) by the stepper motor that will be installed in point B(figure11) and point C(figure 11). The whole system is

controlled and operates by the microcontroller automatically according to the extent of rainfall and intensity of the sun rays (temperature).

Now after covering the field with tarpaulin shed, GSM module get activated and inform the farmer about the action taken by microcontroller.

In the similar fashion temperature sensor will also perform its functionality that is as soon as ambient temperature exceeds above predefined threshold (threshold value vary according to the crops), mechanical shutter automatically get operated and microcontroller informs the farmer simultaneously.

V. CONTROL CIRCUIT

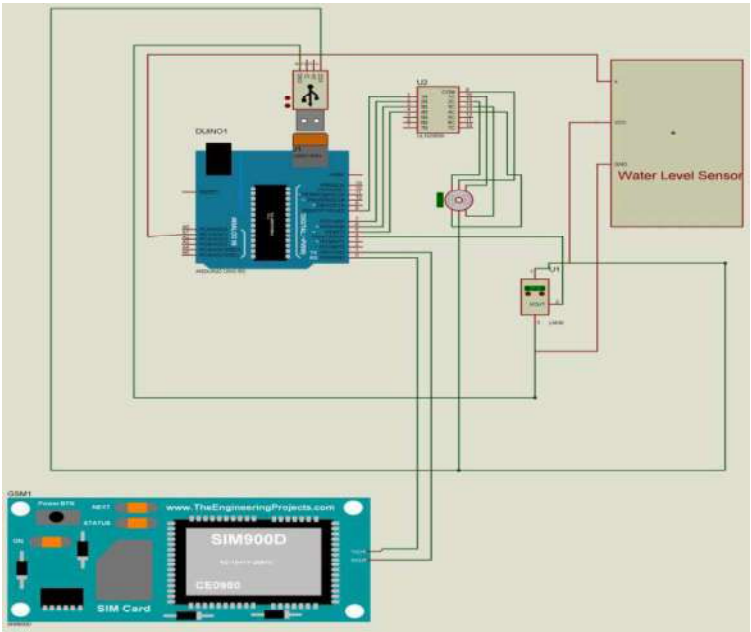

Figure 12: Controller Circuit

The ATMega328P microcontroller [9] is the main controller module unit which is being interfaced with stepper motor, GSM module [8] and is operated with 5V DC Supply which is being generated through solar panel (Solar energy to electrical energy converter circuit)

Digital pin 0(RXD) and pin 1(TXP) of the microcontroller are connected to TXD and RXD pins of SIM900D GSM module respectively which is used to send message to the user to inform the user about covering of field.

Analog pin A1 of microcontroller acts as input pin which collects the information about water level in the field through the rain water level sensor as shown in the circuit diagram. Similarly digital pin 4 collects the information about temperature through LM35 temperature sensor.

Based on above received inputs at analog pin A1 and digital pin 4 decision to operate stepper motor which in turn cover the field with tarpaulin sheet installed on an specially designed structure as shown in figure 9,10,11.

Digital pin 5, 6, 7 and 8 acts as output which is being interfaced with ULN2003A driver integrated circuit, which is used to drive stepper motor precisely as per our requirement.

VI. CONCLUSION

As this is the era of "Internet of Things" so utilizing the technology for protecting the crops from involuntary actions of natural phenomenon (like heavy rainfall) will be great relief and extremely helpful for farmers, who are the backbones of our country. Moreover above prescribed system once installed can work for a long period of time because of its highly robust nature. Hence installing such system in the field will reflect a great mark to economy as well and giving fruitful desired results to the farmers.

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Impact of Artificial Intelligence on Gaming Industry in India

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Abstract

Gaming industry in India is likely to get boomed within few years with modern technologies like artificial intelligence, which certainly will create a revolution in gaming world and strive to change the way gamers look to the games. To cite a study conducted by KPMG, the number of game development companies in India today stands at around 275. This number was a mere 25 in the year 2010. This number alone speaks volumes about the growth and possibilities of the gaming industry in India. India having the world's largest youth population and second-largest internet population and hence eventually made the gaming sector largest growing sector in market. It is estimated to having 22.2 crore gamers in India who spend an average of 42 min/day on mobile games. The constant need for improvement and competition between gaming companies will also give Artificial Intelligence a promising future, in the gaming world. Artificial Intelligence would not only provide an improved gaming experience but also aid in providing high-quality games at lower budgets. Over the last 5-6 years games like Clash of Clans and most recently PUBG, have caught the imagination of the young Indian crowd – extracting hours at length on the interface. NASSCOM data suggests that India's mobile games market will be worth $1.1 billion by end of 2020, and number of users projected to become 628 million by then. Action-based games have seen a surge of more than 427% when it comes to the total time spent on the games. The in-app purchases have gone up by 241%. Casual games have seen a surge in the total time spent by 84% and 66% respectively. Well with the rise of Artificial Intelligence being part of Gaming Background and leading a positive effect on its future, there too happens to be leg pullers who are using artificial intelligence as weapon to enjoy the game by cheating, but eventually are degradation the rise of gaming industry. In this research we get to know how AI can help in growth of gaming industry in positive direction. This might be the chance to give support to artificial intelligence towards positive direction.

Keywords: Machine Learning, Artificial Intelligence, Applications, CAGR, Regression.

I. INTRODUCTION

Gaming is often enjoyed during the leisure time, coming back to enjoyment from the hectic daily schedule and tired full busy hours; people need some entertainment in their lives. Gaming has brought a new creativity in our lives. According to the American Psychological Association, playing video games, including shooter games, can boost learning, health, and social skills. India, having a highly young population is on the position of becoming the hub of the gaming sector. Estimates suggest that number of users projected to become approximately 628 million by 2020. Such advancement taking place in the gaming industry is possible due to the new technologies. The Technologies named as Artificial Intelligence and Machine Learning is major among them [1].

This industry was always in consideration with technological advances but the products of the video game industry just don't rely on software but also on hardware as same. Innovations in the gaming industry are a blend of both. That's why everyone who played their fair of video games (or still does) is not alien to the concept of AI. For gamers, AI has always meant the way the game responds to their interactions [6].

So even before the term "AI" entered the mainstream, popularized by tech giants like Google and Apple, gamers had been familiar with the concept. Some people think that games laid the foundation of AI as we know it, as games were one of the first software systems interacting with humans on a rather high level [1].

However, AI now means a lot more in the context of modern tech. And that also rings true for the video game industry. The applications of artificial intelligence in gaming now transcend the boundaries of in-game experience, affecting game design and business use cases.

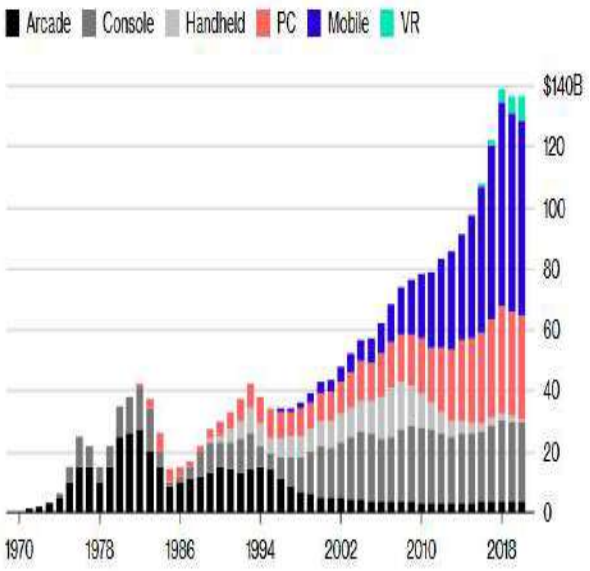

Figure 1: Video Game Revenue Since 1970

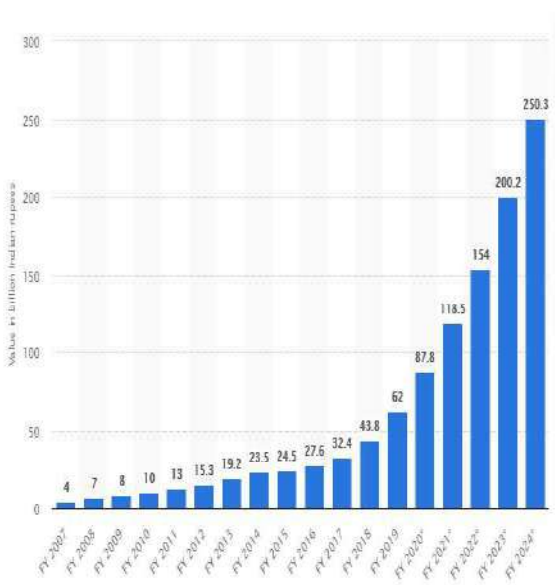

Figure 2: Value of the gaming industry in India from FY 2007-2024

II. AI AND GAMING

Artificial intelligence refers to combining human intelligence with machines and processing them to program on their own with human intervention. Artificial intelligence is also known as machine intelligence or computational intelligence, synthetic intelligence, it is a part of computer science that combines machine learning with human intelligence. Artificial intelligence is turning to be a resource in the development of the gaming industry. AI is efficient in heightening the user experience by providing a real-time view of the gaming activity. From board games to interactive games artificial intelligence impact has concurred all over. Artificial intelligence application has enhanced the graphics to the subsequent level. AI has empowered both to lower the budget in the game design and upgraded the user experience coexists.

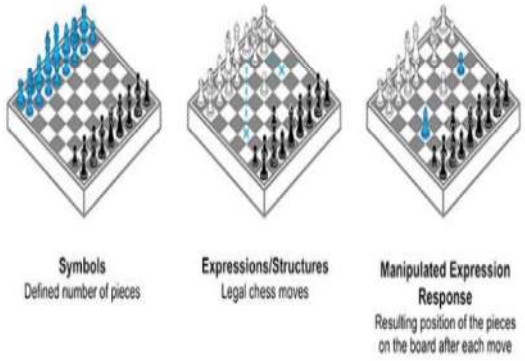

Figure 3: AI decision making for next move in Chess

III. GAMING AND MACHINE LEARNING

Machine learning is basically a part of artificial intelligence that provides the system with the ability to learn and perform from the last experiences without being programmed externally. The machine learning market size is expected to grow at the CAGR of 44.1 percent getting a hike from 1.41 billion to 8.81 billion by the end of 2022. Machine learning is also transforming the gaming industry in diversified forms. It has enabled the machines to play games along with humans. So, in any case, if we are alone and we need a partner for games our computers are the best friend. It is also capable of turning the complex programs into simpler ones and giving it a more realistic feature [4].

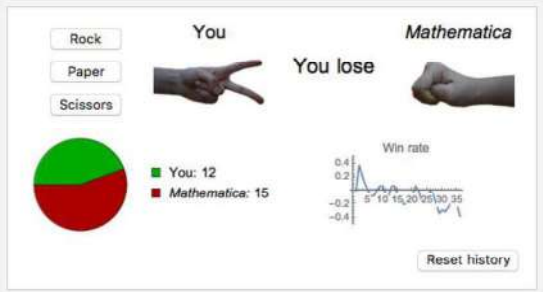

Figure 4: Rock-Paper-Scissor Game with AI

IV. IN – GAME AI

Performance of AI in games validates the potential capabilities of AI in general. Think of these innovations as marketing for the general concept of AI. In 1997, IBM's Deep Blue made headlines by winning against the best chess player in the world at that time, Garry Kasparov. Remarkably, 20 years later, Elon Musk's Open AI project made a huge splash when it won against some of the best Dota 2 players in the world. This leap from winning a purely math-based game to winning a P2P game involving a lot of seeming unpredictability was truly giant for AI [3].

These advances also validate technologies that enable AI. For example, Open AI used a technique called reinforcement learning to win against its opponents. While this approach isn't useful for many of today's AI applications, it validates the potential of AI that goes beyond automation [6].

V. VISUAL EFFECTS AND GRAPHICS

The evolution of graphic design in games was heavily tied to the performance of the hardware. That's why when Crisis came out in 2007, only the best PCs could run it smoothly. Even today, some computers have issues running the game above 80fps. Many software technologies introduced in that game were far ahead of their time. But that's no longer the case for even mid-range graphics capabilities, with hardware being able to process tons of data and create realistic renderings in real time without performance issues. Now video game companies are actively exploring the capabilities of AI in games, enabled by powerful hardware and major developments in all the flavors of AI. The effect is bilateral. Some of the most powerful AI systems can only be built with the help of hardware created by companies

in the video game industry. That's why companies like Nvidia are actively investing in companies like H2O.ai, which are at the forefront of artificial intelligence. That said, artificial intelligence has a significant impact on the quality of video game graphics [3].

Figure 5: Augment reality Game with location Tracker (Pokémon GO)

There are research initiatives and experimental projects that use artificial intelligence to produce smoother image renders. These developments can improve both the quality and the rendering speed since AI can be taught to recognize the optimal final shape of the render and pre-populate it [4].

A project by Nvidia and Remedy Entertainment uses AI to create high-quality facial animations out of audio. The system can recreate facial expressions using just the audio that you supply. No need to have actual people filmed and then transformed into graphics. Even people inexperienced in machine learning and AI can build a system that improves video game graphics. Like Chintan Trivedi, who improved FIFA graphics and even managed to insert his face into the game [3].

VI. GAME DESIGN

This section will talk on the game concepts that serve as the foundation for the graphics rather than about graphics themselves. It's the ideas, concepts, and game mechanics that make games fun. Designing engaging game levels or mechanics is challenging. But companies that manage to do it, even while delivering worse graphics, reap the benefits and delight gamers. All of the successful indie games visualized in 2D and top-down views are a testament to that [3].

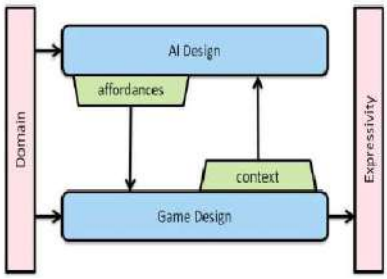

Figure 6: Game Design

For example, evolutionary computation is a subset of machine learning techniques that are aimed at improving results based on prior experiences. With more traditional machine learning, algorithms learn data from the past to predict the outcome. In the case of evolutionary computation, the algorithms learn to improve the outcome [1].

The most famous system of this type is ANGELINA, which comes up with new level design ideas and game rules. A person still has to polish the concepts generated by the AI, but it's a step in the right direction. However, many of such techniques are still in their infancy. Back in 2012, games like City Conquest used AI for play testing, where the AI-driven system would explore game options and come up with strategies. This process discovered flaws in the game and allowed the developers to better polish the product [3].

VII. BUILDING BETTER AI

We already mentioned that video games are a great environment for AI. And so, we wanted to briefly reverse things around and talk about the influence of video games on the development of AI. Games offer a unique environment for problem-solving skills. Many games challenge creativity on a whole different level. That's why they're perfect for testing AIs. For example, the Open AI project created an AI without any goals (it wasn't given an outcome that it should aim for), so the AI simply started exploring the games out of what human call "curiosity." No other environment provides this kind of research opportunities [3].

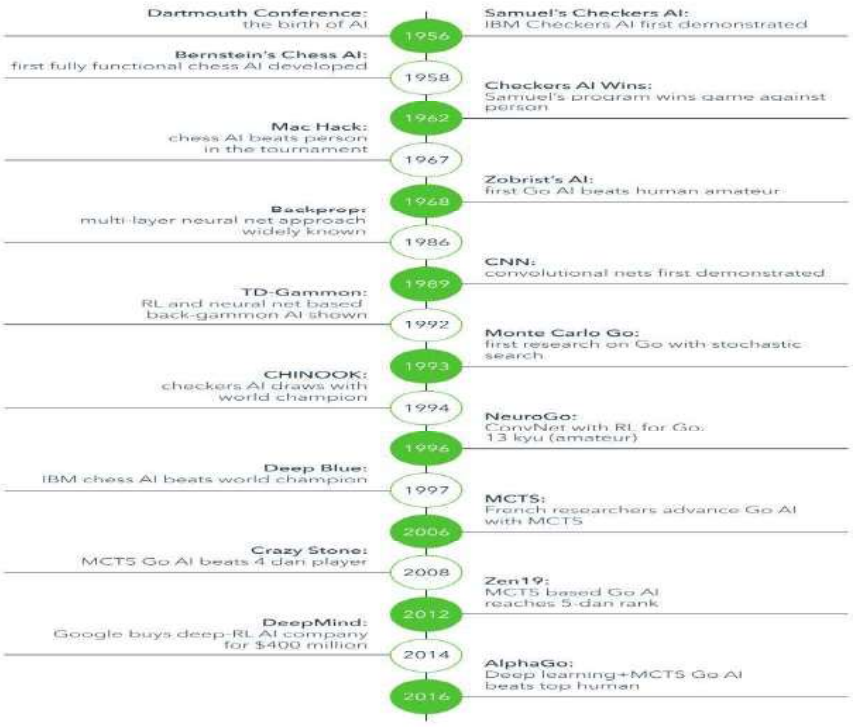

Figure 7: History of GAME AI

Not to mention that games offer almost infinite possibilities, which means data to train AI could be generated almost infinitely too. For example, the number of possible plays for chess is higher than the number of atoms in the observable universe. That's why it takes an AI to beat a real grandmaster. A hard-coded machine usually doesn't have the "creativity" required to make such complex decisions.

VIII. FRAUD DETECTION

Now let's come back to some of the more routine applications of AI in games. Cheating and fraud are a real problem for all kinds of gaming communities. From multiplayer games to online gambling sites—everybody hates cheaters. The problem is that there are too many of them. According to Irdeto, a cyber security firm, around 37% of gamers has cheated at least once. Microsoft recently filed a patent for an AI system that uses machine learning to detect cheaters. The finances in games with a significant number of transactions can be monitored for anomalies with a variety of algorithms designed to find outliers or anomalous transactions. These solutions are usually built with the help of unsupervised machine learning. These algorithms are specifically designed to detect patterns within data that don't fall under usual behavioral patterns. And gaming giants like Valve are already using deep learning to detect in-game cheaters [3].

Figure 8: Cheating in Game using AI algorithms where gun automatically fires when it sees the person (CS-GO)

IX. THEORIES AND ALGORITHMS

Practical AI for video game development involves applying algorithms, such as the Minimax algorithm, into machine learning in order to provide the technology with all of the information it needs to outsmart a human. After applying game theories and formula information into AI technology, scientists found that they could program a computer with enough information to beat professionals at no-limit.

According to Author and Engineer, George Epstein, "The AI researchers used game theory, the mathematics of strategic decision making to find the best strategy for each hand, while faced with a variety of uncertainties. Because the possibilities are so vast, this usually involves making appropriate approximations.

AI is able to do this because the information it holds brings each decision down to a science. All of the information used by machine learning came from humans, but with enough information from enough resources, the machine has more strategic knowledge than is possible for a human to have in mind at all times [7].

X. CUSTOMER ANALYSIS

The modern gaming industry is a cut-throat business. The staggering growth attracts new players. There are tons of development tools that allow almost anybody to create games. And platforms like Steam allow those indie developers to have a market. The rules of the game are even more brutal in mobile gaming, a market that's been exploding for the past couple of years. Today, it's a $50 billion industry.

Naturally, getting ahead of the competition through any means possible is exceptionally important, especially when it's hard to differentiate. For example, card games and other gambling sites are a hugely competitive market. When you can't differentiate in a market like that, you go for marketing and customer analytics as some of the few available growth drivers.

Luckily, there are tons of applications for AI in this specific domain:

- Predicting player churn
- Predicting likelihood of up sell/cross-sell of in-game currency or upgrades
- Predicting the next best marketing action through better marketing attribution

These are just some examples, but the list is endless. There are plenty of custom-made, open-source, and enterprise solutions. Most of such systems are aimed at retail and other consumer-centric industries, but their capabilities could be adapted for the gaming industry too with the help of AI consultants [4].

Figure 9: Impact of AI on business in next 5 years

XI. OPERATIONS

We recently covered demand forecasting as one of the most lucrative use cases for AI. It works for manufacturing, retail, and many other industries. But how can it be applied in the gaming industry?

Predicting demand, especially in multiplayer games, is crucial for operational efficiency.

- Knowing where players are going to be at peak activity can help game developers to control server availability to make sure that everyone stays online.
- Gaming companies can also schedule promotions or in-game notifications to reflect activity spikes and make sure that most of the players will get the message at the optimal instance.
- Predicting demand churn can also guide marketing activities to delay losing players.
- Game developers that run events, like LAN parties, can predict network failure and wireless signal failure in real time. These capabilities are important, especially from the reputational standpoint.

XII. CONCLUSION

With the growth of gaming industries, the use of technology too grew up. Since the AI is somewhat a fast-growing section of the technology it is clearly pre-estimated that the AI will affect the gaming sector in a huge way. With the huge way it is meant have the change in the positive direction and as we have seen how the AI along with hardware implementation may change the whole gaming view from literally 2D games to an augmented reality real life living game. So, with the such a drastic change of the both population of youth gamers and the gaming experience it can be easily seen using the data that the AI technology has provided and created a historical mark in the Gaming Industry. The Gaming industry is estimated to generate a breakthrough record of generating revenue drastically. The predicted data says that the by the FY 2024 the revenue may reach 250.3 billion Indian Rupees [4] which is the huge sum and is a good sign for the growth of Gaming industry. Technically the time is not too far when AI will be the daily basis need so may be one may not get difference between real life and artificial life until they feel hungry or you know.

So basically, AI is building the secured gaming industry in all manners from supporting it, protecting it and helping in the development of new games. Finally, we can say that a close positive nurturing impact is of AI on the Gaming Industries.

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Modeling & Simulation of IEEE 14 Bus With Different DG Configurations Using Typhoon HIL Software

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Abstract

Interconnecting a distributed generation (DG) to an existing distribution system provides various benefits to several entities such as the DG owner, utility and end users. DG provides an improved power quality, higher reliability of the distribution system and covering of peak shaves. In this paper, the effect of DG penetration on the short circuit level of the network is investigated through simulating the IEEE 14 bus test feeder using Typhoon HIL Software. The simulation is repeated for nine different cases at which the location of one large DG is changed in six of the cases to study the effect of the distance on the fault level, while the rest of the cases are performed using small decentralized DGs. The result of those three cases at which the DG is decentralized are used to investigate the effect of the generating capacity of the generation unit on the distribution network parameters and on the currents flowing through the laterals of the distribution network.

Keywords: DG, IEEE14 Bus, Typhoon HIL Software

I. INTRODUCTION

DG is one of the most concerns nowadays, as it has a great role in fulfilling the end-user increasing requirements in a manner that increases the reliability of their power supply. Penetration of DG systems to existing distribution networks has a great impact on the short circuit levels of the system and on protective devices, there are some factors affecting this impact such as the size of the DG penetrating the system, the location at which the DG is placed and the type of DG used.

The main concern of this chapter is to investigate the effects of adding a DG to the existing network as well as the effect of a single centralized DG compared to several small distributed DGs. The system (model) studied in this chapter is the IEEE 14 bus system, and it is simulated using software named ETAP.

II. IEEE 14 BUS TEST FEEDER

The IEEE 14 bus is a small feeder, but it displays many features and is considered as a model that can be used to investigate the behavior of a power system for the desired simulation. The features of the IEEE 14 node test feeder is basically the presence of over head and underground lines, distributed and spot loads, capacitor banks and a 500 kVA inline transformer. Fig. 1 shows the schematic layout of the IEEE test feeder used as the model to be simulated [6], without showing the different connected loads or the nature and configuration of the transmission components of the network. There are some assumptions taken into consideration while performing the simulation, these assumptions are listed below.

1) The effect of voltage regulator at bus 650 is not taken into consideration in the calculations
2) Distributed loads between buses 671 and 632 are not taken into consideration in the calculation.
3) The type of DG used is wind turbine.
4) The type of wind turbine is a doubly fed induction generator.

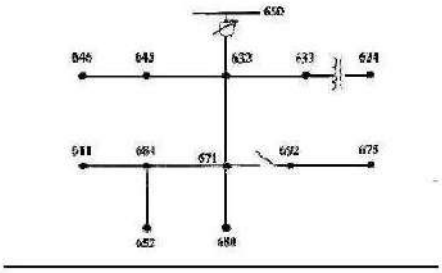

Figure 1: Illustrating the IEEE 13 test feeder [6]

Load Models

There are different load models used in this test feeder. The loads are classified into either spot or distributed; all loads are either three phase or single phase. Each and every load model is given a separate code that will be shown in Table 1 [3].

Table 1: Listing the load models [3]

Code	Connection	Model
Y-PQ	Wye	Constant KW, constant kVAR
Y-I	Wye	Constant Current
Y-Z	Wye	Constant Impedance
D-PQ	Delta	Constant KW, constant kVAR
D-I	Delta	Constant Current
D-Z	Delta	Constant Impedance

Spot load configuration in the network is presented in Table 2. All load values are in either kW or kVAr according to the load nature.

Table 2: Expressing spot load configuration in IEEE test feeder [6]

Node	Load Model	Ph-1 kW	Ph-1 kVAr	Ph-2 kW	Ph-2 kVAr	Ph-3 kW	Ph-3 kVAr
634	Y-PQ	160	110	120	90	120	90
645	Y-PQ	0	0	170	125	0	0
646	D Z	0	0	230	132	0	0
652	Y-Z	128	86	0	0	0	0
671	D-PQ	385	220	385	220	385	220
675	Y-PQ	485	190	68	60	290	212
692	D-I	0	0	0	0	170	151
611	Y-I	0	0	0	0	170	80
	TOTAL	1158	606	973	627	1135	753

Over Head Lines

Over head lines have different configurations based on the number of phases and accordingly the spacing ID. Table 3 will show the over head lines configuration data [6].

Table 3: Listing the overhead line configuration data. [6]

Config.	Phasing	Phase	Neutral	Spacing
		ACSR	ACSR	ID
601	BACN	556. 500 26/7	4/0 6/1	500
602	CABN	4/0 6/1	4/0 6/1	500
603	CBN	1/0	1/0	505
604	ACN	1/0	1/0	505
605	CN	1/0	1/0	510

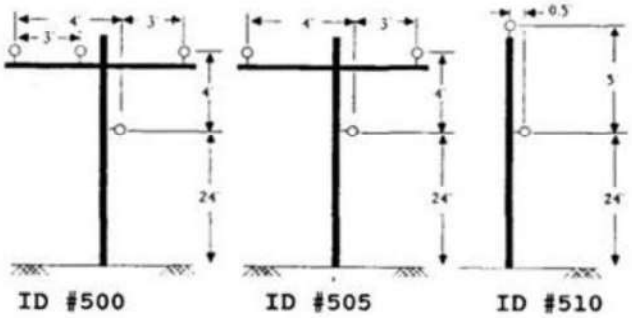

Figure.2: Overhead line spacing. [3]

Table.4: Shows the spacing ID coding [6]

Spacing ID	Type
500	Three phase, 4 wires
505	Two phase, 3 wires
510	One phase, 2 wires

Table 5: Listing the line segment data. [6]

Node A	Node B	Length(ft.)	Config.
632	645	500	603
632	633	500	602
633	634	0	XFM-1
645	646	300	603
650	632	2000	601
684	652	800	607
632	671	2000	601
671	684	300	604
671	680	1000	601
671	692	0	Switch
684	611	300	605
692	675	500	606

Table 6: Underground cable configuration [6]

Config.	Phasing	Cable	Neutral	Space ID
606	A B C N	250,000 AA, CN	None	515
607	A N	1/0 AA, TS	1/0 Cu	520

Transformers

Below is a table listing the specifications of both the utility and the inline transformers

Table 7: Transformer data [6]

	kVA	kV-high	kV-low	R - %	X - %
Substation:	5,000	115 – D	4.16 Gr. Y	1	8
XFM -1	500	4.16 – Gr.W	0.48 – Gr.W	1.1	2

Shunt Capacitor Banks

The details of capacitor banks used in the IEEE test feeder are listed in table8 below.

Table 8: Capacitor data. [6]

Node	Ph-A	Ph-B	Ph-c
	kVAr	kVAr	kVAr
675	200	200	200
611			100
Total	200	200	300

III. DISCUSSION

In this section, the results of the simulation will be discussed to verify the impact of DG on fault currents, short circuit levels and effect on protection equipment, Results show the values of four types of faults but the discussion will concern only single line to ground fault as it is the most common and occurring fault. Table 9 below lists the fault currents in each case when the fault is at different buses; those values were used to make comparison charts to compare the fault current at each case with the standard case which is case 1.

Table 9: Fault currents for all cases with different fault locations

Location of Fault	Case1	Case 2	Case3	Case 4	Case 5	Case 6	Case 7	Case 8	Case 9
632	8.444	10.451	9.085	9.554	9.465	9.380	9.859	9.846	10.288
633	5.925	6.846	6.567	6.448	6.405	6.368	6.586	6.580	6.774
634	18.991	19.905	35.309	19.530	19.487	19.451	19.664	19.658	19.839
671	4.514	4.904	4.651	5.980	5.849	5.720	5.773	5.751	5.826
675	4.163	4.488	4.276	5.354	5.666	5.145	5.301	5.284	5.342
680	3.250	3.448	3.321	3.947	3.889	4.408	3.856	4.019	3.880
692	4.514	4.904	4.651	5.980	5.849	5.720	5.773	5.751	5.826

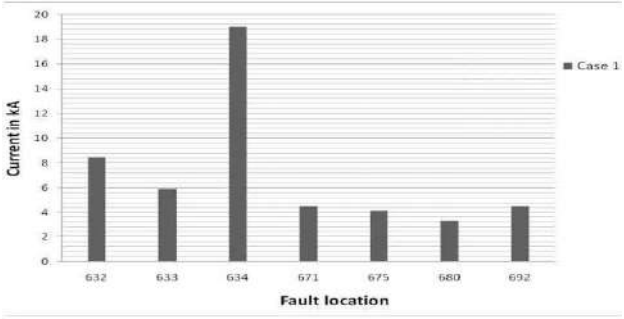

Figure 3: Fault current at different fault locations for case 1.

The above chart shows the values of short circuit currents at the studied buses of the network and is considered the base and set values of all protection equipment, those values will be compared with the values recorded from all the other cases. It is clear from Fig. 3 that the highest short circuit level reported is with the fault location at bus 634, and this is due to the presence of that bus at the low voltage side of a transformer, and the fault voltage is 480 V, the rest of fault locations have a fault voltage of 4.16 kV.

For case 2, one large centralized 8 MW DG is placed at bus 632 and a comparison chart is made between case 1 & case 2 in Fig. 4 to investigate the impact of the added DG.

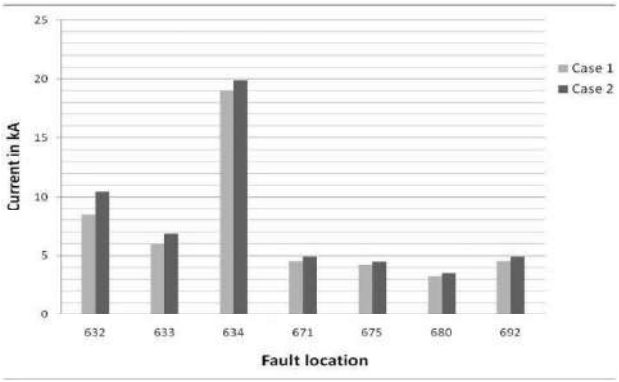

Figure 4: Comparison between case 1 and case 2

It is clear from the chart that placing the DG at bus 632 will increase the short circuit level of the network. The maximum increase is at bus 632 and this seems to be quite reasonable as the DG is located at this bus, thus the distance between the DG and the fault is too small and the current is not damped at all, this close distance lead to an increase in the percentage of DG contribution to the fault, consequently increasing the value of short circuit level. Increase in short circuit levels at other buses is less than that at bus 632 due to the close distance of the fault location from both utility and the DG.

In case 3, one large centralized DG is placed at bus 634. Fig.5 shows a comparison between case 3 and case 1.

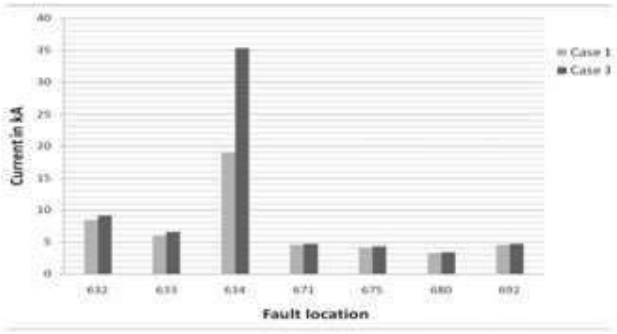

Figure 5: Comparison between case 1 and case 3

Referring to the chart, it is clear that placing the DG at bus 634 caused a slight increase of the short circuit level of the network, but when the fault location is at bus 634, the percentage contribution of the DG to the fault is **49.7%**, and this caused a total increase in the fault current by **90%**. DG contribution in this case is high due to the presence of both the DG and the fault location in a close distance as both are at the same side of the transformer, besides the operation of the DG is at a low voltage thus the short circuit current contributed by the DG is so high. On the other hand the value of the short current flowing to bus 634 from the entire network is quite low when compared to the fault current, it is **1.821 kA** and the fault current is **35.309 kA**, but when transformed by the transformer it became a considerable value of **15.784 kA**. The substation has a fault percentage contribution of **39%**.

In case 4, one large centralized DG is placed at bus 671, Fig.6 below shows a comparison between cases 1 and 4.

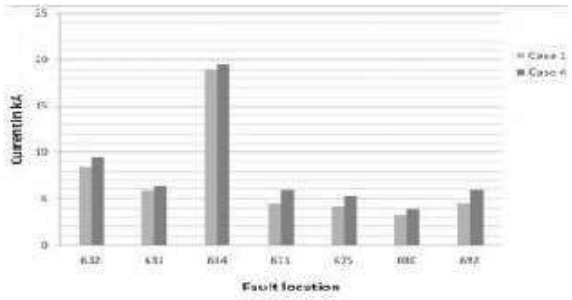

Figure 6: Comparison between case 4 and case 1

Fig.6 shows that the presence of a DG at bus 671 increased the short circuit currents of the network. The largest increase reported is when the fault location is at bus 671, this percentage increase is **33%**. This escalation in the fault current is a result of the small distance between the DG and the fault location. As the distance between the fault location and the DG increases, the contribution of the DG to the fault decreases, consequently the rise in fault current will decrease as there will always be an increase in the fault current when a DG is added to the system. It can be generalized that as the distance of the fault location from any generating source increases the contribution of the generating source to the fault will decrease.

In case 5, one large centralized DG is placed at bus 675. Fig. 7 below illustrates a comparison between cases 5 and 1.

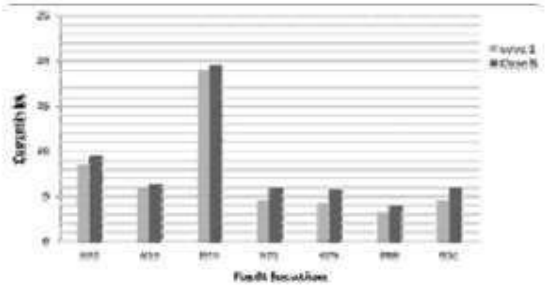

Figure 7: Comparison between case 5 and case 1

Fig.7 clearly states that, placing a DG at bus 675 causes an increase of the short circuit level at all buses with a maximum increase at bus 675 where the DG is located and this is common in all the previous cases, the maximum increase in fault current is at the bus at which the DG is located. The percentage increase in fault current at bus 675 is reported to be **33%**.

Case 6 illustrates the condition of placing one large centralized 8 MW DG at bus 680. Placing a DG at this bus has a great effect on the system. Fig.8 below presents a comparison between case 6 and case 1

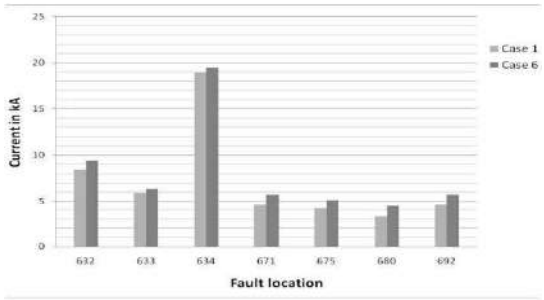

Figure 8: Comparison between case 6 and case 1

When studying Fig.8, it is realized that placing a DG at bus 680 increased the short circuit level of the network and it caused a short circuit current to flow in the branch between buses 671and 680 that is eliminated in all cases except when the fault location is at bus 680. Placing the DG at bus 680 might cause a lot of problems to the existing protection scheme as the percentage fault current increase reported is **35.6%**, this value also represents the percentage increase in the short circuit current flowing through the branch between buses 671 and 680. The reported increase could be sufficient to cause a "**reduction of reach**" to the protection equipment responsible about protecting this part of the network.

Case 7 is the first case at which the large centralized DG is replaced by smaller DGs with the same total generating capacity. In this case, four distributed 2 MW DGs are placed at buses 632, 671 and 675. Fig.9 below shows a comparison between cases 7 and 1.

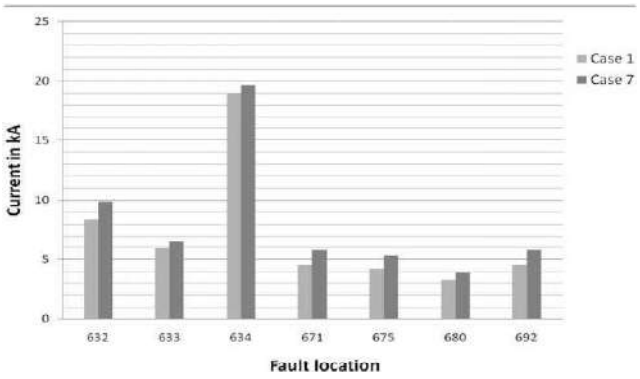

Figure 9: Comparison between case 7 and case 1

Fig. 9 can be used to study the difference between the impact of one large centralized DG and this case. It is clear from the results of this case that the penetration of those four small DGs into the network caused an increase in the fault level of the network, the amount of increase is a function of the configuration but the difference between the effect of centralized and decentralized cases can be sensed from the percentage contribution to faults of both the substation and the DG. Decentralized DGs Showed that the percentage of overall DG contribution to fault is increased and the fault currents are also increased for all fault locations, while the percentage contribution of the substation is decreased. Centralized DG with the same total generating capacity located in all locations showed an increase of the fault currents along with the increase in the percentage of DG contribution to faults that is configuration dependent. It is observed that decentralizing the DG increases the percentage of DG contribution to faults and decreases the percentage of utility contribution to faults. The maximum increase in the fault current is reported when the fault location is at bus 632; this is due to the presence of one of the DGs at this bus besides the close distance of this bus from the substation.

For case 8, four distributed 2 MW DG are located at buses 632, 671, 675 and 680. Fig. 8 illustrates a comparison between case 8 and case 1.

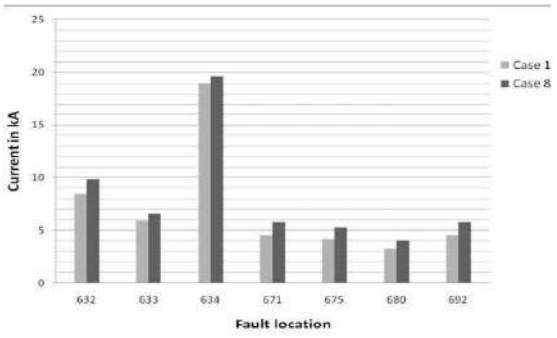

Figure10: Comparison between case 1 and case 8

This case is similar to the previous case with close results. The above figure showed an increase in the fault level of the network with a maximum increase at bus 632. When

comparing this case with the previous case, it is observed that the configuration of case 8 has a higher substation contribution to faults for fault locations other than at bus 680. When the fault is at this bus, the value of the fault current is higher than that of case 7. The difference between both cases is too small at all fault locations except for the fault location at buses 633 and 680.

For case 9, five distributed 2 MW DG located at buses 632, 671 and 675. Fig. 11 illustrates a comparison between case 1 and case 9

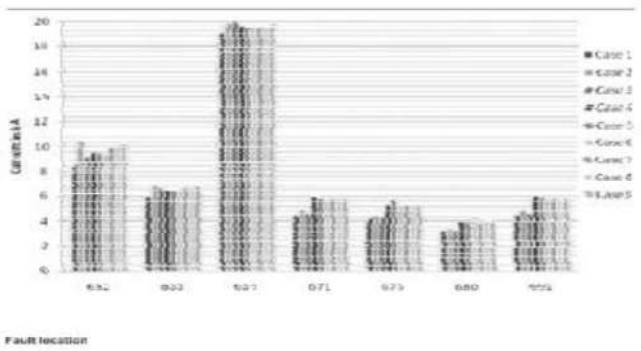

Figure 11: Comparison between case 1 and case 9

This case is a unique case at which the total generating capacity of all DGs is 10 MW. It is obvious that the increase in fault is higher when compared with all cases as the level of DG penetration into the network is higher. It is clear from the above figure that the maximum increase in fault level is when the fault is at bus 632, and this is due to the close distance between bus 632 and the substation in addition to the presence of two DGs at this bus. The configuration in this case caused a decrease in the percentage contribution of the substation to faults at all fault locations, but on the other hand, it caused an increase of the percentage DG contribution to faults.

To study the effect of changing the DG location on the network, cases 2 to 6 are considered, while cases 7 to 9 are considered to study the difference between centralising and decentralizing the DG. Fig. 9 below illustrates a comparison between fault currents at each fault location for all cases.

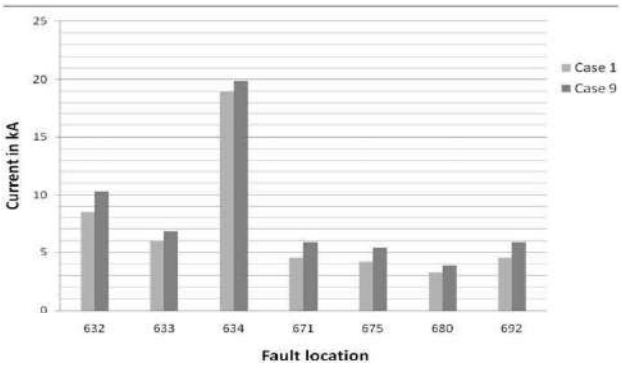

Figure 12: Comparison between fault currents for all cases

Referring to Fig. 12, when the fault location is at bus 632; case 2 has the maximum fault current due to the close distance of the fault location from the utility substation and the presence of a DG at the faulted bus. Placing the DG at bus 634 showed the least impact on the fault current due to the presence of a transformer between bus 633 and bus 634, the DG is operating at the low voltage side thus the high short circuit currents produced by the DG are transformed to the high tension side of the transformer to lower values. A portion of the transformed current represents the contribution of the DG to the fault; consequently the fault current will not increase as the rest of the cases, the percentage DG contribution to the fault is 10% from the total fault current while the substation contribution is reported to be 77.3%. It is clear from the above figure that centralizing the DG showed less impact on the fault current at bus 632 as cases 7 to 9 caused the fault current to increase. Configurations of DGs used in cases 7, 8 and 9 caused a decrease in the substation contribution to the fault and caused the DGs to play a higher role during the fault as a result of the presence of a DG at bus 632. The presence of any DG at a faulted bus has a great impact on this bus fault level. The situation at which bus 633 is the faulted bus showed the same response of the network to the different configurations of the DG but with lower fault currents when compared with bus 632 as the faulted bus. Fault currents at bus 633 are less than that at bus 632 due to the increase in the distance between the substation and the fault.

Bus 634 is a unique bus in the system; it is the only bus that is operating at 480V while the rest of the network buses are operating at 4.16 kV. The presence of a transformer caused the effect of any DG in the network to be reduced when the fault is at bus 634, and the effect of the DG when placed at bus 634 to be reduced at all fault locations other than bus 634 itself. The highest fault currents observed at all fault locations is at bus 634; this is because of the low operating voltage that causes the fault currents to be high. The most severe fault current is the current observed in case 3 at which the DG was placed at bus 634. The DG has a contribution to the fault of 49.7% while the substation has a percentage contribution of 39%.

Buses 671 and 692 are considered as the same bus as the difference between both is a switch so the results at both buses are identical. Results are showing less fault levels than the previous fault locations, and this is due to the increase in distance away from the substation. At bus 671, the highest short circuit current observed is the current of case 4, at which one DG was placed at bus 671, followed by case 5 at which the DG was placed at bus 675. Cases 7 and 8 had less fault currents which showed that decentralizing the DG causes the fault Current to be slightly less than cases 4 and 5 but slightly higher than case 6. The DG configuration used in case 7 resulted in 46.6% substation contribution and 33.5% DG contribution to the fault when the fault is at bus 671 or at bus 692, while configuration used in case 8 resulted in 47% substation contribution and 33% DG contribution.

For the fault location at bus 675, the highest fault current observed is case 5 at which the DG is located at the same bus. This fault location showed that using several small capacities DG's is better than using one large centralized DG. The increases in fault currents at this bus for cases 7, 8 and 9 respectively are 27.3%, 26.9% and 28.3%, which shows that it is less than cases 4 and 5, but higher than case 6 due the absence of any DG in a close distance, similarly with cases 2 and 3 the location of the DG is a large distance from the fault besides the far distance of the fault away from the substation, so the fault current reported in both cases shows a low increase of 7.8% and 2.7% respectively. At this fault location, case 9

has the least substation contribution to the fault due to the use of several DGs, which caused the overall impedance of the network. To be higher, this causes the current contributed from the substation to the fault to be reduced.

Bus 680 has the lowest fault currents in the whole system and usually in any fault location in the system other than bus 680 there will be no current flowing from or to this bus, if there is no DG located at this bus. Results at 680 show that as the distance of the fault location increases away from the substation the less the fault level is at that bus. When comparing cases 7 and 8, it is observed that case 7 has a lower fault level due to the presence of a DG at bus 680 in case 8. Case 9 showed that the effect of decentralizing the DG has less impact on a faulted bus that does not have a DG interconnected to it, although the generating capacity of case 9 is higher than that of case 8, but the value of the short circuit current observed in case 9is less than that of case 8 and this is due to the DG configuration used. It is clear from results that the system lost its radiality in power and current flow, thus protection devices are severely affected by the presence of DG in the network. The DG might cause a failure in the desired existing protection scheme in some cases due to the impact of DG penetration on the fault levels of the network which is a factor of DG size, location (configuration) and type of DG used. This leads to various miss protection scenarios and undesired consequences such as the loss of coordination between protective devices, which is quite clear in case 5 when the fault is at bus 692 and might lead to an unintentional islanding if a fuse is blown away at bus 692 leaving the DG energizing part of the network.

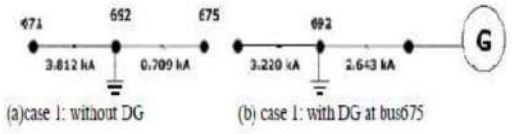

Figure13: illustrating the possibility of fuse blowing

It is clear from Fig. 13 that after the penetration of the DG, the fault current flowing through bus 671 to bus 692 is decreased by 16.5% from the normal case which is case 1. As a result of this decrease, protection devices will not sense a fault, thus no tripping will occur to isolate the fault at bus 671 as there is no fault conditions from the Protective devices' point of view. On the other hand, the fault current flowing from 675 to 692 is 3.72 times the designed current which is considered a large increase that will have a great effect on protective devices. If the protection scheme is based on the coordination between fuse, re closer and breaker to perform fuse saving technique, it will fail due to the several multiples of the fault current that will cause the fuse to operate first due to the inverse time over current characteristics, the fuse operates before the fast strike of the re closer. If the fuse blows out, then the DG will be left energizing the loads connected to bus 675 performing a power island, but the DG is capable of supplying several multiples of these loads which might lead to severe trouble.

Running the simulation on IEEE 14 bus came out with numerical values presenting the values of currents flowing in the network. Table 10 lists the values of fault currents' flowing in the branch from bus 650 to bus 632 and Fig. 3.17 is a plot of the fault currents flowing in the same branch for all the studied cases at all studied fault locations. Bus 632 is

the link between the utility and the entire network thus the current flowing from bus 650 to bus 632 is the fault current flowing from the utility to the network

Table 10: Fault currents in branch from bus 650 to bus 632

	632		633		634		671		675		680		692	
	If (kA)	% D	If (kA)	% D	If (kA)	% D	If (kA)	% D	If (kA)	% D	If (kA)	% D	If (kA)	% D
Case 1	7.225	0.00	5.014	0.00	1.749	0.00	3.275	0.00	2.975	0.00	2.358	0.00	3.275	0.00
Case 2	6.632	8.21	4.287	**14.50**	1.349	**22.87**	2.602	20.55	2.345	21.18	1.830	22.39	2.602	20.55
Case 3	7.021	2.82	4.797	4.33	1.583	9.65	3.305	-0.92	2.747	7.66	2.167	8.10	3.305	-0.92
Case 4	6.880	4.78	4.592	8.42	1.509	13.72	2.740	16.34	2.414	18.86	1.809	23.28	2.740	16.34
Case 5	6.910	4.36	4.619	7.88	1.525	12.81	2.782	15.05	2.479	16.67	1.850	21.54	2.782	15.05
Case 6	6.939	3.96	4.654	7.18	1.543	11.78	2.833	13.50	2.507	15.75	1.865	20.91	2.833	13.50
Case 7	6.801	5.87	4.485	10.55	1.452	16.58	2.692	17.80	2.391	19.63	1.798	23.75	2.692	17.80
Case 8	6.800	5.81	4.490	10.43	1.454	16.37	2.698	17.62	2.398	19.39	1.804	23.49	2.698	17.62
Case 9	6.673	**7.64**	4.336	13.52	1.375	21.38	2.570	**21.53**	2.228	**25.11**	1.711	**27.44**	2.570	**21.53**

%D is the percentage decrease in the short circuit current flowing through that branch

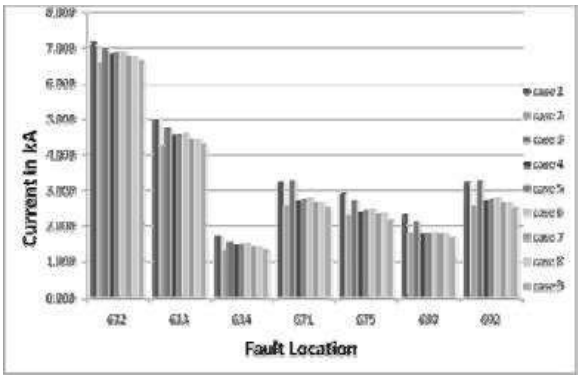

Figure 14: Fault current in branch from bus 650 to bus 632.

Bus 650 to bus 632 has a special behavior as the only source of current in this branch is the utility so the current is always flowing in one direction cause all the fault locations on the main feeder. Fig.14 shows a comparison between all cases while the fault is at different locations. For each fault location nine current values are plotted, those nine values are called set of results at the certain fault location. i.e. set 1 is the group of fault current values of 9 cases when fault is at bus 632. Set 2 is the group of fault currents when the fault is at bus 633 and so on. Current flowing in this bus is the fault current contributed by the substation to the fault. It is clear that cases 7, 8 and 9 decrease the substation contribution. This shows that decentralizing the DG has a positive impact on the substation.

Set 1 has the highest fault current flowing in branch from bus 650 to bus 632 and the reason for this is that bus 632 is the closest bus to the utility, so the network's thevenin equivalent impedance is low; consequently the fault current values are high. As the distance of fault location increases, the value of fault current decreases. This can be seen from the comparison figure by considering set 2, the distance increased away from the substation resulting in a decrease of the fault level. Set 3 is out of spot as it is the only bus in the network with a voltage of 480 V and it is the only bus that has a transformer connected to it,

bus 634 is operating at the low tension side of the transformer. The highest fault current in the entire network is at bus 634 but when transformed to the high tension side the value of fault current contributed from the DG to the fault becomes quite low compared to that of naturally high voltage faults, this heads to ignoring set 3 in the comparison.

Bus 680 is the furthest bus from bus 650 thus set 6 has the lowest fault current values due to the high thevenin equivalent impedance of the network when the fault is at that bus.

Sets 4 and 7 are identical with all fault currents having the same value as the difference between bus 671 and 692 is a switch which has no effect on the impedance between both buses thus the current flowing from 692 to 671 is neither damped nor increased. The main factor affecting the fault current groups is the distance of the fault from bus 650 which represents the utility. All sets seem to have the same behavior meaning that the effect of DG configuration (case) is the same at all fault locations; case 2 is the least fault current of the set while case 1 is the highest, this indicates the decrease in utility contribution to fault currents. This shows that presence of DG in the network decreases the contribution of utility to faults while the fault current itself is increased. (i.e. presence of DG in Network decreases the percentage utility contribution to faults). Cases 2, 3, 4 and 5 are simulated using one centralized DG while cases 7, 8, and 9 are simulated using a decentralized DG configuration, results show that centralized DG has less effect on decreasing the percentage utility contribution while decentralized DG with a total capacity equal to the centralized DG capacity as in cases 7 and 8, causes a decrease in the % utility contribution, except for case 2 which the DG is at the fault location, this case increases the impedance of the network causing the percentage DG contribution to increase, while case 9 shows that as the de-centralized DG capacity increase, the percentage utility contribution decreases while the value of fault current is increased. Cases 2 and 9 are the two cases that will probably have an effect on the protection equipment as the percentage decrease of the current flowing through this branch is high which might decrease the sensitivity of the protection equipment causing fault conditions to not be discriminated an d no tripping will occur. Studying the branch from bus 632 to bus 671 is performed using the outcome of the software and results are tabulated below in Table 12.

The above table shows the values of fault current (Ish) flowing in the branch from bus 632 to bus 671 at all fault locations and with different cases, in addition to the percentage of fault current (%Ish) from the set value which is the current flowing in this branch without the presence of any DG (case 1). Results in the table were used to plot the comparison chart shown in Fig. 3.15 below.

Table 11: Fault currents for branch from bus 632 to 671

	632		633		634		671		675		680		692	
	I_{sh}	%Ish	I_{sh}	%Ish	I_{sh}	%Ish	I_{sh}	%Ish	I_{sh}	%Ish	I_{sh}	%Ish	I_{sh}	%Ish
Case 1	0.96	100.00	0.67	100.00	0.25	100.00	3.40	100.00	3.08	100.00	2.44	100.00	3.40	100.00
Case 2	0.91	94.38	0.59	87.84	0.18	78.88	3.80	111.90	3.43	111.09	2.67	109.29	3.80	111.90
Case 3	0.94	98.15	0.65	97.00	0.23	97.41	3.54	104.24	3.20	103.92	2.53	103.36	3.54	104.24
Case 4	2.41	250.88	1.61	242.34	0.54	231.47	2.87	84.48	2.53	81.97	1.89	77.45	2.87	84.48
Case 5	2.28	237.04	1.54	230.48	0.51	221.12	2.91	85.71	2.60	84.20	1.94	79.17	2.91	85.71
Case 6	2.18	226.95	1.47	220.57	0.49	212.07	2.97	87.45	2.62	84.95	1.96	80.03	2.96	87.15
Case 7	2.08	216.65	1.38	207.06	0.45	194.43	3.07	90.40	2.73	88.39	2.05	83.88	3.07	90.40
Case 8	2.06	214.67	1.37	205.26	0.45	192.67	3.08	90.63	2.73	88.65	2.05	84.04	3.08	90.63
Case 9	2.00	208.12	1.31	195.95	0.42	180.63	3.15	92.90	2.80	90.69	2.10	85.97	3.15	92.90

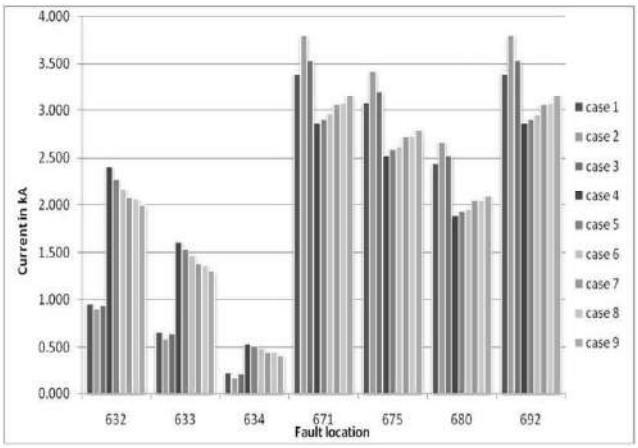

Fig.15: Short circuit current flowing in branch from bus 632 to bus 671 in all cases with Different fault location

This branch is considered as a main feeder branch; at which current passes through to be delivered to several laterals to reach the loads. It is clear from Fig.15 that there is a great difference between the current levels flowing through this branch which is considered as a hazard to the protection equipments when using some of the studied DG configurations. Designing a protection scheme for this branch will be so difficult in some cases due to the huge difference in levels of the current flowing through it. According to Table 3.92, case 2 seems to be the best DG configuration to be used for maintaining the existing protection scheme for this branch and it may not affect the coordination of the existing protection devices as the variations reported in this case have a maximum of 11%.

It is clear that the location of the fault is the main factor affecting the fault level besides the DG configuration; consider set 1 for study at which the fault is at bus 632. In set 1, the values of the short circuit current flowing through this branch in cases 2 and 3 are 5.62% and 1.87% less than that of case 1, which will not cause a considerable effect. The current flowing in these two cases does not contain the short circuit current contributed from any DG to the fault. Fig. 16 below illustrates the short circuit currents flowing through this branch during a fault at bus 632.

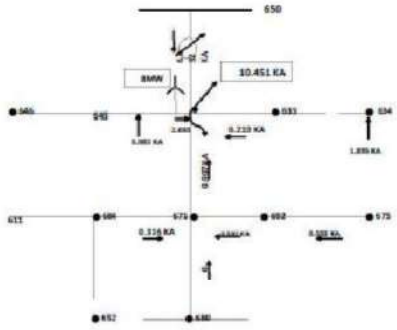

Figure16: Fault at bus 632 with DG at bus 632

The rest of the cases caused a considerable increase in the currents flowing through this branch with case 4 as the most severe configuration with a 250.88% increase in the short circuit current flowing. The reason for the high currents reported in cases 4-9, is that the short circuit current contributed from the DG to the fault is flowing through the branch so If the DG and fault are on the same side of branch 632 to 671, the DG current will not be part of the current flowing through this branch on the other hand, if the DG and the fault location are on opposite or different sides then the DG contribution current is part of the fault current and it has a great effect on increasing the branch currents this is the situation of cases 4, 5, 6, 7, 8 and 9. The value of the current is varying according to the configuration of DG used.

It is clear from Fig. 16 that decentralizing the DG reported less currents flowing through this branch to the fault, even case 9 which has the highest generating capacity but it reported the least short circuit currents when compared with cases 4-9.

Sets 1-3 have the same behavior but with different levels.

Referring to set 4 from fig. 16 above, it is clear that case 2 is generating the most severe short circuit current flowing in branch from bus 632 to bus 671, the value of this current is 3.799 kA and it is 77.5% of the total fault current. Fig. 17 below illustrates the current flowing through this bus.

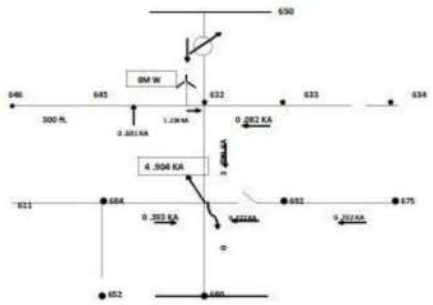

Figure 17: fault at bus 671 with DG at bus 632

Case 4 at this fault location caused the least short circuit current to flow through this branch due to the fact that the DG contributed current is not part of the short circuit current flowing through this branch, similarly the current of cases 5 and 6 does not contain the DG current. Cases 7-9 showed a small increase in the short circuit current flowing through this branch, but the current is less than that of case 1. Case 9 is the best DG configuration to be used when considering the existing protection devices at this bus as the variation of the current from the normal case is within 15%. Set 4 is similar to sets 5-7 but with different current levels according to the distance from the substa

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Smart Grid: Challenges, Solutions and Future of Statewise Indian Power System

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Abstract

This paper presents a discussion of the Challenges, Solutions and future of Indian Power System, Addressing the entire spectrum from power generation, through substations, to distributions and the customer, and the feedback loops along the way necessary to provide the computational intelligence necessary to make the "Smart Grid. The real-time communications can be possible between all regional grid elements in generation, transmission, distribution and consumer end. In this Paper, we first describe the old electrical energy system and then discuss the way to incorporate, intelligence and control to make smart grids which will be safe, secure and efficient. In present scenario electrical system having only one way flow of energy and information but from smart grid technology we will provide various communications function in electrical energy system. In this Paper we will clear out challenges and opportunities in the area of smart grid and smart metering.

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Keywords—Smart grid, smart metering, demand response, SCADA, wire line and wireless communications, renewable energy, security, privacy.

I. INTRODUCTION

The future of electricity is majorly focused on the following domains, globally- the demands of the consumer, the agenda maintained by the leaders of the countries in ways of various policies and the constant development in the field of technology. Also, the need to conserve the natural resources and environment, certain reforms are coming into force at both state and national levels concerning priorities on energy effectiveness, use of natural sources and protection of environment. People are gaining more awareness regarding the need of environment protection along with the energy efficiency and are giving ideas for various such applications of use and the power output satisfaction for the growing population. The base of all development in all areas of life is the upcoming software techniques which have a vast area of operation. Artificial intelligence, Internet of Things (IoT) are just to name a few.

The consumer level satisfaction and conservation need together demand a system that uses new software technique to create a smart system .A system which could entail all the requirements of the future as well as use natural methods of sources and also satisfy the consumers. Such system design has been a driving concern for a long time now but much clarity has not yet been achieved for the same. Different explanations have been given by

various people but they have all been application specific. In this particular article, the term "Smart Grid" is provided a superior explanation. The ongoing electric system is put forward first and then we move towards the major areas of change and specify the alternative approach involving new techniques that are computer- based and provide a more better and fruitful result.

II. PRESENT OF ELECTRIC ENERGY SYSTEM:-

We can categorize the energy system into following- power generation, transmission and distribution which further is broken into the needful value of voltages and power in order to meet the consumer needs. We will focus on the areas which require a smart system to bring changes in every way possible, such areas include-

a) Single generation of power.
b) One way transmission, from generation to consumption.
c) Less awareness of the users, regarding use of electrical power, generally limited to monthly bills.
d) The technological advancements upto present have been impacting only the initial stages of the system while smart system will impact the user end as well.

Indian Power System

Electricity sector in India is growing at rapid pace. During the current year 2016-17 (Up to 31.01.2017),the Peak Demand is about 159 GW and the Installed Capacity is 314.64 GW.

- Thermal - 69.4%
- Hydro- 13.9%
- Renewable- 14.8%
- Nuclear - 1.9%

India: 5^{th} Largest Wind Power Producer Total Renewable Energy Sources ~ 19 GW Wind Installed Capacity ~ 11 GW (Figure 1).

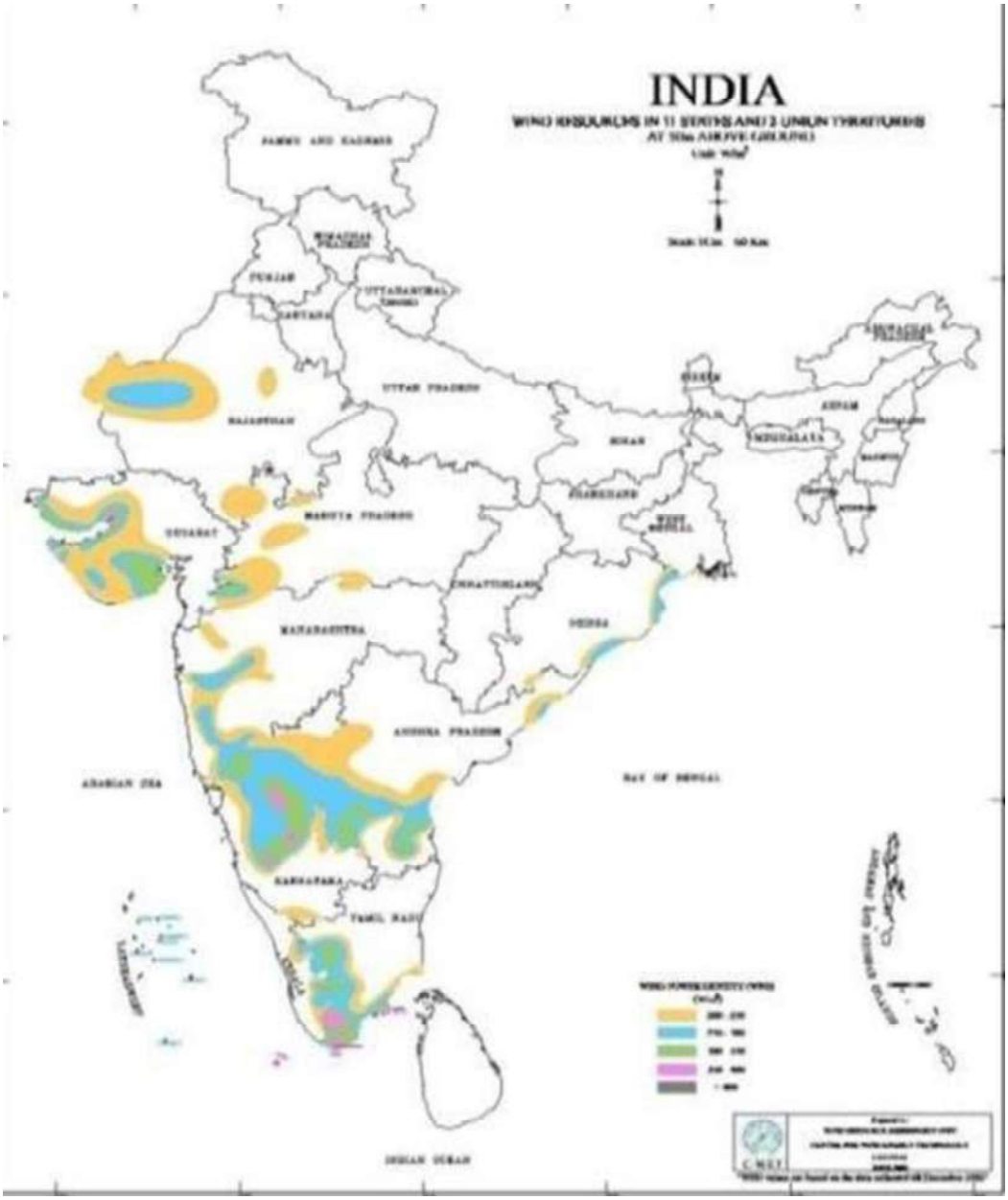

Figure 1 : Wind Installed Capacity

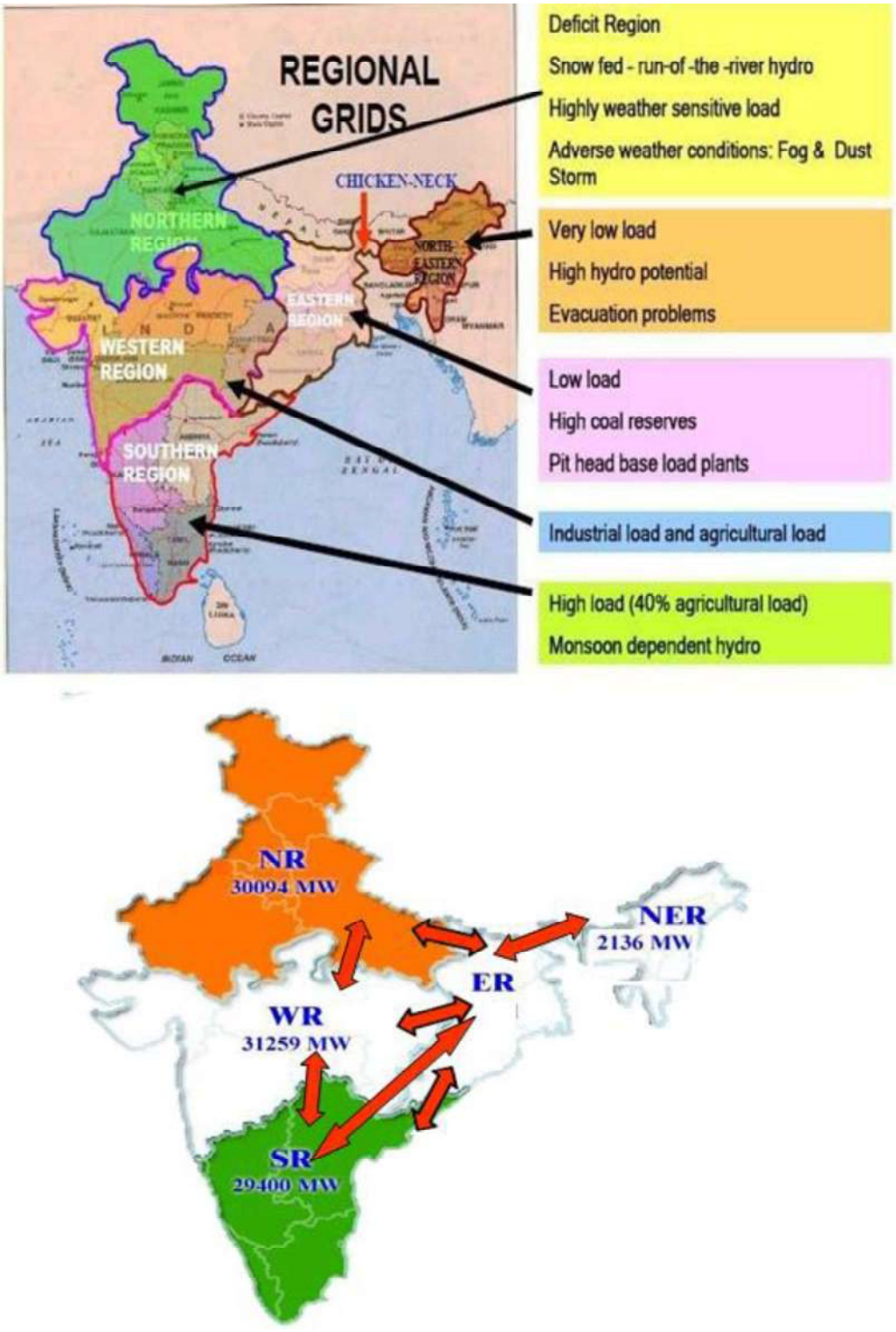

Figure 2: Peculiarities of Regional Grids in India

III. FUTURE OF SMART ELECTRIC ENERGY SYSTEM

The smart system would impact various functions such as,

a) Involvement of reusable energy with the parameters of climate change in consideration.
b) Involvement of aware users regarding the growth of new system and its advantages
c) Use of smart techniques to provide and transmit data in a protective zone.
d) Maximum output from the current benefits in system in order to achieve efficiency for present and upcoming generation.
e) Transforming the transmission techniques to deliver maximum power along with cost effectiveness.
f) Conserve environment by reducing use of pollution-causing sources and putting new methods into use which are centered to electricity.
g) Advance the systems for power generation as well as the stored power in order to widen the system and also result in pocket-friendly bills.
h) To create an inter-related operation in the system to achieve maximum efficiency along with providing the security of the user data and overall improving the management of the grid.
i) This smart technique has a major advantage that it adds-on the features of use in the current system rather than designing a whole new concept. It particularly focuses on improving features of the present system.

IV. SMART GRID - MEANING

Keeping in view the features mentioned above, Smart Grid can be understood as a system of interconnected bi-directional network or grid with secure data transfer and software related up gradation on all levels of the existing system i.e. generation, transmission and distribution so that the updated system gives more efficiency, is environment friendly, has proper data handling capacity along with data security and is responsible in every possible domain. This in itself covers all the levels of work in both power generation as well as the consumer level.

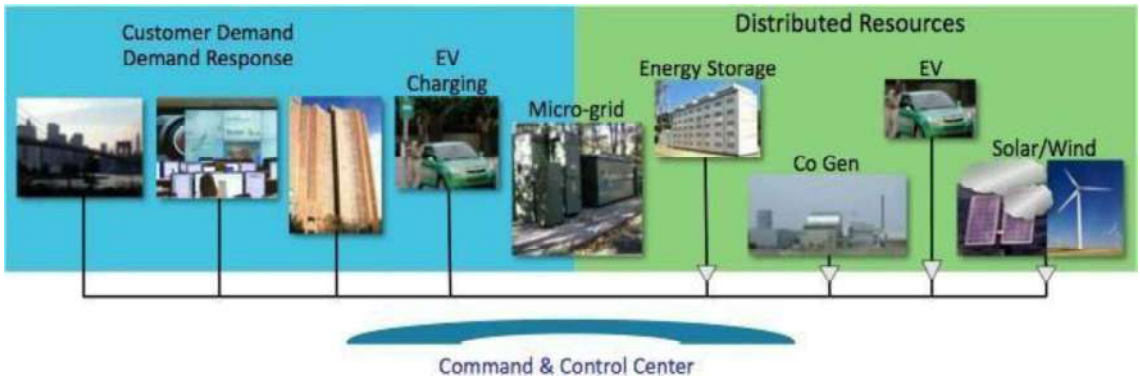

Figure 3: Creation of Smart Grid system

For the creation of this Smart Grid system (as shown in Figure 3), all functions that must be fulfilled must be carried out separately, without any necessity to change the whole system at once-

- System must be provided proper channel at both ends with data security.
- The use of sensors and variance calculations are made for all the essential components while the required system is monitored throughout in the real-time.

The controllers used for the same must contain the following features-

- Automatically test the system for any future faults and remove such faulty party of system from the main system for repair purpose and at the same time prepare a backup route to provide supply to the respective users while system is out for repair.
- Flexible
- Predictive
- Interactive
- Optimized
- Secure

V. SMART GRID – WHAT ARE THE NEW EFFECTIVE COMPONENTS?

In order to include the smart grid approach in the present day system at all levels i.e. generation, transmission, distribution and consumption; the system must be adaptable to the new technology of data analysis and must be flexible to include new types of machine and smart techniques. For the proper working of such integrated system it is also very essential that the effective running of system must go hand in hand with the controlled operation of the system such as for continuous monitoring of data, for before-hand detection of faults, for smart distribution of power to users and for saving o power at low-load time period.

a) Customer Demand, Demand Response and Curtail able Loads
b) Photovoltaic's
c) EV, Charging Stations and Micro grids
d) Energy Storage
e) AMI(Meters and network)
f) Advanced grid sensing and visualization technology BRAIN
g) Demand and Response
h) Building energy management system
i) MDMS(Meter data management system)
j) End-use energy efficiency MUSCLE
k) Distributed generation from renewable sources energy storage technology BONE
l) Transmission line(HVDC, Superconducting)
m) New transformers and substation equipment

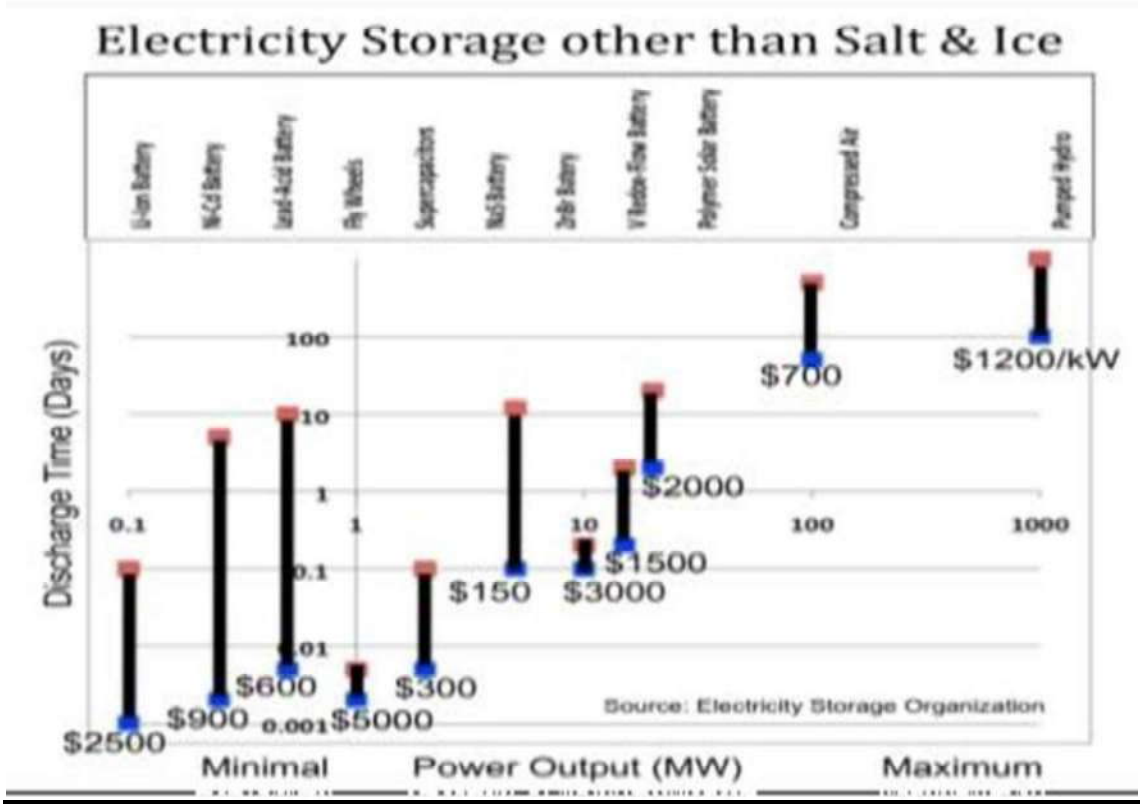

Figure 4: Electricity storage other than salt and ice

VI. CHALLENGES TO ACHIEVE THE SMART GRID APPROACH

The major requirement that the 'Smart Grid' system is fulfilling is the use of power in more amount along with cost reduction. The available power through Smart Grid would only

be able to make changes in existing system if it is cheaper than today. Hence such transition is a major change to bring. Also with advancements in the present system, proper charts and matrix must be plotted over a long period of time in order to understand the impact that the smart system has brought. These graphs must be continuously brought to notice for updating the system as per demand for around 20-30 years as that is a nominal time being that any country would take to completely transform its present electric grid to a Smart Grid.

The smart system would be a complete package of advantages as it involves proper supply and demand management for both generation and consumer level. This in turn would increase the current capacity of power use in a positive manner. The best part is the use of present hardware in its original form by only including the smart controlling technology so as to use optimal power.

The smart system is based on many factors, wherein consumers play the key role as they must understand the effectiveness of the power in use, the cost reduction ratio, the need to optimize the system for the real time monitoring and the essential demand to be updated with the new technology from self as well as government provided data.

6.1 Traditional Grid V/S Smart Grid:

Electromechanical v/s Solid state Digital/Microprocessor
One way and local v/s Global/Integrated Centralized generation v/s Distributed generation

Limited monitoring, protection v/s Adaptive protection 'Blind' Self- and control system monitoring

Manual restoration v/s Automated restoration

Check equipment manually v/s Monitor equipment remotely

Limited control system v/s Pervasive control system

Estimated reliability v/s Predictive reliability

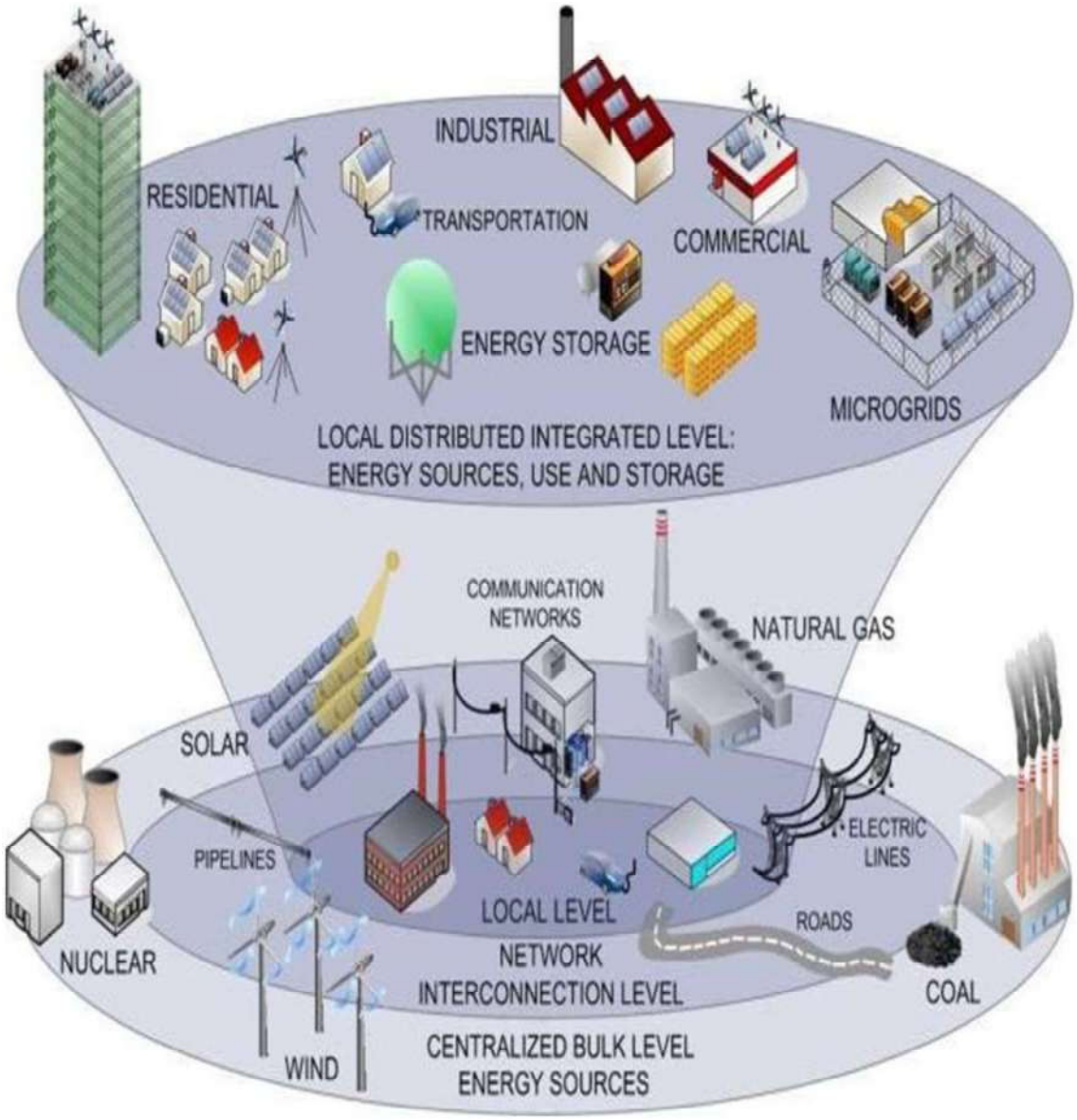

Figure 5: Customer-centric view of power grid including smart grid technologies

VII. DISTRIBUTED GENERATION:-

Distributed Generation (DG) technology incorporates wind turbines, micro turbines, photovoltaic systems, fuel cells, energy storage and synchronous generator applications to supply active power to distributed systems connected close to the consumers load. This concept is becoming a major player for Green House Gases (GHG) mitigation and power system reliability.

Evolution of Distributed Generation,

- Centralized integration of renewable energy issue: generation profile unbalances.
- Complicated stability control.
- The grid lacks operational flexibility because it is a passive network.
- The grid user is a passive participant whether he/she likes it or not.
- The grid is old: it has the same 1880s structure. Power plants average age is > 30 years.

VIII. DG GENERATION TYPES

DG generation can be classified into following types-

1. Micro (1W and less than 5 kW),
2. Small (5 kW and less than 5 MW),
3. Medium (5 MW and less than 50 MW), and
4. Large (50 MW and less than 300 MW) depending on the level of power generation.

Proper location and size of DG in the power system is important for obtaining their maximum potential benefits. DGs may be applied to-

- Defer or eliminate system upgrades,
- improve voltage profile,
- reduce system losses,
- reinforce grid, and
- improve system reliability and efficiency.

8.1 DG LOCATIONS,

The location of distributed generation is defined as the installation and operation of electric power generation modular connected directly to the distribution network or connected to the network on the customer site of meter. A distribution system can be defined as: "The system, which is operated by a distribution company, can provide power generation through an electric utility or customers and involved in distribution or retail service".

8.2 Distributed Generation Components

- Generation units = microsources (aprox. less than 100 kW)
- PV Modules.
- Small wind generators
- Fuel Cells
- Microturbines

- Energy Storage (power profile)
- Batteries
- Ultra-capacitors
- Flywheels
- Loads
- Electronic loads.
- Plug-in hybrids.
- The main grid.
- Power electronics interfaces
- Dc-dc converters
- Inverters
- Rectifiers

8.3 Challenges of Distributed Generation

a) Intermittent in nature.

b) Free but not always usable.
c) Deteriorate system stability.
d) Less efficiency.
e) Voltage regulation problem.
f) Less predictable load patterns rooftop solar, electric vehicles, and smart grid
g) Changing revenue patterns –decreasing Marginal prices and changes in resource operational pattern.

IX. Distributed Generation & Smart Grids

a) European concept of smart grids based on electric network need.

b) Flexible: fulfilling customers' needs whilst responding to thechanges and challenges ahead;

c) Accessible: granting connection access to all network users, particularly for renewable power sources and high efficiency local generation with zero or low carbon emissions;

d) Reliable: assuring and improving security and quality of supply, consistent with the demands of the digital age with resilience to hazards and uncertainties;

e) Economic: providing best value through innovation, efficient energy management and

'level playing field' competition and regulation.

X. AMI or Smart Meters

Advanced Metering Infrastructure (AMI) or Smart Meters:

A smart meter is a digital meter that record energy usage in real time. It includes hardware, software, communications, consumer energy displays and controllers, customer associated systems, Meter Data Management (MDM) software, and supplier business systems.

10.1 Advance Sensing & Measurement

- Enhance power system measurements and enable the transformation of data into information.
- Evaluate the health of equipment, the integrity of the grid, and support advanced protective relaying.
- Enable consumer choice and demand response, and help relieve congestion.

10.2 Methods for DGs Planning

Methods of Sizing and Optimal Placement as well as properly coordination of Distribution Generations:

10.3 Conventional methods:

The conventional methods for sizing and optimal placement as well as properly coordination of distribution generations areas follows:

- Eigen value method (Fleming, R.J., et al. 1981; Hsu & Chern, 1987; Pilotto et al., 1997)
- Eigen vector method (Aziz et al., 2014; Rouco & Pagola, 1997)
- Modal analysis method (Wu, G., et al.,1998; Malihe et al., 2007)
- Index Method (Farsang et al., 2004; Mohamed et al., 1996
- Sensitivity method (Verma and Srivastava, 2005; Singh et al., 2006)
- Residue-Based Methods (Obadina &Berg, 1990; Bansal, 2005; Faried et al., 2009)

10.4 Optimization methods:

The optimization methods for optimal placement and sizing as well as properly coordination of distribution generations are as follows:

- Linear Programming (LP) (Keane & Malley, 2005; Costa et al., 2004)
- Non-Linear Programming (NLP) (Liu & Vijay, 2005; Roberto et al., 2007)
- Mixed Integer Non-Linear Programming (MINLP) (Sharma, 2006; Guang, et al., 2007)

- Penalty Successive Linear Programming (PSLP) Approach (Jabr, 2011)
- Dynamic Programming (DYP) (Khalesi et al., 2011; im et al., 2013)
- Dual Programming (DP) (Rotting & Gjelsvik, 1992)
- Stochastic Dual Dynamic Programming (SDDP) (Shapiro et al., 2011)
- Sequential Quadratic Programming (SQP) (Sivasubramani & Swarup, 2011)
- Ordinal Optimization (OO) (Jab & Pal, 2009; Jain et al., 2008)
- Exhaustive Search (ES) (Kotamarty et al., 2008; Lashkar et al., 2012)
- Interior Point Method (IPM) (Parker et al., 1996)
- Optimal Power Flow (OPF) based approach (Harrison et al., 2008)
- Bio-Geography-Based Optimization (Roy, P.K., et al., 2011)
- Analytical Approach (AA) (Wang et al., 2004; Acharya et al., 2006)
- Gradient Search Method (Hedayati et al., 2008)
- Continuation Power Flow (CPP) (Arief et al., 2010) etc.

XI. Multi-Objective Optimization for SMART GRIDS

- Emerging Technologies-FACTS Controllers, Distributed Generations, Electric Vehicles, etc.
- Better Power System Operations, Control, Management and Protections
- Digital Operation and Control
- Cost of Electricity
- SCADA and PMUs Installations
- Quality of Electricity
- Security of the System
- Reliability of the System
- Laodability of the System
- Bandwidth of Operations
- Power System Oscillations
- Environmental Friendly or Green Power Generation
- Real and Reactive Power Losses of the System
- Available Power Transfer Capacity etc.

The parameters weighting factor can be selected on the priority basis.

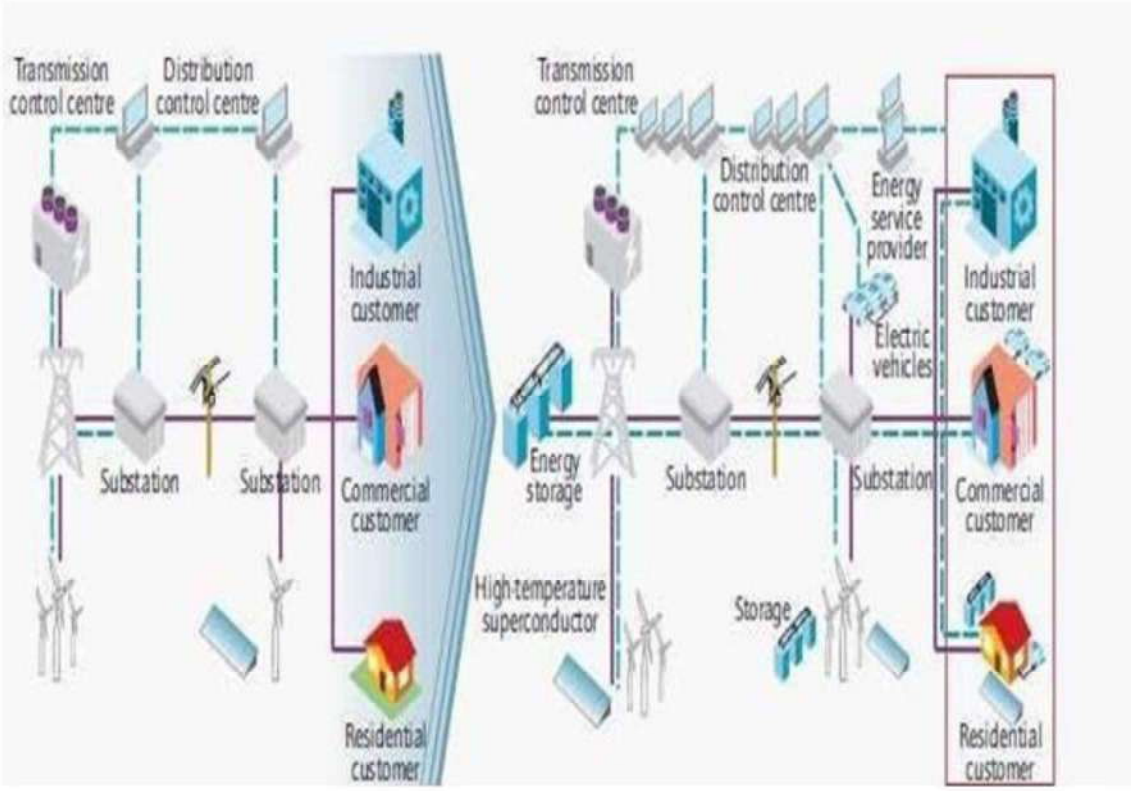

Figure 6: Multi-objective optimization for Smart Metering Systems

XII. CONCLUSION

The paper defines the present and future perspective of the smart grid system in application to the various states of our country depending on the consumer use and varying load demand. The major role of smart grid system is to create a balance in the varying load situations and to balance the peak load demand. Thus the paper provides the various applications and advantages of the smart grid approach and hence it makes it very essential for the future and the work going on in this regard is beneficial.

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National Conference on
Computing, Communication, Control,
Informatics and Pharmaceutical Sciences
***Organized by:** Kanpur Institute of Technology, Kanpur, India*

Impact of Healthcare & Biomedical Devices in Life

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Abstract

The health of the citizen is a national priority. Health Care System (HCS) infrastructure includes services, facilities, institutions and organizations. In today's world, there are major disease garbled in which people are suffering and people are getting affected by it, they may die because there is no cure for it. Recently Corona Virus has affected worse on people of China, Germany, Japan, Vietnam, US, Republic of Korea etc. Those who have fallen ill are reported to have symptoms of coughs, fever and breathing difficulties which might look as normal symptoms but the resulting virus start to kill the person slowly. In it neither any antibiotics nor antiviral medicine show any good effect. This is extremely frightful because it is human to human transmissible. Like Corona virus, there do exist some other diseases, so we should be aware about it to save our life. For this purpose one can use disease tracker apps to avoid horrible disease. Yes, we can solve this problem by using this new invention and with the help of it one is able to know about any diseases that may save our life. This paper shows how applications can help anyone to prevent getting affected by these dangerous diseases. That information can help you to safe and avoid cities where Corona virus cases have been reported.

Keywords: PHCs, SARS-COV, CDC, nCo, MERS.

I. INTRODUCTION

Presently, Healthcare has become one of India's largest sectors (in terms of revenue and employment). The Government, i.e. public key healthcare system comprises limited secondary and tertiary care institutions in cities and focuses on providing basic healthcare facilities in the form of primary healthcare centers (PHCs) in rural areas [1]. The private sector provides majority of secondary, tertiary and quaternary care institutions with a major concentration in metros, Tier I and Tier II cities. India's competitive advantage lies in its large pool of well-trained medical professionals. Healthcare delivery, which includes hospitals, nursing homes and diagnostics centers, and pharmaceuticals, constitutes 65 per cent of the overall market. Even though having these facilities, people died. No medicines or antibiotics hasn't discovered yet.

Recently, The virus that took place, known as 2019-nCoV, causes a serious respiratory illness and has so far infected more than 7,700 people in China and killed at least 170, authorities report. It has also spread to 15 other countries. The infection is thought to have originated in a food market in the Chinese city of Wuhan, which has been on lockdown — with travel into and out of the city restricted — since 23 January 2020.

II. SYMTOMS

For confirmed 2019-nCoV infections, reported illnesses have ranged from people with little to no symptoms to people being severely ill and dying. Symptoms can include:

- Fever
- Cough
- Shortness of breath

CDC believes at this time that symptoms of 2019-nCoV may appear in as few as 2 days or as long as 14 after exposure. This is based on what has been seen previously as the incubation period of viruses [4].

III. DIAGNOSIS

Your healthcare provider may order laboratory tests on respiratory specimens and serum (part of your blood) to detect human Corona viruses. Laboratory testing is more likely to be used if you have severe disease or are suspected of having MERS. If you are experiencing symptoms, you should tell your healthcare provider about any recent travel or contact with animals. Most MERS-COV infections have been reported from countries in the Arabian Peninsula. Therefore reporting a travel history or contact with camels or camel products is very important when trying to diagnose MERS. There is a distinctive characterization of a human:

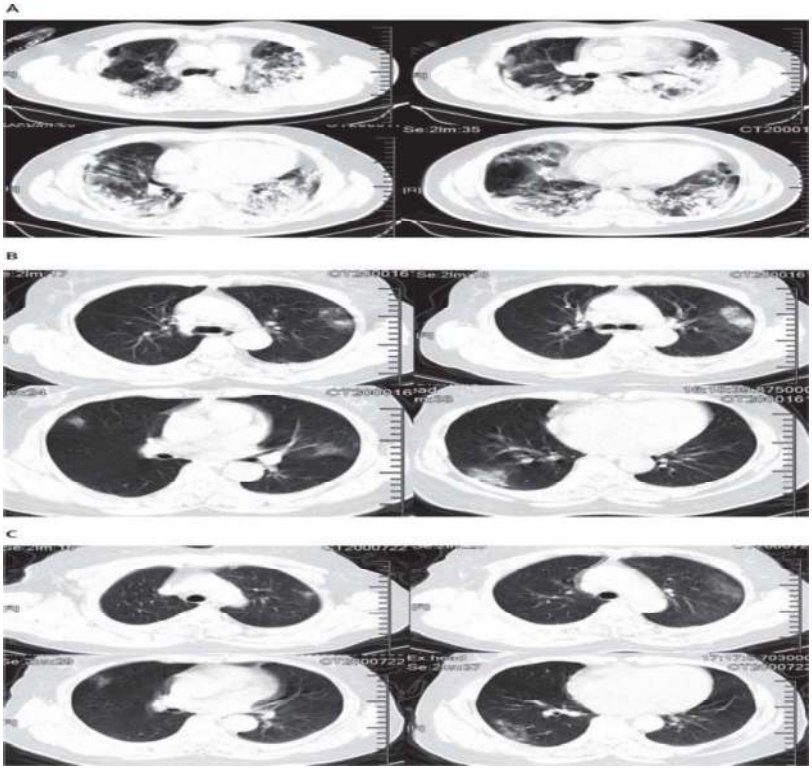

Figure 1: Laboratory tests to detect human Corona viruses

IV. TRANSMISSION

Much is unknown about how 2019-nCoV, a new corona virus, spreads. Current knowledge is largely based on what is known about similar corona viruses. Corona viruses are a large family of viruses that are common in many different species of animals, including camels, cattle, cats, and bats. Rarely, animal corona viruses can infect people and then spread between people such as with MERS, SARS, and now with 2019-nCoV [2].

Most often, spread from person-to-person happens among close contacts (about 6 feet). Person-to-person spread is thought to occur mainly via respiratory droplets produced when an infected person coughs or sneezes, similar to how influenza and other respiratory pathogens spread. These droplets can land in the mouths or noses of people who are nearby or possibly be inhaled into the lungs. It's currently unclear if a person can get 2019-nCoV by touching a surface or object that has the virus on it and then touching their own mouth, nose, or possibly their eyes.

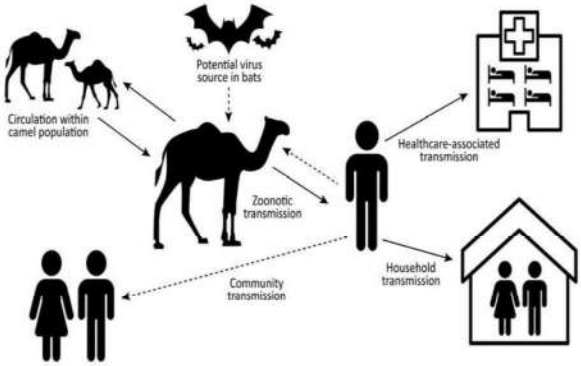

Figure 2: Here's how the virus has spread so far

A. Experience From SARS

The global experience from SARS was a stark reminder of how a novel virus can cause a global public health emergency, from a few sporadic cases to a worldwide epidemic. The SARS-COV spread to 5 countries within a 24-hour period, before international public health measures were in place to identify, control and prevent the spread of infection. The importance and challenges in the implementation of public health measures such as strict hospital infection control measures, case identification, and comprehensive identification and quarantine of contacts cannot be overemphasized. Sharing of information at the local, national and international level was key to managing public and professional fear and anxiety. The lessons learned from the SARS outbreak in 2003 emphasized the need to strengthen international health regulations, have national plans in place to handle similar future outbreaks, maintain public health epidemiological and microbiological capacity and keep ahead of the curve.

V. CONSEQUENCE

Twenty thousand cases; more than 400 lives lost. The corona virus first reported last December is now a public-health emergency of international concern. In China, cities have

been sealed off, and the authorities have built an entire new hospital in Wuhan, where the outbreak started [1].

Figure 3: People are highly suffered under it

A passenger wears a mask following the outbreak of a new corona virus on an MTR train in Hong Kong on Monday, Feb 3rd 2020.This is showing how they people are suffering under it. They have wear mask [2]. *'France warns against travel to China'* France's government has joined the United Kingdom in warning against any non-essential travel to China and suggesting that all of its citizens in China leave while the new virus is still spreading. The Foreign Ministry issued the travel warning Tuesday based on measures taken by Chinese authorities, and on **"***the evolution of the epidemic"***.**

Figure 4: people are suffering

Lining up this weekend to get tickets for free masks and sanitizer outside a Beijing pharmacy. We can differentiate it via a graph:

Figure 5: Map Shows How Many people Are Affected from it

A total of 362 people have died, with a mortality rate of 2.07 percent. Nine relatives are infected after a family meal.

Figure 6: Spread from contact with infected surfaces or objects

A. Prevention And Tresment

There is currently no vaccine to prevent 2019-nCoV infection. The best way to prevent infection is to avoid being exposed to this virus. However, as a reminder, CDC

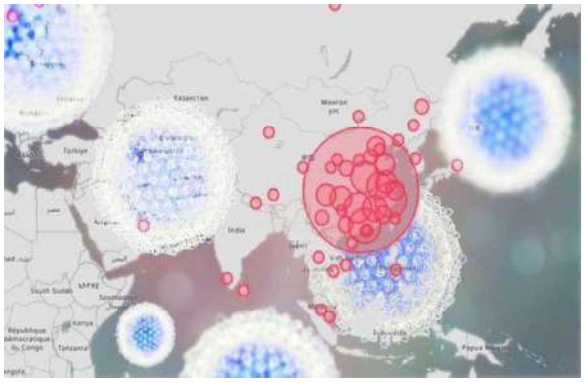

Figure 7: Areas in which people get affected

Always recommends everyday preventive actions to help prevent the spread of respiratory viruses, including:

- Wash your hands often with soap and water for at least 20 seconds, especially after going to the bathroom; before eating; and after blowing your nose, coughing, or sneezing.

Figure 8: Clean Hand And Save Lives

- If soap and water are not readily available, use an alcohol-based hand sanitizer with at least 60% alcohol. Always wash hands with soap and water if hands are visibly dirty.
- Avoid touching your eyes, nose, and mouth with unwashed hands.
- Avoid close contact with people who are sick.
- Stay home when you are sick.
- Cover your cough or sneeze with a tissue, then throw the tissue in the trash.
- Clean and disinfect frequently touched objects and surfaces using a regular household cleaning spray or wipe [6].
- Chinese residents are using mapping programs and travel trackers to avoid neighborhoods with infections of the corona virus and to better prepare for the dangers they face.
- Both the data mapping company Quant Urban and a third-party Wichita mini-program developer have created platforms that take official information on neighborhoods with confirmed cases and map it so users can gauge how close they are to infection sites.
- While the Wichita program, called "Epidemic Situation," covers the southern cities of Shenzhen and Guangzhou, QuantUrban's browser-based maps also cover nine other cities in Guangdong province.
- "Shenzhen might have a major outbreak in the next few days, and government data comes out slowly," said April, a Shenzhen-based manager who declined to give her full name.
- Seeing the map is a psychological comfort. You can't guarantee there won't be fresh cases, but you can avoid an area that's already hit," she said.
- Confirmed cases in Shenzhen have climbed rapidly, to 245 by Monday, making the southern tech capital the most badly affected of China's main cities — Beijing, Shanghai and Guangzhou. It has a large population of migrant workers from the heavily affected central provinces.

Figure 9: Efforts to stop the spread of this corona virus

"We wanted to annotate the information on the map so that the public could better see how epidemic sites are distributed more intuitively and also remind everyone to make adequate protection," said Yuan Xiaohui, QuantUrban's co-founder and CEO. Volunteers also help the team keep the map up to date as the government releases data daily, she said. Young, which also rely on volunteers to keep up to date, originally denoted neighborhoods with confirmed cases with a skull and crossbones logo. It has since changed to less alarming exclamation points after users on the social media platform Web complained that they would cause panic."If I know that there are sick people nearby, I can take steps to be extra cautious," a finance student named Steven told Reuters. "I live between Shenzhen and Guangzhou, and these maps are really great there." State-owned media CCTV and the official government newspaper People's Daily have also given their endorsements to separate programs that help users track whether a bus, train or airplane they have traveled on was also used by a confirmed infected patient. Simulated epidemic trajectories and reported cumulative case counts for 2019-nCoV.The initial growth of the epidemic is based on introduction of the pathogen in mid-November 2019, with $R_0 = 2.3$ and a serial interval of 7 d. The model reproduces estimates of case counts based on volume of internationally exported cases (*green squares*).

Daily cumulative counts of hierologically confirmed cases are based on publicly available reports. Case counts reported on 3 February 2020 are not compatible with reduction of R_e to 1 but could be compatible with reduction to 1.5. If control is achieved, reported case counts will intersect horizontally with the contour lines on this graph. When reported cases move beyond contours vertically, the reproduction numbers represented by those contours become implausible. 2019-nCoV = 2019 novel corona virus; R_0 = basic reproduction number; R_e = effective reproduction number [5]. Figure 2 shows a narrowing (horizontal distance) between case counts generated by the model and those reported by public health authorities over time. This suggests decreasing reporting times (from >10 days on 27 January 2020 to approximately 4 days by 3 February 2020). Contours generated by the model with intervention give us information about which (average) reproduction numbers may be plausible and which are implausible (Figure 2). If R_e had fallen to 1.0 after 24 January 2020, the model predicts fewer cases than are currently being reported (as of 3 February 2020), making this level of control implausible. By contrast, reduction to a R_e of 1.5 is plausible on the basis of reported cases and model estimates up to 3 February 2020, but it would also imply complete reporting. These all can be done via a being computer programmer [3].

VI. TECHNICAL WORKING

China app lets people know if they were in contact with corona virus. They have launched a mobile application named 'Close Contact Detector', enabling people to check whether they were at risk of catching corona virus. After registering with a phone number, users need to enter their name and ID number to know whether they were in close contact with someone infected.

Here's a little respite, a website features real-time map tracking the deadly virus. The map created by Johns Hopkins University's center for Systems Science and Engineering has created the map that follows global Corona virus cases. The "close contact detector" was released Saturday night, according to China's state news agency Xinhua. Users scan a QR code on popular Chinese apps like We Chat and QQ, and submit their name, phone number and government-issued ID number to request information about whether they have been in close contact with anyone infected by the virus.

Tech companies like Apple, Google, and Amazon are monitoring the situation and taking precautionary measures. The GSMA group that organizes Mobile world Congress has announced that it'll have onsite medical support when the conference starts in Barcelona on Feb., 24th. Chinese tech giants have committed big donations to fight the corona virus. Alibaba group, Tencent Holdings, and Meituan Dianping have together donated close to $432.5 million.

VII. CONCLUSION

The emergence of new, infectious, global threats in the past 4 decades (e.g. AIDS, avian influenza A/H5N1 and SARS) has reshaped thinking at both national and international levels on the nature and level of public health responses needed for these threats. The International Health Regulations (2005) have emphasized that all countries are at risk from new infections and therefore need to collaborate on information sharing and data exchange when they occur .In the current age of immediate and ongoing access to world-wide digital information, there are high expectations globally that everything is being done to detect and control an emerging disease threat. Uncertainties as to how a newly discovered disease is going to evolve means that preparations have to be determined at both the national and the global level. During the Cairo meeting, all current knowledge about the cases of nCoV infection and about what has shaped priorities for future actions at the national and the international level was evaluated immediate and long term. These include:

- preparing an inventory of current nCoV virological research activities. In European, American and other national laboratories;
- Encouraging cooperation in development of hierological studies;
- preparing an inventory of training opportunities for laboratory staff testing for nCoV;
- preparing an inventory of laboratories developing nCoV serological tests and list which laboratories are using which tests;

The Singapore Ministry of Health on Wednesday said that government will pay the hospital bills incurred by corona virus patients admitted in public hospitals [4].

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Rural Entrepreneurship: Role of Government

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Abstract

In the country like India role of entrepreneur has been significant through many ways such as they combine various sources of production in order to attain predetermined targets and provide an impulse to the overall development of the country. There is an enormous thrust provided by the government in this area in the recent times by evolving few programmes like start up, stand-up, digital India etc.

An entrepreneur is one who collects and creates new combination factors of production i.e. land, labour& capital, conceiving enterprise using new production methodology, developing innovative products for customers & finding new opportunities. A person, who starts a business enterprise, anticipating prospects, takes financial risk with the hope of generating profit. The rural entrepreneurs are griped with many activities such as agriculture, fishing, forestry, craft works etc. They contribute their valuable efforts in rural entrepreneurship so that Country can come in the category of developed nation from developing countries. India is a country of villages & 65 to 70 % of population comes under villages. Rural industries & business organisations in rural areas generally connected with agriculture & farming. There are a lot of rural industries in rural areas such as agro-based industries, forest based industries & mineral based industries. Majority of rural entrepreneurs have face a lot of problems like lack of fund, poor infrastructure, risk bearing capacity, lack of market information due to poor communication facilities, transportation, low level of education, storage & warehouse issues, unavailability of raw material, machines & equipment, lack of manpower etc. They get very limited support from government. The secondary data has been used for this study. The paper makes an attempt to find out the role of government in Rural Entrepreneurship.

Keywords: Entrepreneurship, Economic Development, Entrepreneurs

Rural Entrepreneurship is defined as entrepreneurship evolving at backward villages that comprise variety of fields of makes an effort in areas such as business, industry, agriculture and acts as driver for economic progress. More particularly in India, majority of rural entrepreneurs are facing different issues and challenges while planning and establishing industries because of low level of education, financial problems, lack of unavailability of material or equipment and Insufficient technical and conceptual ability. The secondary data has been used for this study. The paper makes an attempt to find out the role of government in Rural Entrepreneurship.

I. INTRODUCTION

Entrepreneurs play very important role in the development of economy thus contributing to overall GDP of the country. It has been established that entrepreneurship

plays a significant role in job creation as well as economic development. The term Entrepreneurship originated in Europe during 17th and 18th Century. Entrepreneurship is the process where an entrepreneur determines new ways to collect all resources. Most of the businesses start as a small firm, gradually they utilize the resources & generate more profit & become in the category of large scale firms. Entrepreneurship creates the job opportunities to the youth & wealth in the society. Through rural entrepreneurship, most of the villages come in the category of industrial area.

Rural entrepreneurship has different benefits as it providing employment opportunities for the people, migration of people from rural areas to urban areas, eliminating the poverty and reducing the pollution. This will also help to awake the rural youth to adopt rural entrepreneurship. Literacy rate also can be increased thereby improving standard of living of rural people. But they face different kind of problems in day to day life and work. Majority of rural entrepreneurs are facing problems due to unavailability of basic amenities in rural areas especially in developing countries like India (Jayadatta S, 2017). Financial problems, lack of knowledge and insufficient technical skills at present it is too difficult for the rural entrepreneurs to establish industries in rural areas. According to 2011 Census 68.84% people are living in rural areas of India. Indian economy is highly dependent on rural economy as 68.84 per cent of the total population lives in rural areas where agriculture and allied activities are the major sources of income. According to census 2011,the total number of villages was 6,38,588 and nearly half of the rural population of India is residing in 115,080 villages with population more than 2,000 but less than 10,000.The growth rate of rural population has declined substantially to just 1.2 per cent during 2001–11 from 1.7 per cent per year during 1991–2001. The slow growth rate in rural was mainly marked to decline in rural fertility rates, rural to urban migration and recertification of villages as urban units (IRD report, 2013). The economic development of our country mainly based on the development of rural areas and the standard of living& per capita income of its rural mass. Rural entrepreneur is one of the most important aspects in the economic development of a country.

There are different types of Rural Entrepreneurship:

(a) Individual Entrepreneurship: It is mainly single ownership of the venture.
(b) Group Entrepreneurship: Partnership, private limited company and public limited company.
(c) Cluster Formation Entrepreneurship: NGOs, VOs, CBOs, SHGs and even networking of these groups.
(d) Cooperative Entrepreneurship: It is an independent association of persons joint willingly for a common objective.

Rural areas have peculiar problems of low income, low productivity, high degree of unemployment, high population rate, poor technological growth, low infrastructures, high illiteracy rate, malnutrition, etc. But there are worries that progress in the promotion of rural entrepreneurship may be hindered by lack of or inadequate understanding of its concept and role in the rural sector. Institution of appropriate promotional policies cannot be guaranteed unless there is no support of government (on the part of the people) and its potential in rural development. Therefore, the focus of this study was to understand the role of government in rural entrepreneurship.

II. ISSUE AND CHALLENGES IN RURAL ENTREPRENEURSHIP

Rural entrepreneur are faced with different kind of Issues and challenges which have been divided into four categories i.e. financial, management, marketing and human resource problems.

1. **Financial Problem**
   (a) Scarcity of funds
   (b) Lack of infrastructural facilities
   (c) Risk

2. **Management problems**
   (a) Lack of Knowledge of I.T.
   (b)Technological Challenges
   (c) Poor quality products
   (d) Lack of knowledge of Legal Formalities

3. **Marketing Problems**
   (a) Competition
   (b) Unawareness of market

4. **Human Resource problems**
   (a) Low skill level of workers
   (b) Negative attitude

1 **Financial Problems:** Rural entrepreneurs have paucity of fund for entrepreneurship in rural areas. In spite of efforts made by government the growth of rural entrepreneurs is not very healthy due to lack of proper and adequate infrastructural facilities. Rural Entrepreneurs have very less risk bearing capacity due to lack of financial resources and external support.

2 **Marketing Problems**: Rural entrepreneurs face stiff and severe competition from large sized organizations and urban entrepreneurs. New ventures have limited financial resources and hence cannot afford to spend more on sales promotion and advertising for competing with other venture. Even they can't not able to sell their product, because mostly people prefer brand.

3 **Management Problems**- Information technology as such is not very common in rural areas. Entrepreneurs rely on internal linkages that which encourage the flow of services, goods, ideas and information.-: Rural entrepreneurs experience a harsh problem of lack of technical knowledge. They have to face challenges due to technology up gradation. In complying with various legal formalities and in obtaining licenses rural entrepreneurs find it extremely difficult due to ignorance and illiteracy. Another important problem is growth of rural entrepreneurship is the low-grad equality of products produced due to lack of availability of standard implements and other equipment's as well as poor quality of raw materials.

4 **Human resource Problems**: Some of the major human resource problems found in organization are as follows: Most of the entrepreneurs working in rural areas are unable to find workers with high skills. In this case turnover rates are also high. Sometimes environment in the family, society and support system is not much conducive enough to encourage rural people to take up entrepreneurship as a career. It may be certainly due to lack of awareness and knowledge of entrepreneurial opportunities. Young and mostly well-educated youths mostly tend to leave.

III. LITERATURE REVIEW

This study tried to find out the perceptions of rural entrepreneurs on the nature and role of entrepreneurship in rural economic development. Study was conducted on 200 rural entrepreneurs from five towns in Oyi Local Government Area. It was found that rural entrepreneurship can assist increase output, generate employment and diminish rural urban migration. It has also found that different kind of problem is being facing rural entrepreneurs are faced with certain challenges such as insufficient funds and lack of government support. This study has suggested that rural areas should be made attractive and government should concentrate on for rural entrepreneurs through their policies and other assistance (Jayadatta S.2017)

The paper also makes an attempt to find out the challenges and problems for the potentiality of rural entrepreneurship. It also tries to shots on the key troubles faced by entrepreneurs particularly in the field of marketing of products, other primary amenities like water supply, availability of electricity, transport facilities, required energy and (Patel, B &ChavadaKirit, 2013)

This paper provides an insight into the present scenario of rural entrepreneurship, advantages, opportunities, challenges faced by the entrepreneur and institutions promoting rural entrepreneurship and their role in developing and fostering rural enterprises. (S.MoghanaLavanya, S.Hemalatha & V.M. Indumathi, 2014)

Onibokun (1987) in his policy paper revealed that the rural population constitutes 70% – 80% of the entire population of most third world countries. Nigeria's rural dwellers constitute 53% of the country's total population (World Bank 2015)

This paper aims to develop a abstract structure that consider the role, government guidelines plays in the development of entrepreneurship and its impact on economic development. The study frames on existing literature on entrepreneurship, economic development and government procedure as it relates to entrepreneurial practices. The outcomes of literature review propose two hypotheses. Integrating entrepreneurship proceedings with economic development, with government policy intervening, a framework is developed. For the reason that entrepreneurship is a part of economic development approach engaged by several countries globally to achieve macro-economic reimbursement. The framework provides a starting point for researchers and practitioners to further examine entrepreneurship policies and practices. For researchers, the structure clarifies the adjudging attributes of entrepreneurship, government policy and economic development proportions and their proposed relationships. For practitioners, the framework can be used to achieve an

understanding of the function of government guidelines on entrepreneurship development as well as economic development (NkemOkpa Obaji1 & Mercy UcheOlugu).

IV. ROLE OF GOVERNMENT IN RURAL ENTREPRENEURSHIP

There is wide gap between rural and urban development in India. To bridge the gap, the only need is to develop entrepreneurial activities in the rural areas (National Council of Rural Institutes).

The rural growth by entrepreneurship has derived in post independent India in constructive path. India being a developing country with 80 % rural population and 6 to 7 % GDP has announced for a good entrepreneur development Scenario. This has been achieved by the effective policies implemented by the government and active participation of NGO"s. There is a wide scope for further improvement in the area of rural Entrepreneurship development involving modern technology and scientific management strategic (G. Vedanthadesikan & P. Pathmanathan, 2016). Kumar and Liu study reveal that entrepreneurial sector contribution to employment and GDP is on the increase. For this reason Acs, Z.J., et al., 2004 suggested that governments should minimize the constraints entrepreneurship. Entrepreneurial success of any nation is largely dependent on the policy behaviour of the government.

Rural entrepreneurship however is the best answer for removal of rural poverty in India. Hence government should strain and put emphasis more on incorporated rural development programs. Also most of the rural youths do not feel, entrepreneurship as a profession. Hence organizations and government should come with training and sustaining support systems providing all necessary assistance so that rural youth can be motivated to take up entrepreneurship as a career. Besides there should also be well-organized synchronized markets and governments should also loan its helping hand in this framework.

1. Digital India

Digital India was started by Government of India on July 01, 2015. The main objective is to digitally empower the whole India& its people, advance infrastructure, provide quality life etc. Through this program, Government tries to establish digital connection between citizens & government departments so that, they can run smooth administration. Government tries to reduce paper work & provide better services through digitally. There are three central areas of this program-

- Digital Infrastructure
- Digital Literacy
- Digital Delivery of Services

2. PradhanMantri Mudra Yojana

PradhanMantri Mudra Yojana(PMMY) is a program, which runs by Government of India for providing funds to unfunded people. It allows a small debtor to take for one self from all Public Sector Banks for loans up to Rs. 10 lakhs for non-farm income generating activities. The sketch was launched on 8th April, 2015.

3. Stand up India

This program is only for those persons who want to start their new business of develop their existing business. Business should be related to manufacturing, trading or other services. This program is basically for those, who belongs from Scheduled Caste (SC) or Scheduled Tribe (ST) and any woman entrepreneur. Stand-Up India program Facilitates bank loans between Rs. 10 lakh to Rs. 1 Crore.

4. Pradhan Mantri Kaushal Vikas Yojana

Pradhan Mantri Kaushal Vikas Yojana (PMKVY) is a program, run by Ministry of Skill Development & Entrepreneurship (MSDE). The objective of this Skill Certification program is to help a huge number of youth to take up industry-oriented skill training that will help them in winning a better opportunity. The main objective of this program is to provide better opportunities to youth, so that they can choose their preferred field & become successful. Through this program, youth can learn multiple skills. Under this Program, Training and Assessment fees are paid by the Government for youth learning

V. KEY COMPONENTS

- Short term training
- Special projects
- Kaushal and rojgarmela
- Placement guidelines
- Monitoring guidelines

VI. CONCLUSION

The majority of rural entrepreneurs are facing many problems like non availability of primary amenities in rural areas, lack of education, financial problems, insufficient technical and conceptual ability etc. it is making difficult for the rural entrepreneurs to establish industries in the rural areas. It is clear that rural entrepreneurs are the persons who takes the risk of setting up an enterprise in rural area and has a major role in the country's economic development process. A rural entrepreneur needs an enabler like an established set up with government support, infrastructure etc. Without government support & factors of production, any entrepreneur cannot run any unit. Entrepreneurial inputs such as land, building, capital, transportation, communication is quite easy in urban area than in rural. So challenge before rural entrepreneur is more difficult. In this regards government role & policies become extremely important for rural entrepreneurship. Although Government has taken many initiatives but still a lot needs to be done in this area.

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Management Education in 2020: Issues, Challenges and Opportunities

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Abstract

Management Education by 2020 would see a new development model for education – a deregulated educational system remodelled after free market to prepare the next generation of workers for amorphous job market. We are leading to strong convergent developments in management education. 'Glocal' along with global' has been added. We should focus on: .Providing greater flexibility in educational provision .Equipping students to handle uncertain markets .Equity, ethical and real world issues .Critical, innovative, integrated thinking .Broadening abilities with specialist's perspective .Re-examining mindsets with regard to competition and risks .Indigenising pedagogic structures

Keywords: Deregulated, Glocal, Indigenising

I. INTRODUCTION

Throughout the world change has never been more rapid, the need for learning by citizens and collectively by society never more critical, nor the challenges to management education more demanding. It is the pervasiveness of management practice, rather than its exclusivity, that makes quality business schools so vital to individuals, organizations, and societies around the world.

Management education has entered a period of profound transition driven by globalization, technology, demographics, and pressing social imperatives. The era of globalisation has tremendous concomitant implications for knowledge, education and learning developing a new educational model which will include many components that do not exist in the current management educational model. Because management education is an investment in the future of business, it's important to understand the challenges, opportunities, potential risks and rewards associated with this transition.

Let us have a look at the challenges and issues that awaits the management education in future.

II. REINVENTION OF CURRICULUM AND PEDAGOGY

In the future, as greater emphasis is placed on learning by the individual, traditional methods, structures, and institutional processes will be replaced and the delivery of instruction focused on "anytime, anywhere" delivery. The curricular program, the classroom lecture, the credit hour structure will all be reviewed and most likely changed.

Tomorrow's college education will focus on outcomes and assessment will be on a competency basis. It will include the living environment as part of a better controlled learning

environment. It will include learning by doing, learning in teams, interdisciplinary problem solving.

It will include a global and an international focus and will stress quality, critical thinking, communication skills and practice in confronting change. It will make use of advanced technologies as an extension of the human capability and will emphasise systems thinking. We can hope that it will prepare the student for an unpredictable future. The student experience in the future will be a learning adventure in an academic culture significantly different from that of today, every bit as exciting, and possibly more so.

The new focus will be on how to broaden abilities, but at the same time offer a specialist's perspective. Dr M.L.Srikant, Dean, SPJIMR feels that pedagogy architecture should be home grown and indigenous— that is the only way B-schools can develop sensibilities to the local issues along with human and ethical dimensions of the possible solutions.

Shiv Agarwal, CEO of ABC Consultants, a recruitment firm adds, "More corporates are looking for people who have a flavour of experience. Also there's a greater need for B-school to devote time to look at personality development, business and personal communication skills and overall etiquette for managers to operate successfully in today's complex environment."

1. Matrimony of Business and Academics in context of Faculty as well as Students

B-schools also need to look at greater interaction with industry to offer more real-world problems that need analytical thinking and help develop interpersonal skills.

Recent crisis has brought into sharp focus the inability of managers to effectively deal with real world issues emphasizing the need to adapt to changing dynamics. The charge is that the business schools are too focussed on scientific research; that they hire professors who have limited corporate exposure and students who graduate end-up being ill equipped to tackle complex issues and ethics.

So, another challenge looming large in the face of management education is of finding quality faculty and training them on modern business thinking. Some faculty members will come from the academic track but great efforts also need to be made to attract high quality faculty from among practising managers.

The challenge for academic leaders, in today's competitive environment, is to blend the best of business practices with the academic culture so the organizational members can embrace new ways of operating while still feeling ennobled by their work.

III. ACHIEVING AND MAINTAINING DIVERSITY

Achieving and maintaining diversity on our campuses is a matter of extra ordinary practical importance. In an increasingly diverse world, the decisions we make on our

campuses will be better decisions if they are made with the full diversity of opinions, talents, and backgrounds around our tables.

Expansion in management education has brought greater diversity among the programs and providers in management education. Schools have different missions and aspirations; vary in governance structures, faculty characteristics, and financial models; and are embedded in a wide array of cultures, histories, and governing systems. All of this diversity is to be nurtured and celebrated. Diversity means that students and employers have choices to meet their unique goals and accommodate their circumstances. It also fosters innovation among schools and programs

Moreover, our students leave us to make their way in this more diverse world and its job markets. We will serve them best if their experience with us prepares them for that world. We should broaden access because it is the right thing to do and because the practical need for diversity on our campuses is too compelling to ignore.

We are leading to stronger convergent developments in management education between countries. The rapid growth in the number of international students with qualifications from more than one country, the internationalisation of disciplinary research and the use of English as the primary medium of scholarly discourse are all sources of convergence.

IV. FINANCIAL SUPPORT

Financial support and direction drawn largely from the government is changing. The global trend, though inconsistent, has been toward shrinking government financial support and delegating more decision-making authority to institutions. On the surface, these two developments complement one another; both point toward institutional independence.

However, these changes challenge governments to continue to ensure that the institutions respond to public interest agendas.

Meanwhile, institutions struggle to generate revenues to sustain quality and achieve aspirations, and they must balance more complex portfolio objectives, respond to more diverse — and sometimes conflicting — stakeholder perspectives, and expedite efforts to create innovative programs to differentiate themselves among competitors. Institutions need autonomy and flexibility to succeed in increasingly open and competitive markets.

Private individual philanthropy, (largely alumni philanthropy) the primary source of funds for institutional endowments, have enhanced the flexibility and strengthened the independence of institutes.. Frequently this kind of funding takes the form of partnerships to support specific research projects of direct interest to the private sponsor. These grants, of course, present more serious ethical problems than private philanthropy. Specifically, issues of publication and ownership of research findings raise issues that need clear policy guidelines to resolve.

V. COMPOSITION AND ROLES OF THE INSTITUTIONAL WORKFORCE

Human resource is increasingly being recognized as central to the organisation, and as a strategic partner for capacity building.

It is evident that the management of human resources involve a combination of "hard" issues such as recruitment and retention, rewards and incentives, and "softer" issues such as motivation, work-life balance, and career development. Bringing together these two sets of issues at both institutional and local levels is a challenge, especially in devolved organisational structures with distributed management and leadership.

Also composition and roles of the institutional workforce are becoming complex, fragmented and mixed. The range of functions includes teaching, research, business partnership and project work. Furthermore, as distinctions blur between academic work and the contributory functions required to contextualise that work in global, mass higher management education systems, individuals move increasingly between contiguous academic, quasi-academic and management domains. As a result, the composition of institutional workforces is changing, and mixed roles emerging (Whitchurch, 2006a, 2006b).

The range of roles that an academic may be expected to undertake can include: "teacher, scholar, practitioner, demonstrator, writer, model, discoverer, inventor, investigator, designer, architect, explorer, expert, learner, developer, collaborator, transformer, facilitator, enabler, evaluator, critic, assessor, setter, guide, colleague, supervisor, mentor, listener, advisor, coach, counsellor, negotiator, mediator, juggler, manager, leader, entrepreneur" (Gordon, 1997, pp. 67-68).

VI. CHANGE— THE NORM FOR THE FUTURE

As we look to the future, change will become the norm and stability, the anomaly. Success, by almost any measure, will depend on our ability to adapt to rapid change and to work our way through the transitions that go with change. The impact of incredible change on learning by the individual is almost unimaginable.

But as educators we cannot allow it to be unimaginable, because it is our responsibility to constantly prepare the individual to cope with change. In order to do this our institutions must be capable of rapid innovation. We must ask ourselves whether the management structure of higher education is capable of timely response to rapidly changing conditions within our global society, and whether we are as flexible as we should be.

The pace of change has been accelerating and has become more complex. Stronger ties among economies, advances in information technology, employment dynamics in a global services environment, emerging social needs, and the like have contributed to an increasingly complex and rapidly changing environment for business schools. Also the likelihood of a surprise external shock has been increasing. In the future, a conflict will appear in an unexpected place; a currency crisis will materialize from one region and ripple instantaneously around the world etc. These shocks are not predictable, but they will happen

with nearly 100 percent certainty. These final, underlying trends reinforce an overarching theme that the business schools of the future must be able to learn and adapt to survive, but they must be forward-looking, nimble, and quick to change so that they can also lead.

VII. ROLE OF RESEARCH

Role of research as a primary differentiator of management education institutions will continue to be heightened. Research is more central and salient now than at other times in the history of universities, as knowledge production and obsolescence continue to accelerate, and individual prestige and reward continue to adhere to research rather than to teaching. But the research needs to be in Indian context, that is, the problems Indian businesses and markets face.

VIII. ENTREPRENEURSHIP

Entrepreneurship within universities has to be welcomed. In order for a university to be entrepreneurial, the organisational culture must be characterised by a collective including a high tolerance for risk-taking. An entrepreneurial institution is an organisation where risk-taking is a normal phenomenon when new practices are initiated, and where entrepreneurship is often perceived as taking innovative practices to a commercial profit-exploiting stage.

This understanding must be operational in terms of goals regarding teaching, human resource development, innovation, and creation of value for society and monetary profits, and how these goals relate to academic achievements.

At the heart of an entrepreneurial university one finds a strong and expedient central decision-making body able to react to expanding and changing market conditions. Fast and innovative mobilisation of resources at all levels is of the essence, so the steering core must be able to embrace the values of managerial practice as well as the values of academia.

The core academic units will also need to adopt an entrepreneurial ethos. The culture of the entrepreneurial university needs to embrace entrepreneurship into its working practices and, change has is to be simultaneously welcomed, fostered and absorbed by the organisational culture.

IX. WILLINGNESS TO TAKE RISKS

There must be a willingness to take risks, financially and intellectually, and regarding intellectual risk there must be an academic recognition of high-quality applied research.

A *risk-averse culture* often characterises the management decisions when it comes to the allocation of resources to new initiatives and the freeing up of existing resources to new forms of use. There is a tendency for management to equate entrepreneurial activities only with making money rather than with developing the quality of research, teaching, and external co-operation. In general, incentive structures need to be unambiguous and tuned to entrepreneurial activities, *e.g.* in the form of demand structures that result in positive incentives.

X. NEW TECHNOLOGIES

Communication and information technologies deserve special attention here because of their direct impact on the creation, delivery, and management of education. Education is a voracious user of information and communication technologies. But, information technology also offers the promise to address the challenges of meeting growing demand for management education — especially among working professionals in need of continuous education.

The likelihood that new technologies will challenge, even overthrow, the hegemony of institutions as providers of higher education is not entirely unfounded. In counterpoint Van Ginkel (1994) posited a future in which: ‘‘The university will remain the centre for creativity and innovation well into the middle of the next century, remain firmly fixed in the midst of society. This university will look rather different from the university we know today. It will be an international business in every sense. Knowledge management will occupy the centre stage’’ (p. 79).

From the student perspective, we must realize that today’s graduates are already children of the “information age”, and that tomorrow’s students will be even more conditioned by electronic media.

Today’s university students increasingly *expect* to learn with computers and the latest information technology, not least because an increasingly competitive labour market demands no less. As Kenneth Green puts it, institutions engage in “a kind of educational malpractice” if they fail to provide students with technology training as part of their educational experience (Green, 1997*b*, p. 9).

The new information technology knows no boundaries and opens a potential world of possibilities for students. It takes the classroom to the student rather than the other way around. The students have more control over where, how, and when they learn.

But the question gaping at us is - How will the students assess the relative quality and utility of educational opportunities offered in cyberspace? Also, how will employers evaluate skills and credentials acquired in the virtual mode? (Barley, 1997). Issues of accreditation and credentialising are problematic enough in the realm of management education. But the wide openness of new technology invites educators, entrepreneurs, and students alike to cross national and other borders, adding a whole new dimension of complexity.

XI. GLOCALISATION

Prosperity in the globalised environment within which we exit the twentieth century will however depend for most universities on their capacity to be regionally integrated and networked through multi stranded interacting partnerships within their respective regions (Alter and Hage, 1993). Acting globally as well as thinking globally will increasingly depend for most of us on acting effectively locally, despite the capacity for information, ideas, money and the many of the products of labour to move around the world in micro-seconds. Its

capacity to compete successfully, but more importantly to collaborate, to form networks of partnerships, and to provide a high level of what is now called client service, is considerable.

Harvard Business School professor Pankaj Ghemawat stresses that "most types of economic activity that can be conducted either within or across borders are still quite localized by country." (2007, p. 11). Globalization means that business and management must be understood in the context of local history, politics, and culture. Therefore, management education should not be "culture *free,*" but "culture *full.*"

Specific economic circumstances in some countries also send strong signals for management educators to develop more relevant, meaningful programs that support local development efforts. That is, business schools should think globally and act locally. For example, authors Vipin Gupta and Kamala Gollakota write about the globally recognized and respected Indian Institutes of Management (IIMs):

Considerable economic activity takes place at much smaller micro-enterprise levels in much of the developing world. Individuals, families and cooperatives are involved in various economic activity from selling fish to handicrafts. While there is no need for a formal MBA for micro-enterprises, certainly there is considerable need for knowledge of sound business practices … the IIMs could form strategic collaborations with the business schools in the rural areas, in the small cities, and those focused on women and other such groups; and offer various forms of support to these local institutions.
(Gupta and Gollakota, 2005, p. 52 to 53)

XII. CORPORATE SOCIAL RESPONSIBILITY

There is a more problematic, and important, question. How special, and "socially responsible", will these "cathedrals of the learning society" will be? Economic rationalism may prove to be a spent force in the early years of next century.

The recent spotlight on unethical practices has been most effective in motivating business leaders to think beyond the bottom line. But, a shift has been occurring; many companies have begun to discover that social responsibility, good governance, and sustainable practices not only ward off or repair negative press, but they are integral to the long-term profitability and health of the organization. Increasingly, business leaders believe that the long-term success of their organizations, and of business itself, will require positive social change today. As Porter and Kramer later point out, "An affirmative corporate social agenda moves from mitigating harm to reinforcing corporate strategy through social progress" (2006, p. 84).

To address India's developmental needs, Gupta and Gollakota suggest that the business schools should assume a leadership role in the development process and work toward making "the capabilities for entrepreneurship and leadership accessible to all" (Gupta and Gollakota, 2005, p. 52). They further recommend that:

The IIMs should also adopt a more entrepreneurial mindset in relation to the challenge of the accessibility of business education. The lack of responsive programs for the smaller cities, smaller businesses, and women have resulted in access to quality business

education being limited to the larger cities, being orientated towards the needs of larger businesses, and slanted towards the male-dominated business world. (Gupta and Gollakota, 2005, p. 52)

XIII. CONCLUSION

The value addition of MBA degree is repeatedly being questioned today. A large set of unmet needs have been identified in areas such as global perspectives, leadership development, critical, innovative and integrative thinking. Students understand the functions of management as marketing, operations and finance but are ill-equipped to identify and frame unstructured problems managers routinely encounter.

We need to train our students to better understand people they will lead— workers, salesmen, employees in different countries. Management is a profession where success comes only if a manager can motivate and inspire others. That requires skill and practice. Emphasis in future will be on results and competency rather than on seat time or accumulated student credit hours. Collaborative learning, learning in teams and hands-on, interdisciplinary problem solving will be the norm. Co-curricular experiences will be integrated to the extent possible in the student's total learning experience. As institutions of management education clarify their values to cope with global pressures to provide mass higher education and to meet the needs of the knowledge economy, they must also serve as places of imagination, innovation, disputation, scepticism and questioning. The "idea of an institution" will be reborn and reinvigorated as a prominent knowledge and culture "cathedral" sustaining the development of learning societies.

In summary, the turbulent, uncertain, increasingly knowledge-based and information-rich society of the century of lifelong learning will need to focus on abstract concepts; have holistic, as opposed to linear approach; be agile and flexible and break the boundaries of space and time. Coping with change in a world characterised by change, finding the opportunities associated with it while maintaining values will require new ways of thinking and acting. For management education the responsibilities are daunting; the opportunities, unique; and the future, exciting. Alvin Toffler in his famous book 'Future Shock' Says "To help avert future shock, we must create a super industrial education system and to do this, we must search for our objective methods in the future rather than the past... Education must shift into future tense." Keeping in mind the future scenario, re-engineering of management education must be done.

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