Adaptive digital medical image watermarking approach in 2D-wavelet domain using speed-up robust feature method

Y. Gangadhar, V.S. Giridhar Akula and P. Chenna Reddy

Published Online: 5 Feb 2019

Abstract

In the recent trends, the utilisation of digital images had got their importance in many fields. One of the major fields which had the more prominence utilisation of digital images is health care. The patient's information is stored in digital images for maintaining privacy and there is a need for preserving the content of the images. Watermarking serves well for protecting digital images. In this paper, Adaptive Digital Medical image watermarking approach is proposed. This proposed method utilises the 2D-Wavelet domain for converting the medical image in to number of sub bands. The interesting points are identified using the Speed-Up Robust Feature (SURF) method. The scaling parameter is calculated for the digital images using the bipolar sigmoid function. The control parameter is introduced to adjust the scaling parameter and it plays a crucial role in deciding the strength of the watermark. Experimental evaluation is carried out using three parameters, Peak Signal to Noise Ratio (PSNR), Structure SImilarity Measure (SSIM) and Normalised Correlation Coefficient (NCC). The experimental results proved that the proposed method had superior performance in both visible and invisible watermarking.

Keywords

2D-wavelet domain, watermarking, medical images, region of interest, SURF

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ISSN:0971-1260

Vol-22-Issue-10-November-2019

Applications Of IOT In Communications & Security

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ABSTRACT

IOT(Internet of Things) is the buzz word in the present market. The Internet of Things (IoT) is characterized as a paradigm in which objects outfitted with sensors, actuators, and processors speak with each other to fill a significant need. In this paper, we overview cutting edge strategies, protocols, and applications in this new rising territory. This overview paper proposes a novel taxonomy for IoT advancements, features probably the most critical innovations, and profiles a few applications that can possibly have a striking effect in human life, particularly for the diversely abled and the elderly. When contrasted with comparable overview papers in the territory, this paper is much more far reaching in its scope and thoroughly covers most real advances traversing from sensors to applications.

Key Words*:* Actuators, Communication network, Transport layer security, RFID, SIOT, Neural sensors, Mobile Cloud Computing, mashups, preprocessing.

I. INTRODUCTION

Today the Internet has turned out to be omnipresent, has touched relatively every side of the globe, and is influencing human life in impossible ways. Be that as it may, the trip is a long way from being done. We are currently entering a time of considerably more unavoidable availability where a wide assortment of machines will be associated with the web. We are entering a time of the "Internet of Things" (shortened as IoT). This term has been characterized by various creators in a wide range of ways. Give us a chance to take a gander at two of the most mainstream definitions. Vermesan et al. characterize the Internet of Things as just an association between the physical and advanced universes. The computerized world cooperates with the physical world utilizing a plenty of sensors and actuators. Another definition by Peña-López et al. characterizes the Internet of Things as a paradigm in which computing and networking abilities are implanted in any sort of possible question. We utilize these abilities to inquiry the condition of the question and to change its state if conceivable. In like manner speech, the Internet of Things alludes to another sort of world where every one of the devices and apparatuses that we utilize are associated with a network. We can utilize them cooperatively to accomplish complex errands that require a high level of insight.

ISSN:0971-1260

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For this knowledge and interconnection, IoT devices are furnished with installed sensors, actuators, processors, and handsets. IoT is not a solitary technology; rather it is an combination of different advancements that cooperate pair.

Sensors and actuators are devices, which help in cooperating with the physical environment. The data gathered by the sensors must be put away and handled cleverly keeping in mind the end goal to get valuable derivations from it. Note that we broadly characterize the term sensor; a mobile telephone or even a microwave stove can consider a sensor as long as it gives contributions about its present state (inner state + environment). An actuator is a gadget that is utilized to impact an adjustment in the environment, for example, the temperature controller of an aeration and cooling system .

The storage and handling of data should be possible on the edge of the network itself or in a remote server. In the event that any preprocessing of data is conceivable, at that point it is ordinarily done at either the sensor or some other proximate gadget. The prepared data is then regularly sent to a remote server. The storage and preparing capacities of an IoT protest are likewise confined by the assets accessible, which are frequently exceptionally compelled because of restrictions of size, vitality, control, and computational ability. Accordingly the primary research challenge is to guarantee that we get the correct sort of data at the coveted level of precision. Alongside the difficulties of data gathering, and taking care of, there are challenges in communication also. The communication between IoT devices is essentially wireless since they are by and large introduced at geologically scattered areas. The wireless channels frequently have high rates of bending and are inconsistent. In this situation dependably imparting data without excessively numerous retransmissions is a critical issue and hence communication innovations are basic to the investigation of IoT devices.

Presently, in the wake of preparing the IOT data, some move should be. The idea of activities can be different. We can specifically alter the physical world through actuators. Or then again we may accomplish something for all intents and purposes. For instance, we can send some data to other brilliant things.

The way toward affecting an adjustment in the physical world is regularly dependent on its state by then of time. This is called setting mindfulness. Each move is made keeping in consideration the setting on the grounds that an application can act contrastingly in various settings. For instance, a man dislike messages from his office to interfere with him when he is in the midst of some recreation.

Sensors, actuators, figure servers, and the communication network shape the center foundation of an IoT structure. In any case, there are numerous software angles that should be considered. To start with, we require a middleware that can be utilized to interface and deal with these heterogeneous parts. We require a great deal of standardization to interface a wide range of devices.

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II. LITERATURE WORK

According to P. P. Jayaraman, X. Yang, A. Yavari, D. Georgakopoulos, and X. Yi**,** the security is a fundamental piece of the fast improvement of IoT-based applications environment in the present period. The conventional IoT security architecture and standard of IoT isn't sufficient for the client utilizing diverse shrewd devices. The dynamic protection based system is required for IoT gadget security issue, which are being illuminated in better and more productive routes, for example, how the Computer Aided Design (CAD) technique are receiving a minimal effort arrangement contrasted with costly equipment procedure used. The fundamental security objectives of IoT devices are Confidentiality Integrity and Availability (CIA). The novel techniques are utilized for end-to-end security and protection oversaw for cutting edge IoT based systems that have a critical contact as for execution assessment techniques.

The works of J. Lin, W. Yu, N. Zhang, X. Yang, H. Zhang, and W. Zhao said that, the major IoT security challenges are secured medicinal services system and transposition system for sparing human life and furthermore avoiding money related misfortune. The IoT architecture layers all confronted security issues in term of security attacks. The security necessities are diverse as indicated by various applications. The IoT architectures' best layer of the application layers' principle security issues till today are data sharing that ensure client protection and access controls. Alternate attacks additionally looked on application layers incorporate phishing, malware and X contents. The IoT architecture center network layer confronted primary security challenges like respectability and classified data .

H. Suo, J. Wan, C. Zou, and J. Liu narrated that the IoT architecture security necessities are diverse at various layers. Specialists investigated that the application layer security prerequisites are confirmation and key administration, security insurance, security training and administration. The network layer security prerequisites are character validation, encryption component, and communication security fundamentally. The discernment layer security necessities are lightweight encryption technology, insurance sensor data, and key administration. The IoT security challenges included distinctive encryption components, for example, end- to-end encryption and bounce encryption. The IoT security challenges included distinctive communication protocols, for example, Transport Layer Security (TLS), Secure Socket Layer (SSL), Internet Protocol Security (IPSec). The IoT security challenges are controlled through the execute activity of cryptographic algorithms such Advance Encryption Standard (AES) for secrecy, Rivest Shamir Adelman (RSA) for the computerized mark of the key, Diffi-Hellman (DH) for key assention and Secure Hash Algorithm (SHA) for uprightness .

According to the works of D. Miorandi, S. Sicari, F. De Pellegrini, and I. Chlamtac, the IoT security is dependent on three things data secrecy, protection, and trust. The IoT security objectives are accomplished betterly if the previously mentioned three things are used for the majority of the clients of IoT proficient and solid way. The three IoT security challenges are graphically spoken to in Figure 1 .

ISSN:0971-1260

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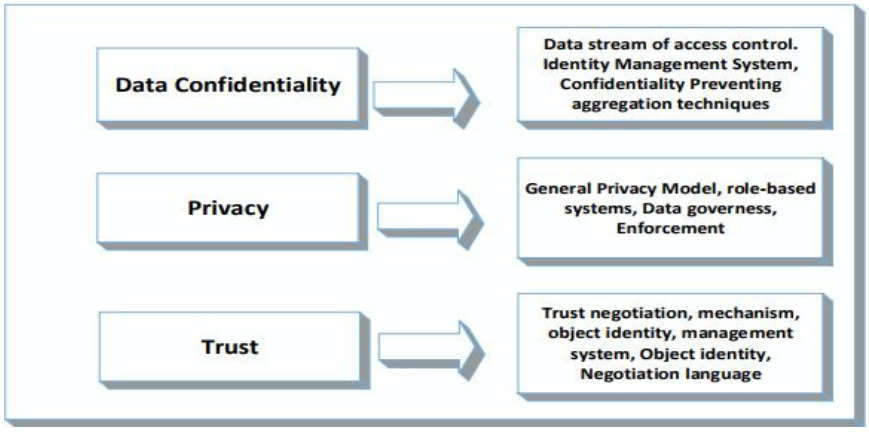

Figure 1: IoT Security Challenges

III. ARCHITECTURE OF IOT

There is no single accord on architecture for IoT, which is concurred all around. Distinctive architectures have been proposed by various scientists.

Three- and Five-Layer Architectures

The most essential architecture is three- layer architecture as appeared in Figure 2. It was presented in the beginning times of research around there. It has three layers, in particular, the observation, network, and application layers.

1. The discernment layer is the physical layer, which has sensors for detecting and assembling data about the environment. It detects some physical parameters or distinguishes other brilliant questions in the environment.

2. The network layer is in charge of interfacing with other brilliant things, network devices, and servers. Its highlights are likewise utilized for transmitting and preparing sensor data.

3. The application layer is in charge of conveying application particular services to the client. It characterizes different applications in which the Internet of Things can be conveyed, for instance, savvy homes, keen urban areas, and shrewd wellbeing.

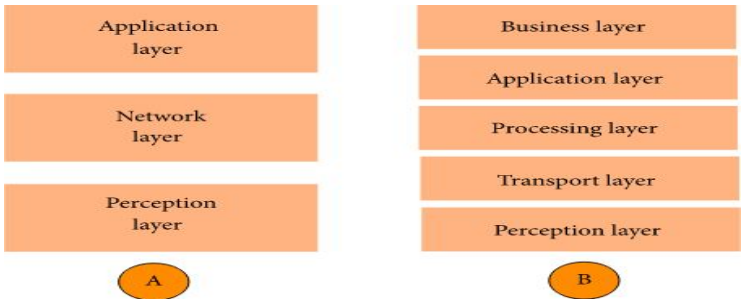

Figure 2: Architecture of IoT (A: three layers) (B: five layers).

ISSN:0971-1260

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The three-layer architecture characterizes the principle thought of the Internet of Things, yet it isn't adequate for inquire about on IoT in light of the fact that exploration regularly centers around better parts of the Internet of Things. That is the reason, we have numerous more layered architectures proposed in the writing. One is the five-layer architecture, which furthermore incorporates the handling and business layers. The five layers are discernment, transport, preparing, application, and business layers. The part of the observation and application layers is the same as the architecture with three layers. We layout the capacity of the staying three layers

1. The transport layer exchanges the sensor data from the discernment layer to the handling layer and the other way around through networks, for example, wireless, 3G, LAN, Bluetooth, RFID, and NFC.

2. The processing layer is otherwise called the middleware layer. It stores, breaks down, and forms tremendous measures of data that originates from the transport layer. It can oversee and give a various arrangement of services to the lower layers. It utilizes numerous innovations, for example, databases, cloud computing, and huge data preparing modules.

3. The business layer deals with the entire IoT system, including applications, business and benefit models, and clients' protection. The business layer is out of the extent of this paper. Consequently, we don't talk about it further.

Another architecture proposed by Ning and Wang is enlivened by the layers of processing in the human cerebrum. It is propelled by the knowledge and capacity of people to think, feel, recollect, decide, and respond to the physical environment. It is constituted of three sections. Initially is the human cerebrum, which is closely resembling the processing and data administration unit or the data focus.

Second is the spinal line, which is practically equivalent to the conveyed network of data processing nodes and brilliant portals. Third is the network of nerves, which compares to the networking parts and sensors .

Cloud and Fog Based Architectures

Give us now a chance to examine two sorts of systems architectures: cloud and fog computing. Note that this grouping is not the same as the arrangement, which was done based on protocols.

Specifically, we have been marginally ambiguous about the idea of data produced by IoT devices, and the idea of data processing. In some system architectures the data processing is done in a substantial incorporated manner by cloud PCs. Such a cloud driven architecture keeps the cloud at the middle, applications above it, and the network of savvy things underneath it. Cloud computing is given power since it gives incredible adaptability and versatility. It offers services, for example, the center framework, stage, software, and storage. Engineers can give their storage instruments, software devices, data mining, and machine learning apparatuses, and representation devices through the cloud.

Recently, there is a move towards system architecture, to be specific, fog computing, where the sensors and network passages complete a piece of the data processing and investigation. Fog architecture introduces a layered approach as appeared in Figure 3, which embeds observing, preprocessing, storage, and security layers between the physical and transport layers. The checking layer screens control, assets, reactions, and services. The preprocessing layer performs separating, processing, and investigation of

ISSN:0971-1260

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sensor data. The brief storage layer gives storage functionalities, for example, data replication, conveyance, and storage. At long last, the security layer performs encryption/decoding and guarantees data honesty and protection. Observing and preprocessing are done on the edge of the network before sending data to the cloud .

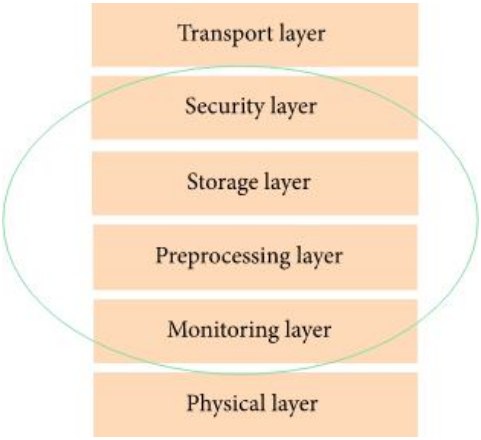

Figure 3: Fog architecture of a smart IoT gateway.

Social IoT

Give us now a chance to examine another paradigm: social IoT (SIoT). Here, we consider social connections between objects an indistinguishable path from people frame social connections. Here are the three principle features of a SIoT system:

- The SIoT is traversable. We can begin with one gadget and explore through every one of the devices that are associated with it. It is anything but difficult to find new devices and services utilizing such a social network of IoT devices.
- A need of dependability (quality of the relationship) is available between devices (like friends on Facebook).
- We can utilize models like concentrate human social networks to likewise contemplate the social networks of IoT devices.

Representative Architecture

Most architecture proposed for the SIoT has server side architecture also. The server associates with all the interconnected parts, totals (creates) the services, and goes about as a solitary purpose of administration for clients.

The server side architecture regularly has three layers. The first is the base layer that contains a database that stores subtle elements of the considerable number of devices, their characteristics, met data, and their connections. The second layer (Component layer) contains code to communicate with the devices, inquiry their status, and utilize a subset of them to influence an administration. The highest layer is the application

ISSN:0971-1260

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layer, which gives services to the clients .

Security Services

Taken after by security services, Internet of Things as a sort of normal and Internet network system it additionally has security issues as the other Internet system. The security issue in the Internet of Things system is principally for the item distinguishing proof, transmission and questions the procedure of security dangers. For instance, in the ID of things, might be because of the system's equipment and software vulnerabilities prompt protest acknowledgment technology did not play the coveted impact, coming about that it can't be precisely recognized. For example, during the time spent doing the recognizable proof of data transmission items, it will likewise happen during the time spent security issues, particularly when the data more processing data builds, the Internet of things transmission system may bomb, genuinely influencing the data transmission. In the inquiry of the things, the security issues emerge chiefly on the grounds that the question system isn't built up if the honesty of the inquiry might not be right or inadequate inquiry, which will inquiry the system put in a dangerous environment, the database Information is anything but difficult to alter. Along these lines, the best approach to accomplish the Internet of things ought to be considered the wellbeing of Internet of things, to give security services.

IV. Sensors and Actuators

All IoT applications need at least one sensors to gather data from the environment. Sensors are fundamental segments of savvy objects. A standout amongst the most imperative parts of the Internet of Things is setting mindfulness, which isn't conceivable without sensor technology. IoT sensors are generally little in estimate, have minimal effort, and expend less power. They are compelled by variables, for example, battery limit and simplicity of organization. Schmidt and Van Laerhoven give an outline of different sorts of sensors utilized for building keen applications.

Mobile Phone Based Sensors

Most importantly, let us take a gander at the mobile phone, which is universal and has numerous kinds of sensors implanted in it. In particular, the Smartphone is an extremely convenient and easy to use gadget that has a large group of implicit communication and data processing highlights. With the expanding prevalence of advanced mobile phones among individuals, scientists are indicating enthusiasm for building keen IoT arrangements utilizing PDAs due to the inserted sensors. Some extra sensors can likewise be utilized depending upon the necessities. Applications can be based on the Smartphone that utilizations sensor data to create significant outcomes.

Medical Sensors

The Internet of Things can be extremely useful for human services applications. We can utilize sensors, which can gauge and screen different therapeutic parameters in the human body. These applications can go for observing a patient's wellbeing when they are not in healing center or when they are distant from everyone else. In this way, they can give ongoing criticism to the specialist, relatives, or the patient.
There are numerous wearable detecting devices accessible in the market. They are outfitted with restorative sensors that are equipped for estimating distinctive parameters, for example, the heart rate, beat, circulatory strain, body temperature, respiration rate, and blood glucose levels. These wearables

ISSN:0971-1260

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incorporate brilliant watches, wristbands, observing patches, and shrewd materials.

Neural Sensors

Today, it is conceivable to comprehend neural flags in the cerebrum, construe the condition of the mind, and prepare it for better consideration and core interest. This is known as neuro input. The technology utilized for perusing cerebrum signals is called EEG (Electroencephalography) or a mind PC interface. The neurons inside the cerebrum convey electronically and make an electric field, which can be estimated from outside as far as frequencies. Cerebrum waves can be sorted into alpha, beta, gamma, theta, and delta waves depending upon the recurrence.

Environmental and Chemical Sensors

Environmental sensors are utilized to detect parameters in the physical environment, for example, temperature, moistness, weight, water contamination, and air contamination. Parameters, for example, the temperature and weight can be estimated with a thermometer and indicator. Air quality can be estimated with sensors, which sense the nearness of gases and other particulate issue noticeable all around
Chemical sensors are utilized to identify synthetic and biochemical substances. These sensors comprise of an acknowledgment component and a transducer. The electronic nose (e-nose) and electronic tongue (e-tongue) are innovations that can be utilized to detect chemicals based on smell and taste, separately. The e-nose and e-tongue comprise of a variety of compound sensors combined with propel design acknowledgment software. The sensors inside the e-nose and e-tongue deliver complex data, which is then examined through example acknowledgment to distinguish the stimulus.

Radio Frequency Identification (RFID)

RFID is an identification technology in which a RFID tag (a little chip with a receiving wire) conveys data, which is perused by a RFID user. The tag transmits the data put away in it by means of radio waves. It is like standardized tag technology. In any case, dissimilar to a conventional standardized identification, it doesn't require observable pathway communication between the tag and the user and can distinguish itself from a distance even without a human administrator. The range of RFID fluctuates with the frequency. It can go up to several meters.

V. Preprocessing

As savvy things gather immense measure of sensor data, figure and storage assets are required to investigate, store, and process this data. The most widely recognized figure and storage assets are cloud based in light of the fact that the cloud offers gigantic data dealing with, adaptability, and adaptability. However, this won't be adequate to meet the prerequisites of numerous IoT applications due to the accompanying reasons.

- *Mobility:* The greater parts of the keen devices are mobile. Their changing area makes it hard to speak with the cloud data focus as a result of changing network conditions crosswise over various areas.
- *Reliable and real time actuation:* speaking with the cloud and getting back reactions requires some serious energy. Inactivity delicate applications, which require real time reactions, may not be

ISSN:0971-1260

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achievable with this model. Likewise, the communication might be lossy because of wireless connections, which can prompt unreliable data.

- *Scalability:* more devices imply more demands to the cloud, in this way expanding the dormancy.
- *Power constraints:* communication devours a great deal of power, and IoT devices are battery powered. They therefore can't stand to impart constantly.

To take care of the issue of mobility, specialists have proposed mobile cloud computing (MCC). Be that as it may, there are still issues related with idleness and power. MCC likewise experiences mobility issues, for example, every now and again changing network conditions because of which issues, for example, flag blurring and benefit corruption emerge.

ISSN:0971-1260

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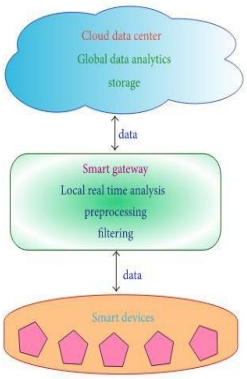

Figure 4: Smart gateway for preprocessing

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VI. CONCLUSION

Presently, IoT is in an exceptionally beginning stage. The advances in the center framework layers are hinting at development. In any case, significantly more needs to occur in the territories of IoT applications and communication advances. These fields will develop and affect human life in unfathomable courses throughout the following decade. Most IoT systems give noteworthy measure of help to making the application layer. This incorporates data mining, data processing, and perception APIs. Making mashups and dashboards of data is these days simple to do give the broad help gave by IoT structures. By the by, here the tradeoff is between the highlights gave and the assets that are required. We needn't bother with an overwhelming structure in the event that we don't want a ton of highlights. This call should be taken by the application engineers.

V. REFERENCES

[1] O. Vermesan, P. Friess, P. Guillemin et al., “Internet of things strategic research roadmap,” in Internet of Things: Global Technological and Societal Trends, vol. 1, pp. 9–52, 2011.

[2] Peña-López, Itu Internet Report 2005: The Internet of Things, 2005.

[3] Mashal, O. Alsaryrah, T.-Y. Chung, C.-Z. Yang, W.-H. Kuo, and D. P. Agrawal, “Choices for interaction with things on Internet and underlying issues,” Ad Hoc Networks, vol. 28, pp. 68–90, 2015.

[4] P. P. Jayaraman, X. Yang, A. Yavari, D. Georgakopoulos, and X. Yi, "Privacy preserving Internet of Things: From privacy techniques to a blueprint architecture and efficient implementation," Future Generation Computer Systems, 2017. challenges," Ad Hoc Networks, vol. 10, pp. 1497-1516, 2012.

[5] J Lin, W.Yu, N.Zhang and W. Zhao,” A survey on internet of things: Architecture, enabling technologies, security and privacy, and applications”. IEEE Internet of Things Journal 2017.

ISSN:0971-1260

Vol-22-Issue-10-November-2019

[6] H Suo, J Wan, C Zou and J. Liu. " Security in the Internet of Things: a review", in the computer Science and Electronics Engineering (ICCSEE), International Conference pp-648-651, 2012.

[7] D Miorandi, S Sicari, F Depellegrini & I Chlamtac, " Internet of Things: Vission, applications and Research applications and key Challenges" in the proceedings of the 10th International Conference on Frontiers of Information Technology (FIT), pp:257-260, 2012.

[8] H Ning and Z Wang. " Future internet of things architecture: likeminded neural system or social organization framework:, IEEE Communications Letters, Vol 15, No 4, pp:461-463,2011

[9] M Weyrich and C Ebert, "Reference architectures for the Internet of Things". IEEE Software, Vol 33, No 1,pp 112-116, 2016.

ACCENT JOURNAL OF ECONOMICS ECOLOGY & ENGINEERING
Peer Reviewed and Refereed Journal ISSN NO. 2456-1037 IMPACT FACTOR: 7.98 (INTERNATIONAL JOURNAL)
Vol. 04, Issue 08, August 2019 Available Online: www.ajeee.co.in/index.php/AJEEE

AN ANALYTICAL RESEARCH BASED ON MECHANICAL PROPERTIES IN POLYCRYSTALLINE SAMPLES USING SPHERICAL NANOINDENTATION

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Abstract - This paper describes the development of novel experimental protocols and data analysis procedures for extracting meaningful indentation stress–strain curves from spherical nanoindentation on polycrystalline samples, and correlating these measurements to the local crystal lattice orientation measured by orientation imaging microscopy at the indentation site. In particular, we demonstrate that it is possible to estimate the percentage increases in the local slip resistance in deformed samples of polycrystalline cubic metals from their fully annealed condition.
Keywords: Nanoindentation; Orientation imaging microscopy (OIM); Metal and alloys–steel; Yield phenomena; Slip resistance.

1. INTRODUCTION

Nanoindentation, with its high goal burden and profundity detecting capacities, is being utilized progressively to describe the nearby mechanical way of behaving at ever decreasing sizes of interest in a wide scope of materials frameworks with heterogeneous microstructures. This method has been customarily utilized for describing the neighborhood hardness utilizing sharp indenters. Notwithstanding, our new work has shown the colossal potential to change the crude burden dislodging information acquired utilizing round indenters into significant space pressure strain bends. These recently evolved space information examination techniques have effectively caught the neighborhood stacking and dumping versatile moduli, the nearby space yield qualities and certain parts of postyield strain solidifying conduct in polycrystalline aluminum and tungsten tests. They have additionally been viewed as extremely helpful in distinguishing and making sense of a few of the surface readiness curios normally experienced in the nanoindentation estimations. Since the length scales in nanoindentation are more modest than the regular crystallite (additionally called grain) sizes in polycrystalline examples, this method is an optimal apparatus for point by point portrayal of the

Peer Reviewed and Refereed Journal ISSN NO. 2456-1037 IMPACT FACTOR: 7.98 (INTERNATIONAL JOURNAL)
Vol. 04, Issue 08, August 2019 Available Online: www.ajeee.co.in/index.php/AJEEE

microscale heterogeneities present in these materials and their development during different metal molding/working activities.

In this paper, we report on the turn of events and approval of the nanoindentation information examination methodology with the particular point of portraying the nearby space yield qualities in individual grains of distorted polycrystalline metallic examples and relating them to expansions in the neighborhood slip protections. Our concentration in this paper will be on cubic metals. It is notable that metals solidify altogether with the burden of plastic strain (particularly when disfigured at low homologous temperatures; additionally called cold-working). In any case, because of the grain-scale heterogeneity in their microstructures, the singular grains don't solidify similarly. Regardless of some revealed exploratory and demonstrating studies to comprehend the improvement of distorted microstructures in polycrystalline cubic metals, there stays a basic requirement for the improvement of novel strategies to describe the neighborhood changes in the yield strength in the singular grains of a polycrystalline metallic example as a component of the macroscale plastic twisting forced on the example. Nanoindentation offers gigantic commitment for tending to this basic need. Notwithstanding, it requires improvement and approval of the information examination techniques that account thoroughly for the inborn reliance of the space yield strength on the nearby gem grid direction. For instance, it is completely expected that the space yield strength will fluctuate altogether starting with one precious stone direction then onto the next, even in completely toughened examples where there are no significant contrasts in the separation content of the contrastingly arranged grains. This is on the grounds that the plastic misshapening forced by the indenter should be obliged locally at the space site by slip action on the accessible slip frameworks, whose direction and actuation are unequivocally reliant upon the nearby gem cross section direction concerning the space course. Consequently, a thorough philosophy is expected to represent the impact of the gem cross section direction on the space yield strength so we can dependably lay out the commitment to the space yield strength from the separation content at the space site. In the event that we can effectively decouple the impacts of direction from the impacts of the expanded disengagement thickness on the neighborhood estimations of space yield strength, it ought to be feasible to appraise the nearby rate expansion in the normal slip opposition at the space site.

One of the difficulties emerges from the way that the mechanical reaction of individual

Peer Reviewed and Refereed Journal ISSN NO. 2456-1037 IMPACT FACTOR: 7.98 (INTERNATIONAL JOURNAL)
Vol. 04, Issue 08, August 2019 Available Online: www.ajeee.co.in/index.php/AJEEE

grains is innately anisotropic, though practically all nanoindentation information examination techniques are based on Hertz's hypothesis, which accepts an isotropic flexible material way of behaving. As displayed in this paper, the space reaction of Fe-3% Si steel can be sufficiently caught by involving a changed type of Hertz's examinations for flexibly anisotropic cubic materials, initially proposed by Vlassak and Nix. It is likewise essential to perceive that it is important to separate the nearby space yield strength from an examination of the underlying stacking fragment in the space try, in light of the fact that the actual space will change the neighborhood microstructure and its properties once it forces extra nearby plastic misshapening.

It will be displayed in this paper that the typical expansion in the neighborhood slip opposition at the space site in the disfigured polycrystalline microstructures can be described by consolidating the capacities of circular nanoindentation and direction imaging microscopy (OIM) (this essential thought was momentarily presented in an earlier report from our examination bunch). OIM depends on computerized ordering of back-dispersed electron diffraction designs (got utilizing an examining electron magnifying lens) and has a spatial goal of under a micron.

2. MATERIALS AND METHODS

Polycrystalline examples of Fe-3% Si steel, which is known to display significant flexible anisotropy (A = 2.84) and plastic anisotropy on the size of individual grains, were utilized in this review. The examples were separated by electric release machining from the chill zone of a directionally cemented electrical steel ingot. These examples were picked on the grounds that they showed very huge grains (of the request for not many millimeters in compelling grain size). The enormous grains essentially decrease the opportunities for the presence of a grain limit just beneath the surface at the space site, particularly when the spaces are acted in the focal pieces of huge grains. It ought to be noticed that the OIM method tests basically the top surface of the examples, and is accordingly unfit to recognize subsurface subtleties of the microstructure. A portion of the examples were given a 30% decrease in basic pressure to deliver a decently twisted microstructure; different examples were exposed to 80% decrease in plane strain pressure to create a vigorously disfigured microstructure. Both of these misshapenings were applied at room temperature utilizing an Instron (Frame 1127R) screw-driven testing machine. During these disfigurements, all contact surfaces between the example and the passes on were greased up

Peer Reviewed and Refereed Journal ISSN NO. 2456-1037 IMPACT FACTOR: 7.98 (INTERNATIONAL JOURNAL)
Vol. 04, Issue 08, August 2019 Available Online: www.ajeee.co.in/index.php/AJEEE

with graphite-based oil and a 0.1 mm thick Teflon sheet.

The examples (as-given a role as well as twisted) were first ready for OIM utilizing a Buehler crushing and cleaning machine. Subsequent to crushing by Si-C papers, 3 and 1 lm precious stone suspensions were utilized for cleaning the examples related to a few transitional engravings by Nital (5 vol. % combination of nitric corrosive in ethanol). The examples were hence cleaned utilizing 0.05lm colloidal silica. The last step remembered vibratory cleaning with 0.02 lm colloidal silica for a Buehler vibratory polisher for a few (2-4) days. Note that a great last surface completion is significant for both the OIM estimations and the ensuing space tests. Whenever this definite example planning convention was not followed cautiously, we frequently saw that the estimations were inclined to huge mistakes. This issue has been examined exhaustively in our new distribution [9]. It is emphasized here that the last surface readiness step with the vibratory polisher for a couple of days is of most extreme significance, as it delivered a smooth surface, equivalent to electro cleaning, that gives off an impression of being liberated from any extra strain because of the example planning methods themselves[18].

Nanoindentations were completed utilizing a nanoindenter (MTS XP System outfitted with the nonstop solidness estimation (CSM) connection) with a 13.5 lm sweep round jewel tip. The tests were completed under load control to top removals of 150 nm in all examples. The nanoindentation test focuses were picked at the center of the singular grains, well away from the grain limits, to relieve any impact of the grain limits on the experimental outcomes.

3. DATA ANALYSIS METHODS FOR SPHERICAL INDENTATION

Changing the deliberate burden relocation information in round nanoindentation into space pressure strain bends permits a more straightforward and proficient approach to dissecting the nearby material way of behaving. These space pressure strain bends permit a superior distinguishing proof of the various phases of material conduct under contact stacking, especially during the stacking fragment of the space interaction. Our new reports show how the space pressure strain bends can be utilized to catch an abundance of data about the material, including the flexible moduli estimated in stacking and dumping sections [6-8], as far as possible (which can be recognized as yielding in metallic examples [6,8,9] or locking in a high viewpoint proportion material like carbon nanotubes [19]), various parts of the postelastic conduct [6,8], as well as distinguishing and

making sense of a few of the surface readiness curios normally experienced in nanoindentation estimations [9].

Our examination methods are itemized in Ref. [6] and can be momentarily summed up as a two-step method. The most important phase in the examination cycle is a precise assessment of the place of powerful starting contact in the given informational index, for example an unmistakable recognizable proof of a zero-point that makes the estimations in the underlying versatile stacking section steady with the expectations of Hertz's hypothesis.

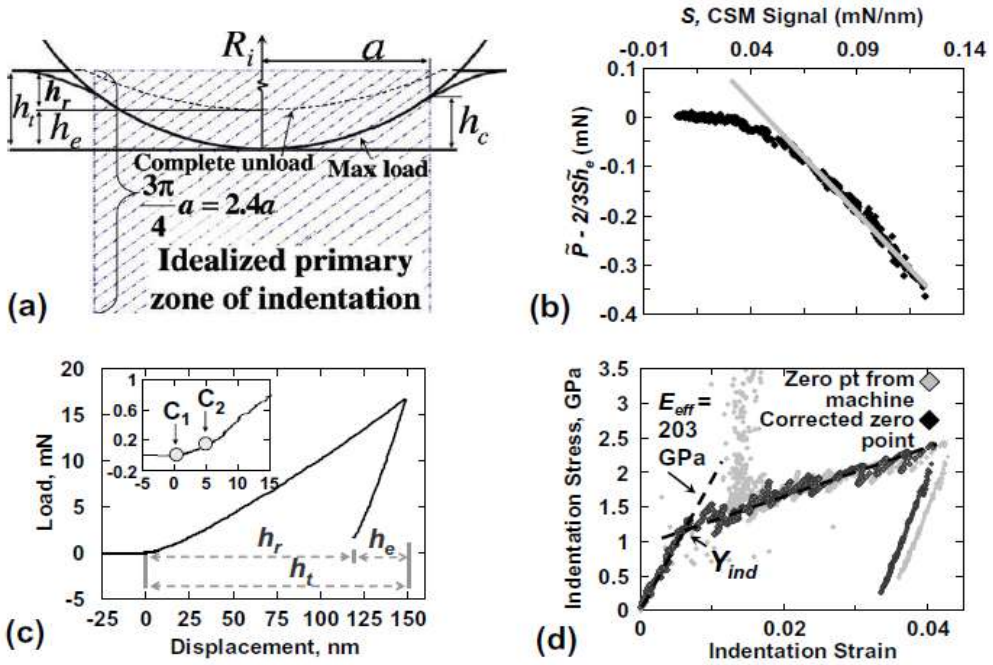

Figure 1 (a) Schematic of a spherical indentation showing the primary zone of indentation. (b) The identification of the effective zero-point following the linear regression analysis method described in Ref. [6]. (c) The measured load–displacement curve and (d) the extracted indentation stress–strain curves for Fe–3% Si steel are shown here using two different estimates of the zero-point. The use of the zero-point established by the machine (C1) results in an unexplainable spike in the initial elastic loading portion of the curve. When the effective zero-point (C2) is determined using Ref. [6], much better indentation stress–strain curves are obtained. (d) also shows the back-extrapolation method used to estimate the indentation yield strength.

Hertz's hypothesis (communicated here as Eqs. (1) and (2)) tended to just the versatile space of an isotropic example. Be that as it may, practically speaking, the versatile reaction of the example at the normal length size of nanoindentation is in many cases innately anisotropic, particularly in polycrystalline metals, where the indents are a lot more modest than the regular

grain sizes. A few scientists have utilized horribly improved on medicines of anisotropy in the examinations of the nanoindentation information (for example the utilization of powerful isotropic flexible properties or the utilization of versatile modulus toward space). All the more as of late, Vlassak and Nix [15, 16, 23, 24] have given a considerably more thorough treatment of the hypothesis of the versatile space of anisotropic examples. These creators recommend that Eq. (2) can be utilized for versatile space of cubic precious stones, gave that an anisotropy boundary, b, is suitably brought into the meaning of the powerful space modulus. Specifically, they recommend that Eq. (2) be changed as

$$\frac{1}{E_{eff}} = \frac{1}{\beta}\left(\frac{1-v_s^2}{E_s}\right) + \left(\frac{1-v_i^2}{E_i}\right)$$

where E_s and versus indicate the viable upsides of Young's modulus and Poisson's proportion, separately, for a haphazardly finished polycrystalline total of gems with similar flexible properties as the single precious stone being contemplated [15,16]. For cubic precious stones, the worth of β relies emphatically upon the gem cross section direction and the level of cubic versatile anisotropy. The flexible anisotropy of a cubic gem is generally characterized by A = 2C44/(C11 - C12), where C11, C12 and C44 signify the cubic versatile constants used to characterize the precious stone flexible firmness in its own reference outline. The upsides of the boundary β have been systematically processed and approved for a couple of unique (symmetric) cross section directions. In view of the qualities revealed by Vlassak and Nix [15, 16], the upsides of β ought to be in the scope of 0.9-1.1 for Fe-3% Si gems (for which A = 2.84) of various directions. In the current review, we have performed spaces on a wide scope of gem directions in Fe-3% Si and approved the straight connection between the space pressure and the space strain (characterized in Eq. (1) and changed by the presentation of β in Eq.)) in the flexible stacking system, as well as the upsides of β anticipated by Vlassak and Nix.

4. RESULTS AND DISCUSSION

As depicted before, an as-projected polycrystalline example of Fe-3% Si steel with exceptionally huge grains was utilized in this review. The OIM filter acquired on this example. The grain directions are variety coded to mirror their situations in the converse shaft figure map gave. For instance, the grains that have a (0 0 1) crystallographic plane lined up with the example surface are shaded red.1 Because we are concentrating on cubic gems, this likewise implies that the grains hued red have a [0 0 1] crystallographic heading lined up

with the example ordinary course (ND; additionally the space bearing). Likewise, grains with a (1 0 1) plane lined up with the surface are shaded green, while the grains with a (1 1 1) plane lined up with the surface are hued blue. It is seen that the chose district of the example has a scope of grain directions that give a decent inclusion of the sides of the basic triangle in the converse shaft figure for cubic gems. As a result of the extremely enormous grain sizes in the example, we can expect that the space estimations in any one grain are probably not going to be impacted by the adjoining grain directions or grain limits.

The space estimations directed in this study showed the biggest distinction in the space pressure strain bends of the almost (1 1 1)- arranged grains and the almost (0 0 1)- situated grains, with the reaction of the almost (1 0 1)- arranged grains being genuinely near the reaction of the close to (1 1 1)- situated grains. Space pressure strain bends got from various spaces in two of the grains contemplated. It is seen that the estimations in each grain are profoundly predictable with one another, aside from the event of pop-ins that outcome in a lengthy beginning straight flexible section. Strangely, it is additionally seen that the space pressure strain bend after the pop-in occasion is especially reliable with the estimations got without the pop-in occasions. The actual beginning of the pop-in occasions will be examined later.

The least complex relationship one can lay out between the addition in the space yield point and the neighborhood disengagement content is through the augmentation in the basic settled shear strength of the slip framework. In a profoundly improved on approach, one could communicate this relationship as

$$Y_{ind} = M(\Phi, \varphi_2)\,\tau_{CRSS}, \quad \Delta\tau_{CRSS} \propto \sqrt{\rho}$$

where 1/M is a Schmid-like factor that depends only on the grain orientation (in the present case only on two of the three Bunge–Euler angles describing the crystal orientation), τ_{CRSS} is the averaged critical resolved shear stress in the crystal, $\Delta\tau_{CRSS}$ is the increment in the local averaged critical resolved shear strength between the as-cast and cold-worked conditions, and ρ is the local dislocation density. Since the factor M is the only orientation dependent variable, it is easy to see that percentage increase in the indentation yield point can be assumed to be equal to the percentage increase in τ_{CRSS}. These are all the measurements in the deformed sample obtained in this study. The percentage increases in τ_{CRSS} provide an indirect measure of the local dislocation content or the local

stored energy in the deformed sample. It is seen from the limited number of measurements obtained in this study that the changes in τ_{CRSS} vary significantly from one deformation step to another and also from one region to another in the same deformed sample, resulting in a highly heterogeneous microstructure in the deformed polycrystalline samples. It is also clear that any conclusions drawn regarding the local slip resistance or the local dislocation content directly from the measured indentation yield points without accounting for the effect of the crystal lattice orientation at the indentation site would be highly erroneous in the examples shown here.

5. CONCLUSIONS

In summary, we have demonstrated a novel approach to extract meaningful correlations between local crystal lattice orientation measurements obtained from OIM and the estimates of local elastic and yield properties from nanoindentation measurements. This has been made possible by the use of our newly developed data analysis procedures for the conversion of load–displacement data obtained in spherical nanoindentation of polycrystalline cubic metals into indentation stress–strain curves that includes our new procedure for establishing the effective zero-load and zero-displacement point in the raw dataset. In this work, conducted on polycrystalline Fe–3% Si samples but easily extendable to other material systems, our analysis procedures are able to account for the effect of crystal lattice orientation on the indentation modulus and the indentation yield strength of the as-cast samples. Using this information, we are then able to correlate the increment in indentation yield strength to the changes in the slip resistance at the indentation site of the 30% and 80% plastically deformed samples.

REFERENCES

1. Fischer-Cripps AC. Nanoindentation. Berlin: Springer; 2004.
2. Johnson KL. Contact mechanics. Cambridge: Cambridge University Press; 1987.
3. Tabor D. The hardness of metals. Oxford: Oxford University Press; 1951.
4. Oliver WC, Pharr GM. J Mater Res 1992; 7: 1564.
5. Schuh CA. Mater Today 2006; 9: 32.
6. Kalidindi SR, Pathak S. Acta Mater 2008; 56: 3523.
7. Pathak S, Kalidindi SR, Klemenz C, Orlovskaya N. J Eur Ceram Soc 2008; 28: 2213.
8. Pathak S, Shaffer J, Kalidindi SR. Scripta Mater 2009; 60: 439.
9. Pathak S, Stojakovic D, Doherty R, Kalidindi SR. J Mater Res 2009; 24(March): 1127 [Focus Issue on Nanoindentation].
10. Bhattacharyya A, El-Danaf E, Kalidindi SR, Doherty RD. Key Eng Mater 2000;177–180:183.
11. Bhattacharyya A, El-Danaf E, Kalidindi SR, Doherty RD. Int J Plasticity 2001;17: 861.

12. Kalidindi SR, Bhattacharyya A, Doherty RD. Adv Mater 2003; 15: 1345.
13. Kalidindi SR, Bhattacharyya A, Doherty RD. Proc Royal Soc London, Ser A: Math, Phys and Eng Sci 2004; 460: 1935.
14. Hertz H. Miscellaneous papers. New York: Macmillan & Co. Ltd.; 1896.
15. Vlassak JJ, Nix WD. Philos Mag A: Phys Condens Matter Defect Mech Propert 1993; 67: 1045.
16. Vlassak JJ, Nix WD. J Mech Phys Solids 1994; 42: 1223.
17. Proust G, Kalidindi SR. TMS Lett: The Min Met Mater Soc 2004; 7: 151.
18. Biener MM, Biener J, Hodge AM, Hamza AV. Phys Rev B: Condens Matter Mater Phys 2007; 76: 165422.
19. Pathak S, Go knur Cambaz Z, Kalidindi SR, Gregory Swadener J, Gogotsi Y. Carbon 2009, doi:10.1016/j.carbon.2009.03.042 .
20. Sneddon IN. Int J Eng Sci 1965; 3: 47.
21. Farthing LJ, Weihs TP, Kisker DW, Krajewski JJ, Tang MF, Stevenson DA. In: Thin films: stresses and mechanical properties symposium. Boston, MA: Materials Research Society; 1988 [p.123].
22. Cammarata RC, Schlesinger TE, Kim C, Qadri SB, Edelstein AS. Appl Phys Lett 1990; 56: 1862.
23. Vlassak JJ, Ciavarella M, Barber JR, Wang X. J Mech Phys Solids 2003; 51: 1701.
24. Willis JR. J Mech Phys Solids 1966; 14: 163.

ACCENT JOURNAL OF ECONOMICS ECOLOGY & ENGINEERING
Peer Reviewed and Refereed Journal IMPACT FACTOR: 7.98 (INTERNATIONAL JOURNAL)
Vol. 04, Issue 12, December 2019 Available Online: www.ajeee.co.in/index.php/AJEEE

EVFC BASED ASYNCHRONOUS GENERATOR FOR LOW POWER TECHNIQUE

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Abstract- In this paper, an electronic voltage and frequency (EVFC) controller has been implemented and simulated in MATLAB/SIMULINK Simper System Block set to regulate voltage and frequency of a IAG feeding three-phase balanced and unbalanced linear and non-linear consumer load for constant power applications such as uncontrolled turbine in Pico hydro power generation (<10kW). The EVFC consists of a diode bridge rectifier, IGBT based chopper switch, dc filtering capacitor, PI controller and a resistive Dump load.

Keywords:-Isolated Asynchronous Generator, linear and non-linear load, diode bridge rectifier.

1. INTRODUCTION

Distributed or on-site power generation has proven to be more reliable and economical in recent years than the off-site generation due to its cost, complexity of national grid system, reduced reliability and transmission losses. Thus, a distributed power generation system is an alternative or an enhancement of the existing traditional electric power system. Thus a suitable self-excited or standalone system using locally available energy sources like small hydro, wind, biomass become a preferred option. As these energy sources systems are located in remote areas they must be reliable, robust, economical and manageable by local communities.

The unskilled community must handle the complete system comprises of prime mover, generator and its associated controller.

Micro turbines or pumps as a turbine are used as a prime mover. The Asynchronous generator in stand-alone mode is the most preferred and suitable option due to low cost, simple construction, ruggedness, brushless rotor, absence of DC source, maintenance-free nature, self-protection against short-circuit and its off-the shelf availability. Due to the latest research on non-conventional energy sources and grid OFF systems, the GIAG becomes one of the most important

and favoured renewable sources of energy. For low power rating (less than 100kW) uncontrolled turbines driving Grid Isolated Asynchronous Generator are preferred which maintain the hydropower constant, thus requiring the generator output power to be held constant at varying consumer loads. This requires Electronics based load controller where a dump load is connected in shunt or across the consumer load so that the total power consumed is held constant.

Various types of electronics based controllers (EVFC) for IAG have been developed and are reported in literature along-with its advantages and disadvantages. The IAG can be used for constant power applications and for constant speed variable power application. In constant power applications, prime mover speed, value of excitation capacitor and the consumer load are kept constant and thus known as a single point operation. In constant speed variable power applications, speed of the prime mover is kept constant but the value of excitation capacitance increases with load. For constant power application, generated power and consumer output power must be fixed for stable operation of three-phase IAG. Input power remains constant with uncontrolled Pico-hydro turbine but output power may not be constant due to varying consumer load. In this paper, a simple EVFC is developed which maintain the IAG output power constant.

2. SCHEMATIC DIAGRAM DESCRIPTIONS

The complete Schematic diagram of the three-phase EVFC-IAG system is shown in the whole system is a combination of Asynchronous machine, delta connected capacitor bank, three-phase load and an electronic voltage and frequency controller (EVFC). The value of excitation capacitor is selected in such a way that it generates the rated voltage at no load. It consists of six-pulse diode bridge rectifier, the IGBT operated chopper switch, a filtering capacitor(C), dump load resistance (Rd). The diode bridge rectifier is used to convert input three-phase ac terminal voltage of IAG to dc output voltage. The output dc voltage has the ripples, which should be filtered and therefore a filtering capacitor is used to smoothen the dc voltage.

An IGBT is used as a chopper switch providing the variable dc voltage across the dump load. Initially the consumer load and the electronics based dump load controller are kept OFF and the generator is self-excited at no-load. After successful voltage build-up, the electronics based dump load controller consumes the whole of the generated power. When both the consumer load and the chopper is switched ON, the

current flows through the dump load and consumes the difference between the generated power and consumer load power and this result in a constant load on the IAG and hence constant voltage and frequency at the balanced consumer load.

Thus the generator maintains the power balance in the system. The duty cycle of the chopper is varied by a discrete PI controller. The output of the PI controller is compared with the saw tooth wave to generate switching signal of varying duty cycle for the chopper switch. According to the principle of operation of the system, the suitable value of capacitors is connected to generate rated voltage at desired power. The input power of the IAG is held constant at varying consumer loads. Thus IAG supplies power to consumer load and dump load in parallel such that the total power is constant.

3. CONTROL STRATEGY

The control circuit of electronics voltage and frequency controller (EVFC) consists of a voltage sensor for sensing the three-phase ac voltage of IAG, a comparator for comparing the sensed ac voltage with the reference voltage, a discrete PI controller for processing the error voltage. The output of PI controller is compared with a saw tooth carrier waveform of 1 kHz frequency to generate the PWM switching signal for IGBT operated chopper switch.

4. SIMULATED RESULTS DETAILS AND ITS FINDINGS

All the simulations have been carried out in MATLAB software package on a 3730 W Squirrel cage Asynchronous motor with Simulation type (Discrete), Sample time (50e-6), Discrete solver mode (Forward Euler), Simulation time (2 seconds), Relative tolerance (1e-3), Time tolerance (10*128*eps) and ode45 (Stiff/TR-BDF2) solver A three-phase electronics voltage and frequency (EVFC) controller for a three-phase IAG is implemented. The dump load resistance and DC link capacitor are selected to 103 Ω and 151 µF for the simulation study under balanced/unbalanced three phase linear and non-linear consumer load. A three-phase star-connected Asynchronous machine of 3.73 kW, 460 V, 60 Hz, 4 poles is used as IAG. The IAG is driven by a three-phase alternator. To generate rated voltage i.e. 460 V at no-load, three phase capacitor of appropriate value is connected across the machine stator terminals.

4.1 Performance of Iag-Evfc System Feeding Three-Phase Balanced/Unbalanced Resistive Load

The transient waveforms of three-phase generator voltages (Vabcg), three- phase generator currents

(Iabcg), three-phase resistive load currents (Iabcl), per-phase EVFC currents (Iac, Ibc, Icc), generated power (Pgen), consumer load power (Pcload) and electronic load power (Peload) It is observed from the simulated results that when the three-phase balanced delta connected resistive load of 2 kW is switched ON between each phase to phase at 0.7 sec, consumers load current increases and the EVFC currents decreases. It indicates that transfer of power takes place from three-phase EVFC to the balanced three-phase consumer load and IAG experiences constant load on it and hence maintain constant voltage and frequency. It is also observed that at this time power grabbed by the dump load (Preload) is nearly zero.

With the switching OFF of one phase at 0.8 sec and another phase of load at 0.85 sec, the load becomes unbalanced. Under these operating conditions, consumer load current decreases and the EVFC currents increases. It indicates that transfer of power takes place from three-phase consumer load to the three-phase EVFC and IAG experiences constant load on it and hence maintains constant voltage and frequency. At 0.9 sec one-phase and at 0.95 sec another phase of load is reconnected on IAG and the system becomes balanced once again. At the instant of switching OFF the three-phase balanced resistive consumer load at 1.2 sec, load current becomes zero and EVFC current increase which gives an indication of transfer of power from consumer load to EVFC such that IAG experiences a constant load on it and maintain constant voltage and frequency.

It is observed from that electronic load power decreases whereas the consumer load power increases with increase in balanced /unbalanced consumer load so that the load on the IAG remains constant. That the EVFC is capable of reducing the harmonics generated by the load and maintain the THD of the generated voltage at 2.23% under balanced and at 2.42% under unbalanced load conditions .The THD of the generated current is at 4.14% under balanced and at 4.22% under unbalanced load. The THD of both the generated voltage and current are within the limit as specified by IEEE 519 standards. Shakuntla Boora et al.

4.2 Performance of Iag-Evfc System Feeding Three-Phase Balanced/ =Unbalanced Reactive Load

With the switching ON of three-phase balanced reactive load at 0.7 sec, load current increases and EVFC current of the three -phases decreases to balance the IAG system. With the switching OFF of one phase at 0.8sec and another phase of load at 0.85 sec, the load becomes unbalanced and hence

EVFC currents of two phases increase for balancing the IAG system. At 0.9 sec one-phase and at 0.95 sec another phase of load is reconnected on IAG. Under such situation, EVFC currents decrease to make IAG system balanced. It means that the controller current increases and decreases when the consumer load decreases and increases respectively.

It means that the generated power of the IAG remains constant even at varying load conditions. In reactive load situation, generator voltage is constant and is perfectly sinusoidal which shows that EVFC is acting as a voltage regulator and load balancer. The speed of the IAG is constant throughout the whole process which shows that the IAG is generating constant voltage, frequency and power. That the EVFC is capable of reducing the harmonics generated by the load and maintain the THD of the generated voltage at 2.84% under balanced and at 2.94% under unbalanced load conditions .The THD of the generated current is at 4.53% under balanced and at 4.62% under unbalanced load.

4.3 Performance of Iag-Evfc System Feeding Three-Phase Balanced/Unbalanced Non-Linear Load

On removal of one phase of the load at 0.8 sec, the load becomes unbalanced but the generator currents remain balanced, which shows the load balancing aspect of the controller. The speed of the IAG is constant throughout the whole process which shows that the IAG is generating constant voltage, frequency and power. the steady state performance characteristics of IAG voltage, Dump power, frequency, load current and dump load current with variation in Consumer load for the three-phase EVFC. It is noticed that IAG voltage and frequency remains constant when the consumer load is varying from 0 to 2 kW. At 0kW consumer power, the dump load power is equal to the rated power of IAG. Further, the dump power decreases with an increase in consumer power. With increase in consumer power, the load current decreases whereas the dump loads current increases to make the load constant on the generator.

5. CONCLUSIONS

The steady state and transient state analysis results showed that the developed EVFC for GIAG is capable to maintain both voltage and frequency constant despite the variation in balanced and unbalanced consumer resistive/ reactive/non-linear load. The THD of the generated voltage and current are within the limits specified by IEEE 519 standard. Such type of developed system can be used for electrical power production in Pico-hydro based applications.

REFERENCES

1. R. C. Bansal, Three-Phase Self-Excited Induction Generators: An Overview, IEEE transactions on Energy Conversion, Vol. 20, No. 2, 2005, pp. 292-299.
2. J.M. Elder, J.T. Boys and J.L. Woodward, Integral cycle control of stand-alone generators , IEE Proc., Vol. 132 , No. 2, 1985, pp. 57-66.
3. R. Bonert and S. Rajakaruna, Self-excited induction generator with excellent voltage and frequency control, IEEE Proc. Genre Transm. Diatribe. Vol. 145, No. 1, 1998, pp. 33-39.
4. Chandra, T.S, Bishnu, P.M., Voltage regulators for self-excited induction generator, IEEE Transactions on Energy Conversion, Vol. 20, No. 4, 2004, pp. 460-463.
5. S.C Kuo and L Wang, P.M., Analysis of voltage control for a self-excited induction generator using a current-controlled voltage source inverter (CC-VSI), Proc. Inst. Elect. Eng., Transom. Diatribe, Vol. 148, No. 5, 2001, pp. 431-438.
6. E. Suarez and G. Bortolotto, Voltage frequency control of a self-excited induction Generator, IEEE Trans. Energy Convers, Vol. 14, No. 3, 1999, pp. 394-401.
7. B. Singh, S.S. Murthy and S. Gupta, Analysis and implementation of an electronic load controller for a self-excited induction generator, IEE Proc. Genre. Transom. Diatribe, Vol. 151, No. 7, 2004, pp. 51-60.
8. B. Singh, S.S. Murthy and S. Gupta, Analysis and design of an electronic load controller for a self-excited induction generator, IEEE Trans. On Energy Conversion, Vol. 21, No. 1, 2006, pp. 285-293.
9. Sarsing Gao, S.S Murthy, G. Bhubaneswar and M. Sree Lalitha Gayathri, Design of microcontroller based electronic load controller for a self-excited induction generator supplying single-phase loads, Journal of Power Electronics, Vol. 10, No. 4, 2010, pp. 444-449.
10. Juan M. Ramirez and Emmanuel Torres M., An Electronic load controller for self-excited induction generators, IEEE PES General Meeting, June, 2007.

ACCENT JOURNAL OF ECONOMICS ECOLOGY & ENGINEERING
Peer Reviewed and Refereed Journal ISSN NO. 2456-1037 IMPACT FACTOR: 7.98 (INTERNATIONAL JOURNAL)
Vol. 04, Issue 08, August 2019 Available Online: www.ajeee.co.in/index.php/AJEEE

AN ANALYTICAL REVIEW BASED ON ADAPTIVE CONTROL APPROACH WITH VECTOR CONTROL SCHEME FOR INDUCTION DRIVE

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Abstract- Speed sensor less vector control is the current trend in variable speed industrial AC drives due to its substantial energy efficiency and robustness. The existing Flux Oriented and/or Direct Torque Vector Control of Induction Motor need improvement in dynamic performance in terms of ripple free torque and smooth flux operation. In this project a new scheme combining both flux and torque control is developed effectively and its performance during starting, steady state operation and dynamic load changing conditions is analysed by dynamic modelling of a typical three phase three level Voltage source inverter fed induction motor drive with an improved Flux-Torque-speed observer for Feedback in software simulation.
Keywords:-Vector Control, Feedback Observer, VSI fed IM.

1. INTRODUCTION

Modern industries require Variable Speed Drives with the speed maintained accurately independent of load. This saves energy, cost and also improves the system efficiency. Traditionally Induction Motor is employed only as constant speed drive due to inherent simple and rugged construction but complex speed control. But in recent times with the advent of power semiconductor devices and various converter topologies with improved control and estimation methods brought high performance AC drives for industrial applications. Inverter fed IM control is of scalar or vector control. In the simple V/f scalar control, the voltage and frequency are the control variables.

The torque is not under control and no role on space vector position during transient. Contrarily vector control, is valid for dynamic states, i.e., not only magnitude and frequency but also instantaneous positions of voltage, current, and flux space vectors are controlled. The conventional method is FOC, proposed by Hasse and Blaschke even though it gives better performance; the major drawback is it requires coordinate transformation and the control structure dependent on the rotor parameters. There was a trend toward the standardization of the control systems on the basis of the

Peer Reviewed and Refereed Journal ISSN NO. 2456-1037 IMPACT FACTOR: 7.98 (INTERNATIONAL JOURNAL)
Vol. 04, Issue 08, August 2019 Available Online: www.ajeee.co.in/index.php/AJEEE

FOC philosophy, there appeared innovative studies of Depenbrock and of Takahashi and Noguchi which depart from the idea of coordinate transformation and as analogy with DC motor control.

It basically had a bang-bang control, which meets very well with on-off operation of the inverter semiconductor power devices and it is commonly referred to as DTC. Many modifications of the classical ST-DTC scheme aimed at improving starting, very low speed operation, torque ripple reduction, overload conditions, variable switching frequency functioning, and noise level attenuation have been proposed during last decade. Habib proposed a new strategy of deadbeat type Torque and Flux DTC. This is different from the classical DTC in the calculation of the voltage vector to be applied to the machine.

2. VSI FED INDUCTION MOTOR DRIVE

The block diagram of the complete system. The detail of the components in this experiment is given in. A three phase Diode Bridge Rectifier changes the incoming alternating current supply to direct current. The DC is then conditioned in the filter circuit. The three phases three level inverter converts the rectified and conditioned DC back to AC of variable frequency and voltage which is given to three faze Induction Motor.

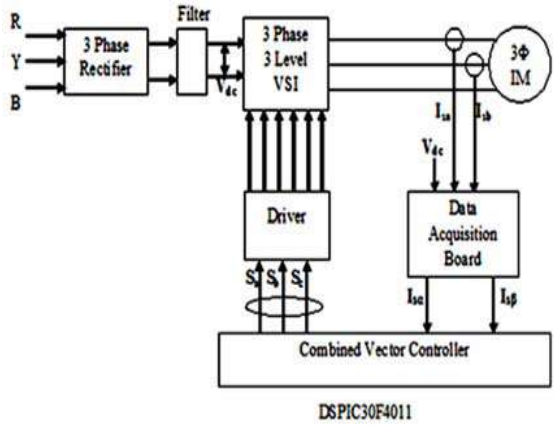

Fig. 1

2.1 System Modelling

In simulation the three phase squirrel cage Induction Motor is designed using the dynamic d – q model and in particular synchronous reference frame is chosen because it is most convenient frame of reference to study the transient and dynamic characteristics of IM. The Combined Vector Controller unit controls the whole operation of the three phases Induction Motor; it monitors and controls the rectifier, the filter circuit and the inverter to deliver the correct output in response to an external control signal.

2.2 Combined Vector Control

The Combined Vector Controller block has been shown in a new concept combining the advantages of both conventional FOC and DTC scheme is developed. This scheme shows conventional FOC eliminating the inner current loop and basic DTC eliminating the hysteresis controller and switch table modulator. Thus a PI

Peer Reviewed and Refereed Journal ISSN NO. 2456-1037 IMPACT FACTOR: 7.98 (INTERNATIONAL JOURNAL)
Vol. 04, Issue 08, August 2019 Available Online: www.ajeee.co.in/index.php/AJEEE

controller is used for torque regulation. Its output produces an increment in the torque angle, as shown in Assuming that the rotor and flux magnitudes are approximately equal, the torque is controlled by changing the torque angle. The stator flux vector is calculated by addition of the estimated flux position and change of the torque angle. Its value is compared with the estimated flux, and the stator flux error produced is directly used for the calculation of VSI switching states in the SVM block. The increment in torque angle corresponds to the increment of stator flux vector. The internal stator flux loop eliminating the flux PI controller is used for the calculation of flux error in flux PWM.

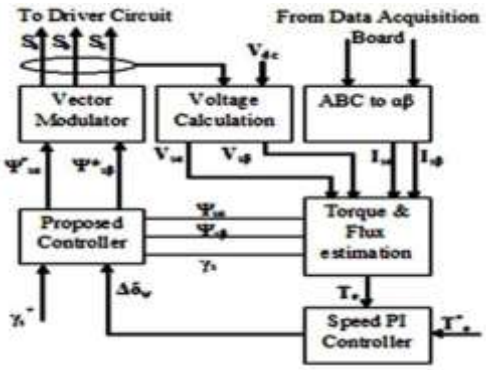

Fig. 2 Proposed Combined Vector Controller

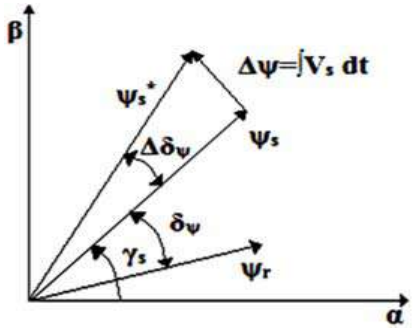

Fig. 3 Vector increment in torque angle

The proposed combined vector control uses a cascaded structure similar to FOC and a vector rotation along with the assumption of known machine torque similar to the DTC. The SVM modulation technique is used to control the inverter output voltage.

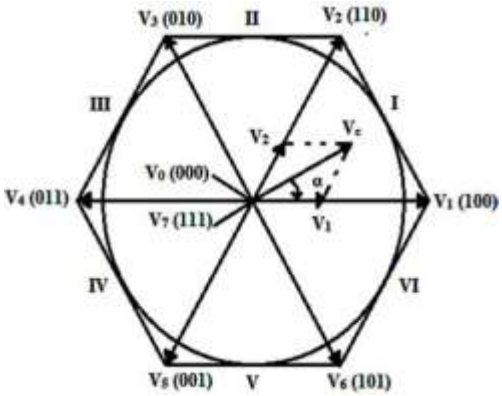

Fig. 4 Principle of Space Vector Modulation

The reference voltage vector Vcis realized by the sequential switching of active and zero vectors. The six active vectors divide a plane for the six sectors I – IV. In the each sector the reference voltage vector Vcis obtained by switching on, for a proper time. The reference voltage vector Vcis sampled with the fixed clock frequency fs=1/T. The residual sampling time Tsis reserved for zero vectors V0 and V7. Voltage. In order to obtain the output of the inverter supported by SVPWM as sinusoidal the reference vector locus with respect to time should be a circle instead of hexagon as locus of the vector sum of three voltages gives a circle. To achieve the above scenario, the vector in

each sector is sampled for a specific duration using active and zero vectors and hence we can obtain required vector corresponding instant.

2.3 Software Implementation

The Combined Vector Control strategy is implemented in DSPIC30F4011 microcontroller. The programming is done using Embedded C language. A first party complier software MPLAB is used to compile the program. This restricts the user to access the program code from the Microcontroller. The PWM pulses are generated using PWM module in DSPIC30F4011. Some features of PWM module are 6 PWM I/O pins with 3 duty cycle generators, Upton 16-bit resolution, 'On- the-fly' PWM frequency changes. This module contains 3 duty cycle generators, numbered through. The module has 6 PWM output pins, numbered PWM1H/PWM1L through PWM3H/PWM3L. The six I/O pins are grouped into high/low numbered pairs, denoted by the suffix H or L, respectively.

3 CONCLUSIONS

In this project a new Combined Vector Control scheme with both Flux Oriented and Direct Torque Control technique is modelled in simulation and hardware. The dynamic mathematical model of IM has been realized successfully. The flux and torque observer with rotor speed estimator for IM drive was developed and modelled effectively. The simulation and experimental results show satisfactory steady state and dynamic performance of the drive even under variable speed and torque condition. A comparative performance analysis of VSI fed IM drive with proposed scheme with the conventional FOC and DTC vector control techniques has been carried out. For the detail simulation results and analysis, it is understood that proposed CVC is a combination of DTC and FOC which eliminates basic disadvantages while keeping main advantages of both methods. Also, operation at constant switching frequency improves considerably the drive performance in terms of reduced torque and flux pulsations reliable start up even under low speed operation.

REFERENCE

1. F. Blaschke. The principle of field-orientation as applied to the Trans vector closed-loop control system for rotating-field machines. Siemens Rev., 1972; vol. 34, pp. 217–220.
2. Depenbrock. M. Direct self-control (DSC) of inverter-fed induction machine. Power Electronics, IEEE Transactions on, Oct 1988; vol.3, no.4, pp.420, 429.
3. I. Takahashi and T. Noguchi. A new quick response and high efficiency control strategy of an induction motor. IEEE Trans. Ind. Appl., Sep./Oct.1986; vol. IA-22, no. 5, pp. 820–827.
4. Habib Kraiem and Lassaad Sbita. Sensor less Induction Motor Drive based on Deadbeat Torque and Flux Control. CEIT'13, 2013; vol.3, pp.169-173.

Peer Reviewed and Refereed Journal ISSN NO. 2456-1037 IMPACT FACTOR: 7.98 (INTERNATIONAL JOURNAL)
Vol. 04, Issue 08, August 2019 Available Online: www.ajeee.co.in/index.php/AJEEE

5. Buja. G. S and Kazmierkowski. M. P. Direct torque control of PWM inverter-fed AC Motors—A survey. IEEE Trans. Ind. Electron., Aug 2004; vol. 51, no. 4, pp. 744– 757.
6. H. Abu-rub1, d. Stando2_, and m.p. Kazmierkowski. Simple speed sensorlessdtcsvm scheme for induction motor drives. Bulletin of the polish academy of sciences technical sciences, 2013; vol. 61, no. 2, Doi: 10.2478/bpasts-2013-0028.
7. J. Holtz. Sensorless control of induction machines—with or without signal injection. IEEE Trans. on Ind. Electron, 2006; 53(1), 7– 30.
8. L. Xu and M. Fu. A sensor less direct torque control technique for permanent magnet synchronous motors. In Proc. IEEE Ind. Appl. Conf., 1999; vol. 1. pp. 159–164.
9. A. Tripathi, A. M. Khambadkone, and S. K. Panda. Stator flux based space vector modulation and closed loop control of the stator flux vector in over modulation into six step mode. IEEE Trans. Power Electron. May 2004; vol. 19, no. 3, pp. 775–782.

ACCENT JOURNAL OF ECONOMICS ECOLOGY & ENGINEERING
Peer Reviewed and Refereed Journal IMPACT FACTOR: 7.98 (INTERNATIONAL JOURNAL)
Vol. 04, Issue 12, December 2019 Available Online: www.ajeee.co.in/index.php/AJEEE

AN ANALYTICAL RESEARCH ON RURAL ENTREPRENEURSHIP IN INDIA

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Abstract- Country entrepreneurship is currently times a major chance to the individuals who move keeping from rustic regions or semi - urban zones with urban zones. Unexpectedly it may be also an actuality that those larger part for country business people would confronting a lot of people issues because of not accessibility for grade comforts clinched alongside rustic regions for Creating nation such as india. Absence of education, monetary problems, insufflates specialized foul theoretical capability it is excessively challenging for those country business people to build commercial enterprises in the rustic regions. This paper makes an endeavor will figure out the issues tests to the potentiality from claiming country Entrepreneurship. It additionally keeps tabs on the real issues confronted by provincial business people particularly in the fields for promoting from claiming products, budgetary comforts other essential amenities, i. E. Accessibility about electricity, water supply; transport offices obliged vitality and so forth.

Keywords: Rural Entrepreneurship, challenges, Problems, constraints, rural, amenities.

1. INTRODUCTION

1.1 Concept of Rural Entrepreneurship

Characterizing entrepreneurship may be not a simple undertaking. On some, entrepreneurship implies principally innovation, will others it methods risk-taking? Should others a showcase balancing out energy with others at present it intends starting, owning Dealing with a little business. A business person is an individual who whichever makes new combinations from claiming processing variables for example, such that new systems of production, new products, new markets, figures new wellsprings from claiming supply and new authoritative types or Likewise an individual who is eager to take dangers or an individual who by exploiting business sector opportunities, dispenses with disequilibrium between aggravator supply Also aggravator interest or Similarly as you quit offering on that one who claims Also works An benefits of the business.

1.2 What is Rural Entrepreneurship?

The problem is essentially lopsided development which is a development of one area at the cost of development of some other place, with concomitant associated problems of underdevelopment. For instance, we have seen unemployment or underemployment in the villages that has led to influx of rural population to the cities. What is needed is to create a situation so that the migration from rural areas to urban areas

comes down. Migration per se is not always undesirable but it should be the minimum as far as employment is concerned. Rather the situation should be such that people should find it worthwhile to shift themselves from towns and cities to rural areas because of realization of better opportunities there. In other words, migration from rural areas should not only get checked but overpopulated towns and cities should also get decongested. If it is so, ways can always be found out. One is by forcibly stopping villagers from settling in the slums of towns and cities, making use of all powers to clear the slums so the villagers are forced to go back. But such practices have not achieved the desired results in the past. Apart from causing suffering to the poor people and adding to the expenditure of the Government, social tensions and economic hardships created by the government officials and their staff in every demolition of slums is not desirable from a sane government. Moreover, when a slum is demolished people do not move out of urban localities. They only relocate to a nearby place because they are entrenched in the economy of the town or city. Though governments have tried out various schemes for generating incomes in the rural areas such as government initiatives have not stopped people from moving out of villages to cities. This is because such government initiatives are not on their own capable of enabling people to earn adequately and ameliorate their conditions. There has to be some committed enterprising individual or a group of people.

2. RURAL ENTREPRENEURSHIP IN INDIA

Who ought to a chance to be skilled of making utilization of those legislature arrangements schemes for the improvement about country people? A few people who happen on a chance to be neighborhood pioneers Also Ngos who need aid conferred of the reason for the provincial kin need been reactant operators to improvement. If their exertions requirement will a chance to be distinguished yet a great deal that's only the tip of the iceberg needs should make done will opposite the bearing for development of people, i. E. With Lure kin in the rustic regions. It methods not main ceasing those outpouring for provincial individuals yet also attracting them again starting with the towns urban areas the place they needed migrated. This may be time permits at youngsters Think as of rustic regions similarly as spots about chances. Regardless of every last one of insufficiency clinched alongside rustic regions you quit offering on that one ought to assess their qualities expand on them on make rustic regions puts from claiming chances. This may be a great deal to do for that manner person sees that actuality of the rustic regions. Those route An survivor alternately employment seeker might perceive things might absolutely make unique in relation to the individuals who might want should would something advantageous would prepared on experience a troublesome way to attain their objectives. It isn't that there will be a lack about kin with such an outlook. In any case for time they

progress their personalities join the fleeting trend for occupation seekers because of Different compilations. Empowering them should think positively, creatively Entrepreneurship purposefully may be moss cup oak of the improvement from claiming rustic regions. Youngsters for such point of view Also with the help about rightly channelized exertions might introduce an period of provincial entrepreneurship.

The basic principles of entrepreneur which applied the rural development are:

- Optimum utilization of local resources in an entrepreneurial venture by rural population - Better distributions of the farm produce results in the rural prosperity.
- Entrepreneurial occupation rural population to reduce discrimination and providing alternative occupations as against the rural migration.
- To activate such system to provide basic '6 m'- manpower, money , material, machinery, management and market to the rural population.

2.1 Rural Entrepreneurship in changing Environment

Those evolving worldwide surroundings raises inquiries regarding the capacity for traditional, little scale organizations on rustic regions will allotment those possibility reductions advertised the evolving nature's domain. Those fast (though declining) populace growth, coupled for Indeed speedier urbanization, makes expanding requests. Previously, India, urban populaces by and large develop around twice concerning illustration quick likewise the Generally speaking total, Toward they might surpass those extent of provincial populaces. Such A significant demographic pattern tests the capacities from claiming a few accepted little scale organizations will adapt to those expanding requests.

3. EFFECT OF GLOBALIZATION ON RURAL ENTREPRENEURSHIP

Since globalization is a macro-concept and rural entrepreneurship is a micro-concept, occurring in a very limited area, it is very difficult to establish causal linkages, or to quantify the specific effects of globalization on rural entrepreneurship. However, it is possible to identify a range of different channels through which various aspects of globalization can be expected to change the welfare of rural entrepreneurship in India.

3.1 Productivity and efficiency effect

Globalization is frequently said will bring about higher productivity, because of those get with worldwide markets, abilities with specialize; Also with detract preferences about economies about scale degree. Purposes of presentation of the worldwide rivalry camwood bring about large amounts about benefit Also effectiveness. However, it may be lesquerella essential to substantial economies similar to India. Again, those possibility additions to country business person need aid additionally large, in light of globalization enhances countries' abilities with misuse similar

preferences emerging starting with varying common and biological states. At that level for national policy, these contentions appear to be on support globalization. Still, it is thick, as simple to see how those provincial business person Might still lose crazy. This may be genuine inconsistency On A large portion body of evidence two part harmony the absence of moderate offices clinched alongside rustic regions. There would numerous different elements which spot provincial business people at An inconvenience. Practically about them, absence get of the innovations business sector data that might empower them with go along with nature determinations also adequately react on developing chances. They infrequently need right will kudos and the different money related administrations vital on contend in the up to date world. A number face helter skelter transportation information costochondritis that further decrease their capability will contend. Additionally, there need aid some whose societies put more terrific quality on the support of accepted approaches for life, as opposed with respect to material prosperity for a focused universe. Separated starting with these disadvantages, there will be the wider address from claiming if the investments also regulate infrastructures, and the structure of policies, need aid ideal to little Undertakings will succeeding universal rivalry. Clinched alongside short, globalization displays true dangers of the country entrepreneur, should situated against those could reasonably be expected points of interest to the wider economy.

3.2 Economic growth effect

As already noted, the argument in favor of globalization is the positive link between globalization and rural entrepreneurship in India. Because the potential benefits include improved access to foreign technology and managerial expertise. There have been varied views concerning the connection between trade openness and rural entrepreneurship growth, and this has given rise to a large body of empirical literature, suggesting a positive relationship between trade openness and rural entrepreneurship growth. Edwards (1998) concludes that greater openness accelerates economic growth, and that large departures from free trade dampen it. The evidence suggests that liberalizing countries outperform those who failed liberalization attempts (Michael et al., 1991). In contrast, Helleiner (1986) suggested that a certain level of national development is necessary before the objective of export-led growth can be realized.

Rise of the WTO and the arrangement of deliberations under those uruguay round need changed those universe budgetary request. Indian administration need shelved the sooner protectionist approaches opened dependent upon those economy of the universe advertise. Undoubtedly, this need aided the Indian economy on recover its quality for the stream of global capital and innovation organization bringing about a strong monetary position. The economy will be moving relentlessly for more than 6 % DGP development rate to the most recent two decades or something

like that. However, those new budgetary request need posed extreme tests of the Agricola country parts of the economy.

Overall, it demonstrates that openness pushes speedier Growth. Still, the address remains as should what this could do to the country enterprises, especially as little FDI streams under agriculture, minimum from claiming the greater part little-scale agribusiness. The impact for globalization looking into country ventures relies upon those progressions on gap Also transforms done salary conveyance. The confirmation recommends that that provincial business person general would considerably include Likewise beneficiaries starting with financial development. However, that degree for consideration varies internationally.

Concerning illustration examined earlier, organized commerce openness brings about quicker development. Development may a chance to be expected will particularly profit those country business person of the degree that those agricola division is incorporated in the financial extension. Over fact, there is minimal confirmation that trade development over India need really taken this structure.

3.3 Technological effect

Transfer of technology is one of the prominent features of globalization and one of the major reasons for predicting improved growth. Many formerly small rural entrepreneurs saw major improvements in their businesses, but the improvements were in a very limited area and to a very limited number of entrepreneurs.

The focus today is on the potentials and dangers of biotechnology. In principle, the benefits here too may be large. The benefits may be from raising productivity, reduced risks of drought and pests, as well as lower food prices.

Biotechnology research has been more relevant to the problems of high-income countries. The benefits tend to be specific to particular environments, conditions or markets. As mall number of multinational corporations is also carrying out much of the research.

There has been a general focus upon the problems of rural entrepreneurs in rich countries, with little attention being paid to developing countries' like India's basic food crops and the problems of their small farmers.

3.4 Distributional Effect

It is not conceivable will gage the generally impact from claiming globalization on the level for inequality; the impact ahead ladies business person previously, rustic region may be lesquerella vague. A lot of people country ladies business people need aid hampered from benefiting from the transforms emerging starting with globalization. They need lesquerella get over men with instruction training, lesquerella time to commit with profitable activities, lesquerella summon over critical assets for example, such that land, credit Also money. Pay Creating countries, the sexual division from claiming work precludes ladies starting with pay inferred from money yields. In

addition, they additionally need lesquerella impetus on react to monetary signals; since they need aid inclined to need lesquerella control again whatever salary.

3.5 Transformational and insecurity effect

Country entrepreneurship may be not continuously specifically identified with salary. It might likewise allude on a powerful level about unreliability. A lot of people times the individuals who have figured out how on enhance their position would pressed back up once more by common disasters, expansion different shocks.

A few viewpoints about globalization build such issues. Globalization may be by and large connected with the accelerated pace of progress clinched alongside financial term expanded focused weights. This obliges a expedient adaptation, which might essentially be outside the extend of the individuals for couple present day abilities alternately other possessions. Likewise shown earlier, globalization is interfaced on expanded specialization, anyway this, for every last bit its advantages, builds dangers to country business people pushing them should 'play at their cards'. These factors need aid further exacerbated toward the transformational unreliability impact because of unstable earth.

Greater financial interdependence amongst national economies, resulting from globalization, has the effect of transferring or spreading shocks from one nation to another. This can be seen from the financial crisis in the last year (2008) which affected the world, leading to a global slowdown. The enormous cross-border movements of highly mobile financial capital and the difficulties of regulating this have resulted in the tendency for financial shocks to spreading around the world. Many of these shocks coming from the rest of the world hit the urban sector hardest. Still, there are a number of channels through which the effect is transferred to the rural enterprises.

3.6 Policy

Government of India has, in a sense, discriminated against agriculture and those enterprises that depend upon it. This 'discrimination' has typically taken the form of overvalued exchange rates, state trading monopolies for domestic and external marketing of agricultural commodities. Additionally, the revenues from commodity exports have been used for the growth of civil services and urban development, rather than reinvestment in agriculture.

4. CHALLENGES FACED BY RURAL ENTREPRENEURSHIP IN INDIA

4.1 Family Challenges: Convincing to opt for business over job is easy is not an easy task for an individual. The first thing compared is – Will you make more money in the business of your choice or as a successor of family business. This is where it becomes almost impossible to convince that you can generate more cash with your passion than doing what your Dad is doing.

4.2 Social Challenges: Family challenges are always at the top

because that is what matter the most but at times social challenges also are very important. Let us say you and your friend graduated at the same time. You opted for entrepreneurship and your friend opted for a job. He now has a flat, car and what not because he could easily get those with a bank loan but you still have nothing to show off and this is where the challenge comes.

4.3 Technological Challenges: Indian education system lags too much from the Job industry as a whole but then it lags even more when it comes to online entrepreneurship. What technology would be ideal and how to use that technology effectively?

4.4 Financial Challenges: (Difficulty in borrowing fund): Financial challenges are a lot different in India especially for online entrepreneurs. When you are starting out as an entrepreneur you don't opt for venture funding but try to go to funding for small to medium business people. Many such non-technical business people don't understand the online business models as a whole and so getting an initial business funding from them becomes challenging. The other option you can think of is a loan but bank loan is not at all an option in India for new online entrepreneurs.

4.5 Policy Challenges: Now and then there are lots of changes in the policies to change in the government. Problems of TRIPS and TRIMS. Problems of raising equity capital, Problems of availing raw-materials, Problems of obsolescence of indigenous technology Increased pollutions Ecological imbalanced. Exploitation of small and poor countries etc.

A. Opportunities

- Free entry into world trade.
- Improved risk taking ability.
- Governments of nations withdrawn some restrictions
- Technology and inventions spread into the world.
- Encouragement to innovations and inventions.
- Promotion of healthy completions among nations
- Consideration increase in government assistance for international trade.
- The establishment of other national and international institutes to support business among the nations of the world.
- Benefits of specialization.
- Social and cultural development

B. Challenges for Rural Entrepreneurs

- Growth of Mall Culture
- Poor Assistance
- Power Failure
- Lack of Technical know how
- Capacity Utilization
- Infrastructure Sickness

C. Opportunities for Rural Entrepreneurs

- Crashed Scheme for Rural Development
- Food for Work Program
- National Rural Employment Program
- Regional Rural Development Centers
- Entrepreneurship Development Institute of India
- Bank of Technology
- Rural Innovation Funding
- Social Rural Entrepreneurship.

Peer Reviewed and Refereed Journal IMPACT FACTOR: 7.98 (INTERNATIONAL JOURNAL)
Vol. 04, Issue 12, December 2019 Available Online: www.ajeee.co.in/index.php/AJEEE

D. Need for Creating Indian Entrepreneurs- A Snapshot:

A recent Mckinsey & Company-Bascom report estimates that India needs at least 8,000 new businesses to achieve its target of building a US$87 billion IT sector. In the next 10 years, 110-130 million Indian citizens will be searching for jobs, including 80-100 million looking for their first jobs.

In today's knowledge based economy is fertile ground for entrepreneurs, in India. It is rightly believed that India has an extraordinary talent pool with virtually limitless potential to become entrepreneurs. Therefore, it is important to get committed to creating the right environment to develop successful entrepreneurs. To achieve this, India must focus on the following area.

- Create the Right Environment for Success
- Ensure that Entrepreneurs have access to the Right Skill
- Ensure that Entrepreneurs have access to „Smart Capital"
- Enable Networking and Exchange
- Government Support: Both the Central and State Governments should take more interest in promoting the growth of entrepreneurship.

REFERENCES

1. Ahirrao Jitendra. (2013), Enterpreneurship and Rural Women in India, New Century, New Delhi.
2. Nandanwar Kalpana P. (2011), Role of Rural Entrepreneurship in Rural Development, International Referred Research Journal, ISSN- 0974-2832, Vol. II, ISSUE-26, March.
3. Saxena Sandeep. (2012), Problems Faced By Rural Entrepreneurs and Remedies to Solve It, Journal of Business and Management, ISSN 2278-487X, Vol. 3, Issue 1, July-August.
4. Santhi N. and Rajesh Kumar S. (2011), Entrepreneurship Challenges and Opportunities in India, Bonfring International Journal of Industrial Engineering and Management Science, Vol. 1, Special Issue, December.
5. Kishor Choudhary. (2011), Effect of Globalization on Rural Entrepreneurship in India, Half Yearly Global Economic Research Journal, ISSN 2249- 4081, Vol. I, Issue, pp. 88-92.
6. www.iosrjournals.org
7. http://www.scribd.com/doc/26661470/Rural-Entrepreneurship-in-India

ACCENT JOURNAL OF ECONOMICS ECOLOGY & ENGINEERING
Peer Reviewed and Refereed Journal IMPACT FACTOR: 7.98 (INTERNATIONAL JOURNAL)
Vol. 04, Issue 12, December 2019 Available Online: www.ajeee.co.in/index.php/AJEEE

AN ANALYTICAL STUDY BASED ON GENERALIZED TOPOLOGICAL SPACES

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Abstract- A. Csfiaszfiar introduced and extensively studied the notion of generalized open sets. Following Csfiazar, we introduce a new notion hyperconnected. We study some specific properties about connected and hyperconnected in generalized topological spaces. Finally, we characterize the connected component in generalized topological spaces.
Keywords: Generalized topology, *m*-structure, weak structure, connected, *g*-closed, hyperconnected.

1. INTRODUCTION

The properties of structures defined by a given set X and a relation, respectively relations defined on a class of subsets of X and satisfying some conditions are often studied. Such structures are given for example in [1, 3, 5, 6, 11, 12]. The best known structures of such type are topological spaces defined by a closure operation. Generalized topological space is an important generalization of topological spaces. In the past decade, Csfiazar [4{10] and others have been considering generalized topological spaces, and developing a theory for them. more precisely, for the last years, difierent forms of open sets are being studied. Recently, a significant contribution to the theory of generalized open sets has been presented by A.

Csfiazar [5{10]. Especially, the author defined some basic operators on generalized topological spaces. It is observed that a large number of papers are devoted to the study of generalized open sets like open sets of a topological space, containing the class of open sets and possessing properties more or less similar to those of open sets. In the present paper, we introduce the notion of hyper connected and we studied some specific properties about connected and hyper connected in Generalized Topological Spaces.

2. PRELIMINAIRES

Let X be a nonempty set and g be a collection of subsets of X. Then g is called a *generalized topology* (GT for short) on X if $\emptyset \in$

g and $G_i \in g$ for $i \in I \neq \emptyset$ 2 g. The pair (X,g) is called a generalized topological space (GTS for short) on X. The elements of g are called g- open sets and their complements are called g- closed sets. We denote the family of all g- closed sets in X by $gc(X)$. The generalized closure of a subset S of X, denoted by $cg(S)$, is the intersection of all generalized closed sets including S. And the generalized interior of S, denoted by $ig(S)$, is the union of generalized open sets contained in S.

Definition 2.1 2Let (X, g_X) be a generalized topological space and $4 \subseteq X$. Then A is said to be

$g-$semi$-$open if $A \subseteq c_g(i_g(A))$,
$g-$preopen if $A \subseteq i_g(c_g(A))$,
$g-\alpha-$ open if $A \subseteq i_g(c_g(i_g(A)))$,
$g-\beta-$ open if $A \subseteq c_g(i_g(c_g(A)))$,

The complement of $g-$semi$-$open (resp., $g-$preopen, $g-$ α-open, $g-$ β-open) is said to be $g-$semi-closed (resp., $g-$preclosed, $g-$ α-closed, $g-$ β-closed).

Let us denote the class of all g-semi-open sets, $g-$preopen sets, $g-\alpha$-open sets and g-β-open sets on X by $\sigma(g_X)$ (σ for short), $\pi(g_X)$ (π for short), $\alpha(g_X)$ (α for short),and $\beta(g_X)$ (β for short) respectively.

Denote by $c_\sigma(X)$, $c_\pi(X)$, $c_\alpha(X)$ and $c_\beta(X)$, the closures of g-semi-closed sets, $g-$preclosed stes, $g-$ α-closed sets and $g-\beta$-closed sets on X.

Definition 2.2 1Let gX and gY be generalized topologies on X and Y, respectively. Then a function $f : X \to Y$ is said to be (g_X, g_Y)-continuous if $G' \in g_Y$ implies that $f^{-1}(G') \in g_X$

Definition 2.3 3Let gX and gY be generalized topologies on X and Y, respectively.

Then a function $f : X \to Y$ is said to be

(α, g_Y)-continuous if for each $g-$open set U in Y, $f^{-1}(U)$ is $g-\alpha$-open in X,
(σ, g_Y)-continuous if for each $g-$open set U in Y, $f^{-1}(U)$ is $g-$semi-open in X
(π, g_Y)-continuous if for each $g-$open set Uin Y, $f^{-1}(U)$ is $g-$preopen in X
(β, g_Y)-continuous if for each $g-$open set U in Y, $f^{-1}(U)$ is $g-\beta$-open in X

3. ON GENERALIZED CONNECTED SPACES

Definition 3.1 Let (X,gX) be a GTS. X is called: g- connected if there are no nonempty disjoint g-open subsets $U; V$ of X such that $U \cup V = X$ connected if there are no nonempty disjoint $g-\alpha$-open subsets $U; V$ of X such that that $U \cup V = X$ connected if there are no nonempty disjoint $g$semi-open subsets $U; V$ of X such that that $U \cup V = X$ connected if there are no nonempty disjoint $g-\alpha$-preopen subsets $U; V$ of X such that $U \cup V =$

X g- _-connected if there are no nonempty disjoint $g-\alpha$-open subsets *U; V* of *X* such that that $U \cup V = X$

Proposition 3.6 Let (*X,gX*) be a GTS and $A \subseteq X$. Then we have the following implcations.

(1) $(1)\ A$ is $g-$open set $\Rightarrow$ (2) $g-\alpha$-open set $\Rightarrow$ (3) $g-$semi-open set $\Rightarrow$ (4) $g-\beta$-open set And (5) $g-\alpha$-open set $\Rightarrow$ (6) $g-$preopen set $\Rightarrow$ (7) $g-\beta$-open set

Proof. (1) $\Rightarrow$ (2). A is $g-$open set ie $A = i_g(A)$. Since $A \subseteq c_g(A) = c_g(i_g(A))$. Thus $i_g(A) = A \subseteq i_g(c_g(i_g(A)))$. Then A is $g-\alpha$-open set. $4 \subseteq$ ■

(2) $\Rightarrow$ (3). A is $g-\alpha$-open set ie $A \subseteq i_g(c_g(i_g(A))) \subseteq c_g(i_g(A)))$. Thus A is $g-$semi-open set ■

(3) $\Rightarrow$ (4). We have $A \subseteq c_g(A)$ and $i_g(A) \subseteq i_g(c_g(A))$. Thus $c_g(i_g(A)) \subseteq c_g(i_g(c_g(A)))$. Since A is $g-$semi-open, we have $A \subseteq c_g(i_g(A))$. Then A is $g-\beta$-open. (4)

(5) $\Rightarrow$ (6). We have $i_g(A) \subseteq A$ and $c_g(i_g(A)) \subseteq c_g(A)$. Thus $i_g(c_g(i_g(A))) \subseteq i_g(c_g(A))$. Since A is $g-\alpha$-open we have $A \subseteq i_g(c_g(A))$. Then A is $g-$preopen.

(6) $\Rightarrow$ (7). We have $i_g(c_g(A)) \subseteq c_g(i_g(c_g(A)))$. Since A is $g-$preopen, we have $A \subseteq i_g(c_g(A))$. Thus $A \subseteq c_g(i_g(c_g(A)))$. Then A is $g-\beta$-open. ■

REFERENCES

1. E. Bouacida, O. Echi, E. Salhi, Topologies associfiees fia une relation binaire et relation Bonaire spectrale. Bollettino della Unione Mathematica Italiana (7), 10-B (1996), 417-439.
2. E. Bouassida, B. Ghanmi, R. Messaoud, A. Missaoui, Generalized superconnectedness, Journal of Linear and Topological Algebra, 04 (04) (2015), 267-273.
3. E. CECH, Topologicke prostory. Cas. pest, mat., 66 (1936-37), 225-264.
4. A. Csfiazar, Generalized topology, generalized continuity, Acta math. Hungar., 96 (2002), 351-357.
5. A. Csfiazar, Generalized open sets in generalized topologies, Acta math. Hungar., 106 (2005), 53-66.
6. A. Csfiazar, Grundlagen der allgemeinen Topologie. Budapest 1963.
7. A. Csfiazar, Weak structres, Acta math. Hungar 131 (1-2) (2011), 193-195.
8. A. Csfiazar, -connected sets, Acta Math. Hungar. 101 (2003), 273-279.
9. A. Csfiazar, Normal generalized topologies, Acta Math. Hungar. 115 (4) (2007), 309-313.
10. A. Csfiazar, _ and _-modifications of generalized topologies, Acta Math. Hungar. 120 (2008), 275-279.
11. F. Hausdorfi, Gestufte Raume. Fundamenta mathematicae, 25 (1935), 486-502.
12. J. L. Kelley, General Topology. D. Van Nostrand company, New York 1955.
13. W. K. Min, Generalized continuous functions defined by generalized open sets on generalized topological spaces, Acta Math. Hungar., 128 (2009), doi: 10.1007/s10474-009-9037-6.
14. D. Jayanthi, Contra Continuity on generalized topological spaces, Acta Math. Hungar., 137 (4) (2012), 263.

ACCENT JOURNAL OF ECONOMICS ECOLOGY & ENGINEERING
Peer Reviewed and Refereed Journal, ISSN NO. 2456-1037, IMPACT FACTOR: 7.98 (INTERNATIONAL JOURNAL)
Vol. 04, Issue 09, September 2019 Available Online: www.ajeee.co.in/index.php/AJEEE

FUZZY LOGIC BASED PERFORMANCE ANALYSIS FOR POWER SYSTEM DRIVE FOR OSCILLATIONS

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Abstract- This paper presents a new approach for determining the effective control signals for damping of oscillations by using fuzzy logic based Interline Power Flow Controller[IPFC]. The IPFC performance is tested with PI controllers in comparison with fuzzy logic based controller on Modified Phllips-Heffron Model of Single Machine Infinite Bus system to achieve improved damping performance by selecting effective control signals such as Δmi1 is the deviation in pulse width modulation index mi1 of voltage series converter 1 in line 1, Δmi2 is the pulse width modulation index mi2 deviation of voltage series converter 2 in line 2, Δα1 is the deviation in phase angle of the injected voltage of convertor 1, Δ α2 is the injected voltage phase angle deviation of convertor 2.
Keywords:-FACTS, IPFC, FLC, Damping of oscillations.

1. INTRODUCTION

When a power system is subjected to a disturbance, the system variables undergo oscillations. Some low frequency electromechanical oscillations of small magnitude exist in the power system for long periods of time, and in some cases they might impose limitations on the transmission line functionality. With low damping, power system is subjected to prolonged large oscillations. Several devices and control methods have been developed to increase damping in power systems and improve power transfer limits. In particular, the application of multifunctional FACTS controllers based on back to back dc/ac voltage source converter has greatly meet with power demand in the recent years. The high current semiconductor device based FACTS devices with proper control strategy can improve the power system stability of power system. Many researcher presented work on various nonlinear VSC based FACTS devices like STATCOM, SSSC and UPFC for transient stability improvement of the power system under various system conditions.

Amongst the other developed VSC based nonlinear FACTS devices, Interline Power Flow Controller (IPFC) is most versatile FACTS device, it consists of

number of SSSC are connected in each line which are connected via common dc bus, addresses the problem of compensating a number of transmission lines. The special feature of IPFC is not only to perform an independently controllable reactive series compensation of each individual line but also to deliver real power between the compensated lines. This capability of IPFC makes it possible to: equalize both real and reactive power flow between the lines; hence avoid the burden of overloaded; making compensation for resistive line voltage drops and the associated reactive power demand and increase the efficacy of the overall compensating system for dynamic disturbances. Shan Jiang et al discusses the behaviour of two FACTS devices; the combined series-series controller and the combined series-shunt controller in a benchmark system and proved that the IPFC has more series branches than the UPFC; it provides more opportunities for network segmentation and, hence, has the potential for greater damping improvement.

Gopinath et al introduces the model of state estimation embedded with IPFC. A power injection model that shows the influence of IPFC on the power flow between the interconnected lines is presented. Segundo et al have examined the efficacy of VSC-based FACTS controllers in contributing to system-wide damping. The strategy is tested on a practical 45-machine Mexican system that includes number of static VAR compensators. Fuzzy Logic Controller is robust and easily modified. It can use multiple input and output sources. Advantageous feature of Fuzzy logic is to provide solution to the problem can be cast in terms that human operators can apply their experiences for the design of the controller to achieve maximum performance of the IPFC controller. Dhurvey et al have examined the relative effectiveness of IPFC control signals on linearized power system model of single machine infinite bus system (SMIB) system for analysing performance comparison of IPFC in coordination with Power Oscillation Damping Controller [POD] and Power System Stabilizer [PSS].

However, results have been not presented with the consideration of various damping factor D and Kp and Ki is not properly tuned. Hence, the aim of this paper is to present the modified version of reference. Kazemi et al proved the effective damping control function of an IPFC installed in a power system. Parimi, et al implement the Fuzzy logic control for IPFC for damping low frequency oscillations. Alivelu M. Parimi develops the nonlinear model of power system incorporated with Interline Power Flow Controller (IPFC). The oscillation modes with low damping ratio are obtained from the Eigen value analysis of the

linearized Phillips-Heffron model Parimihas proved that IPFC control signal m2 is the most effective. M. R. Banaei et al has proved that signals m1, m2 based controllers have more effect on damping of oscillation and signal based controllers have less effect on damping of oscillation.

Veeramalla, J. et al investigated the effectiveness of the IPFC based damping controller. Dynamic simulations results have emphasized that the damping controller which modulates the control signal m2 provides satisfactory dynamic performance under wide variations in loading condition and system parameters. However, they have not presented an approach for obtaining the simultaneous coordination of IPFC with each control signal and Fuzzy Logic Controller In view of the available work presented by the researchers, the main objective of this paper is to study effectiveness of various control signals of IPFC for damping of power system oscillations. The comparative performance of PI based controller and fuzzy logic based IPFC for improved power system performance is demonstrated. The results are validated in MATLAB environment.

2. SYSTEM MODEL

Single-Machine Infinite Bus power system incorporated with Interline Power Flow Controller in one of the two transmission lines is considered for analysis which consists of an excitation transformer, a boosting transformer, a pair of voltage source converters and a DC link capacitor is shown in Δmi1 is the deviation in pulse width modulation index mi1 of voltage series converter 1 in line 1. By controlling mi1, the magnitude of series injected voltage in line 1 can be controlled. Δmi2 is the deviation in modulation index mi2 of series converter 2 in line 2. By controlling mi2, the magnitude of series injected voltage in line 2 can be controlled. Δα1 is the deviation in phase angle of the injected voltage Vse1. Δα2 is the deviation in phase angle of the injected voltage Vse2.

3. INTERLINE POWER FLOW CONTROLLER

Interline Power Flow Controller (IPFC) is VSC based FACTS controller, consists of two voltage sourced converters (VSCs) inserted in series with transmission lines, whose DC capacitors are linked such that active power can be transferred between the two VSCs. Each VSC provides series compensation for the selected transmission line and is capable of exchanging reactive power with its own transmission system. Basic function is to control power flow among transmission lines and damping of oscillations. A non-linear dynamic model of the system is derived by omitting the resistances of all the components of the system and the transients of

the transmission lines and transformers of the IPFC.

4. PROPORTIONAL INTEGRAL (PI) BASED

In this section, PI Based IPFC is suggested for damping of oscillations. The PI constants Kp and Ki are chosen by trial and error method. In Fig.3, additional damping signal Power Oscillation Damping Controller [POD] can be applied for improvement in PI controller performance. The POD controller may be considered as comprising gain KDC, wash out block and lag-lead compensator. The values of parameters of the lead-lag compensator are chosen so as to obtain best damping performance. Optimum parameters for the damping controllers are given in Appendix-A. The IPFC controllable signals (mi1, α1, mi2 and α2) can be modulated in order to produce a damping torque. Controllability indices for the different Interline Power Flow Controller controllable parameters are given in Appendix-A. The washout circuit as shown is provided to eliminate steady-state bias in the output of POD Controller. The Tω must be chosen in the range of 10 to 20. Structure of Power Oscillation Damping [POD] controller

5. FUZZY LOGIC BASED IPFC

Drawback of PI controller is the frequency deviation. It causes deterioration in performance during varying system conditions. Hence Fuzzy logic can be blended with conventional control techniques. Fuzzy logic is the art which makes machines more intelligent enabling them to reason in a fuzzy manner like humans. The mathematical concepts behind fuzzy reasoning are very simple. Hence Fuzzy logic IPFC controller is proposed. Fuzzy logic is a innovative area of research as it does a good job of trading off between significance and precision. The main concept of fuzzy logic control (FLC) is to build a model of a human expert capable of controlling the plant without thinking in terms of a mathematical model. Fuzzy Logic Controller (FLC) in which the electrical power at IPFC location is feedback to the coordination of control signals are the inputs to the fuzzy logic controller. The control strategy has been prepared based on rules. The fuzzy logic approach more accurately represents the operational constraints of power systems and fuzzified constraints are softer than conventional constraints.

Fuzzy logic based IPFC controller consists of three major parts:-

a) Fuzzification
b) Inference
c) Defuzzification units.

5.1. Fuzzification

In fuzzification the input and output are decomposed into one or more fuzzy sets. Here, theinput variables are mapped onto fuzzy linguistic variables. The choice of

membership functions influences the quality of a fuzzy logic controller. Membership function defined on the universe of discourse is the space where the fuzzy variables are defined. The membership functions designs the elements of the universe onto numerical values in certain membership function. The input (Pe) is fuzzified using three fuzzy sets: high, good and low. Many types of curves can be used, Out of all the curves available, triangular or trapezoidal shaped membership functions are the most popular. These shapes are easier to represent in embedded controllers.

The shapes of membership function are chosen by trial and error approach so that best performance of the fuzzy controller can be achieved. However, the shape of the membership function can vary the small deviations in output of fuzzy logic controller. The Output membership function is fuzzified using three fuzzy sets: big, medium, small. Plot of membership function for input and output variable are as respectively. The parameters of the membership function of the fuzzy logic controller, consisting of e P as control input signal, u is the fuzzy controlled output for IPFC control signal mi1 in Table 1. Robust performance of fuzzy logic controller can be achievable for wider range of input and output signals. The range chosen for input signal e P is 0 to 7.5. Under the transient conditions, large variation in the system parameters can take place and therefore large ranges are chosen for input output mapping. However, for other smaller ranges of input and output fuzzy performance will not deviate.

5.2. Inference

A relation between cause and effect, or a condition and a consequence is done by reasoning. For reasoning, logical inference is used, in order to draw a conclusion. The mechanism of the inference process is the search of input/output relationship to match the input conditions. The objective of control is to influence the behaviour of a system by changing an input of that system according to a rule that model how the system operates. Therefore, an integral part of the inference process is the rule-base (a list of rules that relate the input values to the output values).

Control decisions are made on the basis of fuzzified linguistic variables. We usually follow rules of inference. The rules can be specified to include various operating conditions. In fuzzy logic control, in order to minimize the complexity of the controller, it is always desirable that number of rules in a working controller should be less which makes shorter controller execution time. Hence while designing FLC more stress has been given on effective input variable and minimum rule. FLC has one rule for one input variable. The min-max inference is

applied to determine the degree of membership for the output variable. The main objective of the designed fuzzy inference system is for the improvement in damping of power system oscillations.

5.3 Defuzzification

After the process of fuzzy reasoning, linguistic output variable should be translated into acrisp value. Defuzzification is such inverse transformation which designs the output from the fuzzy domain back into the crisp domain. For IPFC control, the fuzzy inference system coordinates the linguistic input variables. The universe of discourse of the input variables decides the required scaling for correct per-unit operation. The fuzzy logic operations performed (Sup-Min inference) are decided by the decision making logic, and together with the knowledge base influences the outputs of each fuzzy IF-THEN rules. Those are combined and converted to crispy values with the defuzzification block. The fuzzy Controller uses the centroid method.

6. SIMULATION RESULTS

Digital Simulation has been carried out with Modified Phillips Heffron model in MATLAB environment. Independent damping signals and Fuzzy with IPFC has been demonstrated. In small signal analysis, the simulation result of the linearized model with four different input control signals under 10% of variation in mechanical power input is considered. The proposed PI and Fuzzy controller's performances are tested in Single Machine Infinite Bus system.

7. CONCLUSION

In this paper, a systematic approach for determining relative effectiveness of Interline Power Flow Controller (IPFC) control signals (mi1, α1, mi2, α2) in damping low frequency oscillations has been presented. The linearized power system model of Single Machine Infinite Bus system for analysing the performance of fuzzy based IPFC for variation in system parameters has been studied. These control signals shows the significant improvement in damping of power system performance. Investigations have revealed that IPFC control signals mi1 and mi2 provide robust performance over other signals. The proposed Fuzzy Logic Controller performance is comparatively better than PI based controller.

The fuzzy rules have been designed to minimize transients swing, improvement in damping of oscillations. The controller's comparative performance in terms of small signal stability improvement and damping of oscillations is demonstrated. The fuzzy logic controller demonstrates the robust performance and easy to coordinate with damping schemes. The simplicity of the

design is the most attractive feature of Fuzzy based control scheme. The proposed controller fulfils the main objective of this paper. Time domain analysis and Eigen value analysis results validated the performance of various IPFC control strategy.

REFERENCES

1. P. Kundur, Power System Stability and Control, McGraw-Hill, New York, ch. 12, 1994.
2. N.G. Hingorami, L. Gyugyi, and Understanding FACTS: Concepts and Technology of Flexible AC Transmission system, IEEE Power Engineering Society, IEEE press, Delhi, 2001.
3. Y.H. Song and A.T. Johns, (1999) Flexible AC Transmission systems, IEE Power and Energy series 30, London, 1999.
4. Parimi A.M., Elamvazuthi I., Saad N., Fuzzy logic control for IPFC for damping low frequency oscillations, Intelligent and Advanced Systems (ICIAS): 2010 International Conference, pp. 1 – 5
5. Babu A.V.N., Sivanagaraju S., Mathematical modelling, analysis and effects of interline power flow controller (IPFC) parameters in power flow studies, Power Electronics (IICPE), 2010 India International Conference, pp. 1 – 7.
6. Parimi A.M., Sahoo N.C., Elamvazuthi I, Saad N., Transient stability enhancement and power flow control in a multi-machine power system using Interline Power Flow Controller, Energy, Automation, and Signal (ICEAS), 2011 International Conference , pp. 1 – 6
7. Gomathi V., Ramachandran, Kumar C.V., Simulation and state estimation of power system with Interline Power flow Controller, Universities Power Engineering Conference (UPEC), 45th International, 2010, pp. 1 – 6
8. Moghadam M.F., Gharehpetian G.B., Askarian Abyaneh H, Optimized regulation of DC voltage in Interline Power Flow Controller (IPFC) using genetic algorithm**,** Power Engineering and Optimization Conference (PEOCO), 2010, pp. 117 - 121
9. Kazemi, Karimi, the Effect Interline Power Flow Controller (IPFC) on Damping Inter-area Oscillations in the Interconnected Power Systems', Industrial Electronics, IEEE International Symposium, Vol. 3, 2006, pp. 1911 – 1915.
10. Zhihui Yuan, de Haan S.W.H., Ferreira, Braham, A new concept of exchanging active power without common DC link for Interline Power Flow Controller(S-IPFC), Power and Energy Society General Meeting - Conversion and Delivery of Electrical Energy in the 21st Century, IEEE Conference, 2008, pp. 1 – 7.

A SYSTEMATIC REVIEW AND THEORETICAL STUDY FOR MECHANICAL PROPERTIES OF SOME INDIAN WOODS

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Abstract– The paper reports an investigation of mechanical properties of Indian woods of various species having a place with various herbal families. Rigidity and pressure qualities were estimated at ordinary dried condition. A critical variety in mechanical properties is seen regarding every species as well as same types of same organic family. Large scale and miniature organized varieties in wood have been broke down based on variety in above boundaries.

Keywords: Indian woods, Tensile strength, pressure strength, microstructure variety.

1. INTRODUCTION

Wood is an incredibly flexible material with a large number of physical and mechanical properties among the numerous types of wood. It is likewise a sustainable asset with a remarkable solidarity to-weight proportion. Wood and wood items possess a significant spot in designing Wood is a beneficial development material in light of the fact that the energy prerequisites of wood for creating a usable final result are a lot of lower than those of cutthroat materials, like steel, cement, or plastic. Be that as it may, the trial distinguishing proof and the insightful demonstrating of mechanical way of behaving of wood stays an open issue, because of its regular inconstancy, in homogeneity and anisotropy. Wood as lengthy been perceived as an orthotropic material [1], with an inside structure, which is portrayed by the presence of three commonly opposite planes of balance. Those planes are characterized by the longitudinal heading (L) along the filaments, the outspread bearing (R) towards yearly rings and distracting course (T) to the yearly rings. To completely describe the mechanical way of behaving of wood it is important to know the pressure strain connections alluded to the LRT reference outline. The mechanical tests are the best way to acquire such information; however a few

troubles emerge in making the right exploratory estimation, especially those unsettling the distinguishing proof of extreme burdens. A critical issue with displaying trees can emerge when the mechanical and actual properties of dry wood tests are utilized [2-4]. This inadequacy can be particularly significant when models depend on the thickness explicit solidness of wood to gauge the greatest level to which a tree can develop before it flexibly clasps under its own weight. Thickness explicit solidness is the Young's versatile modulus, E, of a material standardized as for the thickness, q, of the material (for example E} p). Youthful versatile modulus is a proportion of the solidness of a material [4, 6]. For fake materials like steel, the mathematical worth of E is a consistent. Be that as it may, for plant tissues like wood, this boundary is referred to fluctuate mathematically as a component of tissue dampness content.

2. MATERIAL AND METHODS

Different wood logs are gathered having a place with various organic families from better places at ordinary dried condition for present examination.

A Universal Testing Machine is utilized to concentrate on the rigidity and pressure qualities. The UTM is a modernized servo controlled tractable, pressure testing machine with ostensible burdens from 20kg to 100 ton. The UTM framework contains a modern electronic control unit with an impeccably paired servo controlled twin screw drive load outline. The heap outline including the test region is made of the fixed lower crosshead hard chromed 2 screws and 2 aide bars and a moving upper cross head. The heap cell which is straightforwardly appended to the upper cross head praises the incredibly inflexible burden outline. Example holds are not simply embellishment, rather they perform one of the main capabilities in material testing methods. Example grasps, utilizing different cinching standards, are accessible to guarantee ideal holding of each and every sort of example. Test length, crosshead speed, taking care of test boundaries and review and printing the outcomes accomplished legitimately entering into the simple to utilize control sheet.

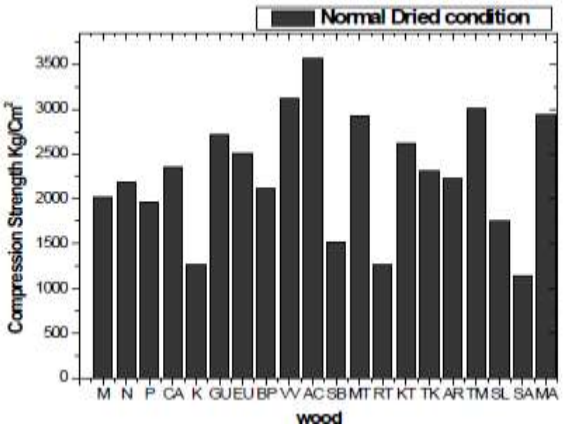
3. RESULTS AND DISCUSSION

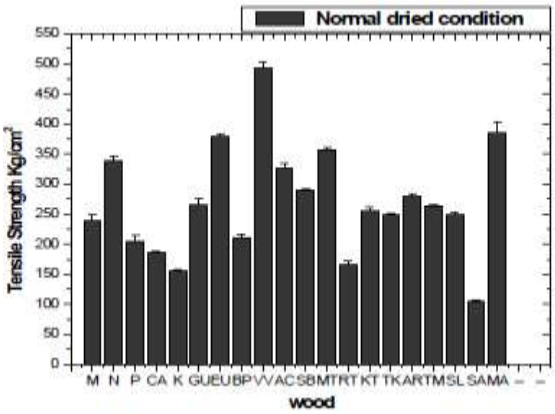
Table 1 presents the information on the mechanical properties, for example, rigidity and pressure strength of twenty Indian wood species taking 5 examples of each in ordinary dried condition. It is obvious from the information mechanical properties are shifting from one example to another having a place with same and Different organic families.

Rigidity and pressure strength connected with thickness, wood test with high thickness shows high mechanical strength. This might be credited to the supramolecular engineering of the phone wall with its unique compound arrangement additionally here assumes a significant part. The variety of rigidity of wood lined up with the grain relies on the strength of the strands and is impacted not just by the nature and aspects of the wood components yet in addition by their game plan. It is most noteworthy in straight grained examples with thick-walled strands. The microfibril point (MFA) can likewise pronouncedly affect the diminished modulus [11-12]. Interestingly, cell wall hardness is by all accounts unfeeling toward MFA, which prompted the end that hardness is more an element of lattice. The mechanical properties represented by hemicelluloses and lignin or on the other hand hardness of cellulose shift close to nothing, with respect to its direction. The information on compressive strength of various woods shows the term grain incorporates both the heading of the strands and the surface of the wood, for example the size and course of action of the cell structures. Rigidity addresses the protection from powers attempting to pull the fiber structure separated and compressive present's protection from pressing or squashing powers both equal and opposite to the grain.

Table 1 Data on mechanical properties of different Indian woods

Name of the wood	Botanical family	Density (gm/cm^3)	Tensile strength (Kg/cm^2)	Compression Strength (Kg/cm^2)
Mango (M)	Anacardiaceae	0.66±0.02	240.15±10.11	2026.30
Neem(N)	Meliaceae	0.81±0.10	338.62±8.67	2182.90
Peepal (P)	Moraceae	0.63±0.01	205.55±8.98	1962.50
Casuarina (CA)	Casuarinaceae	0.72±0.07	185.27±3.15	2361.10
Curry Tree (K)	Rutaceae	0.42± 0.10	156.93±1.15	1263.15
Guava (GU)	Myrtaceae	0.79±0.06	265.12±9.67	2711.20
Eucalyptus (EU)	Myrtaceae	0.83±0.04	379.64±2.67	2501.34
Black Plum (BP)	Myrtaceae	0.71±0.07	211.11±5.91	2121.90
Velvet mestique (VV)	Mimosoideae	0.84±0.12	494.13±8.73	3125.12
Acacia (AC)	Mimosoideae	0.75±0.17	326.20±8.42	3563.21
Subabul (SB)	Mimosoideae	0.53±0.04	289.35±2.74	1513.04
Madhras Thorn (MT)	Mimosoideae	1.1±0.110	356.50±4.31	2920.60
Rain tree (RT)	Mimosoideae	0.48±0.06	165.77±5.84	1268.70
Kadam Tree (KT)	Rubiaceae	0.72±0.11	256.08±5.45	2616.30
Teak (TK)	Lamiaceae	0.71±0.04	250.00±1.95	2312.14
Arjun tree (AR)	Combretaceae	0.82±0.03	279.89±4.35	2233.33
Tamarind tree (TM)	Fabaceae	0.78±0.18	262.91±2.79	3012.10
Sal tree (SL)	Dipterocarpaceae	0.66±0.15	249.48±3.39	1754.40
Sugar-apple (SA)	Annonaceae	0.47±0.07	105.66±2.10	1136.40
Mammee apple (MA)	Sapotaceae	1.12±0.11	384.77±19.7	2933.70





REFERENCES

1. A. P. Schniewird and J. D. Barret, Wood as a linear orthotropic viscoelastic material, Wood Sci. Techn., Vol. 6, No. 1(1972), pp. 43 - 57.
2. T. A. McMahon, Size and shape in biology, Science, Vol. 179(1973), pp.1201 - 1204.
3. T. A. McMahon, R. E. Kronauer, Tree structures: deducing the principle of mechanical design, J. Theo. Bio. Vol. 59(1976), pp. 443 – 466.
4. K. J. Niklas Dependency of the tensile modulus on transverse dimensions, water potential, and cell number of pith parenchyma. Amer. J. Bot. Vol. 75(1988), pp. 1286 – 1292.
5. K. J. Niklas Plant biomechanics: an engineering approach to plant form and function. Chicago: University of Chicago Press,(1992).
6. B. F. Wilson, R. R. Archer, Reaction wood: induction and mechanical action. Annual. Plant. Physiol Vol. 28(1977), pp. 23.
7. J. R. Goodman, J. Bodig, Orthotropic elastic properties of wood, J. Structural Div. Amer. Soc. Civil Engg., Vol.96 (1970), pp. 2301-2319.
8. J. R. Goodman, J. Bodig, Orthotropic strength of wood in compression, Wood Sci., Vol.4 (1971), pp.83- 94.
9. P. O. Olesen, on cyclophysis and topophysis. Sil. ae Genetica., Vol. 27(1978), pp.173-178.
10. L. C. Palka, Predicting the effect of specific gravity, moisture content, temperature and strain rate on the elastic properties of softwoods, Wood. Sci. Technol., Vol. 7(1973), pp 127-141.
11. L. J. Gibson, M. F. Ashby, Cellular Solids – Structure and Properties, Second edn. Cambridge University Press, Cambridge, (2004).
12. W. Gindl, T. Schoberl, The significance of the elastic modulus of wood cell walls obtained from nano indentation measurements. Compos. Appl. Sci. Manuf., Vol. 35(2004), pp.1345 – 1349.

REACTIVE POWER COMPENSATION FOR POWER QUALITY BY USING D-STATCOM

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Abstract- A Static Compensator (STATCOM) is a flexible ac transmission system (FACTS) controller, which can either absorb or deliver reactive power to a power system. Distribution Static Compensator (DSTATCOM) is proposed for compensation of reactive power and unbalance caused by various loads (Sensitive and Non - Linear Loads) in distribution system. Distribution static compensator is based on the VSC principle. A D STATCOM injects a current into the system to correct the voltage sag, swell and power factor. Distribution Static Synchronous Compensator (D-STATCOM) is an effective measure to maintain voltage stability and improve power quality of distribution system. We have reviewed number of literature related to this aspects.

1 INTRODUCTION

Need for Study As commercial and industrial customers become more and more reliant on high- quality and high- reliability electric power. Insufficient power quality can be caused by failures and switching operations in the network, which mainly result in voltage dips, interruptions, transients and network disturbances from loads that mainly result in flicker i.e. fast voltage variations, harmonics, and phase imbalance. Momentary voltage sags and interruptions are by the most common disturbances that adversely impact electric customer process operations in large distribution systems. An increasing demand for high quality, reliable electrical power and increasing number of distorting loads may leads to an increased awareness of power quality both by customers and utilities. The most common power quality problems today are voltage sags, voltage swell, harmonic distortion and low power factor. Momentary voltage sags and interruptions are by far the most common disturbances that adversely impact electric customer process operations in large distribution systems. In fact, an event lasting less than one-

sixtieth of a second (one-cycle) can cause a multimillion- dollar process disruption for a single Industrial customer. Several compensation devices are available to mitigate the impacts of momentary voltage sags and interruptions. When PQ problems are arising from nonlinear customer loads, such as arc furnaces, welding operations, voltage flicker and harmonic problems can affect the entire distribution feeder. Several devices have been designed to minimize or reduce the impact of these variations. The primary concept is to provide dynamic capacitance and reactance to stabilize the power system. This is typically accomplished by using static switching devices to control the capacitance and reactance, or by using an injection transformer to supply the reactive power to the system.

2 D-STATCOM

This paper presents the operating principle of DSTATCOM. It is nothing but a STATCOM but used at the Distribution level. The key component of the DSTATCOM is a power VSC that is based on high power electronics technologies as shown below,

A D-STATCOM (Distribution Static Compensator) is a shunt voltage controller, which is schematically depicted, consists of a two - level Voltage Source Converter (VSC), adc energy storage device, a coupling transformer connected in shunt to the distribution network through a coupling transformer. The VSC converts the dc voltage across the storage device into a set of three - phase ac output voltages. These voltages are in phase and coupled with the ac system through the reactance of the coupling transformer. Suitable adjustment of the phase and magnitude of the DSTATCOM output voltages allows effective control of active and reactive power exchanges between the D-STATCOM and the ac system. Such configuration allows the device to absorb or generate controllable active and reactive power. The VSC connected in shunt with the ac system provides a multifunctional topology which can be used for up to three quite distinct purposes:

1) Voltage regulation and compensation of reactive power;
2) Correction of power factor;
3) Elimination of current harmonics. Here, such device is employed to provide continuous voltage regulation using an indirectly controlled converter.

The shunt injected current Ish corrects the voltage sag by adjusting the voltage drop across the system impedance Zth. The value of Ish can be controlled by adjusting the output voltage of the

converter. It may be mentioned that the effectiveness of the D-STATCOM in correcting voltage sag depends on the value of Zth or fault level of the load bus. When the shunt injected current Ish is kept in quadrature with VL , the desired voltage correction can be achieved without injecting any active power into the system. On the other hand, when the value of Ish is minimized, the same voltage correction can be achieved with minimum apparent power injection into the system.

3 LITERATURE REVIEW

Compensation of sinusoidal or non-sinusoidal load currents with DSTATCOM process was elaborated by C.N Bhende et al [2]. In this process, simultaneous correction of power factor to unity takes place. They also discussed about the three level inverter state space model of the compensator , which can be used for application of high power level and reduce the source currents THD. Three leg VSC with a T-connected transformer based three phase four wire DSTATCOM was analyzed by Bhim Singh et al [3]. By this neutral current compensation and reactive power compensation obtain the harmonic elimination and load balancing. Source to neutral currents has been mitigated by the T-connected transformer. Four leg VSC based DSTATCOM system has been explained by Shiv kumarIyer et al [5]. As per them the VSC is being connected through step down transformer to the distribution system. Injected currents cancellation due to DSTATCOM as a result of which the transformer does not saturate. Voltage control DSTATCOM was elaborated by Mohammad A. Eldery et al [4]. They found that by the utilization of current or voltage source inverters in adjustable speed drives the stability boundaries may be improved. DSTATCOM DC Link capacitor value is controlled as a voltage source from that stability boundaries are less affected. DSTATCOM rating reduction procedures are discussed by Bhim Singh et al [6]. According to them in addition to the cost reduction it also gives freedom to operate with high power and high PWM switching frequency based power electronic devices like IGBT etc. Multilevel Inverter with non stiff source based DSTATCOM was analyzed by Anshuman Shukla et al [7]. Two multilevel inverters viz. FCMLI and DCMLI were considered. A compensating technique like state feedback control has been applied for DSTATCOM. It can supply source currents and terminal voltages with balanced and distortion free. Multilevel inverter is operated with an efficient switching strategy. Tracking the reference ensures an efficient utilization of all output

voltage states of the inverter. A DSTATCOM compensation schemes for various loads in distribution systems was proposed by Bhim Singh and Jitendra Solanki [8]. According to them the evaluation of reactive power theory, synchronous reference frame theory and a new ada line based algorithms can derive reference limits for a DSTATCOM. A two level and a dynamic HVC based DSTATCOM have been proposed by Zhikang Shuai et al [9]. They observed that optimal reactive power capacity of each HVC and realize optimization in economy and effect can be obtained by two level collaborative optimization methods based multi group HVCs.G. Led wich and A. Ghosh [10] was explained a distribution static compensator which can be operated with flexibility in the voltage and current control mode. In view of them the balanced sinusoidal voltage can be supplied by DSTATCOM to distribution bus in voltage control mode, distortions caused by the load can be cancelled; through that compensated load currents are purely balanced and sinusoidal. Above objectives are achieved even unbalances and harmonic distortions in load currents or source voltages. Three single phase voltage source inverters connected in parallel to a filter capacitor included for selected DSTATCOM. To pass the high frequency components of the current a suitable controlled switching scheme is provided. The scheme can allow and give better performance for above DSTATCOM topology. Active filter and/or a static compensator new reference currents generation approach was presented by Arindam Ghosh and Avinash Joshi [11]. They explained that the connection of compensator with load can be assumed either in star or delta fashion. The load may be unbalanced and also it draws harmonic currents. This compensating scheme purpose is to balance the load and make the power factor of supply to a desired value. Yogesh Rohilla, Yash Buddy [16],this paper gives power element rectification, sounds disposal, burden adjusting and nonpartisan current payment of direct and non-straight, adjusted and unequal burdens utilizing custom power gadget DSTATCOM for three-stage four-wire (3p4w) framework. Flawless Symphonious retraction (PHC) hypothesis has been utilized for reference current era. A three-leg voltage source converter topology with T-joined transformer as circulation static compensator (DSTATCOM) is utilized within this paper. T-joined transformer is presented here for nonpartisan current recompense. Ability of this course of action is showed utilizing effects got from MATLAB-Simulink

nature. Bhim Singh, Sabha Raj Arya [17], This paper manages a product stage bolted circle (SPLL) based control calculation for a three stage dispersion static compensator (DSTATCOM) for power quality change under direct/nonlinear loads in an appropriation framework. In this control approach, plentifulness of central dynamic and receptive power segments of burden momentums is concentrated for estimation of reference source flows. The DSTATCOM is demonstrated in the Matlab environment utilizing Simulink and Sim Power Framework (SPS) tool stash. Matlab based created model of DSTATCOM is utilized to reproduce its execution. Reproduced execution of DSTATCOM is discovered agreeable under time shifting and unequal direct and nonlinear customer loads. Syed. Karimulla, P.S.Niranjan Kumar and Gulam Amer [18], the execution of the DSTATCOM relies on upon the control calculation i.e. the extraction of the current segments. In this way, for this, there are different control calculations for the control of DSTATCOM piece relying upon different hypotheses and methodologies like stage movement control, quick PQ hypothesis, synchronous edge hypothesis, Adaline based hypothesis. Each of the calculations specified have their benefits and faults. This paper concentrates on power quality change of little disengaged alternator bolstering a three stage three wire circulation framework with a straight load. Voltage regulation and amendment of straight loads, effectiveness of power, for example, power variable rectification are examined and executed with the assistance of DSTATCOM. Furthermore likewise different control calculations specified are explored and broke down through advanced recreations. The models are produced and mimicked in MATLAB utilizing Simulink and power framework piece set (PSB) tool stash.

4 CONCLUSION

Power quality has turned into a paramount situation as of late. This paper has inspected the advancement of DSTATCOM for power quality change of 3 stage 3 wire appropriation framework. We reviewed number of research article for this methodology.

REFERENCES

1. S. Ostroznik, P. Bajec, and P. Zajec, “A study of a hybrid filter,” IEEE Trans. Ind. Electron., vol. 57, no. 3, pp. 935–942, Mar. 2010.
2. A. Ghosh and G. F. Ledwich, Power Quality Enhancement Using Custom Power Devices.. Norwell, MA, USA: Kluwer, 2002.
3. H. Hu, W. Shi, Y. Lu, and Y. Xing, “Design considerations for DSP controlled 400 Hz shunt active

power filter in an aircraft power system," IEEE Trans. Ind. Electron, vol. 59, no. 9, pp. 3624–3634, Sep. 2012.

4. B. Singh and S. Arya, "Back-propagation control algorithm for power quality improvement using DSTATCOM,"IEEE Trans. Ind. Electron., vol. 61, no. 3, pp. 1204–1212, Mar. 2014.
5. M. Singh, V. Khadkikar, A. Chandra, and R. Varma, "Grid interconnection of renewable energy sources at the distribution level with power quality improvement features," IEEE Trans. Power Del., vol. 26, no. 1,pp. 307–315, Jan. 2011.
6. S. Srik an than and M. K. Mishra, "DC capacitor voltage equalization in neutral clamped inverters for DSTATCOM application," IEEE Trans. Ind. Electron., vol. 57, no. 8, pp. 2768–2775, Aug. 2010.
7. H. Akagi and K. Isozaki, "A hybrid active filter for a three-phase 12-pulsediode rectifier used as the front end of a medium-voltage motor drive, "IEEE Trans. Power Electron., vol. 27, no. 1, pp. 69–77, Jan. 2012.
8. S. Karanki, N. Geddada, M. K. Mishra, and B. Kumar, "A DSTATCOM topology with reduced dc-link voltage rating for load compensation with non stiff source," IEEE Trans. Power Electron., vol. 27, no. 3, pp. 1201– 1211, Mar. 2012
9. K. Karanki, G. Geddada,M. K.Mishra, and B. Kumar, "A modified three phase four-wire UPQC topology with reduced DC-link voltage rating, "IEEE Trans. Ind. Electron., vol. 60, no. 9, pp. 3555–3566, Sep. 2013.
10. O. Vodyakho and C. Mi, "Three-level inverter-based shunt active power filter in three -phase three-wire and four-wire systems," IEEE Trans. Power Electron., vol. 24, no. 5, pp. 1350–1363, May 2009.
11. Q.-C. Zhong and T. Hornik, "Cascaded current– voltage control to improve the power quality for a grid- connected inverter with a local load," IEEE Trans. Ind. Electron., vol. 60, no. 4, pp. 1344– 1355, Apr. 2013.
12. U. Rao, M. K. Mishra, and A. Ghosh, "Control strategies for load compensation using instantaneous symmetrical component theory under different supply voltages," IEEE Trans. Power Del., vol. 23, no. 4, pp. 2310–2317,Oct. 2008.
13. M. K. Mishra and K. Karthikey an, "An in vestigation on design and switching dynamics of a VSI to compensate unbalanced and nonlinear loads, "IEEE Trans. Ind. Electron., vol. 56, no. 8, pp. 2802–2810, Aug. 2009.
14. N. Mohan and T. Undel and, Power Electronics: Converters, Applications, Design. Hoboken, NJ, USA: Wiley, 2007.
15. M. Hanif, V. Khadkikar, W. Xiao, and J. Kirtley, "Two degrees of freedom active damping technique for LCL filter-based grid connected PV systems," IEEE Trans. Ind. Electron., vol. 61, no. 6, pp. 2795–2803,Jun. 2014.
16. Yogesh Rohilla, Yash Pal, "T - connected Transformer Integrated Three - leg VSC based 3P4W DSTATCOM for Power Quality Improvement" 2013 Nirma University International Conference on Engineering (NUiCONE) IEEE.
17. Bhim Singh, Sabha Raj Arya, "Software PLL Based Control Algorithm for Power Quality Improvement in Distribution System" 978 - 1-4673-0934-9/12/$31.00 ©2012 IEEE
18. Syed. Karimulla, P.S. Niranjan Kumar and Gulam Amer

"Enhancement of Power Transmission System Performance " Proceedings of ICETECT 2011 IEEE.

19. Bhim Singh, P. Jayaprakash, Sunil Kumar, and D. P. Kothari, " Implementation of Neural-Network-Controlled Three -Leg VSC and a Transformer as Three -Phase Four-Wire DSTATCOM" IEEE Transactions On Industry Applications, Vol. 47, No. 4, July/August 2011
20. Ms. Manju Aggarwal, Prof. S. K. Gupta Prof. Madhusudan, Dr. Gaurav Kasal, "D-STATCOM control in Low Voltage Distribution System with Distributed Generation" Third International Conference on Emerging Trends in Engineering and Technology, 2010 IEEE.

DIGITAL SIGNAL PROCESSING BASED ADVANCED WRITTEN BY HAND CHARACTER: A CASE

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Abstract - Written by hand reports shape the reason for correspondence. Because of substantial varieties in the penmanship and the given pervasiveness, it is hard to perceive written by hand reports utilizing machine. Well models are utilized as a part of recognizable proof, acknowledgment and forecast framework since they are exceptionally rich in there scientific structure and hence shapes a reason for quantitative confirmation. This paper proposes the use of enlarged Concealed Markov Display for written by hand English character acknowledgment. The model utilized here uses the pre-divided and commotion disconnected pictures of the manually written characters. Subsequent to preprocessing, which incorporates the Binarization, Reversal and Skeletonization, neighborhood highlight vector is separated which is conveyed for the utilization by the Well. The exploratory result demonstrates this expanded strategy is promising and yield more right results than other customary strategies.
Keywords: (Well) Concealed Markov Show, Reversal, Neighborhood Highlight Extraction.

1 INTRODUCTION

Character acknowledgment is a vital theme in the field of example acknowledgment, which is the foundation of machine discernment. Creation of scanners and change in scanner innovation has improved the utilizations of computerized character acknowledgment. We have two kind of acknowledgment frameworks in view of the method for catching the manually written characters: On-line, where information will be caught amid the way toward composing and Disconnected, where information will be caught after the procedure of composing is over. This is the situation which makes the acknowledgment of disconnected penmanship more perplexing than the on-line case. Disconnected and on-line acknowledgment frameworks are additionally separated by the applications they are committed to. The disconnected acknowledgment is

devoted to bank check handling, mail sorting, perusing of routine business frames and so on. We have utilized the most well known classifier for written by hand English letter set acknowledgment, the Shrouded Markov Display (Gee). There are two reasons why Well is so mainstream. To begin with the model is rich in numerical structure and consequently can shape the hypothetical reason for use in extensive variety of use. Second the models, when connected legitimately, works exceptionally well by and by in a few critical application. Well has its application in the region of discourse acknowledgment, bioinformatics, climatology and Acoustics and so on for the most part two sorts of issues happens in these examination range of the demonstrating. The first is the preparation issue of Well to advance the model parameters with the end goal that it can precisely speak to the preparation succession what's more, Second issue is of trying or forecast of succession utilizing the improved Well model. In this paper, we have taken use of English letters in order acknowledgment in which Gee is utilized with an increased technique for acknowledgment.

2. GRID CONNECTED WIND FARM

Generally, wind farms based on their grid connectivity are classified as grid connected and standalone wind farms. In this work, a grid connected ADAMA-I wind farm as shown in have been selected as a case study. Generally, this WF consists of wind, step-up unit transformers, WTG collecting and connector transmission line, wind turbine substation and the main grid transmission line. Where, wind turbine blades have connected to blade rotor, which, has fed to the generator shaft converts kinetic energy of the wind to mechanical energy, WTG convert the mechanical energy to an AC electric power from wind and then this power is filtered by generator side filter then rectified in to DC power by a rectifier.

The DC power is boosted by using DC-DC boost converter, and then converted to AC power by the inverter. The output of inverter voltage is again filtered by grid side filter and stepped up to medium voltage level (33kV) with WTG unit transformer. Then the output of WTG unit transformer AC power /voltage is collected and transmitted to the wind turbine main substation. At the wind farm substation as shown in the substation transformer is used to step up the 33kV line voltage to 132kV line voltage of the main grid, then the main grid transmission line transmits this power to the national grid.

3. WIND ENERGY CONVERSION SYSTEMS

As shown in the system consists of wind source, three blade turbine, direct derive permanent magnet synchronous generator (DD PMSG) diode bridge rectifier, DC-DC boost converter with associated controllers, DC link capacitor, inverter with controllers, AC filter, unit transformer and AC grid. The three blades are connected to the turbine rotor which is coupled with shaft of the generator. The generator converts the mechanical power of the turbine blade to AC electric power. The AC power is converted DC power the bridge rectifier and boosted by DC-DC converter. The output of the boost converter is converted to AC power by the inverter. Then this power is filtered by RLC filter and stepped up by the unit transformer.

Few fundamental characteristics that make GA versatile, flexible and applicable to a wide range of optimization problems are that, GA's are blind search methods which uses information only about objective function, they are parallel search schemes which simultaneously evaluate many points in the parameter space rather than a single point, they work directly with bit strings representing the parameter sets and not the parameter themselves etc. In view of the above, this paper aims to investigate the effect of SMES units on the dynamic performances of an interconnected thermal power system following a step load disturbance in either of the areas. For different ACE participation factors, the optimum values of integral gain settings in the control areas without and with SMES units are obtained using Genetic algorithms.

4. ISSUES WITH GRID INTEGRATION OF WIND FARMS

The major issues encountered by wind farm integration to the grid includes but not limited to this only are steady state voltage variation, increased temporary over voltage, voltage flicker and harmonic components and restrictions on operation of existing grid protection. In this work steady state, voltage variation and temporary over voltage is considered as a case study.

5 CONCLUSIONS

The target taken in this paper is to show manually written English letters in order acknowledgment, which can perceive letters in order with an indistinguishable acknowledgment precision from people, yet at a quicker rate. In the present work we have formulated novel technique. In the pre-preparing, nearby element extraction techniques have been utilized which makes the component vector. These elements have been utilized to get Well model. The models have been tried considering every one of the letters in order and the acknowledgment rate found in the middle of 79.615

to 99.99%. It is felt that, finding extra concealed extraordinary elements in the English letters in order can assist expand the acknowledgment rate. A blend of Well alongside neural system classifier or with hereditary approach for enhancing the Well parameters can likewise be considered and acknowledgment may turn out to be better.

REFERENCES

1. Rabiner L.R., "A instructional exercise on Well and Chose Applications in Discourse Acknowledgment", Procedures of the IEEE, Vol. 77, NO. 2, P267-296.
2. R. Sundararajan, "Securities exchange pattern and predection utilizing Markov models", Branch of ECE, Amrita Vishwa vidyapeeth, Coimbatore, RTCSP 09.
3. S. Kwong, C. W. Chau, K.F. Man, K.S. Tang, "Advancement of Gee topology and its model parameters by hereditary calculation", Example acknowledgments 34 (2001) 509-522.
4. The City Calculation, "Measurable Frameworks and Mimicked Strengthening".

CHALLENGES AND ISSUES WITH DEMONETIZATION

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Abstract:
Objectives: to recognize the could reasonably be expected effect from claiming late demonetization strategy over india by reviewing the existing written works looking at those expense god proportion and gad development rate and segment insightful Growth rate previously, then following demonetization.
Methods: Since display consider is fundamentally a survey about existing writing thus it will be completely In light of auxiliary information. Optional majority of the data will be gathered starting with Different diaries Also monetary review from claiming India Different issue.
Findings: By reviewing the prior written works it may be watched that starting with hypothetical perspective for see demonetization may be not swaying. The investigation likewise discovered that In spite of the expense gap proportion need been expanded then afterward demonetization yet all the gap development rate alongside Growth rate of separate division have fall promptly following demonetization.
Future improvements: In any case because of absence of data, long run sway in effect ahead recouping bootleg cash need not assessed in the introduce study. Something like that future ponders cam wood is aggravated in this view.
Keywords: GDP Growth Rate, Tax GDP Ratio.

1. INTRODUCTION

Demonetization is a procedure through which whichever exactly alternately all of the cash denominations are acknowledged concerning illustration ineligible to utilizing clinched alongside transactions. To mossy cup oak of the nations on those world, principle point behind demonetization might have been will check debasement and dark cash. Demonetization is not another particular idea over India.

Prior Different time's secondary division banknotes were demonetized RBI. Over 1946, to that initial period legislature demonetize notes for division □1,000 □5,000, □10,000. Further higher division banknotes for example, 1,000, 5,000, 10,000 reintroduced clinched alongside 1954 and every last bit about them were demonetized done 1978 with check unaccounted cash. However, the result of demonetization on

both the chance on controlling bootleg cash might have been not altogether palatable. Likewise, ahead 8 November 2016, those Indian administration demonetized high-value cash notes of division 1,000 500 which comprises a quality about almost 86. 9% for aggregate coin in coursing library on India with those point about controlling dark economy and defilement decreasing measure from claiming fake cash.

2. METHODOLOGY

Since present study is basically a review of existing literature so it is fully based on secondary data. Secondary information is collected from various journals and different issue of economic survey of India. In the first part a brief review of earlier studies has been given to conceptualize the issue. Later on impact of demonetization on Indian economy has been examined by collecting secondary data. The basic variable considered in the study is tax –GDP ratio, GDP growth rate. Sector wise GDP growth rate are also considered to analyze the impact of demonetization on different sectors of the economy.

3. THEORETICAL BACKGROUND

3.1. Monetary theory

In analyzed that hypothetical viewpoint of demonetization also found that from hypothetical side of the point about see demonetization will be not the fruitful particular case. Distinguishing the vitality of money, fiscal scholar contended that a economy run with cash gives All the more profit over an economy run under trade framework. Thereabouts starting with this perspective of view, utilization venture choice about both present and future period will make adversely influenced that procedure of demonetization. Moreover, in the event that from claiming Indian economy the place an enormous extent for transactions are completed through money payment, the negative impact will be a great deal additional.

Through cash multiplier model, a few analyst seen that demonetization will build cash supply. Since demonetization will decrease the particular cash coursing library Also will improve those deposits, thereby giving banks would certain on expansion for a positive save proportion. However, at some point further expand On stores Similarly as an aftereffect of demonetization might not prompt build clinched alongside cash supply though banks generally hold abundance saves. Moreover, as stated by that in the current economy bank makes cash not fundamentally through those stores yet all the through advances. Consequently those proficiency from claiming making cash relies on intensity of the saving money industry, and the

accessibility of gainful venture chances as opposed add up of stores. In view of this argument, Indian banks might not have the ability should make All the more cash following demonetization. A result for lesquerella chance to gainful financing 100% incremental CRR on new deposits, it may be profoundly prone that plausibility of making new loans/deposits and thereby cash supply will be thick, as low.

3.2. Behavioral theory

In made an extensive analysis on behavioural economics perspective of demonetization. The paper put forward various behavioural theories to explain the possible impact demonetization in the long run. The study added that welfare gains of demonetization can be increased by targeting only those who actually have black income.

Possibility hypothesis Additionally provides for those perfect something like those time permits result of a open strategy which depicts those choice from claiming kin under distinctive circumstances from claiming and the estimation something like they could reasonably be expected result of each from claiming these choices. As stated by this theory, current circumstance of danger relies on both the current also future recognition from claiming addition passing I. E. Current and anticipated status. In this way, people recommended different example for danger inclination similarly as a response should an open policy, for example, risk-aversion also risk-seeking to additions misfortunes separately under secondary probability; risk-seeking and risk-aversion for additions misfortunes under low likelihood. In the connection of the demonetization problem, accepting primed accessibility get will trade for transaction purposes Concerning illustration current situation, individuals would required to think those move towards An cashless economy Similarly as An negative deviation Consequently An passing. Further, confronting with the observation for secondary misfortunes with secondary probability, the holder about bootleg cash need aid continuously relied upon will make locked in over helter skelter risk-seeking conduct.

4. DISCUSSION

4.1. Indian experience of demonetization

Over analyses the distinctive nation's experience of demonetization crosswise over that planet will analyze those time permits effect from claiming demonetization to India. They saw that mossy cup oak of the organizations in the nation over the reality need received the demonetization strategy to dispense with dark money, fake particular cash also regulating expansion. But USA also Australia,

The greater part of the economy broken down following demonetization. They also included that, in short run, know division are required to make adversely influenced because of diminishment of cash, however, On long-run casual economy might transform under formal particular case. Once more new business person will be benefited a direct result Likewise cash supply decreases, rate of investment will fall Also there will a chance to be that's only the tip of the iceberg right with advance. Moreover, they likewise included that following demonetization Indian economy is relied upon with move towards cashless economy. As stated by tending to the issue about debasement Also dark money, lessen those degree of fake money, development towards electronic money, progressed majority of the data over those money economy would a percentage of the distinguished profit for demonetization.

5. CONCLUSION

Demonetization might have been initiated on India in place to control dark money, fake cash debasement moving towards cashless economy. However, reviewing the sooner written works it might be reasoned that demonetization will be not great you quit offering on that one On India, both hypothetically also observationally. Trade withdrawal need been expanded after demonetization as news person store bank about India.

However, long run sway from claiming demonetization can't be investigated in the available study since these will require long run information. So as on perceive that long run sway for controlling dark cash long run information will make required. Normal individuals need aid tolerant those challenges throughout demonetization in the would like from claiming disposal from claiming bootleg cash Also debasement. However those duty gap proportion need been marginally expanded following demonetization, yet the gap Growth rate need declined. Farming industry Growth rate declined; inasmuch as administration division Growth expanded as a quick response with demonetization in the to start with quarter about 2017.

REFERENCES

1. R. Jangid. Demonetization and its impact on Indian Economy. UGP Project Report. 2017; 1-10.
2. A. Kaur. The Demonetization puzzle. Business Today. 2016; 25(25), 1-24.
3. P. Waknis. Demonetization: some theoretical perspectives. MPRA Paper No. 76391. 2017; 1-9.
4. N. Wallace. Whether monetary economics? International Economic Review. 2001; 42(4), 847–869
5. Money, Payments, and Liquidity. https://www.amazon.com/Money-Payments-Liquidity-MIT-Press/dp/0262016281. Date accessed: 28//10/2018.

6. S. Carpenter, S. Demiralp. Money, reserves, and the transmission of monetary policy: does the money multiplier exist? Journal of Macroeconomics. 2012; 34(1), 59–75
7. M. McLeay, A. Radia, R. Thomas. Money creation in the modern economy. Bank of England, Quarterly Bulletin Q1. 2014; 54(1), 14-27.
8. A. Shah. A monetary economics view of the demonetization. Business Standard. 2016.
9. T. Jayakumar. Behavioural economics perspective of demonetization. Economic & Political Weekly. 2017; 41; 1-6.
10. D. Kahneman, A. Tversky. Prospect theory: An analysis of decision making under risk. Econometrica. 1979; 47(2), 263–91,
11. A. Tversky, D. Kahneman. Advances in prospect theory: cumulative representation of uncertainty. Journal of Risk and Uncertainty. 1922; 5, 297–323.
12. Demonetization: 27 Senior Bank Officials Suspended to Check Corrupt Practices. https://timesofindia.indiatimes.com /india/Demonetization27seniorbank officialssuspendedtocheckcorruptpra ctices/articleshow/55753967.cms. Date accessed: 02/12/2016.
13. Demonetization and its impact on Indian economy. http://ijariie.com/AdminUploadPdf/ DEMONETIZATION_AND_ITS_IMPAC T_ON__INDIAN_ECONOMY_ijariie639 2.pdf. Date accessed: 2017.
14. Notes (and anecdotes) on Demonetization. https://sites01.lsu.edu/faculty/ach anda/wp /content/uploads/sites/136/2016/ 12/Notes-on-Demonetization.pdf. Date accessed: 17/12/2016.
15. P. Kumar, D.S. Chaubey. Demonetization and its impact on adoption of digital /payment: opportunities, issues and challenges. Abhinav National Monthly Refereed Journal of Research in Commerce &Management. 2017; 6(6), 1-14.
16. R.R. Kumar. Demonetization and its effect on life of common people in India. Indian Journal of Economics and Development. 2016; 4(11), 1-3.
17. Impact of Demonetization on Indian Economy. https://www.youthkiawaaz.com/201 7/12/impact-of-demonetization-on-the-indian-economy/. Date accessed: 02/12/2017.
18. One step forward, two steps back.http://www.redspark.nu/en/p eoples-war/india/one-step-forward-two-steps-back-kobad-ghandy-on-demonetization/. Date accessed: 10/12/2016.
19. Economic Survey 2017-18. https://www.ibef.org/economy/econ omic-survey-2017-18. Date accessed: 01/2018.

A STUDY BASED ON ALGEBRAIC AND TRANSCENDENTAL DIOPHANTINE EQUATIONS IM METHAMATICS

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Abstract - When it comes to number theory, Diophantine approximation is the field of number theory that deals with questions such as whether or not an integer is rational, irrational, or transcendental. On the other hand, one can ask how well an irrational number approximates a rational number, or how well algebraic numbers approximate a transcendental number.
Keywords: The diophantine equation, polynomial equation, algebra.

1 TRANSCENDENTAL EQUATIONS – AN OVERVIEW

Theoretical physics is replete with transcendental equations. There are numerous quantum mechanical and nanophysical systems whose energy eigenvalues may be determined via transcendental equations. Transcendental equations include, but are not limited to,

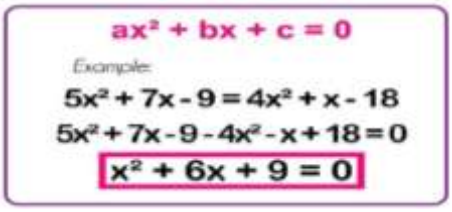
$$\zeta e^{\zeta} = p, \quad \frac{\sin\zeta}{\zeta} = \pm p, \quad \frac{\cos\zeta}{\zeta} = \pm p$$

Solving such equations might involve the use of trigonometric functions (tan, cot), hyperbolic functions (sin, cosh, tanh), or more sophisticated algebraic formulations. You may do this by finding a function that has an explicit form $\zeta(p)$, which is equal to finding each function $p = p(\zeta)$, defined as follows:

1.1 Algebraic Equations

Two expressions are placed at the same value, One way to describe an algebraic equation is a mathematical statement. Variables, coefficients, and constants are the main components of an algebraic equation in most cases.

Equations, or the equal sign, represent equality. To "equate one quantity with another" is what equations are for.



Equations are akin to a scale of equality. There must be an identical quantity of power

positioned on whichever surface of a balancing level in order for it to be called "balanced". With only one side of the scale being heavier, the scale will tip and no longer be evenly distributed between both. In the same way, equations follow a logical progression. Anything on one side of an equal sign has to match up perfectly with whatever is opposite it or else it becomes an inequality.

2 ILLUSTRATION

Consider

$72A + 36 = 6 * (12A + 6) = 9 * (8A + 4)$ which implies

$(12A + 12)^2 + (8A - 5)^2 = (12A)^2 + (8A + 13)^2 = 208A^2 + 208A + 169$

which is a R_2number.

Remarkable Observation

Let (x_0, y_0, z_0) be any solution of (2.31), then the following triple of integers based on x_0, y_0 and z_0 also satisfy (2.31).

1. **Triple 1:** $(x_0, 2z_0 - 2x_0 + y_0 - 2, -z_0 + 2x_0 + 2)$
2. **Triple 2:** $(x_0 + 2z_0 - 2y_0 - 6, y_0, -z_0 + 2y_0 + 6)$ $(x_0, 2z_0 - 2x_0 + y_0 - 2, -z_0 + 2x_0 + 2)$
3. **Triple 3:** $(y_0 + 2, x_0 - 2, z_0)$

3 DEALS WITH TERNARY CUBIC DIOPHANTINE EQUATIONS

They are discussed in subsections **III.A.1** and **III.A.2**.

Trivariate cubic diophantine equation of the Non-trival distinct integer solutions

$$ax^2 + by^2 = (a + b)z^3$$

are presented in **III.A.1**.

The ternary cubic diophantine to the non-trival integral solutions of the problem in III.A.2

$5(x^2 + y^2) - 9xy + x + y + 1 = 35z^3$

are obtained.

In **III.B** cubic diophantine equations with four unknowns are considered. They are explained in subsections **III.B.1** and **III.B.2**.

III.B.1 involves the study of the cubic diophantine problem with four variables

$$x^3 + y^3 = (z + w)^2 (z - w)$$

Because of the non-zero integral answers it provides.

In **III.B.2**, The cubic diophantine problem has non-zero integral solutions

$$x^3 + y^3 = 14zw^2$$

When it is solved for its integrals

4 WITH FOUR UNKNOWNS DEALS WITH BI-QUADRATIC DIOPHANTINE EQUATIONS

They are discussed in subsections from **IV.A.1** to **IV.A.3**.

4.1 The Bi-Quadratic Diophantine Equation with four Unknowns the Non-Trival Integral Solutions

$$x^4 - y^4 = (k^2 + 1)(z^2 - w^2)$$

are attained.

The bi-quadratic diophantine equation has different integer solutions that are Non-trival

$$8(x^3 + y^3) = (1+ 3k^2)^n z^3w$$

are presented in **IV.A.2**.

In **IV.A.3** the bi-quadratic equation

$$(x + y)(x^3 + y^3) = 52z^2w^2$$

Solved for its distinct integral solutions that do not equal 0.

In section **IV.B** bi-quadratic diophantine equations with five unknowns are considered. They are explained in two subsections **IV.B.1** and **IV.B.2**.

5 FIVE UNKNOWNS IN A NON-HOMOGENOUS QUINTIC EQUATION

$$(x - y)(x^3 + y^3) = 2(z^2 - w^2)T^3$$

The diophantine equation that represents the quintic equation using five unknowns is

$$(x - y)(x^3 + y^3) = 2(z^2 - w^2)T^3$$

Introduction of the linear transformations

$$x = u + v, y = u - v, z = 2u + v, w = 2u - v$$

in guides to

$$u^2 + 3v^2 = 4T^3$$

As a result, five separate solutions to the following equation may be obtained by solving it in five different ways.

Pattern 1

Let

$$T = a^2 + 3b^2$$

Write 4 as

$$4 = (1 + i\sqrt{3})(1 - i\sqrt{3})$$

If (5.3) is substituted for (5.4) and (5.5) and factorization is used, conclude

$$(u + i\sqrt{3}v) = (1 + i\sqrt{3})(a + i\sqrt{3}b)^3$$

Real and imaginary components are equal in (5.6), which gives us

$$u = a^3 - 9a^2 - 9ab^2 + 9b^3$$
$$v = a^3 + 3a^2b - 9ab^2 - 3b^3$$

Given and x, y, z and w corresponds to these values for each of the four variables.

$$\left.\begin{aligned} x(a,b) &= 2a^3 - 6a^2b - 18ab^2 + 6b^3 \\ y(a,b) &= -12a^2b + 12b^3 \\ z(a,b) &= 3a^3 - 15a^2b - 27ab^2 + 15b^3 \\ w(a,b) &= a^3 - 21a^2b - 9ab^2 + 21b^3 \end{aligned}\right\}$$

6 WITH FOUR UNKNOWNS OBSERVATIONS ON THE NON-HOMOGENEOUS SEXTIC EQUATION

$$x^4 - y^4 = 2^{2k+1}zT^5$$

There is an equation that has to be solved:

$$x^4 - y^4 = 2^{2k+1}zT^5$$

Introduction of the transformations

$$x = u + v, y = u - v, z = 4uv\ (u \neq v)$$

in leads to

$$u^2 + v^2 = 2^{2k}\,T^5$$

Take

$$T = a^2 + b^2$$

Write

$$2 = (1+i)(1-i)$$

To define use the factorization technique together

$$u + iv = (1+i)^{2k}(a+ib)^5$$

$$= \sqrt{2}^{2k}\left(\cos\frac{k\pi}{2} + i\sin\frac{k\pi}{2}\right)(a+ib)^5$$

6.1 With Four Unknowns on the Observations Non-Homogenous Sextic Equation

$$(x-y)(x^2+y^2) = z(x^2 - xy + y^2 + 7w^5)$$

There is an equation that has to be solved:

$$(x-y)(x^2+y^2) = z(x^2 - xy + y^2 + 7w^5)$$

Introduction of the linear transformations

$$x = u+v, y = u-v, z = v$$

in leads to

$$v^2 + 3u^2 = 7w^5$$

REFERENCES

1. Ajai Choudhary, On Equal Sums of Cubes, Rocky Mountain J. Math., Vol. 28, 1251-1257, 1998.
2. Ajai Choudhary, A Diophantine Problem Concerning Cubes, J. Number Theory, Vol. 110, 403-412, 2005.
3. 3Ajai Choudhry, The general solution of a Cubic Diophantine equation, Ganita, Vol. 50, No. 1, 1-4, 1999.
4. Albert H. Beiler, Recreations in the Theory of Numbers, Dover Publications, New York, 1963.
5. Andre Weil, Number Theory: An approach through history, From Hammurapito to Legendre, Birkahsuser, Boston, 1987.
6. Andre Weil, Basic Number Theory, Third Edition, Springer Verlag, Berlin, 1995.
7. Andre Wiles, Modular Elliptic Curves and Fermat's Last Theorem, Annals Math., Vol.141, 443-531, 1995.
8. Arif S.A., Fadwa S. Abu Muriefah, On the Diophantine equation x2 + q2k+1 = yn , Journal of Number Theory, 95-100, 2002.
9. *Baker A., The diophantine equation y 2 = ax3 + bx2 + cx + d , J. London Math. Soc., Vol. 43, 1-9, 1968.*
10. *Beiler A.H., Recreations in the Theory of Numbers, Dover Publications, New York, 1966.*
11. Gopalan M.A. and Shanmuganandham P., *On the biquadratic equation x*4 + *y*4 + *z*4 = 2*w*4 , Impact J. Sci. Tech., Vol. 4, No. 4, 111-115, 2010.
12. Gopalan M.A. and Sangeetha G., *Integral solutions of non-homogeneous Quartic equation x*4 - *y*4 = (2a 2 + 2a +1)(*z*2 - *w*2) , Impact J. Sci. Tech., Vol. 4, No. 3, 15-21, July-Sep. 2010.
13. Gopalan M.A., Vidhyalakshmi S. and Devibala S., *On the Diophantine equation* 3*x*2 + *xy* = 14, Acta Ciencia Indica, Vol. XXXIIIM, No. 2, 645-646, 2007.
14. Gopalan M.A. and Vijayashankar A., *Integral solutions of the sextic equation x*4 + *y* 4 + *z* 4 = 2*w*6, Indian Journal of Mathematical Sciences, 6(2), 241-245, 2010.
15. Gopalan M.A. and Vijayashankar A., *Integral Solutions of non-homogenous sextic equation xy* + *z* 2 = *w*6, Impact Journal of Science and Technology, 6(1), 47-52, 2012.
16. Gopalan M.A., Manju Somnath and Vanitha N., *Parametric solutions of x*2 - *y* 6 = *z* 2 , Acta Ciencia Indica, XXXIII(3), 1083-1085, 2007.

17. Gopalan M.A., Vidhyalakshmi S., Usha Rani T.R. and Mallika S., *Observations on y* 2 = 12*x*2 - 3, Bessel J. Math., Vol. 2(3), 153-164, 2012.
18. Gopalan M.A., Vidhyalakshmi S., Usha Rani, T.R. and Arulmozhi M., *Observations on the hyperbola y* 2 = 90*x*2 +1, International Journal of Multidisciplinary Research and Development, 2(3), 350-352, 2015.
19. Gopalan M.A., Vidhyalakshmi S., Usha Rani T.R. and Agalya K., *Observations on the hyperbola y* 2 = 110*x*2 +1, International Journal of Multidisciplinary Research and Development, 2(3), 237-239, 2015.
20. Gopalan M.A., Vidhyalakshmi S., Usha Rani T.R. and Arulmozhi M., *On the negative pell equation y* 2 = 35*x*2 -19, International Journal of Research and Review, Vol. 2, Issue 4, 183-188, April 2015.
21. Jan-hendrik evertse, kálmán győry, and cameron l. Stewart, "Mahler's Work On Diophantine Equations And Subsequent Developments", arXiv:1806.00355v1 [math.HO] 31 May 2018.
22. Dijana Kreso, Robert F. Tichy, "Diophantine equations in separated variables", Period Math Hung (2018) 76:47–67, https://doi.org/10.1007/s10998-017-0195-y.

A STUDY ON AI BASED MEDICINAL SERVICES INNOVATION

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Abstract - In the tremendous and complex universe of medicinal services innovation, we should ask ourselves — what is the most ideal approach to convey the advantages of the most recent innovation? Doctors today are under expanding weight to see more patients in less time, a genuine stressor that is exacerbated by desires that specialists rapidly assess and fuse into clinical practice quickly changing restorative proof. On the off chance that human services choices are autos, then doctors are the drivers. They manage the place human services is conveyed, the time allotment of conveyance and the measure of cash spent on it. This impeccable tempest of too little time, an excess of data, and excessively couple of assets makes a domain more open to analytic blunder.
Keywords: Sensors, Micro-Controller, Arm-7, Gsm-Module.

1 INTRODUCTION

In the field of wellbeing observing the current most critical client gatherings are those matured 40 and then some. The gathering of 40+ clients indicates more differing qualities in their wellbeing conditions than more youthful individuals. There are ring-sort beats checking sensor accessible in the market in which the deliberate information are shown in the LCD and can't be transmitted out of the ring. Accordingly, it is impractical to constantly screen the imperative parameters, for example, temperature, weight and heartbeat from a far off area. In a clinic either the medical attendant or the specialist needs to move physically from one individual to another for wellbeing check, which may not be conceivable to screen their conditions constantly. In this manner any basic circumstances can't be discovered effortlessly unless the medical attendant or specialist checks the people wellbeing right then and there. This might be a strain for the specialists who need to deal with a great deal number of individuals in the doctor's facility. With a specific end goal to keep in track of basic wellbeing conditions, an ongoing wellbeing observing arrangement of patient in view of ZigBee, GSM, and SMS is introduced. This finds

endless application in the remote and urban spots where the general population are out of reach from the experienced specialists; remembering this component best exertion is done to actualize a portion of the fundamental trial of obsessive information on the framework [1,2]. A continuous wellbeing checking arrangement of remote patient created is a wearable gadget. This gadget will be wearied by the patient and parameters, for example, ECG, Temperature and Heart Beat will be constantly transmitted and screen through remote innovation ZigBee [1,2].At the beneficiary side (specialist side) the information will be remotely gotten utilizing ZigBee. The specialist will screen the deliberate parameter on the GUI composed utilizing Visual Basic on PC. The information from the patient is gathered ceaselessly and put away in the database planned utilizing SQL (Structured Query Language) if the specialist is not present right then and there of time, he will be hinted through a SMS (Short Messaging Service)also the relatives will get a message if there should arise an occurrence of irregularities. On identifying the kind of irregularity the specialist can call the patient and let him know the further strategy. The information caught is transferred on the server cloud. The approved individual having the get to Id can get to information at whatever time. By this way healing facility or specialist can screen their patient effectively and easily. They can screen each perceptions, for example, beat, circulatory strain and distinctive medicinal parameters. Through remote sensors specialist can give distinctive exhortation to the understanding whenever. In the event that specialist is at home can address understanding sitting at home.I can say then, it is the main way a specialist is 24*7 checking tolerant. Figure1 demonstrates the incorporating distinctive modules, for example, extraordinary sensors, diverse medicinal equipment's, with LCD and with remote sensors and insights about power supply framework to gadget.

2 OUTLINE CONSIDERATIONS

After some time, huge numbers of versatile, single parameter screens/meters rose for measuring such things as blood weight, glucose levels, beat, tidal carbon dioxide, and different other biometric values. Today, understanding screens are compact, adaptable gadgets equipped for being adjusted to an assortment of clinical applications, supporting different wired and remote interfaces. Whether the screen is a solitary or multi-parameter gadget; focused on ability, control utilization and framework flexibility are regularly key prerequisites. These days, a screen can move with the patient from the working space to an

emergency unit, the doctor's facility room, and even into their home. This is central in this day and age of medicinal services. The most vital components in today's patient screens are versatility, convenience, and easy patient information exchange. Versatility incorporates movability and in addition the capacity to interface with other restorative gadgets, for example, anesthesia machines or defibrillators. Convenience can be accomplished with touch screen shows and multilevel menu driven profiles that can be arranged for nature and in addition the patient's essential measurements. Information exchange crosswise over everything from remote to RS232 should be conceivable. Healing facilities may bolster a particular foundation all through all ranges; in any case, emergency vehicle, home and different situations may require bolster for various conventions. The regularly expanding need to minimize social insurance

3 CONCLUSIONS

The work of social insurance experts and doctors is to a great extent a work of settling on choices and taking care of issues. It is a work of picking issues that require consideration, setting objectives, finding or planning appropriate blueprints and assessing and picking among option activity. The genuine pith of human services conveyance is basic leadership - what data to accumulate, which tests to request, how to decipher and coordinate this data into symptomatic theories and what medicines to direct. It is hard to offer the best answer for all circumstances. Each exchange off of force utilization, accessible supplies, required determination, conveyability, commotion and more will play into the choice of the key segments. Understanding the ramifications of gadget decision will guarantee that the framework securely conveys quality for the lifetime of the framework. Presenting cloud based server, the correspondence between specialist, tolerant, relatives, doctor's facility staffs will be rapidly. Any approved individual can ready to think about continuous prescription inside simply logging and going to. Entire therapeutic science will be under one top of cloud. We don't need to hold up outside and remain in line for anything. Everything is only one touch away.

REFERENCES

1. Marimuthu A, Karthikeyan P. Worldwide Conference on Information and Network Technology IACSIT Press, Singapore. Remote Patient Monitoring An Implementation in ICU Ward, 2011.
2. Ting W, Jun-Da H, Chenjie G, Jia Z, Wei Y. Remote Monitoring System Based on Bluetooth Smart Telephones. Universal Conference on Networking and Digital society, sixth October 2010; Volume2.

3. Sahandi R, Noroozi S, Roushanbakhti G, Heaslip V, Liu Y. Remote innovation in the development of patient observing on general healing facility wards. Journal of Medical Engineering and Technology 2010; 34(1): 51-63.
4. http://www.eetimes.com/document.asp?doc_id=1278246
5. http://www.ti.com/arrangement/patient_monitoring

AN APPLICATION FOR MECHANICAL DESIGN FIXATION FOR MECHANICAL ENGINEERING STUDENT

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Abstract- A central issue in designing schooling relates to plan obsession, which obstructs the origination of clever thoughts. The term plan obsession alludes to the creator's hesitance (or failure, at times) to consider various techniques to form and settle a plan need. The plan obsession peculiarity seriously restricts imagination and results in common plan arrangements. The essential goal of this paper is to associate the impact of the Indian designing training with the degree of plan obsession in the designing understudies of various disciplines. This work gives a more profound comprehension of the plan obsession peculiarity by laying out a calculated system for the plan cycle in view of the hypotheses of information portrayal in mental science. It can give significant experiences that will assist understudies with defeating the antagonistic impacts of obsession.
Keywords: Design obsession, Engineering instruction, Cognitive science, Conceptual plan.

1 INTRODUCTION

As per Hershberger [1], "All that is consumed and enlisted to you adds to the assortment of thoughts put away in the memory: a kind of library that you can counsel at whatever point an issue emerges. Thus, basically the more you have seen, experienced, and consumed, the more perspectives you will have." This statement is valid in the field of designing plan, where the field has transformed from a plan scratch to a plan through-combination mentality, where fashioners change, join, or adjust components of past or existing plans to blend novel ideas [2, 3]. Nonetheless, the utilization of past plans can unfavorably influence the plan cycle as plan obsession [4], a possibly restricting adherence to existing plans. The data that planners "assimilate and enroll" to them can possibly focus them during the plan cycle and result in absence of development. As the development is vital to progress in this economy, we should figure out how to oversee plan obsession actually. The most important phase in overseeing obsession understands what

various exercises mean for plan obsession during the plan cycle. It is noted in the writing that obsession happens across various degrees of ability [5] and settings [6]. The comprehension can prompt advancement of viable item improvement strategies and helping techniques to decrease obsession impacts. The examination detailed in this paper gives the impacts of plan obsession in Indian designing understudies the two seniors and green beans.

2 LITERATURE REVIEW

The field of configuration has investigated numerous formal and heuristic ways to deal with plan refinement, assembling, age, and calculation [7-9]. The clear techniques research in plan describes the normal perspective followed by people in tackling a plan task. In this manner, it is a use of standards of mental brain research, to plan. The elucidating research includes understanding how the originators see the issues and the strong assertions, find (intelligent fixes, assess plans, and decide.

In this field, specialists enthusiastically sought after mental based plan obsession research and conceptually characterized as hindrances to arrangement in view of genuine and seen requirements [4, 10, 11].

Dahl and Moreau [12] exhibited that subjects presented to inside space models utilized less out-of-area similarities in creating arrangements and that the creativity of the arrangements delivered expanded moderately when subjects were urged to utilize relationships widely and given no model arrangements. Swamp et al. [13] found that inside area models made subjects be one-sided toward creating arrangements with comparative elements to those tracked down in the models. A typical and frequently remarked upon type of obsession is untimely obligation to a specific issue arrangement. Thus, the architects quit chasing after the quest for elective arrangements. This untimely responsibility along these lines brings about less arrangements. These discoveries demonstrate that any investigation with openness to an inside space model preceding ideation can cause obsession. The obsession is manifest as less arrangements and the presence of highlights from the models in the arrangements [14].

3 MEASURING DESIGN FIXATION

Plan obsession is the originators' hesitance to consider numerous procedures to form and tackle a plan issue. The objective of the trial is to assess the impacts of obsession with senior scholarly designing understudies and designing first year recruits. To answer this exploration issue, three mental abilities, viz., familiarity, adaptability, and

innovation, and three plan boundaries, viz., meeting the purpose, effortlessness, and easy to understand, are distinguished and are estimated from the drawings given by the members to the plan task. The measurement for different boundaries is given in Table 1. The members were partitioned into two gatherings - an obsession bunch where the members were presented to a model plan arrangement and a benchmark group to whom just an issue proclamation is given with no model arrangement. Control bunch is utilized to lay out the pattern.

Table 1 Metrics for measuring design fixation skills

Cognitive skill	Definition	Metric
Fluency	Ability to generate many solutions consistently	Quantity of ideas generated
Flexibility	Ability to explore design space in many directions	Variety of ideas generated
Originality	Ability to generate unexpected solutions; think out of box	Originality of ideas generated

3.1 Design Task

Participants in both groups were presented the design task of "design a toy for a blind child of age group 3 to 7 years." The design task is a real existing problem. Participants were provided a paper, pen, pencil, and eraser to sketch their designs. They worked on the design task individually, not in teams. Participants had 45 min to generate as many ideas as possible. After the completion of the task, participants were given 30 min to answer a questionnaire to help analyze their perceptions.

The toy for blind child problem puts most participants in the familiar domain of toys and unfamiliar domain of blindness. While the task requires minimal technical knowledge (application of scientific and mathematical principles), it uses the design skill set such as understanding the need and synthesizing alternative solutions which is common to creative problem solving in many domains. The task engages by providing autonomy, mastery, and purpose. Participants can design their solutions that reflect their values, views, and interests (autonomy); show creativity (mastery); and cherish results (purpose). Hence, the design has the intrinsic motivation for engagement. A diverse set of available solutions can satisfy the task.

The participants are told that the goal of the experiment is to generate as many solutions to the design problem as possible,

where a prize will be given to participants with the greatest number of solutions. This prize is an extrinsic motivation for participants to devote serious effort to the design activity.

3.2 Control Group

Members in the benchmark group are given the plan issue. They are not furnished with any model arrangement or elective portrayal of the plan issue. A bunch of 150 designing understudies is taken to lead the errand. Of them 75 are into the benchmark group and the leftover into the obsession bunch.

4 RESULTS AND DISCUSSION

Information from the plan arrangements and polls is gathered together, and a couple of significant ends have been made in simultaneousness with the measurements of the trial. Normal scores of mental abilities procured by understudies.

Following are the couple of consequences of the examination:

- Scholarly first year recruits plans are more unique than those of senior designing understudy whose plans are less familiar and adaptable which upholds our theory 1.
- Plans of mechanical designing understudies are undeniably more familiar, adaptable, and unique than those of senior designing understudies, supporting theory 2.
- Senior understudies are more acquainted with the plan task given to them than green beans understudies. Aside from the graphical portrayal, this outcome can likewise be upheld by the logical end from the above assertions, which show that as understudies are monitoring issues in the general public, they begin thinking systematically to settle them and subsequently knew about the undertaking given to them somewhat.
- The typical scores procured by first year recruits and seniors of both control and obsession bunches in view of the plan boundaries. It is obvious from the outcomes that rookies show preferred generally execution over seniors in satisfying the plan boundaries.

5 CONCLUSION

The exploratory outcomes show that first year recruits designing understudies display less indications of obsession contrasted with seniors. These outcomes feature a prompt requirement for changing the helping worldview for designing training to build the accentuation on development and imagination in the educational plan to keep the understudies serious in the worldwide economy. The outcomes likewise show contrasts in the degree of obsession in view of the discipline

and distinguish mechanical designing understudies are displaying greater adaptability. The paper additionally suggests that designing staff be aware of obsession and its antagonistic impacts and teach understudies. Over the long haul, as teachers, we should reflect and reformulate the educational program to offset basic comprehension with the need to encourage inventive reasoning abilities so the cutting edge creators investigate plans as well as blend imaginative arrangements.

REFERENCES

1. Herzberger H. Lessons for student in architecture. Rotterdam: Uitgeverij; 1991.
2. Eckert C, Stacey M. Sources of inspiration: a language of design. Des Stud. 2000; 21: 523–38.
3. Eckert C, Stacey M, Earl C. Reasoning by references to past design. International workshop on studying designers. 2005.
4. Jansson DG, Smith SM. Design fixation. Des Stud. 1991; 12: 3–11.
5. Linsey JS, Tseng I, Fu K, Cagan J, Wood KL, Schunn C. A study of design fixation, its mitigation and perception in engineering design faculty. J Mech Des. 2010; 132: 41003.
6. Purcell AT, Gero JS. Design and other types of fixation. Des Stud. 1996; 17: 363–83.
7. Antonsson EK, Cagan J. Formal engineering design synthesis. Cambridge: Cambridge University Press; 2001.
8. Stone RB, Wood KL, Crawford RH. A heuristic method to identify modules from a functional description of a product. Des Stud. 2000; 21: 5–31.
9. Chakrabarti A. Engineering design synthesis: understanding approaches and tools. London: Springer; 2002.
10. Perttula M, Sipila P. The idea exposure paradigm in design idea generation. J Eng Des. 2007; 18(1): 93–102.
11. Moss J, Kotovsky K, Cagan J. The influence of open goals on the acquisition of problem- relevant information. J Exp Psychol Learn Mem Cognit. 2007; 33(5): 876–91.
12. Dahl DW, Moreau P. The influence and value of analogical thinking during new product ideation. J Mark Res. 2002; 39(1): 47–60.
13. Marsh RL, Landau JD, Hicks JL. How examples may and may not constrain creativity. Mem Cognit. 1996; 24(5): 669–80.
14. Simon HA. The sciences of the artificial. Cambridge, MA: MIT; 1968.

REACTIVE POWER COMPENSATION FOR POWER QUALITY IMPROVEMENT USING SVC

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Abstract- This research showing the voltage compensation & reactive power incorporation for the micro hydro power plant using the facts device SVC. This paper pertinent for enhancing power quality by control of voltage what's more, recurrence of a confined smaller scale hydropower era. We reviewed number of article for the reference paper, and I found no work in progress for the Hydro system with SVC, so I will try for the power quality improvement for the hydro system with Fact device SVC.
Keywords: Power quality, Hydro system, Transmission line.

1 OVERVIEW

Today society is to a great extent subject to its vitality supply. Power frames the essential wellspring of vitality. Lighting, warming, cooling, correspondence, transportation, producing, handling enterprises, are all reliant on power. Financial advancement of a nation is reliant on vitality. Financial development worldwide has tripled the power utilization in the previous three decades. The essential vitality hotspot for creating power are coal, common gas, hydro and atomic parting. Every source has constraints, the fossil fills because of its restricted supply, nursery gasses, and are non-renewable sources, hydro force is subject to the precipitation for force era. New power era advances are produced to defeat the detriments of the nonrenewable sources and hydro power. Renewable vitality advances, for example, wind power, sun oriented force, tidal, geothermal is utilized for vitality era. The employments of renewable-vitality sources are expanding quickly in the late years.

2. ELECTRIC ENERGY

2.1 Conventional Sources of Energy:

Coal, Petroleum (oil), and Natural Gas are the three routine sources of energy utilized as a part of warm power station to produce power. Coal is the principal heat hotspot for power era in many nations. Coal and natural gas are scorched in extensive heaters to warmth water to make steam and to

produce hot burning gasses that pass specifically through a turbine, turning the blades of the turbine to create power. Petroleum can likewise be utilized to make steam to turn a turbine. Lingering fuel oil, an item refined from unrefined petroleum, is regularly the petroleum item utilized as a part of electric plants that utilization petroleum to make steam. The introduced limit of Thermal Power in India, as of June 30 2011, was 115649.48 M which is 65.34% of aggregate introduced limit. Current installed base of Coal Based Thermal Power is 96,743.38 MW which comes to 54.66%of aggregate introduced base. Current introduced base of Gas Based Thermal Power is 17,706.35 MW which is 10.00% of aggregate introduced limit. Current introduced base of Oil Based Thermal Power is 1,199.75 MW which is 0.67% of total installed limit. The condition of Maharashtra is the biggest maker of warm power in the nation.

2.2 Non-Traditional Sources of Energy:

Atomic Energy is the vitality that is caught inside every molecule. An atom's nucleus can be part separated. This is known as parting. When this is done, a tremendous measure of vitality as both warmth and light is discharged by the start of a chain response. This vitality, when gradually discharged, can be saddled to create power. Starting 2011, India had 4.8 GW of introduced power era limit utilizing atomic powers. India's atomic plants created 32455 million units or 3.75% of aggregate power delivered in India. Hydropower is one of the best, least expensive, and cleanest wellspring of vitality, this is in actuality one of the most punctual known renewable vitality sources, in the country(since the start of the twentieth century). Hydro force is produced from the flowing and falling water, stream flow and from sea waves and tides.

3. POWER QUALITY — WHAT IT MEANS

PQ alludes to attributes of power at a given point on the conveyance way, as it identifies with the similarity between the power supplied on a system and the heaps associated with that system. So, everything in the middle of "force is off" and "power is on" identifies with Power Quality. Dependability contrasts from Power Quality. It alludes to lost force at the conveyance point just (see chart underneath).

In more specialized terms, a force quality aggravation is connected with the deviations in the extent and recurrence of the sinusoidal waveform. A deviation in the sinusoidal waveform may happen when force stays on and a transmission intrusion does not happen (e.g. the lights remain

focused, it might glimmer or diminish). It can take numerous structures, for example, voltage hang, stage unbalance and voltage swells, transient unsettling influences, flitting intrusions, and long haul enduring state waveform twists.

4. REVIEW OF LITERATURE

Several models of hydropower generation were investigated by scientists. The existing models depend upon the requirement involved in the study. Some of these models were simply analytical while others were constructed from robust system model s showing the dynamic characteristics. IEEE working group/committee [3,4] have shown various models of hydro plant and techniques used to control the generation of power. Describes an approximation of hydro - turbine transfer function to a second order for multi - machine stability studies. Similarly, Qijuan et al. [6] introduced a novel model of hydro turbine generating set which uses recursive least square estimation algorithm. This model is dynamic. In reality, the performance of hydro - turbine is mainly determined by the parameters of the water been supplied to the turbine. According to Singh & al. (2011) , [7], some of these parameters include the effects of water inertia, water compressibility, pipe wall elastic city in penstock . The effect of water inertia is to ensure that changes in turbine flow do normally lag behind changes in turbine gate opening for a smooth operation. On the other hand, the effect of elasticity introduces some element of pressure and flow in the pipe, a phenomenon known as “water hammer”, [7]. Other parameters of the flowing water also affect the flow of water International Journal of Computer Applications (0975 – 8887) Volume 108 – No 18, December 2014 34 and indirectly affect the turbine speed which is directly connected to the generator. In order to have constant power generation it is therefore necessary to implement strong control measures to overcome e the variability of the initial flowing water. Moreover, there are existing models of linear and nonlinear hydro - turbine set with nonelastic and elastic water column effects.

5. STATIC VOLTAGE COMPENSATOR

Static VAR Compensator (SVC) The static VAR compensator is a shunt connected device, using thyristor switches and controllers, is already firmly established equipment for transmission line compensation. The static VAR compensator (SVC) is usually composed of thyristor - switched capacitors and thyristor - controlled reactors. The VAR output of an SVC can be varied continuously and rapidly between the capacitive and inductive

ratings of the equipment[6] . SVC is normally used to regulate the voltage of the transmission system at a selected terminal, often with a priority option to provide damping if power oscillation is detected [7]. However, SVCs control only one of the three import ant parameters determining the power flow in AC power systems: the amplitude of the voltage at selected terminals of the transmission line. Theoretical considerations indicate that high utilization of a complex, interconnected Ac power system, meeting necessary requirements for availability and operating flexibility, may be possible only with some means to control one or both of the other parameters defining the power flow at a given time; the line impedance and the phase angle of the end voltages. The main application of SVC was initially focused on load compensation of fast changing loads such as steel mills and arc furnaces. The SVC may be represented by Thyristor Controlled Reactor (TCR) or Thyristor switched Capacitor (TSC) ora combination of both. With the coordination of capacitor and reactor, the reactive power injected by the SVC can be varied thoroughly for maintaining the desired power flow in transmission network or to control voltage.

6. CONCLUSION

We have discussed & reviewed about the micro hydro system with using the FACTS device & without the FACTS device. we having the number of facts device available for the power quality improvement. A SVC is proposed in a position of a customary which depends on vector control plan including synchronously pivoting reference. As SVC is intended for solidarity power. The SVC likewise performs different capacities like voltage direction, & power control & provide better result for the voltage compensation.

REFERENCES

1. Karady, G. G. and Holbert, K. E. 2013. Electric Generating Stations, in Electrical Energy Conversion and Transport: An Interactive Computer - Based Approach, Second Edition, John Wiley & Sons, Inc.
2. Naghizadeh, R.A., Jazebi, S. and Vahidi, B. 2012. Modelling Hydro Power Plants and Tuning Hydro Governors as an Educational Guideline. International Review on Modelling and Simulations (I.RE.MO.S), Vol. 5, No.4
3. IEEE Committee. 1973. Dynamic models for steam and hydro turbines in power system studies. IEEE Trans on Power Appar Syst; 92:1904 –15.
4. IEEE Working Group. 1992. Hydraulic turbine and turbine control models for system dynamic studies. IEEE Trans on Power Syst; 7:167–79.
5. Vournas CD. Second order hydraulic turbine models for multimachine stability studies. IEEE Trans Energy Conv 1990;5: 239–44. ARTICLE IN PRESS 792 N. Kishor et al./Renewable and Sustainable Energy Reviews 11 (2007) 776–796
6. Qijuan C, Zhihuai Xiao. 2000. Dynamic modeling of hydroturbine generating set. In: IEEE International

Conferenc e on Systems, Man and Cybernetics, pp. 3427 – 3430.

7. Singh, M., and Chandra, A. 2010. Modeling and Control of Isolated Micro -Hydro Power Plant with Battery Storage System. National Power Electronic Conference, Roorkee, India.
8. Malik, O.P., Hope, G. S., Hancock, G., Zhaohui, L., Luqing, Y. E. and Shouping, W. E. I. 1991. Frequency measurement for use with a microprocessor-based water turbine governor. IEEE Trans Energy Conv, 6:361–6.
9. Ramey, D. G. and Skooglund, J. W. 1970. Detailed hydro governor representation for system stability studies. IEEE Trans on Power Apparatus and Systems, 89:106–12.
10. Bhaskar, M. A. 2010. Non Linear Control of SVC. IEEE International Conference on Recent Trends in Information Telecommunication and Computing, pp. 190-195.
11. Luqing, Y. E., Shouping, W. E. I., Malik, O. P. and Hope, G. S. 1989. Variable and time varying parameter control for hydroelectric generating unit. IEEE Trans Energy Conv, 4:293–9, Wozniak.
12. Fuchs, E. F. and Masoum, M.A.S. 2011. Power Conversion of Renewable Energy Systems, Springer, ISBN 978-1-4419-7978-0.
13. Xu, F., Li, Y. and Qijuan, C. 1995. Study of the Modelling of Hydroturbine Generating Set. In: International IEEE/IAS Conference on Industrial Automation and Control: Emerging Technologies, 22-27, pp. 644-647.

Intelligent Medicine Box For Medication Management Using IOT

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Abstract- *A modern health care and in addition to this intelligent home monitoring, controlling embedded system capable of taking care of the patients from all aspects, covering personalized medication, vital signs monitoring. The project gives an experimental idea of patient's health condition and monitor environmental conditions and controlling. The platform involves an open-platform-based intelligent medicine box with enhanced connectivity and interchange ability for the integration of devices and services, Intelligent pharmaceutical packing with communication capability enabled by Zigbee and actuation capability enabled by functional materials and, flexible and wearable bio-medical sensor device enabled. The proposed platform devices with in-home healthcare services for improved user experience and service efficiency. The feasibility of the implemented Health platform has been proven in field trials and if any vital signs recognized then gives alert to predefine care takers through SMS alert and monitor the conditions continuously with an IP address of WIFI.*

Keywords- health monitoring, MEMS, WI-FI, ARM controller.

I. INTRODUCTION

Now a day's healthcare is a burden factor for systems are struggling with aging population, prevalence of chronic diseases, and the accompanying rising costs. In response to these challenges, researchers have been actively seeking for innovative solutions and new technologies [8] that could improve the quality of patient care meanwhile reduce the cost of care through early detection/intervention and more effective disease/patient management. It is envisaged that the future healthcare system should be preventive, predictive, personalized, pervasive, participatory, patient-centered, and precise, i.e., p-health system. Health informatics, which is an emerging interdisciplinary area to advance p-health, mainly deals with the acquisition, transmission, processing, storage, retrieval, and use of different types of health and biomedical information. The two main acquisition technologies of health information are sensing and imaging. This paper focuses only on sensing technologies and reviews the latest developments in sensing and wearable devices for continuous health monitoring [2] and accessing the information This invention relates generally to methods and systems for monitoring a person. The present invention relates to interoperability of medical devices

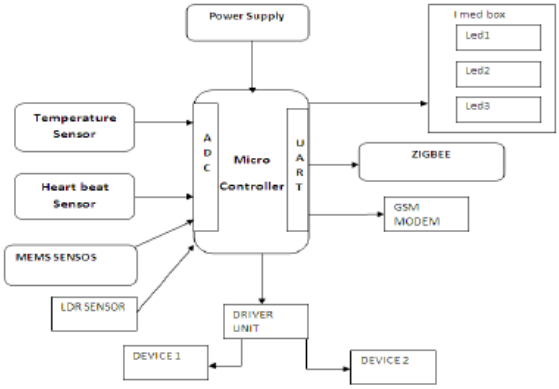
Existing System A person performs daily activities at regular interval of time. This implies that the person is mentally and physically fit and leading a regular life. This tells us that the overall well-being of the person is at a certain standard. If there is decline or change in the regular activity, then the wellness of the person is not in the normal state. Elderly people desire to lead an independent lifestyle, but at old age, people become prone to different accidents [10], so living alone has high risks and is recurrent. A growing amount of research is reported in recent times on development of a system to monitor the activities of an elderly person living alone so that help can be provided before any unforeseen situation happened.

Proposed System An intelligent home monitoring system based on ZigBee [13] wireless sensors network has been designed and developed to monitor and evaluate the well-being of the elderly living alone in a home environment. Wellness of elderly can be evaluated for forecasting unsafe situations during monitoring of regular activities. The developed system is intelligent, robust and does not use any camera or vision sensors as it intrudes privacy. Based on a survey among elderly we find that it has a huge acceptability to be used at home due to non use of the camera or vision based sensors. The intelligent software, along with the electronic system, can monitor the usage of different household appliances [12] and recognize the activities to determine the well-being of the elderly

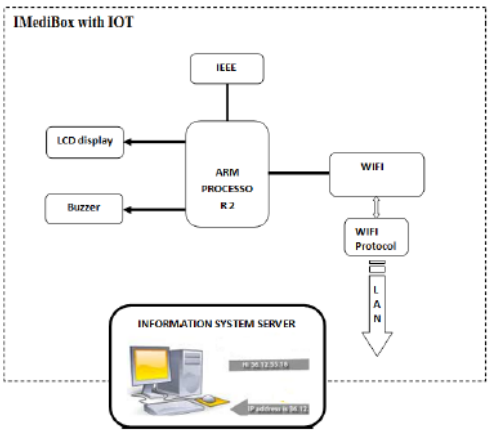
II. ARCHITECTURE AND WORKING THEORY

The overall structure of the system consists of two important modules: i) Wireless Sensor Network (WSN) with Zigbee modules and ii) Intelligent home monitoring software

system to collect sensor data and perform data analysis. Exploration of the sensor data involves measuring the wellness and detecting behavioral changes of an elderly. Above figure depicts the block diagram of the wellness measurement system. Block diagram of Computer Based Wellness Measurement system A. Design of the Sensing Units: The WSN setup [5] used for monitoring smart home consists of fabricated electrical sensing units. These are installed at an elderly home to monitor their daily activity behavior in terms of object usages and execute effectively process. The electrical sensing units connected to various household appliances in this proposed system we implement a health monitoring platform such as temperature heart beat fall occurrence and in addition to this gives an alert message to caring persons or hospitals by using GSM technology. In addition to this an automatic environment controlling like temperature dependent fan controlling and intercity based room light controlling and the additional features to this system



MONITORING SECTION:



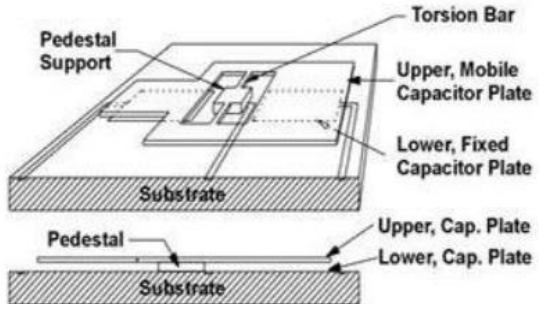
Medical data using a first medical data collection appliance coupled to a network [7], the first appliance transmitting data conforming to an interoperable format, wherein the medical data is transmitted using a first wireless protocol

III. HARDWARE MODULES USED: ARM7 FAMILY

The ARM7 family includes the ARM7TDMI, ARM7TDMI-S, ARM720T, and ARM7EJ-S processors. The ARM7TDMI core is the industry's most widely used 32-bit embedded RISC microprocessor solution. Optimized for cost and power-sensitive applications, the ARM7TDMI solution provides the low power consumption, small size, and high performance needed in portable, embedded applications. The ARM7TDMI-S core is the synthesizable version of the ARM7TDMI core, available in both VERILOG and VHDL, ready for compilation into processes supported by in-house or commercially available synthesis libraries.

LPC2148 MICROCONTROLLER: LPC2148 microcontroller board based on a 16- bit/32-bit ARM7TDMI-S CPU with real-time emulation and embedded trace support, that combine microcontrollers with embedded high-speed flash memory ranging from 32kB to 512kB. A 128-bit wide memory interface and unique accelerator architecture [3] enable 32-bit code execution at the maximum clock rate. For critical code size applications, the alternative 16-bit Thumb mode reduces code by more than 30% with minimal performance penalty. The meaning of LPC is Low Power Low Cost microcontroller. This is 32 bit microcontroller manufactured by Philips semiconductors (NXP).

MEMS Technology Micro-Electro-Mechanical Systems (MEMS) is the integration of mechanical elements, sensors, actuators, and electronics on a common silicon substrate through micro fabrication technology. MEMS is an enabling technology allowing the development of smart products, augmenting the computational ability of microelectronics with the perception and control capabilities of micro sensors



The increasing demand for MEMS (microelectromechanical systems) technology is coming from diverse industries such as automotive, space and consumer electronics. MEMS[9] promises to revolutionize nearly every product category by bringing together silicon-based microelectronics with micromachining technology, making possible the realization of complete systems-on-a-chip, first

developed for the integrated circuit industry, for this emerging market.

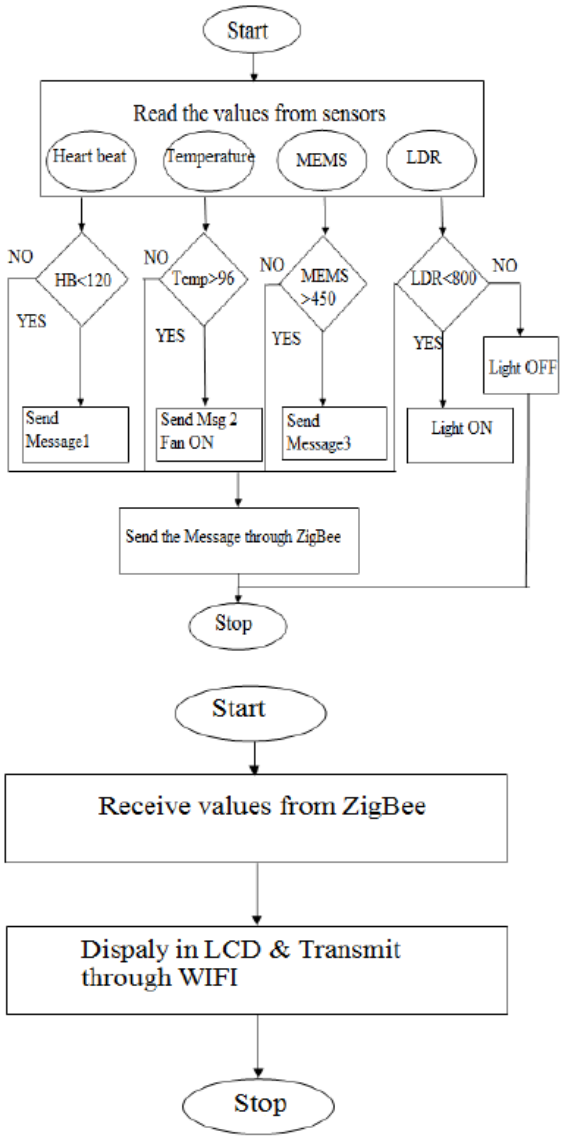
Features of MEMS □ 3-axis single-chip accelerometer □ Built-in IC integrating temperature Sensor and self-diagnosis function □ High sensitivity: up to 1,000mV/G □ External connection for low pass filters □ Automatic correction of mounting angle □ Small size: 5.0 x 5.0 x 2.3mm □ Lead-free.

HEART BEAT SENSOR: The Heart Beat Sensor provides a simple way to study the heart's function. This sensor monitors the flow of blood through ear lobe. As the heart forces blood through the blood vessels in the ear lobe, the amount of blood in the ear changes with time. The sensor shines a light lobe (small incandescent lamp) through the ear and measures the light that is transmitted. The clip [7] can also be used on a fingertip or on the web of skin between the thumb and index finger. The signal is amplified, inverted and filtered, in the box. By graphing this signal, the heart rate can be determined, and some details of the pumping action of the heart can be seen on the graph. Blood flowing through the earlobe rises at the start of the heartbeat. This is caused by the contraction of the ventricles forcing blood into the arteries and by shutting of the heart value at the end of active phase.

IV. GSM MODEM

A GSM modem is a wireless modem that works with a GSM wireless network. A wireless modem behaves like a dial-up modem. The main difference between them is that a dial-up modem sends and receives data through a fixed telephone line while a wireless modem sends and receives data through radio waves. A GSM modem can be an external device or a PC Card / PCMCIA Card [13]. Typically, an external GSM modem is connected to a computer through a serial cable or a USB cable. A GSM modem in the form of a PC Card / PCMCIA Card is designed for use with a laptop computer. It should be inserted into one of the PC Card / PCMCIA Card slots of a laptop computer. Like a GSM mobile phone, a GSM modem requires a SIM card from a wireless carrier in order to operate.GSM SMS messaging can handle large number of transaction in a very short time. You can receive large number SMS messages on your server like e-mails without internet connectivity. E-mails normally get delayed a lot but SMS messages are almost instantaneous for instant transactions. Consider situation like shop owners doing credit card transaction with GSM technology instead of conventional landlines. Time you find local transaction servers busy as these servers use multiple telephone lines to take care of multiple transactions, whereas one GSM connection is enough to handle hundreds of transaction. Mobility, Quick installation: **WIFI** HLK-RM04 is a new low-cost embedded UART-ETH-WIFI[9] module (serial port - Ethernet - Wireless network) developed by Shenzhen Hi-Link Electronic Technology co., Ltd This product is an embedded module based on the universal serial interface network standard, built-in TCP / IP protocol stack, enabling the user serial port, Ethernet, wireless network (WIFI) interface between the conversions. Through the HLK-RM04 module, the traditional serial devices do not need to change any configuration; data can be transmitted through the Internet network. Provide a quick solution for the user's serial devices to transfer data via Ethernet.

Flow Chart:



V. CONCLUSION AND RESULT

We presented an interactive embedded measurement of daily activities through usage of household appliances sensor data. Predicting the behavior of an elderly person was

based on past sensor activity durations. Combination of sensing system with time series data processing and enabled us to measure how well an elderly person is able to perform their daily activities in real-time. So far, the forecasting process was able to rightly measure the wellness indices related to use of non-electrical appliances. Hence, some of the basic elderly daily activities such as sleeping, toileting, dining and relaxing are rightly assessed care takers and hospitals by the wellness measurement system. The most of the electrical appliances usage durations are predefined; validation for activities such as preparing food is limited. However, additional data processing method such as sensor sequence activity pattern analysis was able to rightly measure the occurrences of activities such as preparing breakfast, lunch, dinner and snacks. The next step will be to devise a robust forecasting method including outliers in the wellness of old and ill people measurement and alerting system.

REFERENCES

[1] Jakkula V.R, Cook D, Jain G, "Prediction models for a smart home based health care system", Proceedings of the 21st International Conference on Advanced Information Networking and Applications, pp.761-765,2007 .

[2] Jae H.S, Boreom L, Kwang S.P, "Detection of Abnormal Living Patterns for Elderly Living Alone Using Support Vector Data Description", IEEE Transactions on Information Technology in Biomedicine, Vol. 15, No. 3, Page(s):438-448, May 2011.

[3] Arcelus A, Veledar I, Goubran R, Knoefel F, Sveistrup H and Bilodeau M, "Measurements of Sit-to-Stand Timing and Symmetry from Bed Pressure Sensors," IEEE Transactions on Instrumentation and Measurement, vol. 60, no. 5, pp. 1732-1740.

[4] Tibor B, Mark H, Michel C.A.K, Jan T, "An Ambient Agent Model for Monitoring and Analyzing Dynamics of Complex Human Behavior", Journal of Ambient Intelligence and Smart Environments, Vol 3, No. 4, Page(s): 283-303, 2011.

[5] Gaddam A, Mukhopadhyay S.C, Gupta G.S, "Elder Care Based on Cognitive Sensor Network", IEEE Sensors Journal, Vol. 11, No. 3, Page(s): 574 – 581, 2011.

[6] Suryadevara N.K, Mukhopadhyay S.C, "Wireless Sensor Network based Home Monitoring System for Wellness Determination of Elderly", IEEE Sensors Journal, Vol: 12, No:6, pp.1965 – 1972, 2012.2010.

[7] Brockwell P.J and Davis R.A, "Introduction to Time Series and Forecasting", Springer, 2nd edition, pp.326-330, 2001.

[8] Smarr C.A, Fausset C. B and Rogers W. A, "Understanding the potential for robot assistance for older adults in the home environment", Technical Report-HFA-TR-1102, School of Psychology, Human Factors and Aging Laboratory-Georgia Tech-Atlanta, http://hdl.handle.net/1853/39670 , 2011.