

# IMAGE ANALYSIS AND COMPRESSION BY USING WAVELET BASED TEXTURE SEGMENTATION WITH THE HURST EXPONENT

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## ABSTRACT

*A method for wavelet based image compression by using the Hurst exponent is presented here. Image segmentation is one of the most important steps in image analysis. We decompose an image into two parts that have a strong correlation to objects or areas of the real world. The first part corresponds to edge and trend information. It is obtained either by multiscale edge detection or by thresholding a local Hurst exponent. From this information a partial compressed image is created by thresholding. The second portion of the decomposition contains texture information. It is obtained by taking the difference between the original image and the image constructed from the multiscale edge-trend based encoding. This is referred to as the error image. The texture information, in the form of the error image, is further decomposed by the local Hurst exponent method or rescaled range analysis. The texture parts are then separately compressed by a wavelet or Iterated Function System (IFS) method.*

## I. INTRODUCTION

Over the last two decades, a wide variety of image compression techniques have been proposed. The standard method uses the DCT, eliminating insignificant Fourier coefficients and storing larger ones. Another method, called vector quantization, uses a building block approach, breaking up images into a small number of canonical pieces and storing only a reference to which pieces go where. Fractal image compression is a newer method introduced by M.F.Barnsley[1] and A. Jacquin[2]. Its operation is based on Iterated Functions Systems and the Collage Theorem. The basic idea of IFS theory is to start with an image to be encoded, and to find a contractive transformation whose fixed point approximates the given image. The set of parameters which defines this transformation is called an IFS code for the image. The drawback of fractal image compression is that segmentation is not based on the image roughness or texture of an image. To avoid this, we introduce an edge based and texture based compression method here. Taking any image to be compressed, the wavelet method is applied first to extract edge and trend information. Multiscale edge coding is then performed. We then compute the difference between the original image and the newly coded image, consisting of all the texture information. This is compressed either with fractal method or fast wavelet method. The biorthogonal wavelet families are well adapted to the statistical properties for texture portions. This method is observed to yield a quite high compression ratio with good image quality. Section II considers fractal dimension and the Hurst exponent. Section III introduces the Hurst based texture classification and segmentation. Section IV presents Multiscale image compression method

## II. FRACTAL DIMENSION AND THE HURST EXPONENT:

Fractal dimension (FD) has been used to characterize data texture in a large number of fields. FD separates important classes of images and isolates information which is not characterized by other texture features. A variety of procedures have been proposed for estimating the FD of images. These measurements are frequently referred to as dimension type- e.g., Cover Dimension (CD), Boxcounting Dimension (BCD), Hausdorff-Besicovitch Dimension (HD), Wavelet based FD, etc. We will refer to these procedures as FD-estimators. In this section we discuss the general concept of Rescaled Range (R/S) Analysis for calculating the Hurst exponent.

### 2.1 Rescaled Range Analysis: The Hurst Exponent H

Methods for assessing the fractal characteristics of time-varying signals like heart rate, respiratory rate, seismology signal, stock price and so on which vary, apparently irregularly, have been considered to be driven by external influences which are random, that is to say, just "noise". Hurst[4] defined an empirical descriptor of temporal signals describing natural phenomena. This was based on the statistical assessment of many observations of many phenomena. The Hurst exponent H gives a measure of the smoothness of a fractal object, with  $0 < H < 1$ : a low H indicates a high degree of roughness, so much that the object almost fills the next-higher dimension; a high H indicates maximal smoothness so that the object intrudes very little into the next-higher dimension. The general relationship is  $H = E + 1 - FD$ , where  $E = 0$  for a point, 1 for a line and 2 for surface.

### 2.2 Methodology

Rescaled Range analysis is a simple process that is highly data intensive. Here are the sequential steps 1. Start with the whole observed data set in an interval  $[0, t]$  and calculate the mean  $\bar{A} = (1/N) \sum a_i$  2. Next, sum the differences from the mean to get the cumulative total  $X_{ka}$  at each time point from the beginning of the period up to time t  $X_{ka} = \sum (a_i - \bar{A})$ ,  $k=1,2,3,\dots,n$ . 3. Calculate the range  $R(t) = \max(X_{ka}) - \min(X_{ka})$  for  $k=1,2,3,\dots,n$ . 4. Calculate the standard deviation S of the values  $a_i$ . 5. Calculate  $R/S = R(t)/S(t)$ . 6. For the next stage, partition the time interval in to two blocks of size  $N/2 = t$  and repeat the entire procedure , steps 1-5, and determined R/S for each segment of the data set of length  $N/2$ ; then take averaged value. Repeat, using successively shorter  $t$ 's at each stage dividing the data set into non-overlapping segments and finding the mean R/S of these segments. 7. On the log-log plot, fit the linear regression Y on X where  $Y = \log(R/S)$  and  $X = \log N$ . The exponent H is the slope of the regression line.

**Example:** As an example, R/S analysis has been applied to the signal shown in Figure 1. The *log-log* plot is also shown in Figure 1. The signal produces the H value of 0.3519. Because the Hurst value is different from  $H = 0.50$  we say that signal exhibits the Hurst phenomena of antipersistence. This means that if the signal had been up in the previous period, it is more likely that will be down in the next period and vice versa.

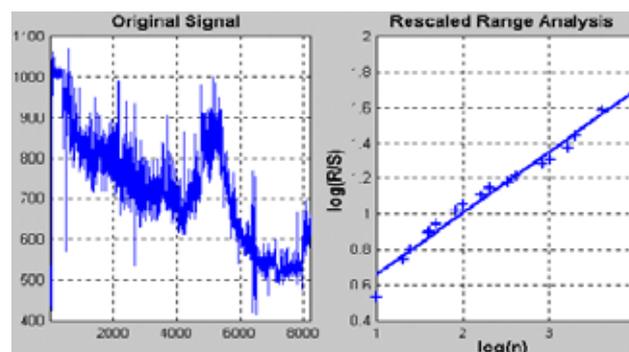


Figure 1: Original Signal and log-log plot

### III. HURST BASED TEXTURE CLASSIFICATION AND SEGMENTATION

Fractal based texture analysis was introduced by Pentland[3], where the relation between natural surface texture and fractal dimension was demonstrated. Fractal based models are useful for image segmentation, texture classification, shape-from texture and the estimation of roughness from image data. A fractal is defined as a set for which the Hausdorff-Besicovitch dimension is strictly greater than the topological dimension [5]. If TD is the topological dimension, then the fractal dimension FD can be estimated by  $H=TD-FD$ , where H is the Hurst exponent. In this section, we develop an efficient method for computing local Hurst exponents to measure the local roughness of an image by using the R/S technique. Image segmentation is one of the most important steps in our approach to image analysis and compression. Its main goal is to divide the image into parts that have same roughness. We will discuss a simple and efficient version of region based segmentation called Hurst based texture classification and segmentation. The basic idea is to calculate the local Hurst exponents for an image. The local FD is then derived from the value of the Hurst exponent. A small value of FD represents a fine texture, while a large FD corresponds to a coarse texture. Based on this description, we can segment the image and find the edges with a simple thresholding method. Thresholding is the transformation of an input image I to an output binary image BI as follows:  $BI(i,j) = 1$  if  $I(i,j) \geq T$   $BI(i,j) = 0$  if  $I(i,j) < T$  where T is the threshold.

#### 3.1 Quincunx Neighborhood Q

Multifractal analysis is a new promising approach to texture classification and image segmentation. In this method, an image I is segmented into a finite set of parts  $P_1, P_2, \dots, P_s$ , which have different parameter FD such that  $I = \bigcup P_i, P_i \cap P_j = \emptyset, i \neq j$ . One of the main problems is finding the local FD. To determine such parameter FD, it is necessary to calculate a local Hurst exponent at each pixel. Selection of a local computation method is not an easy task. To obtain stable and useful results, computations with masks of different size, shape, and position have been considered. We use the variations over a special Quincunx neighborhood to compute the local Hurst exponent.

**Definition:** A quincunx neighborhood is a set of the form:  $(1/2^n)M^{-n}([0,1]^2)$  for odd values of n where  $M=[a,b]$ ;  $a=[1 \ 1]^{-1}$ ,  $b=[1,-1]^{-1}$  is the quincunx matrix.

We represent the nodes by a distance vector  $\mathbf{d}$  whose length is equal to the number of different distances from its origin. For example, the distance vector for a Quincunx neighborhood of size 4 to one decimal place approximation is  $\mathbf{d}=[1,1.4,2,2.2,2.8,3,3,2,4]$ . The Quincunx neighborhoods of size 5 and 4 are shown in the Figure 2.

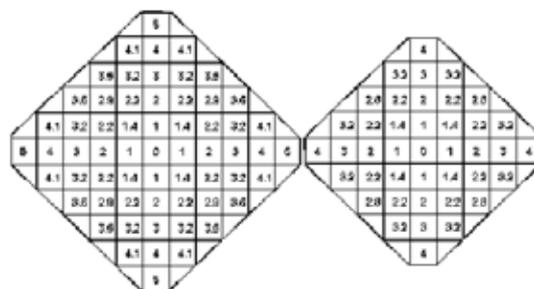
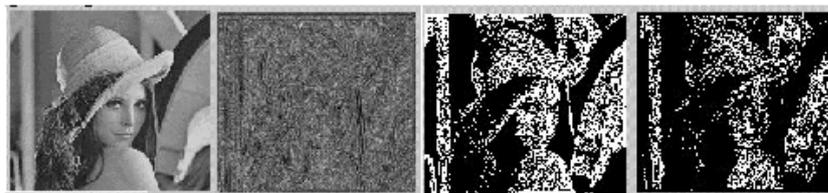


Figure 2: Quincunx Neighborhoods of Different Sizes

#### 3.2 Proposed Method

Our method is a simple form of R/S analysis [6]. Even though R/S analysis is defined for one dimensional time series, we have extended it to the case of two dimensional images. The range,  $R_i$ , for images is the difference between maximum and minimum pixel intensities along the linear traverse of pixels points in a distance vector

**d.** That is, if  $Y_{i,1}, Y_{i,2}, \dots, Y_{i,n}$  is the set of pixel intensity values of points that lies within the distance **d** from the center,  $i=1,2,\dots,m$  where  $m$  is length of distance vector  $\mathbf{d}(i)$ , then  $R_i = \max(Y_{i,1}, Y_{i,2}, \dots, Y_{i,n}) - \min(Y_{i,1}, Y_{i,2}, \dots, Y_{i,n})$ . Because the maximum and minimum values of  $Y$  will always be greater than or equal to zero, the range  $R_i$  will always be nonnegative. The general form of Einstein's[9] T to the one half rule is  $R_i = c * i^H$ . The subscript,  $i$ , for  $R_i$  refers to the rescaled range values for  $Y$ 's;  $c$  is a constant value,  $H$  is generally called the (local)Hurst exponent. The local Hurst exponent  $H$  can be approximated by plotting the  $\log(R_i)$  versus  $\log(i)$  and solving for the slope through an ordinary least squares regression. We form the slope image[7]  $S$  whose pixel values are the local Hurst values of each pixel in the image  $I$ . Since the values of  $\mathbf{d}$  are fixed, we can store these values in a fixed vector which is computationally more efficient. The slope image  $S$  can be segmented by using thresholding techniques.



**Figure 3. Shows The Slope Image And Two Segments Of The Lena Image.**

#### IV. MULTISCALE IMAGE COMPRESSION

The main goal of image compression is to minimize image data volume with no significant loss of information. All basic image compression techniques have advantages and disadvantages. Transformed-based methods are better at preserving subjective image quality and are less sensitive to statistical image property changes. Prediction methods, on the other hand, can achieve higher compression ratios in a much less expensive way. They tend to be much faster than transform-based or vector quantization compression schemes. Hybrid compression methods combine good properties of the various groups. Multiscale image compression is another approach offering extremely high compression ratios and high-quality image reconstruction. Various other image compression methods exist. In this section, we discuss a multiscale image encoding technique. The Main goal of our method is to decompose the image into two portions one containing edge plus trend information and the other containing texture information. We compress the first part by the wavelet method and the second part by either wavelet or fractal image compression. We call this procedure edge and texture based coding. The reconstructed edge based encoding and the reconstructed textured based encoding are added to obtain the approximate image with edge and texture information.

##### 4.1 Methodology

First we start with an image to be compressed and then apply a two-dimensional fast wavelet algorithm with respect to an orthogonal or bi-orthogonal wavelet basis. Since edges in the images are characterized by variations in intensity values, which can occur at several scales, ranging from low to high resolutions, this information can be obtained by eliminating small wavelet coefficients. The end result is that the remaining coefficients contain the edge information. Further the wavelet coefficients in the lower resolutions store information about general trends in image intensity. We can get similar edge information by applying the Local Hurst algorithm[7] to an image and forming the Slope image. From the slope image, edge information can be obtained by the simple thresholding technique explained in[7]. This part corresponds to edge and trend information. Next we construct a partial compression image by thresholding these values. Then we form the error image  $E$  which is the difference between original image and the image constructed above. This contains

texture information along with certain object features representing omitted edges. From error image we form the slope image SE by the Local Hurst algorithm. We segment this slope image as in [7] into 3 portions by simple a thresholding method. Through either a wavelet based method or by an IFS we compress these texture components. The final compressed form is then obtained by adding the resultant images.

#### 4.2 Result and Discussion

In most cases, variations in texture are not highly visible. This suggests that we can construct the image with only edge and trend information of the image. The compression ratios obtained in this method are impressive, ranging from 24 to 49 for a 512 by 512 Lena image. The image is visually similar in quality to the original image. However, when the original image is subtracted from the one that has been compressed, it becomes apparent that the compression process has altered details. When the compression ratio is increased to 60:1, the appearances of artifacts throughout the image is quite apparent. Here we have set the individual thresholds to around 2.7. This results in a compression image consisting of 96.58% and 97.46% zeros with approximately 100% retained energy. Very High compression ratios can be achieved by storing non-zero elements by allocating bits between the texture and edge and trend coding. Figure 4a-b below shows the original image, 34:1 and 46: 1 compressed Lena image from left to right. Figure 4c-e shows 31:1, 44:1 and 58:1 compressed Lena image obtained by compressing texture segmentations separately by performing FWT and adding to compressed edge plus trend information.

#### 4.3 Measure of Image Quality

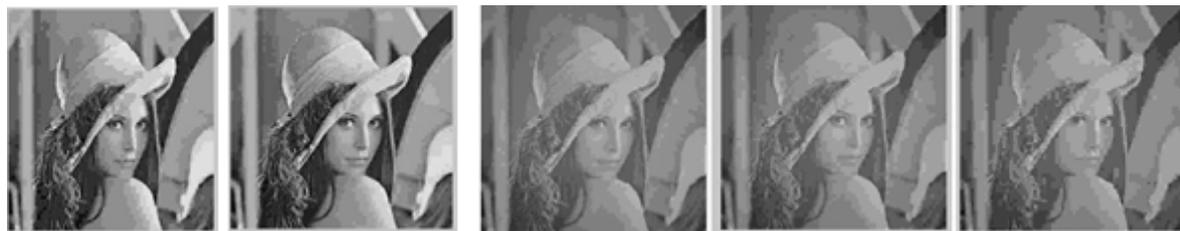


Figure 4 a.                      Figure 4b                      Figure 4c                      Figure 4d                      Figure 4e

Comparing restoration results requires a measure of image quality. Two commonly used measure Root Mean Square Error (RMSE) and Peak Signal-to-Noise Ratio (PSNR). The root mean square error between two images  $I(x,y)$  and  $CI(x,y)$  of size  $M*N$  is  $RMSE = \sqrt{\frac{1}{MN} \sum_i \sum_j (CI(i,j) - I(i,j))^2}$ .<sup>0.5</sup> One problem with RMSE is that it depends strongly on the image intensity scaling. The PSNR avoids this problem by scaling the RMSE according to the image range.  $PSNR = -10 \log_{10}(RMSE/S^2)$  where  $S$  is the maximum pixel value. Figure 5 shows compression ratio versus RMSE, compression ratio versus PSNR, compression ratio versus bit rate for edge trend method and compression ratio versus bit rate for texture method. Further in Figure 5,  $\square, *, \circ$  denote threshold values 30, 20 and 10 respectively.

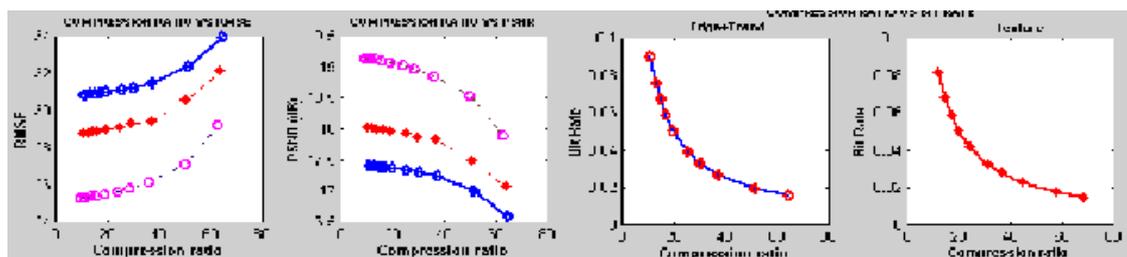


Figure 5

## **V. CONCLUSION**

In this paper, we presented a new method of image analysis and compression based on a) using fast wavelet transformation or multifractal segmentation to extract edge information b) isolating trend information by saving low-pass or low frequency wavelet coefficients and c) analyzing the remaining texture information by multifractal texture segmentation. The methods introduced in this paper, enable us compress images with a high compression ratio. Our method has promising applications in pattern recognition which can be utilized in several disciplines such as ECG(Electrocardiogram) analysis, EEG (Electroencephalogram) analysis, cell classifications, chromosome recognition, automatic inspection, image change detection, target recognition, and other areas. For example, using similar idea we developed a wavelet based method of multifractal signal segmentation and spectral estimation and applied it to Heart Rate Variability (HRV) signals[8]. We also used 2-D multifractal analysis to detect small changes in visually complex image sequences[7].

## **REFERENCES**

- [1]. M.F.Barnsley., Fractal functions and interpolations. Constr. Approx., 2: 033-329, 1986
- [2]. A. Jacquin., A fractal theory of iterated markov operators with applications to DIC. Ph.D thesis, 1989
- [3]. A P Pentland., Fractal-Based Description of natural Scenes, IEEE Trans on Pattern Analysis and Machine Intelligence,1984 ,666-674.
- [4]. H.Hurst., Long-term storage capacity of reservoirs. Trans. Amer.Soc. Civil. Engrs.,116:770-808 1951
- [5]. B. B. Mandelbrot., How Long is the Coast of Great Britain, Statistical Self Similarity and Fractional Dimension, Science, 1967.155, 636-638.
- [6]. J.Feder., Fractals, New York, London Plenum Press, 1989.
- [7]. D.J.Hebert, Soundararajan E.,Wavelet, Fractal and Multifractal image Analysis &Compression preprint.
- [8]. V.Shusterman, D.J.Hebert, Soundararajan E., Increased Complexity of Heart Rate Variability during Head-Up Tilt, North American Society of Pacing and Electrophysiology, 1999.
- [9]. A Einstein., Uber die von der molekularkineticschen Theorie der Warme geforderte Bewegung von in ruhenden Flussigkeiten suspendierten teilchen, Annals of Physics 322, 1908.

# ANALYSIS OF TECHNIQUES IN SENTIMENT VARIATIONS

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## ABSTRACT

*Data mining is one of the emerging technology in the area of data mining. Twitter is a popular micro blogging site where people share their views and opinions. The retrieving or filtering of data from twitter is a challenging task since it may contain noise data and also it is difficult to represent the data. Thus the finding of variation in the opinions or views of the people in these micro blogging sites is a complex task. The main aim of this paper is to analyse the techniques used for retrieving and finding the sentiment variation behind the opinions of the user. The techniques used for finding variations are LDA, K-clustering , POS and cosine similarity.*

**Keywords:** *Clustering, Cosine Similarity, LDA, Part-Of-Speech Tagging.*

## I. INTRODUCTION

Data mining is a vast area which deals with the mining or finding hidden data in large collection of data. The general method of data mining process is to extract or mine information from a large data set and transform it into a structure for future use. Besides the raw data analysis step, it includes database and data management methods, data pre-processing, modeling and inference computations, interestingness metrics, complexity calculations, post-processing of exposed structures, graphical representation, and online revision. Out of this, text mining is the most emerging technology which is used to mine text data from the web. There are many ways for text analytics such as survey and many research areas and business uses this information for their purpose. Then also this data retrieving has many challenges. Tweets are frequently used to express a public's emotion. It describes a diversity of new sources of online data that are designed, initiated, published and used by customers. Sentiment variation on twitter data has provided an effective way to expose public opinion. It is generally difficult to find the exact causes of sentiment variations since they may involve complicated internal and external factors. We observed that the emerging topics in the variation period is highly related to the legitimate reasons responsible for the variations. When people specify their opinions, they usually mention reasons that support their current views. Mining emerging events/topics is a challenging task: (1) The tweets present in the variation period can be very noisy, which covers irrelevant "background" topics which had been considered for a long time and it does not contribute to the changes of the public's opinion. (2) The events and topics which is related to the opinion variations are hard to represent or model. Keywords produced through topic modelling can depict the underlying events to some extent. But they are not as intuitive as natural language

sentences. (3) Reasons could be complicated and involve a number of events. These events might not be equally important. Therefore, the mined events should be ranked with respect to their contributions.

The paper aims at analysing the techniques used in finding the variations in the tweets. For analysing we choose the methods : LDA, K clustering, cosine similarity and POS. Each method has its own benefits. In this analysis, we define document similarity as the distance between topics or words within documents based on the uniformity of their meaning or well formed content. Accordingly, when certain sets of documents display high correlation values, it means that they are semantically identical. We also focus at analysing the combination of these methods can be efficiently used to track the sentiments in tweets which is helpful in finding the variations in the opinion of people.

## **II. SYSTEM ANALYSIS**

The methods used to reduce the challenges in mining was able to solve the problems up to a certain level. But these methods didn't gave a complete solution and it raised certain problems. The current system raises security issues like only English tweets are taken, considers only marketing tweets, computation of vectors and also discusses only about the properties. The existing system uses a combination of data sets, data extraction using keywords, classification and part-of-speech tagging. Hence we analysis of few methods which can be combined to form a new model to efficiently find the variations of sentiment in the tweets. We use Twitter as the textual data source for our analysis, because it is one of the most popular micro blog worldwide and the topics on which Twitter users post are not limited.

The analysis of the system uses following techniques.

- 2.1 LDA
- 2.2 K Clustering
- 2.3 Cosine Similarity
- 2.4 Part-of-speech Tagging

These methods are combined together to form a new system which can be implemented to discriminate the properties and variations of public sentiments in twitter.

### **2.1 Latent Dirichlet Allocation (LDA)**

LDA is a arable probabilistic model for collecting distinct data with a three-level hierarchical Bayesian model, where each item of a collection is modeled as a definite mixture over an underlying set of topics or words. This technique is often used in the text modeling framework, while the topic probabilities imply an accurate representation of a document. We apply this technique to discover the underlying topics or words in the word sets where people describe their subjective views. The goal of this analysis is to draw apparent representations for both word sets including user opinion with the positive or negative semantic properties.

The model can be represented using plate notation. With plate notation, the dependencies among variables which can be captured precisely. The boxes are "plates" representing duplicates. The outer plate represents documents, while the inner plate represents the imitated choice of topics and words within a document. M denotes the number of documents and N represents the number of words in a document. Thus:

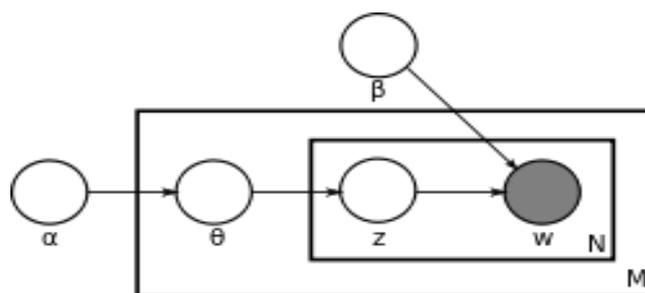


Fig 1: LDA model

$\alpha$  is the parameter of the per-document topic distributions,

$\beta$  is the parameter of the per-topic word distribution,

$\theta_i$  is the topic distribution for corresponding document  $i$ ,

$\phi_k$  is the word distribution for topic  $k$  in the document,

$z_{ij}$  is the topic for the  $j$ th word in document  $i$ , and

$w_{ij}$  is the specific word in the distribution.

The result using LDA can be shown using a graph. In several researches they have used LDA to retrieve topics and shown the sentiment variations. One of the example graph using LDA is shown below. The graph shows the positive and negative sentiment variations. The result is about 85 percent accurate compared to old text retrieving methods.

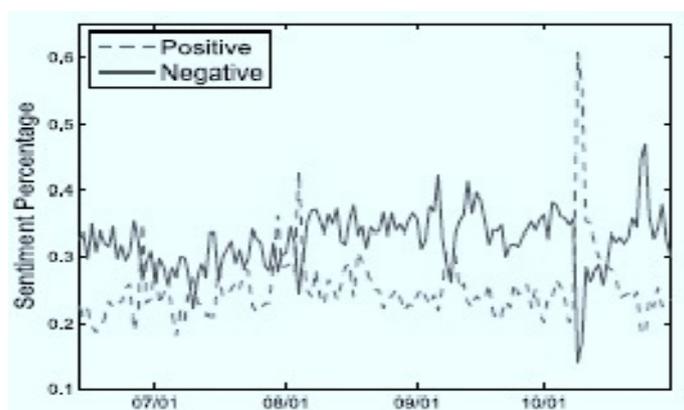


Fig 2: Graph showing sentiment variation using LDA

## 2.2 K-Means Clustering

After finding the word sets with the same sentiment polarities look to be more correlated, hence we are further curious to find how word sets with different sentiment signs are segmented. In detail, we would like to understand how accurately two kinds of word sets with different sentiment properties are gathered together. We propose a popular clustering method, k-means. K-means clustering is one of the data mining techniques popularly used to divide a data set into  $k$  groups in such a way that reduces the within-cluster sum of squares (WCSS):

$$\operatorname{argmin} \sum_{i=1}^k \sum_{x_j} \|x_i - \mu_j\|^2$$

where  $\mu_i$  is the mean of points in  $S_i$  and  $(x_1, x_2 \dots x_n)$  is a set of observations.

Thus, the k-means method segments the data set based on the frequency of the terms that appear in the document matrix. We set  $k$  at two, hypothesizing that there would be two segments and that the word sets originating from the data sets with negative sentiment values would produce one segment, and the word sets

from the data sets with positive values would create another segment. Figure illustrates the k-means analysis result that the positive word sets create one cluster, cluster1, and the negative word sets create another cluster, cluster 2, while k-means divides the word sets one to twelve into two groups exactly depending on their sentiment polarities.

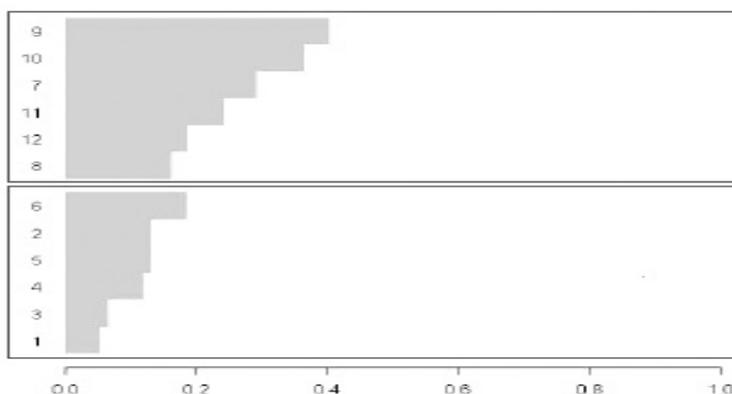


Fig 3: Graph showing K clustering of word sets

### 2.3 Cosine Similarity

Cosine similarity is a metric frequently used to discover similarity and dissimilarity textual data. This metric basically calculates the cosine of the angle between two vectors, indicating that cosine 0 degree represents cosines similarity value of 1, which implies that two vectors are exactly the same, and cosine 90 degrees, a cosine similarity value of 0, which means that the vectors are completely independent. Specifically, cosine similarity measures the inner product space between two vectors which are derived from documents. The set of documents is represented as a set of vectors in a vector space where two documents are relatively close in space whenever they are similar in terms of the semantic meaning. For example,  $vec1 = [1,1,1,1,1,2,1,0,0]$  and  $vec2 = [1,1,1,2,0,0,1,1,1]$  have similarity of 0.9487, which is derived from formula . In general, cosine similarity is calculated based on following formula, where  $A$  and  $B$  represent two vectors values.

$$similarity = \cos \theta = \frac{A \cdot B}{\|A\| \|B\|}$$

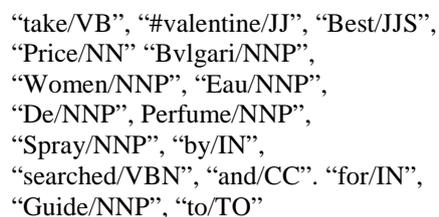
	1	2	3	4	5	6	7	8	9	10	11	12
1	1.00											
2	0.34	1.00										
3	0.27	0.08	1.00									
4	0.52	0.23	0.31	1.00								
5	0.37	0.46	0.11	0.27	1.00							
6	0.44	0.54	0.15	0.37	0.69	1.00						
7	0.57	0.05	0.02	0.10	0.06	0.05	1.00					
8	0.24	0.07	0.02	0.06	0.20	0.12	0.42	1.00				
9	0.45	0.02	0.02	0.08	0.08	0.05	0.81	0.48	1.00			
10	0.50	0.01	0.02	0.09	0.07	0.04	0.73	0.46	0.91	1.00		
11	0.54	0.03	0.04	0.19	0.16	0.11	0.67	0.42	0.77	0.84	1.00	
12	0.44	0.05	0.05	0.14	0.29	0.15	0.60	0.39	0.72	0.57	0.65	1.00

Fig 4: Table showing cosine similarity of words [1]

We apply the cosine similarity method to the term document matrix to determine similarity and dissimilarity between two forms of word sets. The following figure shows the cosine similarity result.

## 2.4 Part-Of-Speech Tagging

Another method used in the data manipulation process is part-of-speech (POS) tagging. POS tagging is one form of syntactic analysis that reads text in some language and assigns parts of speech to each word (or each token) such as noun, verb, adjective, etc. Figure 2 illustrates how POS assigns a tag to each word where “VB” represents verb, “NN” or “NNS” common noun, “JJS” adjective, “IN” preposition, and so forth.



“take/VB”, “#valentine/JJ”, “Best/JJS”,  
“Price/NN” “Bvlgari/NNP”,  
“Women/NNP”, “Eau/NNP”,  
“De/NNP”, “Perfume/NNP”,  
“Spray/NNP”, “by/IN”,  
“searched/VBN”, “and/CC”. “for/IN”,  
“Guide/NNP”, “to/TO”

**Fig 5: Figure showing the POS Tagging**

We apply this technique to produce final data sets consisting of only adjectives, adverbs, and verbs in each document (i.e., a tweet).

## III. CONCLUSIONS

The overall aim of the data mining process is to excerpt information from a large data set and transform it into an logical structure for further uses. The mining is done in twitter data set. The system is used to discriminate the properties and to analyse the public sentiment variations. Thus, in proposed work, we analysed four methods: Latent Dirichlet Allocation (LDA) based models, Cosine similarity, POS and Clustering. The LDA model can filter out background topics and then extract foreground topics to reveal possible reasons. To give a more intuitive representation. Our proposed models were evaluated on real Twitter data. Experimental results showed that our models can mine possible reasons behind sentiment variations. Moreover, the proposed models are general: they can be used to discover special topics or aspects in one text collection in comparison with another background text collection. Also these methods can be combined together to form a new model which can be used for efficient sentiment tracking in twitter as well as in other social networking sites.

## IV. ACKNOWLEDGMENT

We would like to thank various technological experts who researches about data mining and sentiment variation and improve the result by implementing new methods. We would also like to thank Google for providing details on different issues addressing the challenges of mining data from twitter and about other related techniques.

## REFERENCES

- [1] Eun Hee Koand Diego Klabjan, “Semantic Properties of Customer Sentiment in Tweets”, 28th International Conference on Advanced Information Networking and Applications, 2014.
- [2] A.Ghose, and S.P. Han, “An empirical analysis of user content generation and usage behavior on the mobile internet”, Management Science, vol. 57, September 2011.
- [3] B. Liu, M. Hu, and J. Cheng, Opinion observer: analyzing and comparing opinions on the web, 2005.
- [4] B. Liu, “Sentiment analysis and opinion mining” San Rafael, CA: Morgan & Claypool Publishers, 2012.

- [5] B.O'Connor, R. Balasubramanyan, B.R. Routledge, and N.A. Smith, "From tweets to polls: linking text sentiment to public opinion time series" , International AAAI Conference on Weblogs and Soial Media, May 2010.
- [6] D.M. Blei, A.Y. Ng., and M.I., Jordan, "Latent dirichlet allocation", The Journal of Machine Learning Research, vol. 3, pp. 993-1022, March 2003.
- [7] G. Mishne and N. Glance, Leave a reply: an analysis of weblog comments, WWW'06, 2006.
- [8] J.MacQueen, "Some methods of classificatioin and analysis of multivariate observations", L.M.LeCam and J.Neyman, editors, Proc. 5th Berkeley Symposium on Math., Stat., and Prob., p. 281. U. California Press, Berkeley, CA, 1967.
- [9] K. Gimpel et al., "Part-of-speech tagging for Twitter: annotation, features, and experiments", HLT'11 Computational Linguistics: Human Language Technologies, vol. 2, pp. 42-47, 2010.
- [10] P. Blackshaw, and M. Nazzaro, Consumer- generated media (CGM) 101: word of mouth is the ace of the web-fortified consumer, Intelliseek White Paper 2004.
- [11] P.D. Turney, Thumbs up or thumbs down? Semantic orientation applied to unsupervised classification of reviews Association for Computational Linguistics, 2002.

# A SURVEY OF ACTIVITY BASED FRIEND RECOMMENDATION SERVICES

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## ABSTRACT

*In this paper, we have presented a literature review of the modern Activity based friend recommendation services. Social networking sites imply friend recommendation Systems in contribution to providing better user experiences. Online friend recommendation is a rapid developing topic in web mining. Current social networking servicing recommend friends to users based on their social graphs and mutual friends , which may not be the most appropriate to reflect a user's taste on friend selection in real lifetime . In this paper propose a system that recommends friends based on the daily activities of users. Here a semantic based friend recommendation is done based on the users life styles. By using text mining, we display a user's everyday life as life archives, from which his/her ways of life are separated by using the Latent Dirichlet Allocation algorithm. At that point we discover a similarity metric to quantify the similarity of life styles between users, and ascertain users effect as far as ways of life with a similarity matching diagram. At last, we incorporates a feedback component to further enhance the proposal precision.*

**Keywords:** *Activity Recognition; Social Networks; Text Mining; Data Mining; Pattern Recognition.*

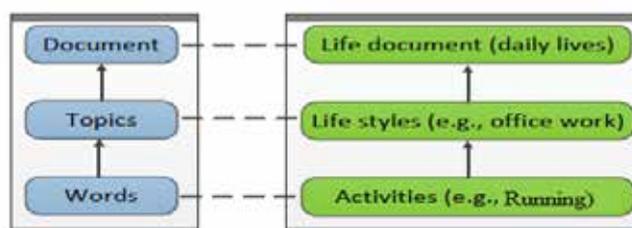
## I. INTRODUCTION

A social network is a system where clients (nodes) are joined with one another by relationship (edges). The edges are undirected and the quantity of edges demonstrates the quantity of companions a client has. A percentage of the remarkable interpersonal organizations are Facebook, Google plus LinkedIn and so forth. Each client keeps up a profile. There are numerous properties in the profile which can be utilized to anticipate the quality of ties between diverse clients.

The vast majority of the friend recommendations system depends on previous client connections to pick friend candidates. For example, Facebook depends on a social connection examination among the individuals who as of now impart basic friends and suggests symmetrical clients as potential friends.

Existing social networking services prescribe friends tousers based on their social graphs, which may not be the most appropriate to reflect a user's preferences on friendselection in real life. With the quick advancement of social network, recommendation systems in different fields rose. A decent suggestion framework ought to consolidate different sorts of suggestion impacts and assurance differences on the base of exactness, in order to fulfil some disagreeable tastes.

One test with existing social networking services is the way to prescribe a good friend to a client. Most of them depend on previous user connections to pick friend candidates. In our ordinary lives, we may have several activities, which structure important groupings that shape our lives. In this paper, we utilize the word activity to explicitly refer to the actions made in the order of seconds, for example, "running", "strolling", or "perusing", while we utilize the expression way of life to allude to more elevated amount reflections of day by day lives, for example, "office work" or "shopping". For example, the "shopping" way of life basically comprises of the "strolling" movement, however might likewise contain the "standing" then again the "sitting" exercises.



**Fig. 1: A Relationship Between Word Archives And Individuals' Everyday Lives**

The commitments of this work are summarized as follows:

- Friend recommendation is done based on life style of users.
- We display the everyday lives of clients as life reports by collecting activities and use the probabilistic topic model to extract life style data of clients.
- Then using similarity metric and calculate the similarity between users and constructing friend matching graphs.
- A user feedback mechanism for improving accuracy and based on that decide optimum threshold value.

## II. LITERATURE SURVEY

There is a broad class of Web applications that include anticipating client predicting user responses to options. Such a facility is called recommendation system. Recommendation systems can be separated into two areas of center: object suggestion and link recommendation. Organizations, for example, Amazon and Netflix stress object suggestion where items are prescribed to clients in light of past behavioral examples [2], [3], [4]. Person to person communication destinations for example, Facebook and LinkedIn concentrate on connection suggestion where companion suggestions are introduced to clients. The work we present in this paper mainly focuses on the latter, in which we develop friend Recommendation system within social networks. The recommendation systems employed by different sites are based on mutual friends.

Friendbook [1], a novel semantic-based friend suggestion system for social networking communities, which prescribes friends to clients focused around their ways of life rather than social graphs. By exploiting sensor-rich cell phones, Friendbook finds ways of life of clients from client driven sensor information, measures the closeness of ways of life in the middle of clients, and prescribes friends to clients if their ways of life have high likeness. LDA is a probabilistic model for collecting distinct data with a three-level hierarchical Bayesian model, where each item of a collection is modelled as a definite mixture over an underlying set of topics or words. The data collection module gathers life reports from users post and other activities. The ways of life of clients are separated by the way of life analysis module with the probabilistic topic model. Latent Dirichlet allocation algorithm is a probability based entropy model with more accuracy. It extracts topics from set of words. Based on the similarity metric, we model the relations between users in real life as a friend-matching graph. Friend-

matching graph: It is a weighted undirected graph  $G=(V,E,W)$  where  $V$  represents users, Edge represents relationship and Weight represents similarity between users. At a time only 5-10 recommendation are made to the user. Suppose the user accept one of the recommendations or sends a friend request then a new recommendation from top of the  $k$ -neighbour list is suggested to the user. Also, changes are made to the 'k-nearest' neighbour list which ensures the same people are not recommended again. To support performance optimization at runtime, we also integrate a feedback control mechanism. Based on the feedback from the user the threshold value can be set. Under different threshold value the algorithm is evaluated for the best results.

Netflix [4] and Rotten Tomatoes [5] suggest movies to a client focused around the client's past evaluations also viewing propensities. As of late, with the development of social networking systems, friend recommendation has gotten a ton of consideration. As a rule, existing friend recommendation in long range social networking systems, e.g., Facebook, LinkedIn and Twitter, suggest friends to clients if, as per their social relations, they impart common friends. In the interim, other proposal components have additionally been proposed via analysts. Another Suggestion based on geologically related friends in social network by joining GPS data and social network structure[8]. The advancement of GPS-empowered mobile phones gives social network researchers a taste of digital cyber-physical social network in advance. Traditional link prediction methods are intended to discover companions exclusively depending on social network information. With area and direction information accessible, we can create more exact and topographically related results, and help web-based social service users find more friends in this present reality. Planning to suggest topographically related companions in interpersonal organization, a three-stage measurable proposal methodology is proposed for GPS-enabled digital physical informal community. By consolidating GPS data and informal community structures, we fabricate an example based heterogeneous information system. Links inside this system reflect both individuals' geographical information, and their social connections. Our methodology assessments join significance and discover promising geo-friends by employing a random walk process on the heterogeneous information network. Exact studies from both manufactured datasets and genuine dataset exhibit the force of fusing GPS information and social diagram structure, and recommend our technique outflanks different routines for companions proposal in GPS-based digital physical informal organization.

Link recommendation [9] in weblogs and comparable social networks, and proposed an methodology focused around community suggestion utilizing the link structure of an social network and substance based proposal utilizing shared pronounced diversions. Kuan et al. proposes an algorithm to place gatherings utilizing a transitive extension based methodology [10]. This examination proposed represented the utilization of a 1.5-clique expansion technique to infer substructures, or groups, inside informal organizations. Results demonstrated that this strategy was genuinely compelling in finding group of friends. Be that as it may, this technique does not give knowledge into how these groups are structured. That is, it is noteworthy to comprehend what basic hobbies cause a arrangement in these groups. Activity recognition serves as the premise for separating abnormal state day by day schedules (in close connection with ways of life) from low-level sensor information, which has been broadly mulled over utilizing different sorts of wearable sensors.

Reddy et al. [14] utilized the inherent GPS and the accelerometer on the cell phones to discover the transportation mode of an single person. Cenceme [15] utilized numerous sensors on the cell phone to catch client's exercises, state, propensities and surroundings. Soundsense [16] utilized the amplifier on the cell phone to perceive general sound sorts (e.g., music, voice) and find client particular sound occasions. Easytracker [17] utilized GPS follows gathered from cell phones that are introduced on travel vehicles to focus courses served,

find stops, and induce plans. The MIT Reality Mining project [18] and Farrahi and Gatica-Perez [19] attempted to find every day area driven schedules from huge scale area information. They could construe every day schedules, for example, leaving from home to office and consuming at a restaurant.

Collaborative Filtering (CF) based Recommender Systems are most essential procedures of prescribing things to the clients. The easiest and unique execution of this methodology prescribes to the dynamic client the things that different clients with comparative tastes enjoyed before. The likeness in taste of two clients is ascertained in view of the similitude in the rating history of the clients. Collaborative Filtering (CF) frameworks work by gathering client criticism as appraisals for things in a given space and abusing similitudes in appraising conduct amongst a few clients in deciding how to prescribe a thing. Collaborative oriented Filtering (CF) routines can be further subdivided into neighbourhood-based and model-based approaches. Collaborative Filtering makes a gathering of clients with comparative conduct, and finds the things favoured by this gathering. Evaluations from client will be taken from client in two ways unequivocal rating and certain rating [5]. CF calculations are partitioned into two sorts, memory-based algorithm and model based algorithm. Memory-Based algorithm just stores all the client evaluations into memory. There are two variations of memory-based proposal and both are in view of the k-Nearest Neighbour calculation: client based sifting and thing based separating. In User - Based Filtering, Rating lattice is utilized to discover neighbouring clients for the dynamic client. This is carried out by utilizing cosine or Pearsons correlation matrix.

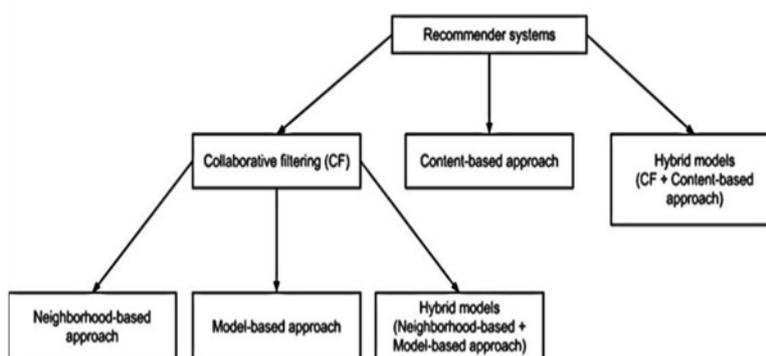


Fig. 2: Types of Recommender Systems

### III. CONCLUSIONS

In this paper, we presented the survey of a new activity based friend recommendation system for social networks. Outlining a recommender system for a social network is extremely difficult as the things prescribed here are not some spiritless merchandise. At the point when a friend is prescribed to a user and the user sends a friend request, the friend can in any case reject the request. There are numerous social elements which assume a part in creating a relationship or a tie between users. Recommender systems are efficient tools that beat the data over-burden issue by giving clients the most relevant contents. Different from the friend recommendation mechanisms relying on social graphs and mutual friends in existing social networking services, System extracted life styles from user-centric data collected from daily activities such as posting, chatting, and other activities and recommended potential friends to users if they share similar life styles The significance of contextual information has been perceived via analysts and specialists in numerous disciplines including Ecommerce, customized IR, ubiquitous and mobile computing, data mining, marketing and management.

#### **IV. ACKNOWLEDGMENT**

We would like to thank various technological experts who researches about data mining, social networking and activity recognition and improve the result by implementing new methods. We would also like to thank Google for providing details on different issues addressing the challenges of mining data from social networking sites and about other related techniques.

#### **REFERENCES**

- [1] Zhibo Wang, Qing Cao, and Zhi Wang, "Friendbook: A Semantic-based Friend Recommendation System for Social Networks", IEEE TRANSACTIONS ON MOBILE COMPUTING.
- [2] Amazon. <http://www.amazon.com/>.
- [3] Facebook statistics. <http://www.digitalbuzzblog.com/facebook-statistics-stats-facts-2011/>.
- [4] Netflix. <https://signup.netflix.com/>.
- [5] Rotten tomatoes. <http://www.rottentomatoes.com/>.
- [6] L. Bian and H. Holtzman. "Online friend recommendation through personality matching and collaborative filtering". Proc. of UBICOMM, pages 230-235, 2011.
- [7] J. Kwon and S. Kim. "Friend recommendation method using physical and social context ". International Journal of Computer Science and Network Security, 10(11):116-120, 2010.
- [8] X. Yu, A. Pan, L.-A. Tang, Z. Li, and J. Han. "Geo-friends recommendation in gps-based cyber-physical social network". Proc. of ASONAM, pages 361-368, 2011.
- [9] W. H. Hsu, A. King, M. Paradesi, T. Pydimarri, and T. Weninger. Collaborative and structural recommendation of friends using weblog-based social network analysis. Proc. of AAAI Spring Symposium Series, 2006.
- [10] S-T. Kuan, B.FY. Wu, and W.FJ. Lee, "Finding friend groups in blFogosphere," in Advanced Information Networking and Applications ; Workshops, 2008. AINAW 2008. 22nd International Conference on, mar. 2008, pp. 1046 –1050.
- [11] Y. Zheng, Y. Chen, Q. Li, X. Xie, and W.-Y. Ma. "Understanding Transportation Modes Based on GPS Data for Web Applications". ACM Transactions on the Web (TWEB), 4(1):1-36, 2010.
- [12] J. Lester, T. Choudhury, N. Kern, G. Borriello, and B. Hannaford. "A Hybrid Discriminative/Generative Approach for Modeling Human Activities". Proc. of IJCAI, pages 766-772, 2005.
- [13] Q. Li, J. A. Stankovic, M. A. Hanson, A. T. Barth, J. Lach, and G. Zhou. "Accurate, Fast Fall Detection Using Gyroscopes and Accelerometer-Derived Posture Information". Proc. of BSN, pages 138-143, 2009.
- [14] S. Reddy, M. Mun, J. Burke, D. Estrin, M. Hansen, and M. Srivastava. "Using Mobile Phones to Determine Transportation Modes." ACM Transactions on Sensor Networks (TOSN), 6(2):13, 2010.
- [15] E. Miluzzo, N. D. Lane, S. B. Eisenman, and A. T. Campbell. "Cenceme-Injecting Sensing Presence into Social Networking Applications". Proc. of EuroSSC, pages 1-28, October 2007.
- [16] E. Miluzzo, C. T. Cornelius, A. Ramaswamy, T. Choudhury, Z. Liu, and A. T. "Campbell. Darwin Phones: the Evolution of Sensing and Inference on Mobile Phones". Proc. of MobiSys, pages 5-20, 2010.
- [17] J. Biagioni, T. Gerlich, T. Merrifield, and J. Eriksson. "EasyTracker: Automatic Transit Tracking, Mapping, and Arrival Time Prediction Using Smartphones". Proc. of SenSys, pages 68-81, 2011.
- [18] N. Eagle and A. S. Pentland. "Reality Mining: Sensing Complex Social Systems". Personal Ubiquitous Computing, 10(4):255-268, March 2006.
- [19] K. Farrahi and D. Gatica-Perez. "Discovering Routines from Largescale Human Locations using Probabilistic Topic Models". ACM Transactions on Intelligent Systems and Technology (TIST), 2(1), 2011.

# THE STUDY OF PRODUCTIVITY IMPROVEMENT OF DESIGNING IN WOOD INDUSTRIES IN KOTA REGION THROUGH COMPUTER INTEGRATED TECHNOLOGY

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## ABSTRACT

*In this research Paper I am focusing on the Indian producing sector which is undergoing a paradigm should be shifted with regards to specialize in Continues improvement within the processes, merchandise and services through completely different ways of optimization employed in Indian producing corporations production techniques. Kumar DR et al (2012) It is conjointly closely connected with 'modern science of entrepreneurship', within which the businesses promote 'cost cutting' on with 'enhancement of quality' and maintain their market share and leadership not solely in conditions of diurnal slowdowns and recessions however conjointly in stable and traditional conditions of industrial climate.*

*It is a standard observation this topic of the "Productivity Improvement in industries through Computer Integrated Technology CIT is the architecture for integrating the engineering, marketing, and manufacturing functions through information technologies This means the link between business method reengineering associated computer- integrated producing with an objective to attain the enterprise integration and management for up productivity and quality.*

*. The major components of CIT is CIM, CAD and CAM technologies, computer numerically control (CNC) equipment, robots, and FMS technology. The computer system is employed to integrate style so producing method and different production coming up with and management systems (such as inventories, materials, schedules, etc.) and also the integration of producing activities with each vendors and suppliers.*

**Indian Manufacturing Industry** *Manufacturing is made up of many diverse sectors, each of which is swayed by the overall-manufacturing ambience. From the Indian perspective, the major manufacturing sectors are Wood, Electronics, Automobile, and Machinery Industries.*

**Keywords-Component;** *Computer Integrated Technology (CIT), Computer Integrated Manufacturing (CIM), Computer Aided Design (CAD), Computer Aided Manufacturing (CAM), Computer Aided Engineering (CAE), Computer Aided Process Planning (CAPP), Computerized Numerical Controls (CNCS), Reconfigurable Manufacturing Systems (RMS), Flexible Manufacturing Systems (FMS), Automated Materials Handling Systems (AMHS).*

## I. INTRODUCTION

Most of the printed reports consider the technological and operational problems at too early a stage of the event of computer integrity. However, the role of strategic, structure and behavior problems has to be due thought for rising integration and flexibility of computer integrity. Kumar R.D. And Thyla P.R. (2011) Therefore, realizing the role of such social control problems in up integration and adaptation, the implementation of computer integrity has been work on this analysis with relevance strategic, structure, technological, activity and operational problems. Solution of the problem during the manufacturing its way develop or created during this analysis to such a framework when measuring Computer Integrated technology CIT of the implementation of new manufacturing process with understand about the following terms.

- 1 Computer Integrated Technologies (CIT)
- 2 Computer Integrated Manufacturing (CIM)
- 3 Productivity Improvement Factors
- 4 Computer Integrated Technologies in Wood Designing Industry

## II. COMPUTER INTEGRATED TECHNOLOGIES (CIT)

The definitions of Computer Integrated Technology, which has been adopted by researchers, are often not uniform, and the presence of ambiguity of terms and notations often leads to an unnecessary and unintended controversy in Research. Accordingly this section establishes the position and meaning of the fundamental terms as used in this Research.

The following classifications have been reviewed and used as background for deriving the definition of Computer integrated Technology.

- Ø Computer integrated Technology (CIT) could means different things to different people and different industries. However, regardless of the various definitions, Computer Integrated Technology systems can be best described by: Systems which enable the integrated, rationalized, design, development, implementation, operation and improvement of production facilities and their output over the life cycle of the product. These systems identify and use appropriate technology to achieve their goals at minimum cost and effort
- Ø As defined by different words can be described as a group of computer-based technologies, including computer -aided Design (CAD), Robotics, Flexible Manufacturing System (FMS), Automated Material Handling systems (AMHS), and Computer Numerically Control (CNC) or Automated techniques.
- Ø In Different words CIT is “a comprehensive collection of technologies for enhancing the efficiency and flexibility of Production systems”.
- Ø Its involved new manufacturing techniques and machines combined with information knowledge, microelectronics and innovative organizational practices in the manufacturing process.

## III. COMPUTER INTEGRATED MANUFACTURING (CIM)

Computer integrated manufacturing (CIM) could means different things to different people and different industries. However, regardless of the various definitions, Computer Integrated Manufacturing systems can be best described by: Systems which enable the integrated, rationalized, design, development, implementation,

operation and improvement of production facilities and their output over the life cycle of the product. These systems identify and use appropriate technology to achieve their goals at minimum cost and effort.

**The Need for CIM** According to R.U. Ayres, CIM is prompted by four linked hypotheses: New manufacturing possibilities have been created by rapid technological progress in electronics and telecommunications. The rapid development of technology facilities applications of programmable automation and CIM arises from the confluence of these supply elements (technology) and demand elements (flexibility, quality, variety).

- In manufacturing processes involving human “on-line” errors result in defects. Because of increasing product complexity, defective designs, components or assemblies are increasingly intolerable.
- Consumers want more choice, which means variety and customization as well as reliability and quality, making the manufacturing process more and more complex and increasing the information-processing load in firms. The rapid introduction of new products is becoming an increasingly important competitive strategy, and product life cycles are shortening.
- There is a trade-off between economies of scale and economics of scope that result from flexible automation. CIM can help increase the integration of functions and control as well as higher quality and greater flexibility, at the meat time generating lower costs.

#### IV. PRODUCTIVITY IMPROVEMENT FACTORS

**Productivity improving technologies** are those technologies that lowered the traditional factors of production of land, labor capital, materials and energy that go into the production of economic output. Increases in productivity are responsible for the increase in per capita living standards.

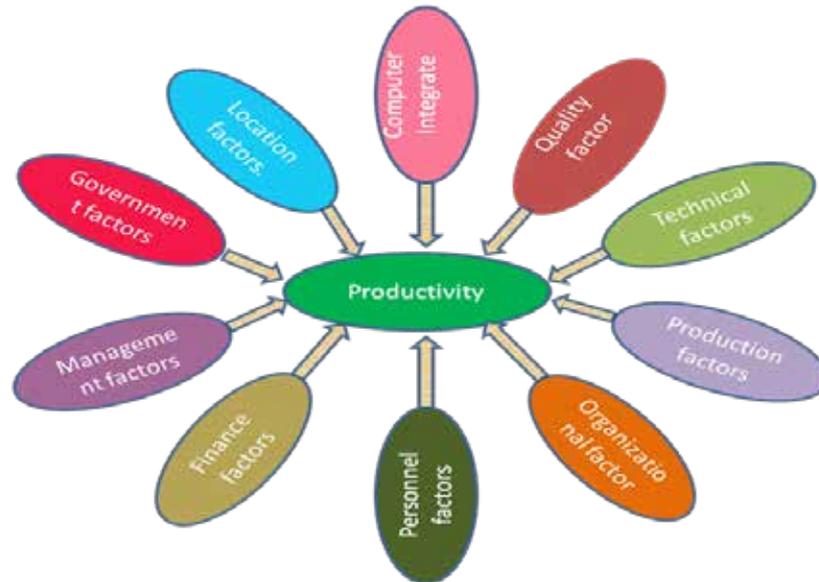
Fabrication, Manufacturing and industry mainly faces problem of Productivity improvement. Productivity measures are used at the level of firms, industries and entire economies. Depending on context and the selection of input and output measures, productivity calculations can have different interpretations. Productivity is a common measure of how well resources are being used or a measure of the effective use of resources usually expressed as the ratio of output to input.

The 10 main factors that affect Organizational productivity are:

1. Computer Integrate
2. Quality factor
3. Technical factors
4. Production factors
5. Organizational factor
6. Personnel factors
7. Finance factors
8. Management factors
9. Government factors
10. Location factors.

This context reviews some major methods which ultimately helps in recovering Organizational productivity.

Few things concluded after reviewing above methods are:



**Figure1 Productivity Improvement Factors**

## V. COMPUTER INTEGRATED TECHNOLOGIES IN WOOD DESIGNING INDUSTRY

The Indian wood industry has become more complex due to globalization, production assortment and the development of technologies.

Technologies implemented by the more than 20% of the companies in the manufacturing use modern technologies in the world. Out of those in Wood and wood products subsector the most popular are efficient waste usage technologies, Furniture manufacturing – modern technological equipment. The CITs investigated in this study can be grouped into six domains based on the literature of CIT studies. The six domains are:

1. Advanced design and engineering technologies: It concerned with design and engineering technologies such as CAD, CAM, CAE and GT.
2. Advanced machining technologies: It concerned with computer numerical control machines (CNC), numerical control/ direct numerical control machines (NC/DNC), flexible manufacturing system (FMS), and robotics.
3. Advanced planning technologies: It concerned with logistic planning such as MRP, MRPII, ERP and ABC analysis.
4. Advanced material handling technologies: It concerned with handling of materials such as AS/RS, AGV, and AMHS etc.
5. Advanced management systems: It concerned with production management tools such as TQM, BPR, SPC, and JIT.
6. Advanced process improvement systems: It concerned with advanced process improvement technologies such as Benchmarking, Kaizen, Training and Recycling.

## VI. CONCLUSION

Due to the global competition and fast change customer requirements, implementing Computer Integrated Technology CIT is beneficial. It could provide products with better quality, lower costs, better support, and in a short lead-time.

Implementing CIT requires organizational and technical understanding and strategic approach.

People at all levels should be educated and commit to the implementation of CIT.

Each individual company has unique characteristics and is subject to different external influences, each will require a different a different point of balance between people and automation, and hence will require a different form of CIT.

Implementation of CIM requires long-term effort and continuous improvement.

## **REFERENCES**

- [1] AlirezaAnvari(2011) A Study on Total Quality Management and Lean Manufacturing: Through Lean Thinking Approach World Applied Sciences Journal 12 (9): 1585-1596, ISSN 1818-4952 © IDOSI Publications, 2011
- [2] Martin Sureshababu (2012) Optimization Of Cutting Parameters For Cnc Turned Parts Using Taguchi's Technique Journal of Mechanical and Production Engineering Research and Development (IJMPERD) ISSN 2249-6890Vol.2, Issue 2, Sep 2012 80-86
- [3] Karkoszka T, Honorowicz J. Kaizen philosophy (2009) a manner of continuous improvement of processes and products. Journal of Achievements in Materials and Manufacturing Engineering 2009; 35(2):197-03.
- [4] Khalid SAS. (2011) Productivity improvement of a motor vehicle inspection station using motion and time study techniques. Journal of King Saud University- Engineering Sciences 2011; 23:33–41.
- [5] Khamis N, Rahman MNA, Jamaludin KR, Ismail AR, Ghani JA and Zulkifli R.(2009) Development of 5S Practice Checklist for Manufacturing Industry. Proceedings of the World Congress on Engineering 2009; 1:978-88.
- [6] Deif A (2012) Implementation of Lean tools and techniques in automotive industry. Journal of Applied Sciences 2012; 12(10):1032-37.
- [7] Lewoc JB, Izworski A, Skowronski SF, Kieleczawa A and Kopacek, P. (2012) Emerging Smart Engineering: An Integrated Manufacturing and Management System. International Journal of Engineering Research and Applications 2012; 2(4):930-36.
- [8] Masood T and Khan I.(2004) Productivity Improvement through Computer Integrated Manufacturing in Post WTO Scenario, National Conference on Emerging Technologies 2004.
- [9] Moin CJ, Haque R and Mahabubuzzaman AK.(2010) A study on Computer integrated manufacturing method in Bangladeshi textile industry. Journal of Innovative development strategy. 2010; 4(1):5-11.
- [10] Nagalingam SV and Lin GCI.(1999) Latest developments in CIM. Robotics and Computer Integrated Manufacturing 1999; 15:423-30.
- [11] Titu MA, Oprean C and Grecu D. (2010) Applying the Kaizen Method and the 5S Technique in the Activity of Post-Sale Services in the Knowledge-Based Organization. Proceedings of the International Multi conference of engineers & computer scientists 2010; 3:978-88.
- [12] Upadhye N, Deshmukh SG, Garg S. (2010) Lean manufacturing system for medium size manufacturing enterprises: an Indian case. International Journal of Management Science and Engineering Management 2010; 5(5):362-75.
- [13] Veeramani D, Tserng HP, Russell JS.(1998) Computer-integrated collaborative design and operation in the construction industry. Automation in Construction 1998; 7:485-92.

- [14] Vendan SP, Sakthidhasan K.(2010) Reduction of Wastages in Motor Manufacturing Industry. Jordan Journal of Mechanical and Industrial Engineering 2010; 4(5):579-90.
- [15] Wang L.(2008) Wise-shop floor: An integrated approach for Web-based Collaborative Manufacturing. IEEE Transactions on Systems, Man, and Cybernetics- Part C: Applications and Reviews 2008; 38(4):562-73. Wikipedia.
- [16] Xu X. (2012) From Cloud computing to cloud manufacturing. Robotics and Computer-Integrated Manufacturing 2012; 28:75-86.
- [17] Battini D, Faccio M, Persona A, Sgarbossa F.(2010) "supermarket warehouses": Stocking policies optimization in an assembly-to-order environment. International Journal of Advanced Manufacturing Technology.2010;50 (5-8):775-88.
- [18] Dimitrov D and Saxer M.(2012) Productivity Improvement in Tooling Manufacture through High Speed 5 Axis Machining, Procedia CIRP 1 2012 277 – 82.
- [19] Gupta A and Kundra TK. (2012) A review of designing machine tool for leanness. Indian Academy of Sciences. 2012;37(2):241–59.
- [20] Jyothi V.E., Rao K.N., (2012), Effective Implementation of Agile Practices – In coordination with Lean Kanban, International Journal on Computer Science and Engineering, Vol. 4 No. 01 January 2012.
- [24] Kumar R.D. And Thyla P.R. (2011), Transformation of lean manufacturing by an automotive component manufacturing company, International Journal of Lean Thinking Volume 2, Issue 2 (December 2011).

# AN EMPIRICAL STUDY ON ANCIENT INDIAN ECONOMIC ETHICS AND THEIR RELEVANCE IN CURRENT ECONOMIC ETHICS, WITH REFERENCE TO ACADEMIC BUSINESS STANDARD AT KOTA

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## ABSTRACT

*The overall purpose of this paper is to reflect on the importance and impact of linkages amongst business ethics as a growing academic discipline, the principle of social engagement as promoted by the 2011 UN Global Compact, and the role and impact of academic research as carried out in higher education institutions. Taken together, these are gaining greater importance in the globalized society of 33 years, as well as in connection with the activities of the United Nations.*

*A considerable number of the objectives related to business ethics and the encouragement of social engagement depend to some extent on the role and contribution of relevant academic research. Certainly researchers, by virtue of their wide knowledge and investigative as well as analytical approaches, can help to identify and document the main or emerging issues surrounding the place of business in socio-economic development. The issues in question are complex ones necessitating reflection from various standpoints on the nature of commercial activity, of profit, of the human professional conduct involved, and of the contribution of this milieu to the general public good. Consequently, the research angle must be an interdisciplinary one so as to study the varied dimensions of the issues. Moreover, it should be recalled that research is the lifeblood of the Knowledge Society and the fuel for its successful operations because it helps generate new and effective approaches to problem-solving.*

*At the present time, it so happens that all these matters are of great interest to the United Nations, which promotes the principles of altruism and international cooperation amongst all nations for a common global good based on peace and equitable human development. This paper aims therefore to make comments on the diverse elements involved and on the synergy which can be derived from their positive interaction.*

**Keywords:** *Component; Business, Ethics, Economic Academic Etc.*

## I. INTRODUCTION

Ethics is the study of human behavior and its consequences in the light of what is ideally possible. Ethics defines the elements essential to human well-being and proposes principles to be used as guidelines for generating an ethical culture. Ethics also refers to the specific values, standards, rules, and agreements people adopt for conducting their lives. Ethics are not merely social conventions, like table manners. Ethics define the

social conditions necessary for human beings to thrive. ethics studies the moral behavior in humans and how one should act. Ethics may be divided into four major areas of study.<sup>[1]</sup>

- Meta-ethics
- Normative ethics
- Applied ethics
- Descriptive ethics

Meta Ethics- it is a psychological ethics or moral proposition.it is focus on how we understand and what we need .we talk about what is right and what is wrong.

Normative Ethics- it is related with ethical action.ie examines standard for rightness and wrongness of actions.

Applied Ethics- it is a discipline of ethics that attempts to apply ethical theories to realize situation such as engg.

Ethics ,bio ethics ,geo ethics public service ethics and business or economic ethics.

Descriptive ethics- descriptive ethics is a value free approach to ethics which defines a social science rather than humanity ,this is a major concept of sociology and political science.

## II. A CONSIDERATION ON BUSINESS ETHICS

A Consideration on business ethics requires a prior consideration of the domain of ethics, per se. This, unlike mathematics, is not an exact science. Resolving an ethical problem requires the analysis of particular circumstances and the study of specific facts.

In the business world, ethics often are displaced by greed when there is a periodic frenzy of rising stock market prices. Inevitably, a steep downturn then inflicts losses on investors and on businesses with a concomitant reduction in the work force. An excessive competitive spirit tends to induce unethical business practices so the business world becomes a battlefield where the normal rules are flouted, skirted or simply disregarded. The ensuing instability is bad for the economy and for the government.

Who is better placed than oneself to take care of one's own needs and desire?

Nevertheless, if self-seeking wreaks great harm to the general good in the process of bringing advantage to the individual, the imbalance must be redressed. It is not only painful but inefficient to live in a society where there are no ethics, law and order. Worse, if individuals or businesses become steeped in unethical practices, this trend generally engulfs the political

world as well. At this point, the quality of democracy languishes and the citizens lose faith in their institutions and their elected officials. Understanding of problems of business ethics can be addressed through a series of questions which offer different perspectives on the subject.

**The first question relates** to the origins of ethics - whether they come from religion, philosophy, the laws of nature, scientific study, study of political theory relating to ethical norms created in society or other fields of knowledge.

Ans A majority of individuals brought up in a monotheistic cultural background - Jews, Christians and Muslims - believe that standards of ethical conduct come from God by revelation. For example, according to the Christian and Jewish religions, God gave Moses the Ten Commandments on a mountain top. For Muslims, Muhammad experienced revelations from Allah which were later written in beautiful prose and poetry in the Quran (Koran). Buddhists believe that Buddha found the proper way to virtue and to respect others through

meditation without the direct intervention of a monotheistic god.

For the purpose of this analysis, the source of ethics is less important than discovering the right rules, at least some of which can evolve with time. However, since many are a product of evolution, traditional ethics could be more robust than new ones we might generate. As we have seen from the above discussion, there are many possible sources of ethics. Each source has probably contributed to ethical conduct.

**The second question** goes to the issue of whether ethics vary at different times and in different cultures.

Ans Beginning in the last half of the 20<sup>th</sup> Century, the human race has become aware that its economic activities on Earth are causing major threats to our environment, to our health and survival as well as to all life on our planet. Some businesses, but not all, have recognized their ethical duty to take special measures to lead them to sustainable social and economic development in their activities. These new ethical duties not only concern the present population on Earth but, perhaps more importantly, future generations. These are new ethical duties that have arisen as Man has begun to have a serious effect on the Earth's ecological systems.

In previous centuries, the slave trade was not generally considered unethical by most of the population but ethics have changed.

**The third question** asked is whether ethics vary depending upon who we are dealing with -- with a friend or foe.

Ans Many of the Crusaders were Christians who followed the ethical teaching of Saint Bernard. However, in order to recover the Holy Land, which could open to them the gates to Heaven, they killed many Jews and Muslims. They did not consider their conduct unethical.

Some Muslim extremists today seem to adopt a similar course of conduct with their Holy War, the "Jihad" against Jews, Christians and secular governments in countries with Muslim populations. History teaches us that violence, war and terrorism do not necessarily have religion since they are used by religious believers or by people without religion. Plundering others apparently has often seemed easier than acquiring wealth by working. Racial hatred, social discrimination and conflicts over territory are often a contributing factor to war and violence.

One seems to find more ethical conduct practiced among in-groups, like families and members of the same community, where ethical conduct is taught and enforced, rather than toward outsiders and foreigners. Outsiders and foreigners are often hated because they do not have the same religion or culture and are sometimes seen as trying to impose their will on a community or compete for the same territory. However, one should also note that violence

**The fourth question** asks whether different ethical conduct depend on the subject matter involved.

Ans Many professions have deontological rules, specially designed to fit their activity. Governments and associations for medical doctors, lawyers, architects make and enforce their special rules. Some have complained that while the American Bar Association (ABA) promulgates rules for lawyers in the United States, they also promote the best interests of the profession. Therefore these rules are not always in the public interest.

**The fifth question** relates to how should ethical rules be transmitted and formalized and how they have been formalized to date.

Ans Ethical rules are transmitted orally in families and schools, through sacred texts, church ceremonies, books on philosophy and other ways.

One also finds ethical principles stated in declarations and other documents. The Declaration of Human Rights was signed by members of the United Nations in 1948, based in part on the Bill of Rights in the amendments to the United States Constitution, the French Rights of Man indicated in the preamble to the French Constitution of 1958 and on the French Declaration of the Rights of Man in 1789. Many laws, constitutions and international treaties and other statements of principles (soft law) have ethical content.

**The sixth question** is whether or not certain activities or businesses are unethical by nature in whole or in part. It also considers whether the corporate institution can function as an ethical entity since it was designed to generate profit.

Ans If "the love of money is the root of all evil"<sup>17</sup>, then, since the primary objective of business is to make money, are all businesses unethical? Or does the love of money only become sinful if it is excessive and leads to improper conduct relating to others? In the Sermon on the Mount it is stated that one cannot serve God and Mammon<sup>18</sup>. But see "Render into Cesar what is Cesar's and into God's what is God's", Mark 12:17. This last quote, according to some Christians, is the basis for secularism separating religion from worldly materialistic activities. In this regard, it is interesting to note that some Churches have accumulated immense fortunes. In the U.S. some large Churches are managed like commercial businesses.

**The seventh question** is whether or not ethical conduct pays in a business context. For most people, ethics are related to justice. The eighth question deals with this subject.

Ans This question is difficult to answer because it is difficult to prove one way or the other since unethical conduct is usually hidden. However, in major business enterprises there are few open advocates for unethical dealing because it adversely affects the business's reputation and can create large potential risks for the business. There have been many examples in the press where unethical conduct has been extremely costly to countries and many individuals. Recent events in the US relating to Enron and World Com are examples where the real financial condition of the business was not apparent to investors because of lack of transparency and questionable accounting practices which resulted in overstating earnings.

#### **What is the relation of ethics to justice?**

Ans Justice can be harsh and severe like in the old testament. Or it can be more merciful and human. In either case it is closely related to ethics. They are adjacent concepts. A company's reputation depends in part upon how it applies social justice in dealing with employees and other third parties.

A leading scholar has written that the concept of justice arose in ancient Greece<sup>25</sup> when there were conflicts and disputes between the noblemen and the common people when the latter's economic position improved

#### **Can ethics be enforced?**

Ans Minimum ethics tend to be enforced by law where the law is effectively enforced. With human nature being imperfect i.e. selfish, envious, greedy, avaricious, violent and not always intelligent, even so-called civilized societies need minimum rules of conduct enforced in practice by some authority.

Public opinion through boycotts or unfavorable publicity in the press can bring pressure on those in violation of ethical principles as well.

Greenpeace objected when Shell planned to sink its petroleum drilling platform into the Baltic Sea. Threats of boycotts of Shell products by the public convinced the company to dispose of the rig in another more expensive way, which it claimed was more harmful to the environment since the rig contained a minimum amount of

petroleum products. Cooperation with Greenpeace at an earlier stage might have avoided this environmental conflict.

Investors in ethical funds have begun to apply pressure by withholding investment in companies in businesses considered unethical like tobacco, the arms industry and by imposing other ethical criteria on investment companies.

Peer pressure by other companies also induces companies to be more ethical even though it is to a certain extent "window-dressing". Competitive pressures motivate companies to keep up with their peers in term of human relations and environmental conduct.

### **III. IMPLICATIONS FOR THE 2011 UNITED NATIONS GLOBAL COMPACT AND SOCIAL ENGAGEMENT**

In recent years, the United Nations has accelerated its interaction with the private sector and with its major element, the business community. This co-operation results from the important role played by the economy (and so by business) in socio-economic development at all levels – community, national, regional and global.

This overview has sketched the wide range of social engagement involving cooperation with the private sector. Each type of alliance brings its specific benefits. In this regard, the private sector is no exception. For the UN, benefits may include greater visibility for the Organization's goals and programmes, the further diversification of partnerships, notably those with leading country and community actors, and the potential for enhanced funding support. For International, national and local business, partnership with the UN demonstrates commitment to social engagement and responsibility and to business ethics as well as support for sustainable human development through economic stability and growth. Such action can add considerable prestige to the image and impact of the private sector at country and community contexts. However, this activity, which is undeniably invaluable, has a more complex dimension related to its ethical nature. This opens a debate as to how ethics must underpin business activity so that business ethics are respected and upheld. This will be explored in the next section of the paper.

### **IV. IMPLICATIONS FOR THE ROLE OF ACADEMIC RESEARCH**

This section will consider how academic research and research universities are significant catalysts in promoting both ethical conduct and social engagement and comment impact of this research.

### **V. CONCLUDING REMARKS**

Consideration of the questions raised in this paper illustrates the complexity of the subject of business ethics. Businesses vie for clients and try to win in the struggle with their competition. But even the law places limits on too aggressive competition, i.e. rules against unfair competition which in France prohibit stealing a significant number of employees of a competitor so the competitor's business is seriously disorganized. Being ethical in business is. Despite these difficulties, the public now more and more expects the private sector to fulfill its ethical and environmental obligations because it has become a most important actor in modern society with a direct and serious impact on the public interest. Public opinion expects it to produce a good result in all three of its balance sheets – financial success, ethics, social justice and sustainable development.

## REFERENCES

- [1] Online Resource Centre [www.oxfordtextbooks.co.uk/orc/brymanbrm3e/](http://www.oxfordtextbooks.co.uk/orc/brymanbrm3e/) Visit the interactive Research Guide that accompanies this book to complete an exercise in Ethics in Business Research.
- [2] Heinrich, Boyd, Bowles, Carnerev, Fehr, Gintis, McElreath. Jan. 13, 2012. *Cooperation, Reciprocity and Punishment in Fifteen Small-Scale Societies*. Reprinted in *The American Economics Review*, May 2012.
- [3] Olson, Mancur. Nov. 2011. *Power and Prosperity: Outgrowing Communist and Capitalist Dictatorships*. Basic Books.
- [4] Kim, Yersu. 2006. *Prospect For a Universal Ethics*. UNESCO
- [5] Kindleberger, Charles P. Jan. 2012. *Manias, Panics, and Crashes: A History of Financial Crises*. John Wiley & Sons; 4th edition.
- [6] OECD. 2009. *OECD Guidelines for Multinational Enterprises - Revision 2012*.
- [7] Piper, Thomas R. et al. *Can Ethics Be Taught? Perspectives, Challenges and Approaches at the Harvard Business School*. Harvard Business School Press, 2013.
- [8] Putnam, Robert D. *Making Democracy Work – Civic Traditions in Modern Italy*. Princeton University Press, Princeton NJ, USA, 2013
- [9] Rhodes, Richard. 2012. *Why They Kill. The Discoveries of a Maverick Criminologist*. Vintage Books, New York.
- [10] Terré, Dominique. 2008. *L'éthique financière*. A private paper
- [11] Wilson, Edward O. 2011. *Consilience - The Unity of Knowledge*. Alfred Knopf

# ANALYSIS OF TECHNIQUES IN CRIME PREVENTION USING FUZZY

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## ABSTRACT

Nowadays volume of crime increases drastically. Crime prevention has become one of the global issues. Government and community officials are doing their best to improve the crime prevention. Most of the crime will happen only if there is an opportunity. This can be prevented using the modern technologies from data mining. This paper takes a literature survey on techniques in crime prevention using fuzzy logic. This paper includes Fuzzy Association Rule Mining (FARM), Decision Supporting System (DSS) and Fuzzy Apriori algorithm techniques.

**Keywords:** *Apriori, Arm, Dss, Farm.*

## I. INTRODUCTION

Data mining is the process that discovers patterns and relationships in data that may be used to make valid predictions. Data Mining is also popularly known as Knowledge Discovery in Databases (KDD). It refers to the extraction of implicit, previously unknown and potentially relevant information from data in databases. Data mining and knowledge discovery in databases (or KDD) are frequently treated as synonyms but actually data mining is part of the knowledge discovery process. The KDD is an iterative process. Once the discovered knowledge is presented to the user then following can be done to get different or more appropriate results. The evaluation measures can be improved, the mining can be more refined, new data can be selected or further transformed, new data sources can be integrated to old ones, in. Data mining derives its name from the similarities between searching for valuable information in a large database and mining rocks for a vein of valuable ore. In these two imply either filtering through a large amount of data or simply searching the data to exactly pinpoint where the values reside. It is, however, a misnomer, since mining for gold in rocks is usually called "gold mining" and not "rock mining", thus by analogy, data mining should have been called "knowledge mining" instead. Nevertheless, data mining became the accepted customary term, and very rapidly a trend that even overshadowed more general terms such as knowledge discovery in databases(KDD) that describe a more complete process Other similar terms referring to data mining are: data dredging, knowledge extraction and pattern discovery

Crime data mining is receiving increased attention to discover underlying patterns in crime data. The need to act quickly to suppress crime activity and discover links between various data sources persists. State law enforcement are continuing to call upon modern geographic information systems and data mining technologies to

enhance crime analytics and better protect their communities and assets. Real-time solutions can save significant resources and push the capability of law enforcement closer to the pulse of criminal activity. DSS has been applied in a wide range of computer applications that commonly manipulate information in a variety of fields. This includes computer-based systems that are being used in handling data in order to achieve an optimization for decision-making in crime prevention. Finding solutions to crime prevention using computer programming is not something new in forensic and information technology. Projects have been done in developed countries and around the world to develop software tools to find solutions for crime prevention.

This paper aims to design and develop a theoretical model of an intelligent system to predict crime that can be happened in future based on previous crime data. This paper uses fuzzy association rules, which are easily understandable by human because of the linguistic terms such as “hot” and “high”. Fuzzy logic assigns membership value between 0 and 1 to each element of a set allowing a smooth transition between membership and non-membership of a set. This paper uses Fuzzy Apriori algorithm for the Fuzzy Association Rule Mining (FARM). The DSS technology can be applied with association rules (AR) approach where AR is focus to determine the factor and effect for specific patterns. For example in crime, the factor is woman and the effect is rape crime with 80% confidence. It means that this type of crime occurs more frequently with 80% confidence in a specific area. By using the DSS technology, we can make some recommendations to the user on what precaution or strategies to be made to pace particular issues when solving specific crimes based on confidence value. The report is in the following structure. Section II discussed about the related works in this field. Section III explains the design of system in detail. Finally summarize conclusions in section IV.

## **II. LITERATURE SURVEY**

*Kaikhah and Doddameti, Texas State University*, on a paper [1] proposed a tool to find the existing trends for each type of crime happening in US cities. They Use Neural network as a tool, with control parameters. The neural network is trained to find correlations and relationships that are in a dataset. Then neural network is pruned. Also it is modified to generalize the correlations and relationships. Finally, the neural network is used as a tool to discover all existing hidden trends in four different types of crimes (murder, rape, robbery, and auto theft) in US cities as well as to predict trends based on existing knowledge inherent in the network. The knowledge discovery technique offers two unique features that are not available in other knowledge discovery techniques. First, the control parameters provide a means to set the desired level of confidence for extracting existing and predicted trends. Second, the predicted trends provide reasonable expectations that can be used for monitoring the environment.

*Tony H. Grubestic, Drexel University*, on a paper [2] discuss about fuzzy clustering to detect the crime hot-spot areas. This paper explore the use of a generalized partitioning method known as fuzzy clustering for hot-spot detection. Functional and visual comparisons of fuzzy clustering and two hard-clustering approaches (medoid and k-means), across a range of cluster values are analysed. The empirical results suggest that a fuzzy clustering approach is better equipped to handle intermediate cases and spatial outliers. This paper provides an empirical investigation on the utility of fuzzy cluster analysis for crime hot-spot detection. The results suggest that the geometric properties of convex hulls are useful when combined with the results from partition-based cluster analysis in the delineation of crime hot-spots..

*Donald E Brown and Stephen Hagen* on a paper [3] discuss about automated association rule mining methods to help law enforcement. This paper describes automated approaches to data association. This method is more

efficient and accurate than manual method. Two methods are mainly used Transformed Categorical Similarities(TCS) and Dynamically Adjusted Weights(DAW) methods. This reduces search time by a factor of 1/3 over SQL based search. It also shows that TCS method is significantly better than DAW method.

*Yifei Xue and Donald E. Brown*, on a paper [4] discussed about a decision model for spatial selection. This paper analyses criminal incidents as spatial choice processes. Spatial choice analysis can be used to discover the distribution of people's behaviour's in space and time. Two adjusted spatial choice models that include models of decision making processes are presented. The comparison results show that adjusted spatial choice models provide efficient and accurate predictions of future crime patterns and can be used as the basis for a law enforcement decision support system. This paper also extends spatial choice modelling to include the class of problems where the decision makers' preferences are derived indirectly through incident reports rather than directly through survey instruments.

*Sheng-Tun Li, Shu-Ching Kuo and Fu-Ching Tsai* on a paper [5] discussed about fuzzy self-organizing map and a rule extraction method for crime prediction. This paper propose a framework of intelligent decision-support model based on a fuzzy self-organizing map (FSOM) network to detect and analyse crime trend patterns from temporal crime activity data. In addition, a rule extraction algorithm is employed to uncover hidden causal-effect knowledge and reveal the shift around effect. This method is accurate on detecting the shift around effect. Here the rules inferred from the data lead to recognition of hidden relationships between crime offenses and locations. One limitation is, more focused on shift around effect.

*Anna L Buczak and Christopher M Grifford*[6] study the application of fuzzy association rule mining for community crime pattern discovery. Discovered rules are presented and discussed at regional and national levels. Rules found to hold in all states, be consistent across all regions, and subsets of regions are also discussed. A relative support metric was defined to extract rare, novel rules from thousands of discovered rules. Such an approach relieves the need of law enforcement personnel to sift through uninteresting, obvious rules in order to find interesting and meaningful crime patterns of importance to their community.

*Hemant K. Bhargava, Daniel J. Power and Daewon Sun* [7] reviews and summarizes recent technology developments, current usage of Web-based DSS, and trends in the deployment of such systems.

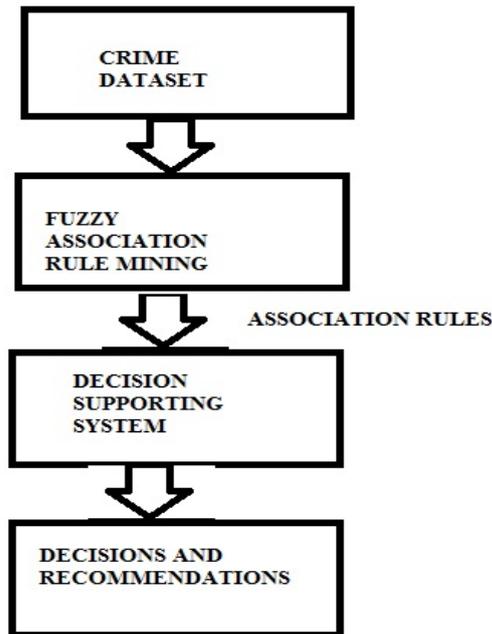
*F.G.Filip*[8] on a paper reviewing several aspects concerning the utilization and technology of DSS in the context of LSS control. Particular emphasis is put on real-time DSS and *multi-participant (group) DSS* which support collaborative work. Several advanced solutions such as mixed knowledge systems, that combine numerical methods with AI-based tools, and the prospects of using *Ambient intelligence* (AmI) concepts in DSS construction are described.

*S.Alter*[9] on a paper discussed about work system of DSS. In his opinion, any DSS of genuine significance is usually an integral part of a work system and often cannot be separated out easily. Analysing the algorithm might be interesting, but anyone trying to understand its implementation and success in the organization would need to look at the work system. In addition, the difference between automating and not automating the decision can describe strategy alternatives for a work system, but is less interesting for classifying DSS.

Figure 1 shows the theoretical system architecture.

The execution is as following:

- First the crime data has been taken from the data base.
- Then fuzzy association rule mining done according to the minimum support and confidence
- Using these methods data has been changed to association rules.
- From these rules decisions can be obtained.



**Fig1- General System Architecture**

Fuzzy association rules are of the form: (X is A)  $\hat{\Delta}$  (Y is B) where X and Y are attributes, and A and B are fuzzy sets that characterize X and Y respectively.

An example fuzzy association rule is the following:

(temperature, hot) and (humidity, high)  $\hat{\Delta}$  (energy-usage, high)

Fuzzy logic assigns degree of membership between 0 and 1 (e.g., 0.4) to each element of a set, allowing for a smooth transition between membership and non-membership of a set.

The measures of support, confidence and lift have been fuzzified for the purpose of fuzzy association rules.

Confidence can be treated as the conditional probability (P(Y|X)) of a transaction containing X and also containing Y. A high confidence value suggests a strong association rule. However, this can be deceptive. For example, if the antecedent or consequent have a high support, they could have a high confidence even if they were independent. This is why lift was suggested as a useful metric. The lift of a rule measures the deviation from independence of X and Y. A lift greater than 1.0 indicates that transactions containing the antecedent (X) tend to contain the consequent (Y) more often than transactions that do not contain the antecedent (X). The higher the lift, the more likely that the existence of X and Y together is not just a random occurrence, but rather due to the relationship between them.

Main steps in these fuzzy association rule mining is

- Find all frequent itemsets that have fuzzy supports above FuzzySupp<sub>min</sub>.
- Use the frequent itemsets to generate fuzzy confident rules with fuzzy confidence above FuzzyConf<sub>min</sub>.

For the purpose of mining fuzzy association rules, Apriori was extended to Fuzzy Apriori. The difference between the two algorithms is that Fuzzy Apriori uses definitions of fuzzy support and fuzzy confidence instead of their crisp counterparts used in Apriori.

### **III. CONCLUSIONS**

The society we live in is a complicated and culturally revolutionized one, where crime problems are rising in an endless stream and their prevention has become a first priority for the police and the government. In this paper, we apply technologies in knowledge discovery in public security index requirement of linguistic data to support decision making for situational crime prevention.

Fuzzy association rule (FAR) mining is undeniable very crucial in discovering the exceptional cases such as air pollution, rare events analysis, crime prevention etc. It is quite complicated, computationally expensive and thus only few attentions are interested in this area. The traditional support-confidence approach and existing interestingness measures such as normal Apriori are not scalable enough to deal with these complex problems with linguistic terms that require high affinity between items.

In this paper, we presented the survey on application of fuzzy on situational crime prevention. The expected outcome such a system is one web-based system that supports decision support in which it can provide intelligence recommendations, so that, we can increase police strategies in an area to make it less attractive to criminal offenders

### **IV. ACKNOWLEDGMENT**

We would like to thank various technological experts who help us to complete our work. We would also like to thank Google for providing details on different issues addressing security and their prevention methods. Last but not the least I express my gratitude for all my friends who showed great support and help.

### **REFERENCES**

- [1] Kaikhah, K. and Doddameti S, "Discovering trends in large datasets using neural networks." *Applied Intelligence*, 24, 51–60, 2006
- [2] Grubestic, T. H. "On the application of fuzzy clustering for crime hot spot detection" *Journal of Quantitative Criminology*, 22(1), 77–105, 2006.
- [3] Brown, D. E. and Hagen S, "Data association methods with applications to law enforcement" *Decision Support Systems*, 34, 369–378, 2002.
- [4] Xue, Y. and Brown, E. D, "Decision model for spatial site selection by criminals: A foundation for law enforcement decision support" *IEEE Transactions on Systems, Man, and Cybernetics – Part C: Applications and Reviews*, 33, 78–85, 2003.
- [5] Sheng-Tun Li, S.-C.K., Fu-Ching Tsai, "An intelligent decision-support model using FSOM and rule extraction for crime prevention". p. 7108–7119, 2010
- [6] Anna L Buczak and Christopher M Gifford . "Fuzzy association rule mining for community crime pattern discovery"
- [7] H.K.Bhargava, D.J.P., S.Daewon, "Progress in Web-Based Decision Support technologies". *Decision Support Systems*, (43): p. 1083-1095, 2007
- [8] F.G.Filip, "Decision support and control for large-scale complex systems". *Annual Reviews in Control*. 32(1): p. 61-70, 2008
- [9] S.Alter, "A Work System View of DSS in its Fourth Decade, in Eighth Americas Conference on Information Systems". 2002. p. 150-156.

# AN ECONOMETRIC ANALYSIS OF PUBLIC DEBT IN ALBANIA

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## ABSTRACT

*Despite the global economic crisis, our country managed to maintain a stable level of economic growth, but the high level of public debt, with an increasing trend over the last three years, is seen as very disturbing on many domestic and foreign economists. In this paper will be analyzed the public debt and economic growth. It is used unitary root test to study the series stationarity and the Granger causality test to detect links between them. With the help of econometric methods it is built for Albania, the economic growth model depending on public debt. Granger theorem shows that the negative impact of public debt on economic growth that exists in periods.*

**Keywords: Growth, Public Debt, Granger, Modeling.**

## I. INTRODUCTION

This study aims at establishing a relationship between sustainability and management of public debt, both very important issues currently, and very strategic components of public policies of a country. The aim is to analyze the relationship between public debt and some macroeconomic variables, using econometric modeling techniques. A deeper analysis takes place between public debt as a quote of GDP (%) and economic growth as a quote of GDP (%), by applying econometric models. The results of the current research emphasize the role of debt management in achieving its sustainability and also prove that the link between economic growth and public debt is inversely and moderately strong, according to the results obtained after the application of an one factorial econometric model.

There are few empirical studies that demonstrate that public external debt and its structure can influence the reduction of public debt stability. In a very similar form other researchers have shown that, according to the debt structure, after the maturity date, a very high volume of short-term debt can generate crises in countries that have constant need for liquidity.

As part of public policy, debt management is a process of stabilization and application of strategies used in the management of government debt, in the collection of necessary funds, in establishing a balance between cost and risk objectives and achieving any goal set by the government. Every government faces strategic choices relationated with: debt management objectives, risk border, part of the government's responsibilities to engage with public debt management, how to manage liabilities, (which can be transformed into financial obligations and if consistency, management and public debt policies materialize in guarantees for loans in foreign currency) and provide a stable governance for public debt management.

Also, for a good management of public debt, oriented to ensure fiscal sustainability in the longer term, there should be a legal and institutional basis sustainable.

Different authors have determined different definitions for the sustainability of public debt. According to their sustainability has to do with stability and optimal level of public debt.

The importance and the impact of the sustainability of public debt policy and fiscal policy constitutes an important aspect of a country politics, with impact and repercussions even in the region so it was thought necessary the intervention of the International Monetary Fond. They identified the procedures for investigating the sustainability of public debt to not exceeding a level designated by each state.

Many empirical studies show that the public external debt and its structure can affect the reduction of debt sustainability. Depending on the structure of the debt after its maturity, a high level of debt in the short term may lead to crises in countries with frequent need for liquidity. Public debt management as part of the government's public politics is the process of establishing and proceedings management strategies of government debt, the collection of necessary funds and to regulate the balance between costs and undertaken risk. Every government faces strategic decisions such as management of public debt, the allowing level of market risk, how to manage liabilities, etc. Also a suitable management of public debt oriented towards ensuring fiscal sustainability in the short term requires the support of an effective legal and institutional basis.

## **II. LITERATURE REVIEW**

To study the relationship between economic growth and public debt many authors have given their contributions to various empirical analysis. Some have found that high levels of public debt have a negative effect on economic growth in developing countries (Pattillo et al., 2002; Pattillo et. Al., 2004; Schclarek, 2004; Kumar and Woo, 2010). thus, Pattillo et al. (2002) analyzed 93 developing countries for the period 1969-1998, building panel models with fixed effects, and concluded that external debt had a negative impact on economic growth in the value of debt over 35-40 per cent of GDP (Pattillo et al, 2002). Later was confirmed that between these two indicators there was a non-linear relationship, in the form of Laffer curve (Reinhart et al, 2012).

Later, in another study, Pattillo et al. (2004) tested again non-linear effects of debt on economic growth considering a larger number of developing countries (61) for the same period (1969-1998).

Also, Alfredo Schclarek (2004) found in his study that there was a linear negative impact of external debt on economic growth, after studying 59 developing countries and 24 industrial countries for the period 1970-2002. He used GMM methodology applied on panel data. The conclusion was that the effect of external debt on economic growth comes mainly from the effect on the accumulation of physical capital, and does not provide arguments why private external debt had not resulted in a statistically significant effect on economic growth.

In their study about the impact of public debt on economic growth in the long term, Kumar and Woo (2010) were based on an analysis panel of 38 developed countries and developing countries over a period of four decades (1970-2010). To achieve their goal they tested the model for: linearity, and differences between developed countries and developing countries and confirmed a negative non- linear relationship between initial level of public debt and economic growth.

Another author, Patrizio Laine (2011) studied the dynamic relationship of public debt and economic growth in the United States of America (USA) for the period 1959-2010. He used SVAR methodology, the Granger test, the impulses of response, VECM etc. It was concluded that public debt had a positive effect on economic growth in the short term, and a negative effect in the long term, and it is quite difficult to have economic growth if we have a total debt reduction.

### III. EMPIRICAL ANALYSIS

#### 3.1 The Data

As data sources to judge the performance of growth factors have served publications of INSTAT, BoA, IMF, WB, EUROSTAT, the Ministry of Economy, Trade and Energy, Ministry of Finance and Open Data Albania. The methodology used is based on econometric analysis of the regression on the time series, which consider a structural fracture data. Also is applied Granger causality test to detect the direction of causality between the two variables. Two series used are real public debt and real economic growth, where the data are annual, measured in percentage, and cover the period 1990-2013.

The following table presented trend of debt and economic growth in Albania for the years 2000-2013.

	<b>Total Debt / GDP</b>	<b>The stock of domestic debt / GDP</b>	<b>The Stock of External Debt / GDP</b>	<b>Real economic growth</b>
<b>2000</b>	60.73%	42.85%	17.88%	6.62
<b>2001</b>	58.54%	41.34%	17.20%	7.94
<b>2002</b>	62.84%	41.87%	20.97%	4.23
<b>2003</b>	58.82%	40.45%	18.37%	5.74
<b>2004</b>	56.45%	39.31%	17.15%	5.67
<b>2005</b>	57.43%	40.18%	17.26%	5.76
<b>2006</b>	56.07%	39.55%	16.52%	5.43
<b>2007</b>	53.42%	38.19%	15.23%	5.9
<b>2008</b>	54.75%	36.80%	17.95%	7.5
<b>2009</b>	59.67%	36.29%	23.38%	3.3
<b>2010</b>	58.51%	33.32%	25.19%	3.8
<b>2011</b>	60.24%	34.20%	26.04%	3.1
<b>2012</b>	62.44%	35.47%	26.97%	1.3
<b>2013</b>	65.15%	38.35%	26.80%	0.7

Source: Ministria e finances 2014

**Table1: The Ratio Between Public Debt As A Percentage Of GDP And Economic Growth**

The level of debt stock versus GDP in the recent years has increased significantly by passing 65% in 2013, in these years is maintained the pace of external debt stock and has obviously increased the level of domestic debt stock. This growth has come as a result of debt taken in the second tier banks in the country, but should not be forgotten the debt on different companies that have outstanding work. In 2014 the level of public debt is even higher than before. Except borrowing to support the budget and foreign projects this year in debt growth has influenced the inclusion of payment of arrears of 35 billion lek, arrears in the infrastructure sector and the tax sector. Albania's public debt at 60 percent of GDP is one of the highest in Southeast Europe (SEE) and fiscal buffers are mainly consumed "(IMF).

### 3.2 The study of Stationarity Unit root test

Variables which are time series are generally variables which have a certain trend towards they are not stationary and must be returned in such using differences. A useful way of determining the order of differentiations is the use of criteria for the existence of unitary root for the series under study, the public debt and growth. The order of differentiations will be determined by the number of the unitary roots.

We will use the DF test assuming that the remains were not correlated between them. If such a thing happens we use the generalized Dickey-Fuller test ADF(g), which is an asymptotic test to show us the existence of unitary roots.

Referring to the model:

$$DDTR_t = b_1 + b_2t + \delta DTR_{t-1} + \sum_{i=1}^p g_i DDTR_{t-i} + u_t$$

Construct hypotheses:

$$H_0 : \delta = 0 \text{ ( variable has a unit root or the time series is not stationary )}$$

$$H_1 : \delta < 0 \text{ (the time series is stationary)}$$

If the student statistics values are greater than the critical value, then the basic hypothesis not reject.

ADF test results for the series Public debt and growth given in the table below:

Null Hypothesis	t-Statistic	Prob.*
Growth has a unit root	0.886781	0.9932
D(Growth) has a unit root	-5.636833	0.0002

**Table 2 Unit Root Test for Growth Time Series. Author's Calculations**

Null Hypothesis	t-Statistic	Prob.*
Public debt has a unit root	2.632425	0.9999
D(Public debt) has a unit root	-6.745974	0.0000

**Table 3 Unit root test for Public debt time series. Author's calculations**

Based on the values of Prob presented in the third column of tables 2 and 3, it is known that if the p value is less than the level of importance of basic hypothesis reject. If we look at the values in the tables above is confirmed that the two series are non stationary and a return to such differences, so are I (1).

### 3.3 Granger Casuality Test

In economic analysis a problem that occurs frequently is the definition of the cause variable and determination of the result variable. This type of problem is analyzed by Granger theory which is based on the VAR (p) models.

To test whether an economic indicator cause another, it is used the teh standard Granger test of casuality(Granger, 1988), which tries to determine how past values of a variable assist in predicting another variable changes. Allegedly, P.debt variable is Granger consequence of Growth variable, if the Growth variable helps in predicting the value of the P.debt variable. Zero hypothesis tested in this test are: first Growth variable does not cause as Granger the P.debt variable and the second P.debt variable does not cause as Ganger the Growth variable. Fischer statistics helps us to perform testing in this case.

The test results are presented in the table below:

Null Hypothesis:	Obs	F-Statistic	Prob.
P. debt does not Granger Cause Growth		7.16518	0.0149
Growth does not Granger Cause P. debt		0.03044	0.8633

**Table 4 Result of Granger Casualty Test Author's Calculations**

The test results show that the Public Debt variable affects economic growth. Even in reality public debt is one of the variables that had a significant impact on economic growth of our country.

### 3.4 Econometrics Model

Relying on economic theories and empirical analysis that we have carried out in the previous paragraphs we will build the general model:

$$\text{Growth} = F(\text{INF}, \text{P.debt})$$

So economic growth is seen depending on P. debt and the inflation variable as a indicator of the country's economic stability.

The selected model is:

$$\text{Growth} = c_0 + c_1 \text{INF} + c_2 \text{P.debt} + u_t$$

The initial model estimated was suffering from autocorrelation, so it was realised its elimination and the Improved model is presented in the table below:

Dependent Variable: D(Growth)				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.120342	0.038176	3.15230	0.0006
INF	0.023178	0.006416	3.612443	0.0005
D(BPP)	-10.79658	3.366131	-3.207416	0.0019
resid(-1)	0.740250	0.104548	7.080452	0.0000
resid(-2)	-0.241409	0.103729	-2.327294	0.0223
R-squared	0.505074	Mean dependent var		0.463551
Adjusted R-squared	0.482054	S.D. dependent var		3.099410
Log likelihood	-199.5586	Hannan-Quinn criter.		4.551452
F-statistic	21.94082	Durbin-Watson stat		2.113731
Prob(F-statistic)	0.000000			

**Table 5 The Estimated Model Author's Calculations**

In short periods P.debt affects negatively in the economic growth in Albania, while inflation has a positive influence on economic growth. The built model is statistically significant so even his partial coefficients are

important. It does not appear problems like different variance of residue or correlation between independent variables, while the problem displayed in the initial model of autocorrelation was eliminated.

To analyze whether this relationship stays even in long term we are using Granger method. According to this theorem, if two variables cointegrated between them then it appears on their ECM.

Based on ECM model is:

$$Dy_t = c_0 + c_1 Dx_t - \tau (u_{t-1}) + e_t$$

Where  $\tau$  is the coefficient of error correction, which is theoretically expected to have a negative value and this value indicates the degree of response to return to equilibrium. Error correction term  $u_{t-1}$ , are  $(y_{t-1} - x_{t-1})$ , in fact are the remains of regression between the two variables that should cointegrated.

Granger test results shown in the table below:

Null hypothesis: Series are not cointegrated				
Cointegrating equation deterministics: C @TREND				
Automatic lags specification based on Schwarz criterion (maxlag=11)				
Dependent	tau-statistic	Prob.*	z-statistic	Prob.*
Growth	-3.407368	0.1420	-78.62762	0.0000
P.Debt	-2.294489	0.6404	-25.09141	0.0489

**Table 6 Result Of Granger Test. Author's Calculations**

Results indicate that the connection between them is not viable in the long term. In the economic growth affect too the level of foreign direct investments. Likewise ruling government policies are more restrictive in order to stabilize debt levels and promoting new investment, the fight against informality etc.

#### IV. CONCLUSIONS

This study emphasized the importance of debt management in ensuring its sustainability. Using statistical and econometric methods, was proved the relationship between economic growth and public debt reaching the conclusion that this relationship is indirect and with a strong intensity, as a result of the values obtained from the application of the one factorial economic model. Time series are not stationary and Granger causality test shows that the link is unilateral and casual and the increase of the public debt affects negatively in the economic growth and this relationship according to Granger theorem has not effect in the long term. Government policies are those that affect not increasing debt levels, but on the other hand the level of debt passed 60% consequently the economy is in contraction phase consequently we have no economic growth of the country. A very high volume of short-term debt can cause a series of crises in developing countries, and in countries in need of permanent liquidity. This study suggests that when the economy is weak, the safer policy to face the debt is to stimulate growth and retain the debt level within the required parameters.

#### LITERATURE

- [1] Albu, L. L., Pelinescu, E.( 2002), ''Sustenabilitatea Datoriei Externe, Cerope'', study 35.

- [2] Bohn, H. (1998), "The behavior of US public debt and deficits", *The Quarterly Journal of Economics*, August /
- [3] Blanchard, O., Chouraqui, J.C., Hagemann, P.R. and Sartor, N. (1990), "The Sustainability of Fiscal Policy New Answers to old Questions", *OE D Economic Studies No. 15 Autumn 1990*
- [4] Buiter, W.W. (1985), "A Guide to Public Sector Debt and Deficits, *Economic Policy*", No.1, November, pp.13,79
- [5] Sustainability, Management and Policy of Public Debt [5] Campeanu, E., Soian, A., Miricescu, E. si Gyorgy, A. (2009), "Sustenabilitatea politicii de indatorare a Romaniei in contextul economic actual", Editura ASE, Bucuresti
- [6] Detragiache, E., Spilimbergo, A. (2001), "Crises and Liquidity - Evidence and Interpretation", *IMF Working Papers 01/2*, International Monetary Fund
- [7] Domar, Evsey D. (1944), "The Burden of the Debt and the National Income", *American Economic Review*, Vol.34, No.4, December, pp. 798,827
- [8] Eichengreen, B. Hausmann, R. Panizza, U. (2003), "Currency Mismatches, Debt Intolerance and Original Sin: Why They Are Not the Same and Why it Matters", *NBER Working Paper no. 10036*
- [9] Fondul Monetar International si Banca Mondiala (2003), "Debt Sustainability In Low- Income Countries – Towards A Forward – Looking Strategy", *Working Paper*, May
- [10] Fondul Monetar International (2002), "Assessing Sustainability", *Working Paper*, May
- [11] International Monetary Fund and World Bank (2003), "Guidelines for Public Debt Management: Accompanying document and selected case studies"
- [12] International Monetary Fund and World Bank (2001), "Guidelines for Public Debt Management", 21 march
- [13] Gherghina, R., Postole, M. A., Duca, I., and Văduva, F. (2010), "Public Debt Management – Public Policy Component", *Universitatea "TIBISCUS", Annals. Economic Science Series*, Vol. XVI
- [14] Keynes, J. (1923), "A Tract on Monetary Reform", in *The Collected Writings of John Maynard Keynes vol. IV*, Macmillan, 1971, pp.23
- [15] Missale, A. and F. Giavazzi (2004), "Public Debt Management in Brazil," *NBER Working Paper 10 94*.
- [16] Zee, H. H. (1987), "On the Sustainability and Optimality of Government Debt", *IMF Working Paper WP/8 /8*, December

# ANDROID CONTROLLED HUMAN ASSISTANCE ROBOT USING SPEECH FOR HUMAN ROBOT INTERACTION

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## ABSTRACT

*The paper deals with the research related to the robot development for the aged people of the society. The robotic guide will be maneuvered using a smart phone. The user will be sending the instructions via an android application that has been developed. Voice commands can also be sent from the android application to the robot which will be received through Bluetooth and finally will lead to the control of the robotic guide. The map of the route will be fed into the robot so that it can take the user to the target destination detecting and avoiding all the obstacles that might be there in the path of movement. The entire project is developed in a way so that the compatibility constraints can be met with all types of smart equipment or a like a smart phone, a tablet or a laptop etc. that is capable of supporting an android operating system.*

**Keywords:** *Android, Bluetooth, route map, google voice to text, Speech Recognition, BOEbot, RFID etc.*

## I. INTRODUCTION

Presently most of the nations are rapidly entering into the aging population which leads to a huge part of the population to suffer from the limitations related to motion and mobility or the inefficiencies related to limb movement due to the lack of physical strength or nerve related issues. In addition to it, the augmenting aged society population creates deficiencies for activities related to assistance and nursing. Hence there is an urgent need to develop assistance guides that can replace nurses and therapists up to a partial level. At present a lot of researchers are working on assistance related to robotics are being done which focusses on numerous applications related to the fore limbs, hind limbs and the training related to assistance robotics for the entire human body. At present mobility or locomotion is one of the primary human activities, for the improvement of which the walker type robotic devices are used centering round rehabilitation goals. The study and development of such type of robots has now been dominating the field of human robot interaction research. Currently various walker robots that are intelligent in nature are being implemented which have efficient and intelligent

framework that comprises of active or passive wheels. Moreover certain robotic guides assists human with ambulatory services as well which enables the potential users to have satisfactory services in a cost effective manner. In addition to it, various researches are going on where the primary focus is with the working of passive robots dealing with the deployment of intelligent walkers that would act as an aid to the aged section of the society. However the present scenario in the ongoing researches comes with numerous loopholes and deficiencies primarily due to the following reasons:

- A wide range of these type of walker robotic devices are predominately designed for mobility in indoor environment when the maneuverability is limited due to the limitations of the spaces in indoor domains.
- Most of the environmental spaces that are encountered while movement consists of narrow spaces which comes in way as a hurdle for these type of robots because of its enormous size and unrestricted weight.

Therefore in order to help the aged people to take a walk outside enabling them to lead a high quality life and accelerate rehabilitation sufficient support in the form of concise, easy compatible and simpler handling devices are required. In order to fulfill this requirement an easier handling robot guide is developed to help the physically handicapped people to reach a particular destination avoiding all the obstacles that might come on its way. The design and construction of the robot will comprise of a BOEbot which has a Board Of Education embedded in it and is a proprietary of Parallax Inc. This BOEbot will be controlled by the user by the aid of an android application having four prominent keys for movement in the forward backward, left and right directions through which the robot will easily be able to navigate in these four directions and can finally reach the target location. The robot can also be controlled using voice commands where similar voice instructions will make the BOEbot move in this four directions apart from being able to reach a pre specified target location which are marked as LAB1 and LAB2 for experimental purpose. The voice commands will be sent over to the robots chassis using Bluetooth and thus making its control a wireless affair. The BOEbot is explicitly chosen as it counters the above mentioned deficiencies due to its miniature size and light weight which can traverse in any path irrespective of the path dimensions thus aiding the user to move to a particular destination and direction by efficiently relocating itself in any type of indoor and outdoor environment. The language used for coding involves BASIC STAMP 2.5 which can be done in an editor. The language is extremely simple to decipher and implement and can easily be executed by any naïve programmer who wishes to create efficient codes in this platform. The speech recognition process involves google voice to text principles to recognize the commands and then finally converting them into symbols or instructions that are easily passed on to the BOEbot via Bluetooth. Since an android application is used in its design, it is compatible with all types of modern devices that can support an android operating systems which is a part of human day to days lives and can be easily be used by any new user without any prior training or guidance thus making the entire operation an extremely simplistic process.

## II. LITERATURE SURVEY AND BACKGROUND

The field of designing, understanding and evaluation of robotic systems for the use of mankind is termed as Human robot Interaction. While doing so there is a mode of communication developed between the human and the robots, the communication of which can be primarily classified into the following 2 main categories.

- A. Remote interaction — This interaction typically deals with the communication between humans and robots that are not location in the same place or time zone. Eg: various robots that are deployed in other planets for study based purpose like Mars Rovers etc.
- B. Proximate interaction — this mode deals with the interaction between humans and robots that are collocated. For example the various service robots or the assistive robots are generally located within the same timeframe and space. Based on the social interaction, tele operation or supervisory control the interaction can be classified as remote operations. Generally proximate interactions are in the form of physical interactions and can be categorized into robotic assistants which involves social interactions in the form of peers and companions

There are several researches that have been going on in the existing domain. O. Khatib et al., [1] have studied on the development of algorithms, models and strategies that are focused with various autonomous capabilities that are essential for the robot operations in human environments. These researches are related to the manipulation and integrated mobility, interaction efficiency with the humans and cooperative skills between multiple robots. Hyun Keun Park et al. [4] developed a robot system named DO-U-MI to be used for nursing for The Elderly and The Disabled. The robot thus developed will help the old and handicapped people to move freely in the indoor environment primarily focusing on moving inside a nursing home. The project is extremely user friendly, However a minor limitation in case of manual control and lack of speech recognition comes into picture in this scenario. A major significant research work done by R. Rangarajan et al. [5], leads to the development and deployment of a speech controlled assistance robotic guide for the visually impaired so that it can aid the aged people as well as the blind people to reach the target location avoiding the various types of traffic and hindrances on the pathway. The robot can also charge on its own and can behave as a watchdog thereby proving an efficient mechanism for human robot interaction. Similar work has been done by Arpit Sharma et al. [7] and they have developed a robot which is arduino based and this robot can be controlled via an android phone wherein an android application has been developed in order to control the maneuverability of the robot. Related works are also being done in the field of automated mobility issues and orientation for the visually impaired people by Abdel Ilah Nour Alshbatat [8], which involves the implementation of GSM-GPS module to pin point the location of the individual as well as to provide any type of information that is related to the obstacles that are obtained from the ultrasonic sensors. However the system depend on braille learning for its operation due to which it might be problem for its use as the individuals need to be trained exclusively. However results have shown that the blind people can smoothly travel to their respective destinations with ease and comfort. A smart vision prototype for navigation has been developed by Joao Jose et al.[9] which comes in wearable form and is concise in shape and size. Efficient Human Robot Interaction is achieved wherein dynamic obstacles are being avoided and the main functionality involve a camera to be worn at the height of the chest and is connected to a laptop that is worn in a bag pack or a pouch. It also consists of a speaker into which the user can speak into so that effective interaction with the machine is obtained. Similarly Brice Burger et al. [10] studied on multimodal interaction between the human and robots specifically focusing on mutual assistance between speech and vision.

A speech processing system was developed that detects the anaphoric and deictic utterances in speech forms. Life has become easier for the aged society with the various inventions and developments in the Human Robot Interaction field. Cumbersome activities like shopping etc. are also being dealt with in this research area wherein Chaitanya Gharpure et al. [11] developed mechanisms for enabling the blind people to move around for shopping experiences. This research has revealed several issues related to spatial cognition and product selection in supermarkets. Additionally, Songmin Jia et al. worked on multiple user interfaces which has been deployed to enhance and improve quality of life, care and cost. Here an extensive use for the Radio Frequency Identification tags are being done which is easily detected by a camera and thus enables the user to avoid the obstacles. In a similar process Iwan Ulrich et al., [13], developed a Guide cane which could assist the elderly people to move about avoiding the obstacles as robotic technologies could be implemented by the device. However speech recognition and dynamic obstacles still are a limitation to this work.

### **III RESEARCH GAPS**

The numerous researches executed in this field involved a huge number of loopholes predominately the following:

#### **A. Portability**

The current researches comprises of enormous equipment especially laptops and other accessories that needs to be carried around for an efficient rehabilitation. The robot that has been developed is small in size and is controlled via an android phone and hence need not be carried around. Moreover since it is developed in an android platform it can be mounted on any smart device that can be carried around in a pocket or palm.

#### **B. Lack of Speech Recognition system**

Most of the robots that are being developed lacks the speech recognition system thereby making it a very complex process of controlling the guide and involves rigorous amount of training and guidance to perform simple operations. However in the developed project the Speech recognition system that has been integrated comprises of google voice to text system which makes the entire system to integrate with the cloud thereby deriving information from the cloud database as a whole and makes the entire system a cloud based robotics framework.

#### **C. Limitations related to Route Decision System**

At present the available systems lack the decision making procedures due to the loopholes related to path related attributes due to which the robot is unable to reach the pre specified target location. This project involves a suitable path definition system where the robot can chose a path efficiently and the assigned path will efficiently make the robot reach a particular target location at the earliest possible time limit without any collision with any of the obstacles on the way.

#### **D. Complex Operation mechanisms**

The mode of operations in the existing system involves a lot of complex mechanisms for its smooth functionality which involves a large number of Radio Frequency Identification tags and sensors thereby making the framework very complicated and difficult to understand and utilize.

### **E. Presence of Dynamic obstacles on the path**

Generally fast moving vehicles, humans and animals may come in the path thereby creating dynamic obstacles on the way which are sudden occurrences and are difficult to control. The study of the limitations related to the present work reveals the need for a robotic guide which is simple in architecture and operations and leads the user to the specified target location without colliding with any of the obstacles on the way. The robot should be built in such a way that it doesn't require any prior training for its smooth operation and can be easily operated using voice commands.

## **IV METHODOLOGY**

### **A. Module 1: BOEbot controlled by Android application**

Initially the development process involves the design of an Android application which consists of four different keys to control and maneuver the BOEbot in four different directions namely 'left', 'right', 'forward' and 'backward'. The android app thus developed will be connected with a BOEbot via the Bluetooth module primarily a Easy Blue 500 Bluetooth module developed by Parallax Inc. The application is developed in such a way that it can maneuver the robot in the above mentioned four directions and it will continue to move in the direction in which the key is pressed. Moreover the additional keys that are named as 'LAB1', 'LAB2' and 'ROUND' will make the robot move to a pre specified target location without colliding with any of the obstacles on its way. The instructions are transmitted from the android application to the BOEbot via a Bluetooth module. The instructions thus received are then processed by a microcontroller embedded in the BOEbot's chassis for the desirable direction of motion.

### **B. Module 2: BOEbot controlled by Speech Recognition**

The next module involves integration of the speech recognition module along with the initial module so that the robot can be controlled by sending voice commands. For this purpose the most simplistic and easily available google API has been used which is known as Google Voice to Text. With this tool certain voice commands are given into the application which then connects to the cloud database to retrieve the text equivalent information. The converted text from the voice inputs are then again converted to numerical instructions and are passed on to the robot via Bluetooth and are processed for further actions to be taken. This module too performs equivalent operations as compared to the initial module. However the only difference which lies with both the modules is that the second module can easily communicate using the voice commands and thereby reduces the manual activity to a great extent.

**C. System Architecture: The complete system architecture of the framework is shown in Fig 1.**

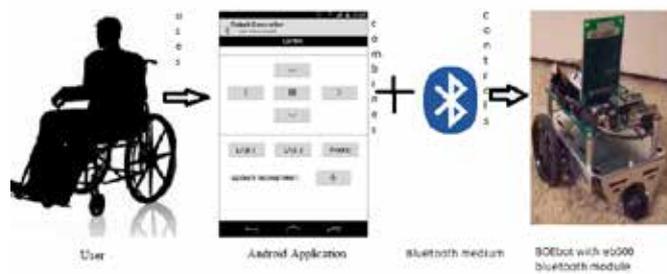


Fig 1: System Architecture

**V REQUIREMENT SPECIFICATION(HARDWARE AND SOFTWARE)**

The hardware and software requirements of the entire project is given below

**A. Software framework**

- Eclipse IDE-Juno (Java Developers version) with the Android plugin.
- The Java Development Kit (JDK)
- Android SDK and add-ons
- Basic Stamp 2( Parallax Inc).

**B. Hardware Requirements**

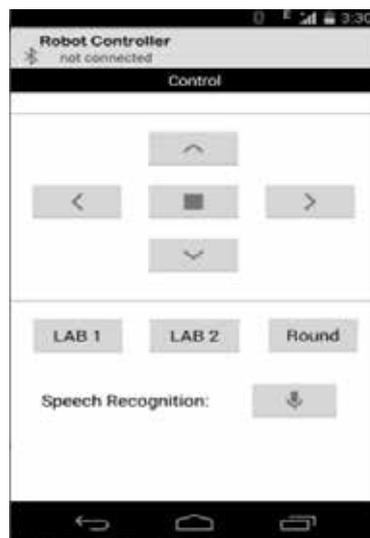
- RAM 3 Gb and above(as android applications require high end processing)
- BOEbot (Parallax Inc) robot.
- EasyBlue 500 SER which represents the Bluetooth module
- Any type of smart phone or a tablet which can support an android operating system.

The primary development phase requires a mobile phone with an android operating system mounted on as the initial hardware component. Due to its platform independent nature and open architecture it is widely used by the software developers in addition to the provision of various communication devices like Bluetooth, USB, WiFi etc. which can enhance the cost effectiveness as compared to any ARM based processing unit. The robot's brain constitutes of a Basic Stamp microcontroller where the program can simply be fed into from the basic stamp editor. It is low in cost and easily available. For Bluetooth communication the Easy Blue 500 SER Bluetooth module developed by Parallax Inc. is used which looks like figure 2 a shown below. This Bluetooth module is then configured with the BOEbot robot (shown below) and is used for communication with the android application.



**Fig 2: EasyBlue 500 SER module and a BOEbot**

Java programming language along with Android SDK and add-ons are used for the development of the android application. The application development involves Eclipse IDE and Java Development Kit (JDK) and Basic Stamp 2-2.5 is used to write into it. The android application looks like Fig 3 that is shown below:



**Fig 3: Android Application**

The four different keys will make the robot move in four different directions with involves left, right, front and backwards. The three keys that are present in the lower panel represents the functionality that involves the robot to maneuver to 2 particular target location for experimental purpose and then a take a round trip from the destination points. The Google voice to text API is used and is used for the recognition of voice commands thereby creating an interface as to where the user will speak and retrieve the voice commands in the form of text or strings which are then finally processed and sent to the target BOEbot's microcontroller to derive the necessary actions. This application can be supported in all the android operated devices.

## **VI DESIGN**

The overall design strategy of the project is divided into 2 parts:

1. Wired communication or Initial System design.
2. Wireless communication or Final System design.

### A. Wired Communication design.



Fig 4: Wired Communication design

The initial system design comprises of the BOEbot robot to be connected to a laptop via a USB cable and the program thus used to maneuver the robot is simply dumped into the microcontroller of the robot through the wired medium. The android application will be sending the keystrokes via the wireless medium i.e. the Bluetooth module that is being mounted on the robot will make the microcontroller receive the instructions.

### B. Wireless communication design.



Fig 5: Wireless communication design

The final system design comprises of wireless communication from both the end i.e. application will communicate with the BOEbot via Bluetooth medium and the voice commands can be transferred from the android application to the BOEbot using Bluetooth and thus the robot can be controlled wirelessly efficiently performing all the functionalities.

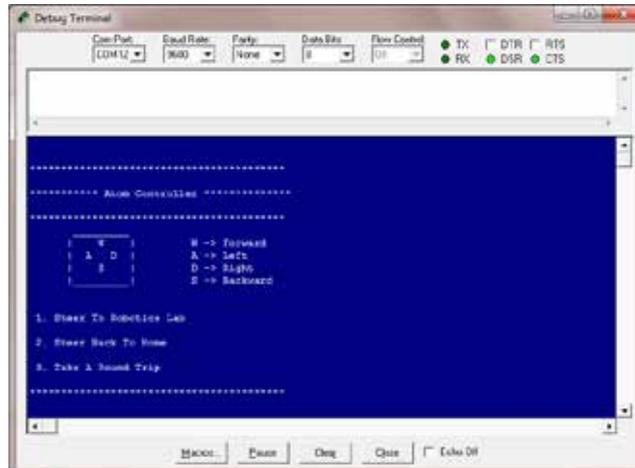
## VII ACHIEVED GOAL

The following are the primary functionalities that are executed by the developed project from the laptop terminal thus directing the robot to move in any particular direction.

1. Forward, Backward, Left, Right with the help of the four keys. Of the keyboard W,A,S and D respectively.
2. Steer to Lab 1 using 1 key
3. Steer to Lab 2 using 2 key
4. Steer to Home using 3 key
5. Make a round trip using the 4 key.

The left, right, forward, backward keys will make the robot move to the respective directions till the key is continuously pressed. The Steer to Lab 1 and Steer to Lab 2 functionalities will be accomplished when the robot will move 22 seconds forward and then take a left turn or a right turn depending on LAB1 and LAB2

respectively. These type of similar functionalities are also attained using the android application. However an additional benefit to it comes in the process when speech recognition was integrated with the current application and BOEbot can be controlled wirelessly through the android application on any android device by simply sending voice commands into the console. The app is capable of recognizing all of the above instructions and can perform similar functionalities with lesser amount of effort and manpower involved.



**Fig 4: Laptop Implementation window which enable the BOEbot to be controlled via keyboard in a wired communication.**

## VIII CONCLUSION

This project would serve as a boon to Human Robot Interaction domain and can assist the aged society and the partially visually impaired category of people to a great extent. Locomotion and mobility becomes a simple affair in the presence of such type of assistive guides which involves minimum amount of effort in addition to keeping pace with the latest technology. The application greatly reduces manual effort and no prior training is required to use this equipment. It will prove much more user friendly to the blind people as it can be controlled by voice commands and no prior knowledge about braille is required to efficiently use this application. The application is built using the latest technology and hence it is compatible with any type of devices that can support an android operating system proving it to be a blessing in technology to make life simpler.

## REFERENCES

- [1] O. Khatib, K. Yokoi, O. Brock, K. Chang, and A. Casal, Robotics Laboratory, Department of Computer Science Stanford University, Stanford, California, Robots in Human Environments, [Available online: [www.redaktion.tu-berlin.de](http://www.redaktion.tu-berlin.de)], Last Access: October 2014].
- [2] How Bluetooth Technology Works, [Available online: [www.bluetooth.com/bluetooth/technology/works](http://www.bluetooth.com/bluetooth/technology/works)], Last Access: October 2014].
- [3] Vladimir Kulyukin, Chaitanya Gharpure Nathan De Graw, Computer Science Department Utah State University Logan. Human-Robot Interaction in a Robotic Guide for the Visually Impaired, [Available online: [www.aaai.org](http://www.aaai.org) (American Association for Artificial Intelligence). Last Access: October 2014].

- [4] Hyun Keun Park, Hyun Seok Hong, Han Jo Kwon, and Myung Jin Chung, Department of Electrical Engineering & Computer Science Korea Advanced Institute of Science and Technology, A Nursing Robot System for The Elderly and The Disabled, [Available online: <http://www.pdx.edu> , Last Access: September 2014].
- [5] R.Rangarajan, Mrs.B.Benslija M.E., Sri Muthukumaran Institute of Technology Chennai, Tamil Nadu, India, Voice Recognition Robotic Dog Guides For Visually Impaired People, IOSR Journal of Electronics and Communication Engineering (IOSR-JECE) e-ISSN: 2278-2834,p- ISSN: 2278-8735.Volume 9, Issue 2, PP 133-139, Ver. V ,Mar - Apr. 2014.
- [6] M. Joshuva Regan, S.R.Barkunan, Anna University Regional Centre, Coimbatore, India, Voice Recognition Robot for Visually Impaired People, International Journal of Innovative Research in Computer and Communication Engineering, ISSN(Online): 2320-9801, Vol.2, Special Issue 1, March 2014.
- [7] Arpit Sharma, Reetesh Verma, Saurabh Gupta and Sukhdeep Kaur Bhatia, Android Phone Controlled Robot Using Bluetooth, International Journal of Electronic and Electrical Engineering.ISSN 0974-2174, Volume 7, Number 5 (2014), pp. 443-448,2014.
- [8] Abdel Ilah Nour Alshbatat, Department of Electrical Engineering , Tafila Technical University, Tafila 66110, Jordan, Automated Mobility and Orientation System for Blind or Partially Sighted People, International Journal On Smart Sensing And Intelligent Systems, Vol. 6, no. 2, ISSN-11885608, April 2013.
- [9] Joao Jose, Miguel Farrajota, João M.F. Rodrigues, J.M. Hans du Buf, Vision Laboratory, Institute for Systems and Robotics (ISR), University of the Algarve (FCT and ISE), Faro, Portugal, The Smart Vision local Navigation Aid for Blind and Visually Impaired Persons, International Journal of Digital Content Technology and its Applications Vol.5 No.5, May 2011, May 2011.
- [10] Brice Burger, Frederic Lerasle, Isabelle Ferran, Aurelie Clodic, University de Toulouse, France, Mutual assistance between speech and vision for human-robot interaction, Intelligent Robots and Systems, 2008. IROS 2008. IEEE/RSJ International Conference on Sept, 22-26, pp- 4011 - 4016 ,ISBN: 978-1-4244-2057-5 ,September 2008
- [11] Chaitanya Gharpure Vladimir Kulyukin, Utah State University Logan,, Robot-Assisted Shopping for the Blind: Issues in Spatial Cognition and Product Selection . Intelligent Service Robotics ,Springer-verlag 2008,e-ISSN: 1861-2776 ,p-ISSN: 1861-2784 , Volume 1, Issue 3, pp 237-251, July 2008.
- [12] Songmin Jia, Kunikatsu Takase University of Electro-Communications, Tokyo Japan, 2008, Development of Service Robot System With Multiple Human User Interface, Human Robot Interaction by Nilanjan Sarkar, ISBN 978-3-902613-13-4, September 2007
- [13] Iwan Ulrich and Johann Borenstein, Member, IEEE , The Guide Cane --Applying Mobile Robot Technologies to Assist the Visually Impaired ,Robotics & Automation Magazine, IEEE ,Volume:10 , Issue: 1 ,ISSN-1070-9932,pp:9-20, March 2003
- [14] O. Rogalla, M. Ehrenmann, R. Zöllner, R. Becher and R. Dillmann, Using Gesture and Speech Control for Commanding a Robot Assistant, Robot and Human Interactive Communication, 2002. Proceedings. 11th IEEE International Workshop on 2002, ISBN :0-7803-7545-9, 2002

# AN ANALYSIS ON MOBILE BANKING APPLICATION WITH RESPECT TO BOI'S STAR CONNECTS IN MIT SCHOOL OF MANAGEMENT PUNE

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## ABSTRACT

*Today's era is the era of Information technology, IT provide all the information on your figure tips and day by day on micro devices like cell phone, all the leading web application are now provide their application on cell phone even all the leading banks provide banking solution over cell phone but user may scare while using banking application most of the time because of security issue the researcher considered this issue and study the bank of India's mobile application Star Connect*

*The researcher takes sample size of 150 account holders with Bank of India's Star Connect was taken for the study and random sampling method was used. The paper is based on Exploratory Research. This research is both quantitative and qualitative. This research is based on the data collected through "Questionnaire" with M-Banking Users and Non-users.*

*The empirical findings of the study are useful for banks, service providers and policy makers.*

**Keywords: Star Connect, BOI, Security, Financial Transaction**

## I. INTRODUCTION

Mobile banking provides all the banking services on figure tips like balance enquiry, fund transfer, loan demand, account management etc through wireless network and a mobile application. Requirement of mobile application generates because the developer wants to synchronized data on cell phone of the user the synchronization required authentic way and that way is mobile app

These APPS can use to provide many features like balance enquiry, to check transaction history even transferring amount etc.

Although the mobile APPS banking is secure the user have certain myth's, like security, reliability, requirement of high speed network etc. because of those reasons the users are heisted to use this services.

In respect with this paper I make and attempt to check Bank of India's Mobile App with MIT College Campus kothrud users. MIT School of Management Campus has an Branch as well as ATM of Bank of India in premises still many users using mobile and internet banking to full fill their requirements.

## II. BANK OF INDIA ONLINE SERVICES

### 2.1 Star Connect Mobile Banking Services

Bank of India's StarConnect Mobile Banking Service, is a state of the art facility, which allows you to do virtually all your banking activities from your mobile device. With StarConnect Mobile Banking you can access all your banking accounts with the Bank, 24 hours a day, 365 days a year, from anywhere.

A host of features like your banking transaction details, viewing of Account Balance, Mini Statement, Statement, Self Transfers, Third Party Transfer of funds, Utility Bill payments, Ticket booking features among others will definitely make it the most convenient way for you to conduct your banking activities.

### 2.2 Review of Literature

This paper aims at filling that uses of Bank of India's Mobile Banking App with respect with security and user aspects.

With the rapid growth of mobile phones, the mobile services become a promise alternative for many sectors including banking sector. However, in comparison to the whole banking transactions, the market of mobile banking still remains very small especially that its usage is not reflecting on the adoption and usage of mobile banking

Internet banking and mobile banking are both electronic banking . However, they differ in the channels to be used in delivering the services to customers. Thus, customers using Internet banking are using computers that are connected to Internet, while customers using mobile

banking are using wireless devices to do transactions . Banks are constantly adopting technology to expand its business and to reach different level of customers. Apart from ATM, Internet banking and other technology enabled services Mobile Banking is one of the services provided by banks to its customers. Astonishing growth in telecommunication sector, its penetration including rural population and technology feasibility are the major factors for the introduction of Mobile banking services. Some banks in India are started providing the mobile banking service to their customers that include State Bank of India (SBI), Union Bank of India (UBI), Punjab National Bank (PNB), HDFC, ICICI, Axis Bank, etc

### 2.3 Objectives of the Study

- This study plans to study the acceptance of Bank of India's Star Connect Theprimary objective of this study is to:
- To study the acceptance of Bank of India's Star Connect services provided by various applications in one of the education society of Pune.
- To identify the factors affecting the Acceptance of M-Banking application in one of the education society of Pune.

### 2.4 Research Methodology

This study is based on both primary and secondary data sources. Primary data was collected through questionnaire of the m-banking users. This paper collectstatistical data regarding to m-banking applications.

### 2.5 Research Design

The data have been grouped into two main categories - primary and secondary data. The Secondary data have been compiled from newspaper, journals, magazines, and web linksand also research papers. The primary data have been collected through an exploratoryresearch –Questionnaire with user and non user of mobile banking.

**2.5 Primary Data**

The data for the research is extracted from a survey conducted in Pune, India. A Total of 150 respondents participated in the research of Mobile banking application. The demographic Profile of respondents in each research is shown in Table and

chart. The data collected through this method was adequate enough to make projections in the research.

**2.6 Secondary Data**

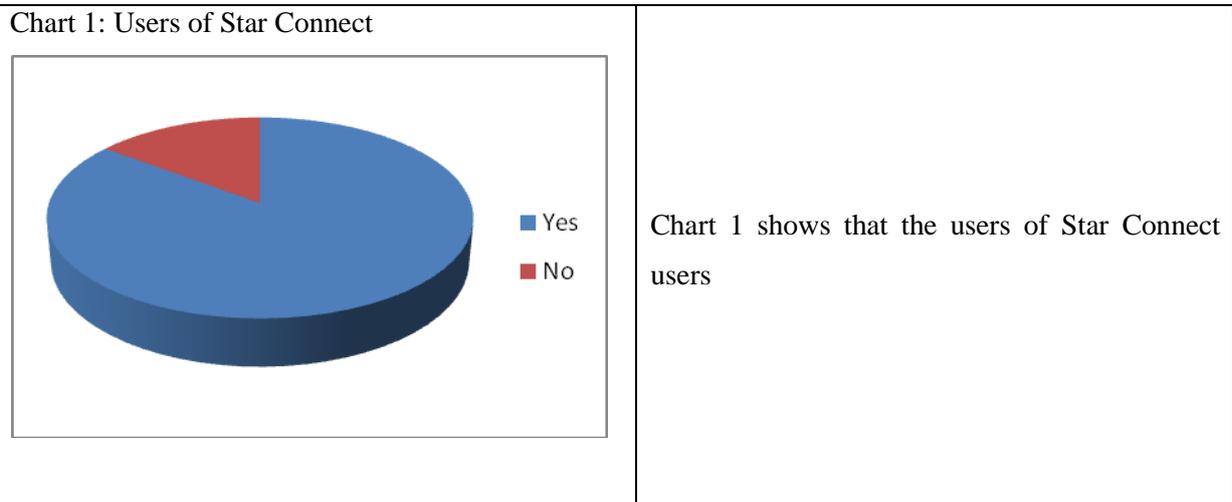
Articles have been sourced from magazines and journals dealing with mobile banking application. Internet & Research Methodology have been a major secondary source for the extraction of the expert’s opinion.

**2.7 Factors That Affect Mobile Banking APPS Adoption**

In order to identify the top and least five perceived items in affecting the acceptance of Mobile banking; the percentage score of the respondents was computed.

1. Security
2. Privacy
3. Cost
4. Usefulness
5. Accessibility

**III. RESULT**



**Analysis 1**

The question has been asked to user who did not use mobile banking app, the following chart shows percentage wise result of the question which found most relevant reasons for not using mobile banking APPS

Sr. No	Question	Strangely Disagree	Disagree	Neutral	Agree	Strongly Agree	No Response
1	My banking needs are being met without mobile banking	9	7	18	35	18	13

2	I'm concerned about the security of mobile banking	7	11	27	22	18	15
3	I don't trust the technology to properly process my banking transactions	0	7	45	13	9	27
4	The cost of data access on my wireless plan is too high	2	15	18	31	13	20
5	It is too difficult to see on my mobile phone's screen	0	0	49	9	0	42
6	It's difficult or time consuming to set up mobile banking	0	0	27	51	5	18
7	I don't have a banking account with which to use mobile banking	0	78	9	4	2	7
9	My bank charges a fee for using mobile banking	51	5	22	9	2	11

(\* Values are in percentage, No of Respondent 45)

Analysis 2 The question has been asked to user who use mobile banking app, the following chart shows percentage wise result of the question which found relevant reasons for using mobile banking APPS

Sr. No	Question	Strangely Disagree	Disagree	Neutral	Agree	Strongly Agree	No Response
1	Convenience (24 hours service, anywhere connectivity)	4	5	26	46	9	10
2	Curiosity	4	28	30	9	5	10
3	Safe and secure	4	11	43	20	9	15
4	Easy to maintain banking transaction activity	5	15	29	26	13	12
5	Problem solving through instant information	4	16	33	12	8	25
6	Better Service	4	4	29	20	10	16

7	User Friendliness	4	15	28	26	13	12
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(\* Values are in percentage, No of Respondent 105)

Analysis 3 finding safe and unsafe about mobile banking APPS

Sr. No	Question	Safe	Unsafe	Neutral
1	SMS (text messaging) (OTP, Other Banking Text)	54	16	30
2	Mobile browser similar to the way you access the Internet on your PC	67	19	14
3	Financial applications downloaded from your phone's mobile app store	41	30	30
4	How would you currently rate the overall security of mobile banking for protecting your personal information	49	33	19

(\* Values are in percentage, No of Respondent 150)

Chart 2: Security Aspects

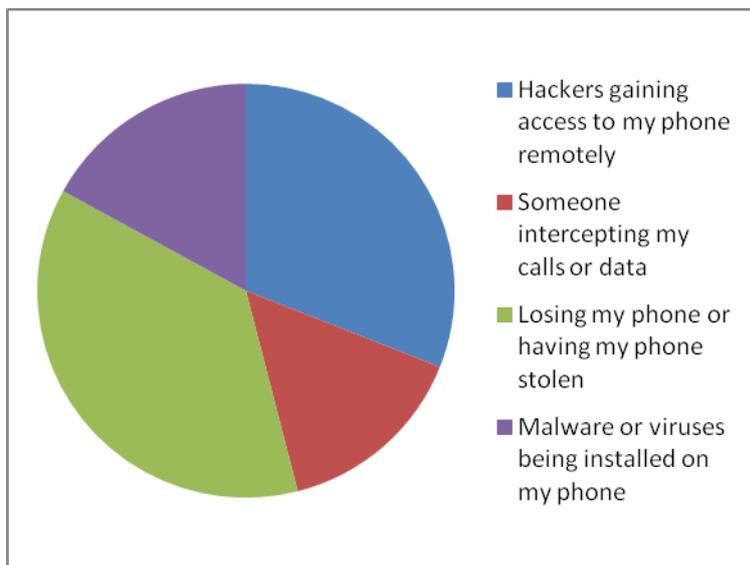


Chart 2 shows the security aspects where user more concern

Chart 3: Security Threads

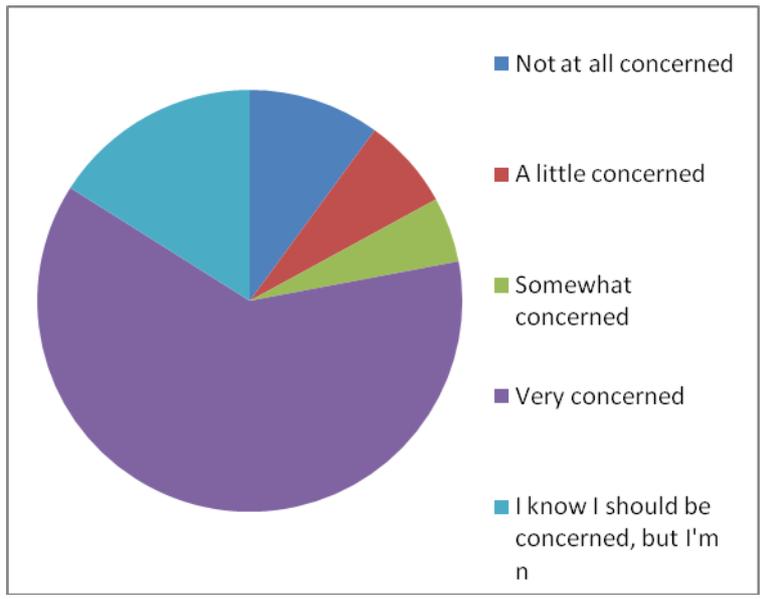


Chart 3 shows the security threads where user more concern

**IV. CONCLUSION**

Chart 1 shows that the how much percentage of users use Star Connect mobile banking Application.  
 Chart 2 shows that according to respondent they are more concern with security of mobile banking application star connect.  
 Chart 3 shows that according to respondent they are more concern with security threats of mobile banking application star connect.  
 The overall conclusion from carts & table is that, Star Connect mobile application are easy to use, time saving but required security as well as reliability. So, if financial institution will provide the secure and robust mobile banking software definitely there would be an improvement in use of such kind of softwares and probably it will help those institutes to overcome the problem of extra load coming on various banking transactions.

**REFERENCE**

**Web Links**

- [1] [http://en.wikipedia.org/wiki/Mobile\\_banking](http://en.wikipedia.org/wiki/Mobile_banking)
- [2] <http://airccse.org/journal/ijmit/papers/6114ijmit01.pdf>
- [3] [http://www.ijetae.com/files/Volume3Issue6/IJETAE\\_0613\\_90.pdf](http://www.ijetae.com/files/Volume3Issue6/IJETAE_0613_90.pdf)
- [4] <http://www.bankofindia.co.in/english/home.aspx>

# MLR BASED POWER ELECTRONICS TRANSFORMER FOR POWER QUALITY IMPROVEMENT

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## ABSTRACT

*A new power electronic transformer (PET) based on multilevel rectifier (MLR) is proposed in this paper for power quality improvement. The main function of a conventional transformer is to transform the required voltage and at the same time provide galvanic isolation between the source and the load. However, the conventional transformers are: bulky in size, expensive and losses due to iron cores and copper windings. Hence, power electronic transformer using multilevel rectifier, isolated DC/DC converter and a DC/AC inverter conversion blocks is proposed, to provide voltage transformation, galvanic isolation, power factor correction and improvement in power quality issues, such as sag, swell and flicker. The proposed system has been simulated in MATLAB/Simulink and the power quality improvement is verified by the result obtained.*

**Keywords:** *Multilevel rectifier, Power quality issues, Power electronic transformer, DC/AC converter*

## I. INTRODUCTION

For many years conventional transformers are being used in electrical system to provide voltage transformation, galvanic isolation and adaptation. However, these transformers are bulky in size, heavy, high cost and also iron and copper losses are very high. And also these transformers cannot handle the ever increasing power quality issues especially in medium and high frequency applications [1,3,7]. In recent years, Advances in Semiconductor devices leads to increased use of power electronic circuits. A new transformer based on power electronic circuits is proposed. The power electronic circuits are used both in primary and secondary sides of the transformer in order to regulate the voltage sag/swell compensation and power factor correction [1-8]. PET consists of three main stages that are the input stage consisting of an AC/DC rectifier (MLR) for reducing the input side filter size and obtain less input current ripple, the isolated DC/DC converter for providing galvanic isolation and the output stage consisting of DC/AC converter usually three phase voltage source inverter for converting the DC output to AC and feeding the load.

Several PET topologies have been proposed in literature [1-8]. In some of the literatures a converter based on the three phase converter, buck converter and H-bridge converter are being proposed at the input side, as in [1]. The focus of that paper is to obtain a medium to low voltage PET using H-bridge converter. In the same manner the PET based on modular multilevel converter is proposed in [2] and the DC/DC isolation converter is realized through a series capacitor to provide a series resonance. The DC/DC converter can provide a two way flow of power [2].

In another paper [4] an AC/AC converter based on matrix converter is proposed to generate the designed output voltage from the square input voltage. The aim here is to reduce the components used in the conventional PETs. Reliability and power quality of the distribution can be significantly improved using the system. In this present work a three stage PET is proposed in which a modular five-level rectifier based on cascaded H-bridge is used in the input side of the transformer, a DC/DC isolation transformer and three phase voltage source inverter at the output side.

The arrangement shown in fig 1 depicts a block diagram of the systems which provide flexibility and functionality of the electronic transformer and also perform different power quality improvement functions together with galvanic isolation. To verify the proposed system, the PET was simulated in MATLAB/Simulink and the simulation results confirm the ability of the system to solve some power quality issues.

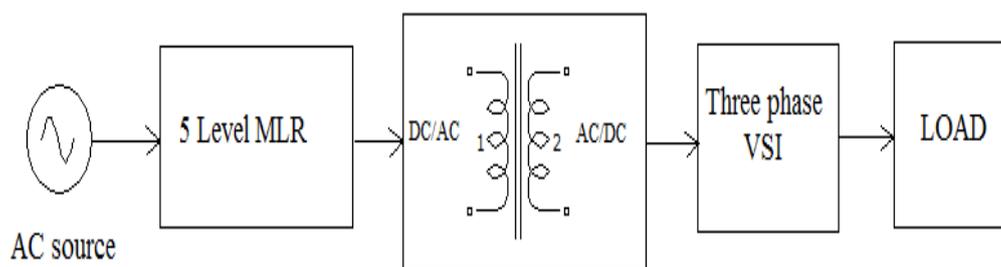


Fig. 1 Block Diagram of PET

## II. INPUT-OUTPUT CONVERTERS

The topologies of the input-output converters connected to both the primary and secondary sides of the transformer respectively depend on the line characteristics of the voltage and frequency. Different architectures can be considered from the input side of the transformer, three phase AC/AC converter, single phase AC/AC converters and DC/DC converters are mostly used. However to get the high power density, less input current ripple and to reduced the input side filter a MLR is used. MLR has less components count and modular in design.

The output converter which is connected to the medium or high frequency transformer is a simple three phase voltage source inverter that is used to feed regulated power to the connected loads [3].

## III. PET ARCHITECTURES

Various topologies have been presented for the realization of PET in power quality improvement. In the first architecture isolation transformer is not used but an AC/AC converter was used to transform the voltage level directly [4,7].

In the next architecture the AC waveform of the line side is changed into high or medium frequency (MF) square wave and it's coupled with secondary of MF and again demodulated to AC form by a converter as an output. Because of the lack of the energy storage it does not provide voltage sag compensation. The basic block diagram is shown in fig.2. As the size of the transformer is inversely proportional to the frequency this PET will be much smaller than the conventional transformer. So, size, weight and the stress factor of the transformer are reduced considerably.

As such the new PET is proposed which consist of three stages- input stage, isolation stage and the output stage. This PET will gives the improvement of the power quality and provide the galvanic isolation but too many power electronic converters and DC capacitors are needed here. In the first stage an AC/DC converter i.e.

five level MLR is used in mitigating the input current ripple and correcting the input power factor and regulate the primary DC bus voltage. Isolation stage is the second stage, here between primary and secondary the galvanic isolation is provided. In this stage, high frequency square wave is converted from DC voltage and coupled to the secondary of the HF or MF transformer. The output stage contains usually three phase voltage source inverter in which AC waveforms is produced and it is fed to the load.

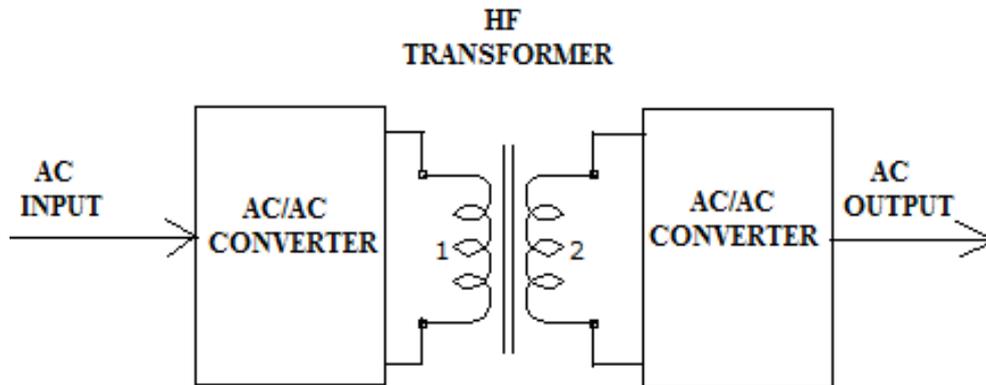


Fig. 2 PET Using HF AC-Link

#### IV. SIMULATION RESULTS

The complete power electronic transformer (PET) system was simulated using Matlab/Simulink and the output waveforms obtained confirmed the effectiveness of the system and its ability to solve and improve the power quality issues.

Fig. 1 shows the complete circuit diagram of the system, and Fig. 2(a), (b) &(c) depicts the input voltage Sag, DC-Link voltage and the output Voltage waveforms respectively. The Input voltage Swell, DC-Link voltage and the Output voltage waveforms are also shown in figure 3. The figures 4(a) &4(b) shows the machines speed and torque respectively. The parameters used in the simulation of the system were given in Table (1) & (2).

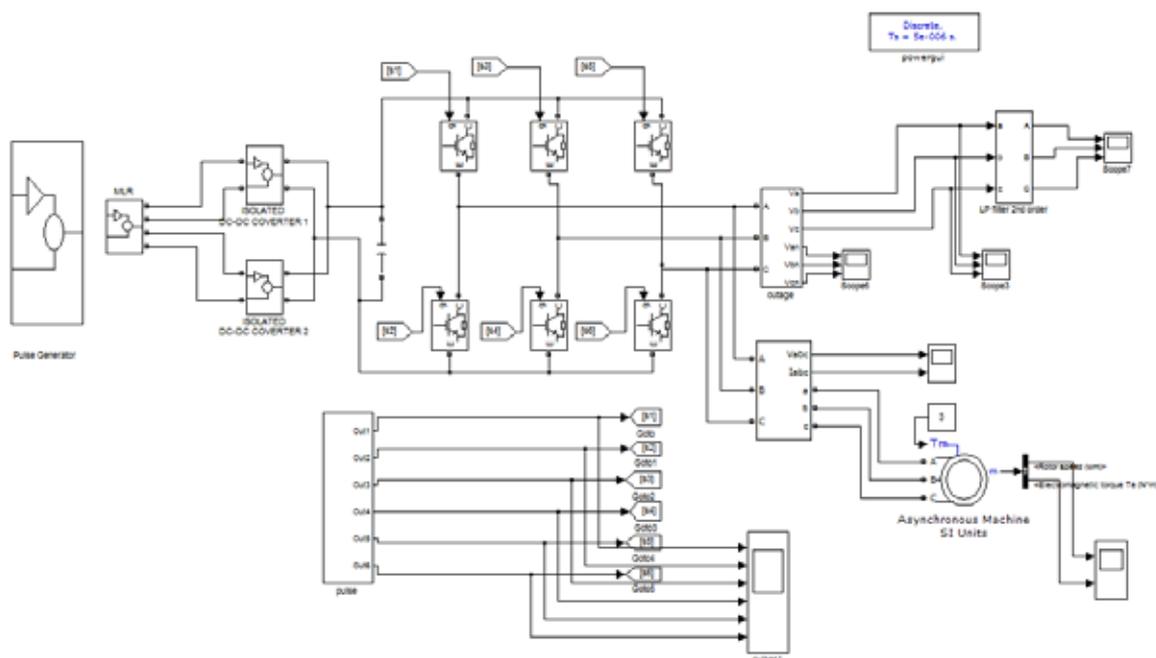
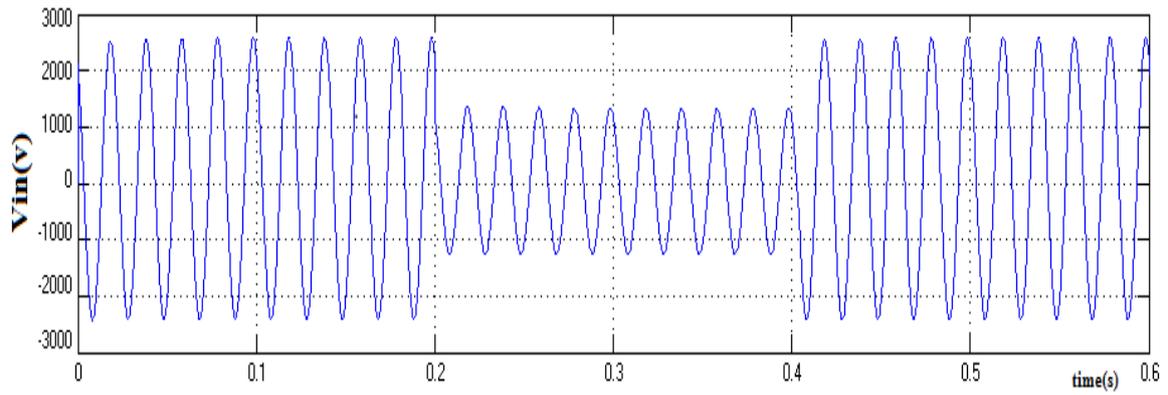
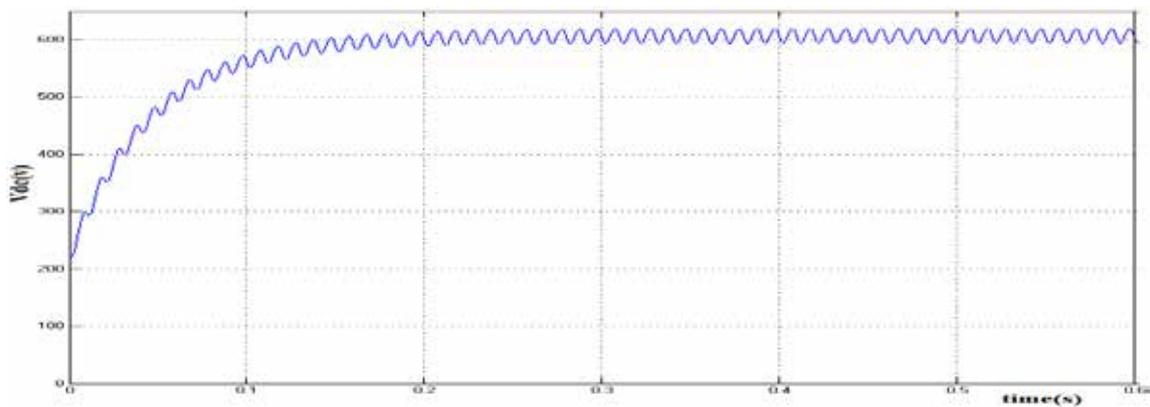


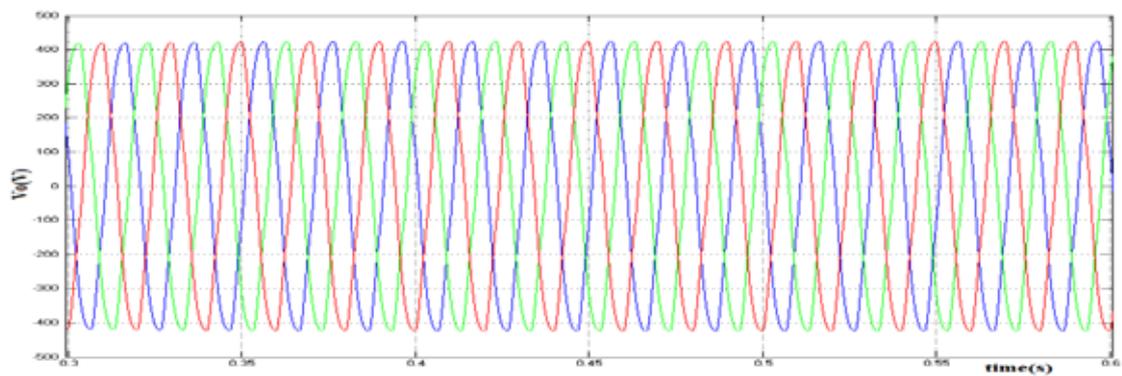
Fig. 3 Matlab/Simulink Circuit for PET



(a)

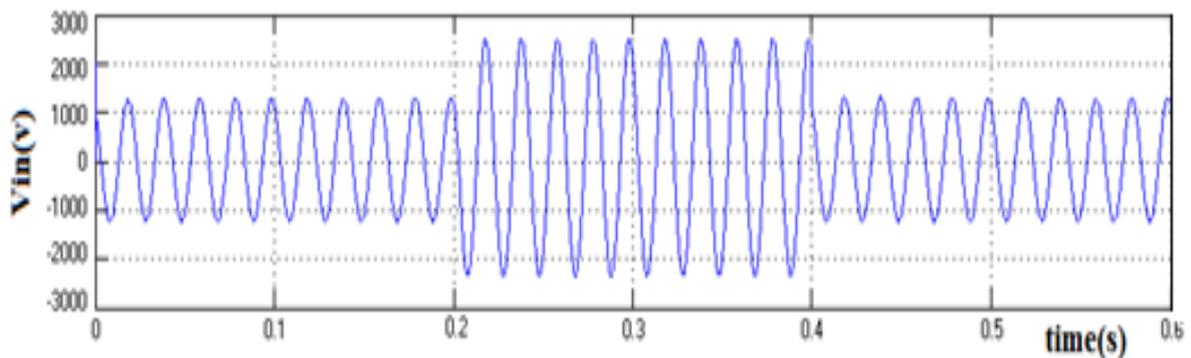


(b)

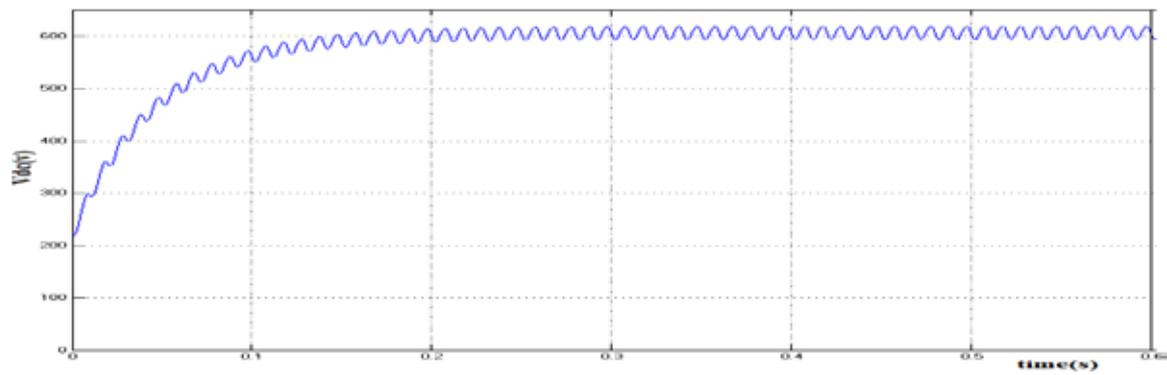


(c)

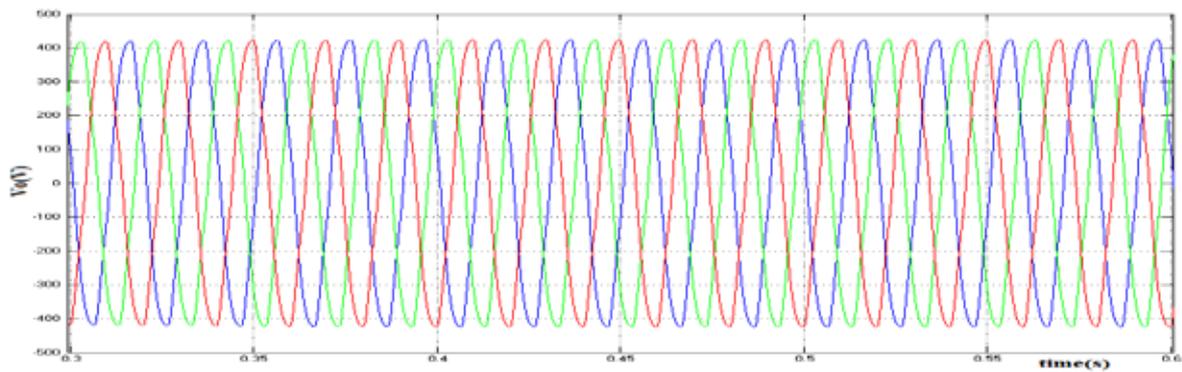
Fig. 4 (a) Input voltage Sag (b) DC-Link voltage (c) Output load voltage



(a)



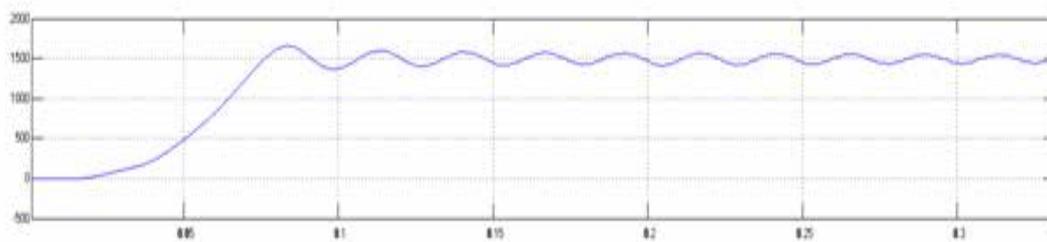
(b)



(c)

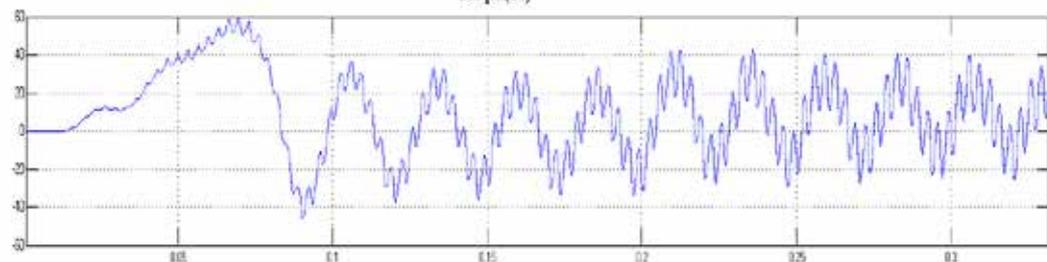
Fig. 5 (a) Input voltage Swell (b) DC-Link voltage (c) Output load voltage

### Speed(rpm)



(a)

### Torque(Te)



(b)

Fig. 6 (a) Speed waveform (b) Torque

**Table 1 System Parameters**

<b>Parameter</b>	<b>Value</b>
Number of series MLR H-bridges at the input(N)	2
System Frequency	50Hz
Input voltage( $V_{in}$ )	2700V
Simulation period	1sec
Output voltage of DC load (V)	600V

**Table 2 Machine Parameters**

<b>Parameter</b>	<b>Value</b>
Nominal power	1100
Rs, Lls	6.03 $\Omega$ , 0.0299 H
Rr', Llr'	6.085 $\Omega$ , 0.0299 H
Lm	0.4893 H
No. of poles	2
J, F	0.011787 Kg.m <sup>2</sup> , 0.0027 Nm/s

## V. CONCLUSION

In the paper, a Power Electronic Transformer (PET) using a 5-Level Multilevel rectifier from the input side is proposed. The simulation result of the system confirm the effectiveness of the system as it is able to solve and improve some power quality issues as it can be seen in the input waveforms reduces and increases from  $t=0.02s$  to  $0.04s$  but still the PET act appropriately to adjust the voltage to the desired level at the output and also improve the power factor.

## VI. ACKNOWLEDGMENT

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## REFERENCES

- [1] H. Iman-Eini, JL. Schanen, Sh Farhangi, J. Barbaroux, JP. Keradec, "A Power electronic based Transformer for feeding sensitive loads", in proc. IEEE France, 2008, 978-1-4244-1668-4/08
- [2] Zhu Haibin, Li Yaohua, Wang Ping, Li Zixin, Chu Zunfang, "Design of Power electronic transformer based modular multilevel converter", in proc. IEEE China, 2012, 978-1-4577-0547-2/12
- [3] A. Dannier, R. Rizzo, "An overview of Power Electronic Transformer: control strategies and topologies", International Symposium on Power Electronics, Electrical Drives, Automation and Motion, 2012.

- [4] B.T. Kalyan, P. Ram Prasad, “Analysis and Design of Power Electronic Transformer based Power Improvement”, IOSR Journal of Electrical and Electronics Engineering 2278-1676 volume 5, issue 1, 2013, pp 61-69.
- [5] Drazen Dujic, Frederick Keiferndorf, Francisco Canales, Uwe Drofenik, “Power Electronic Traction Transformer Technology”, IEEE 7<sup>th</sup> International Poer Electronics and Motion Control Conference-ECCE Asia June 2-5, 2012, Harbin, China.
- [6] Chuanhong Zhao et al. “Power Electronic Transformer (PET) Converter; Design of a 1.2MW for traction application”,International Symposium on Power Electronics, Electrical Drives, Automation and Motion, 2012.
- [7] M.R. Banaei, E. Salary, “Power Quality Improvement Based on novel Power Electronic Transformer” 2011 2<sup>nd</sup> Power Electronics, Drive Systems and technologies conference.
- [8] Drazen Dujic et al. “Power Electronics Transformer Technology for traction Applications- an overview”, Electronics, Vol. 16, No. 1, June 2012.