

## BOGUS CURRENCY RECOGNITION SYSTEM

Pooja Ravi<sup>1</sup>, Mrs.Jeba Paulin<sup>2</sup>, Mr. S.Mohan<sup>3</sup>,Dr.V.Jayaraj<sup>4</sup>

<sup>1</sup>PG Scholar,Dept. of Electronics &Communication Engineering, Nehru Institute of Engineering &Technology  
<sup>2</sup>Assistant Professor ,ECE Department Nehru Institute of Engineering and Technology, <sup>3</sup>Assistant Professor ,ECE Department Nehru Institute of Engineering and Technology, <sup>2</sup>Professor & Head ,ECE Department Nehru Institute of Engineering and Technology

-----\*\*\*-----  
**Abstract** - Fake notes are a noteworthy backset in this day and age economy. Fake notes are structured so convincingly that distinctive them from the first is a task. Money acknowledgment is a significant assignment in various mechanized installment administrations and used to sort the banknotes of various country. Cash acknowledgment is innovation of handling cash pictures that are utilized to order the banknotes of various country and furthermore to recognize counterfeit notes. The significance of programmed techniques for money acknowledgment has been expanding in the time being a direct result of course of phony notes is expanded in the present economy. In India both paper cash and coin money are utilized in the time being, however this framework exclusively focuses on paper cash. This acknowledgment framework contains fundamental picture preparing procedures such like picture procurement, picture preprocesses, remove highlights and characterization utilizing bolster vector machine. Essentially camera or scanner is utilized for picture obtaining. The pictures of money prepared utilizing an assortment of preprocessing strategies and extraordinary highlights of the picture removed utilizing GLCM, when the highlights are extricated it is imperative to perceive the money utilizing successful classifier called Support vector machine. At that point these are characterized dependent on groups utilizing Fuzzy Logic Based Classifier.

**Key Words:** Pre-processing, Gray level co-occurrence matrix, Support Vector Machine, Fuzzy Logic classifier.

### 1.INTRODUCTION

Innovation is becoming extremely quick nowadays. Thusly the financial division is likewise getting present step by step. This brings a profound need of programmed counterfeit money identification in programmed teller machine and programmed merchandise dealer machine. Numerous specialists have been urged to create hearty and proficient programmed money recognition machine [1-5]. Programmed machine which can recognize banknotes are currently broadly utilized in allocators of present day items like confections, soda pops container to transport or railroad tickets. The innovation of money acknowledgment fundamentally goes for distinguishing and extricating noticeable and imperceptible highlights of cash notes. As of recently, numerous methods have been proposed to recognize the money note. Be that as it may, the most ideal route is to utilize the noticeable highlights of the note [1]. For instance, shading and size. In any case, along these lines isn't useful if the note is filthy or torn.. So it is significant that how we remove the highlights of the picture of the money note and apply legitimate calculation to improve precision to perceive the note. We apply here a basic calculation which works appropriately. The picture of the money note is caught through an advanced camera. The concealed highlights of the note are featured in the bright light. Innovation is becoming quick nowadays. Subsequently the financial division is likewise getting present step by step. This brings a profound need of programmed counterfeit cash identification in programmed teller machine and programmed products vender machine. Numerous specialists have been urged to

create hearty and effective programmed cash location machine [1-5]. Programmed machine which can distinguish banknotes are currently broadly utilized in gadgets of present day items like confections, sodas container to transport or railroad tickets. The innovation of money acknowledgment essentially goes for recognizing and extricating noticeable and undetectable highlights of cash notes. Up to this point, numerous procedures have been proposed to distinguish the cash note. In any case, the most ideal route is to utilize the unmistakable highlights of the note [1]. For instance, shading and size. Be that as it may, along these lines isn't useful if the note is messy or torn. On the off chance that a note is messy, its shading trademark is changed broadly. So it is significant that how we extricate the highlights of the picture of the cash note and apply appropriate calculation to improve exactness to perceive the note. We apply here a straightforward calculation which works appropriately. The picture of the cash note is caught through an advanced camera.

**PROPOSED WORK**

The following figure 1 shows the flow chart of the proposed work

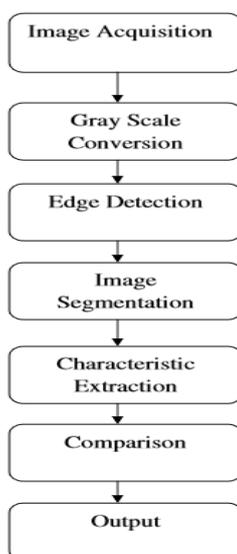


Figure 1 Flow chart of proposed work

The block diagram of the proposed work is shown in the

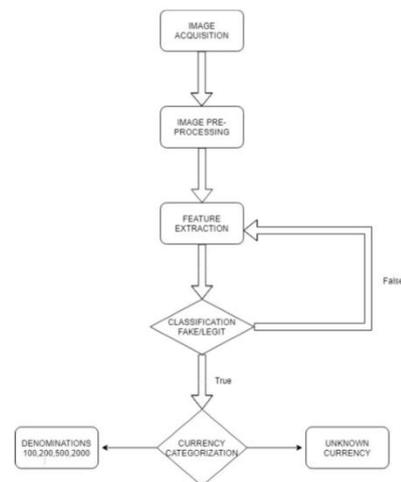


Figure 1.1 Block diagram

**A) IMAGE ACQUISITION**

Picture obtaining is a procedure of catching pictures of Indian cash by utilizing advanced camera and scanner. The pictures are caught in diverse condition to pre-procedure and improve quality for further handling systems. In this undertaking, different pictures of Indian cash are caught and are put away in the framework (both phony and unique). The nature of the picture should be great and subsequently utilizing a top quality camera. The Indian monetary standards with divisions 100, 200, 500 and 2000 are mulled over for this undertaking.



Figure 1.2 Input image

**B) GRAY SCALE CONVERSION**

Gray scale image is one in which the value of each pixel is a single sample representing only an amount of light, that is, it carries only intensity information. Images of this sort, also

known as black-and-white, are composed exclusively of shades of gray, varying from black at the weakest intensity to white at the strongest.



Figure 1.3 Gray scale image

### C) FILTERING

Filtering is a technique for modifying or enhancing an image. An image can be filtered to emphasize certain features or remove other features. In this project, filtering is done to remove noise. Image noise is an unavoidable side-effect occurring as a result of image capture. In a digital camera, if the light which enters the lens misaligns with the sensors, it will create image noise. This impulse noise consists of large positive and negative spikes.

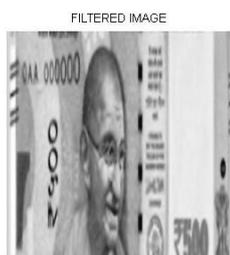


Figure 1.3 Filtered image

### D) FEATURE EXTRACTION

GLCM is Gray Level Co-occurrence matrix. The texture analysis algorithms extract distinguishing feature from each region to facilitate classification of such patterns. The GLCM is a tabulation of how often different combinations of pixel brightness values (grey levels) occur in an image. It is of 2nd order statistics, so information with regards to pixels of pairs

are collected by GLCM. GLCM exhibits how the pixel brightness in an image occurs. A matrix is built up at a distance  $d=1$  and at angles in degrees (0, 45, 90, 135). GLCM texture picks up the relation between two pixels at a time, called the reference and the neighbour pixel. GLCM expounds the distance and angular spatial relationship over an image sub- region of specific size. GLCM is prepared from gray scale values. It is taken into account how often a pixel with gray level (gray scale intensity or gray tone) values come either horizontally, vertically and diagonally to level the pixels with the value  $j$ .

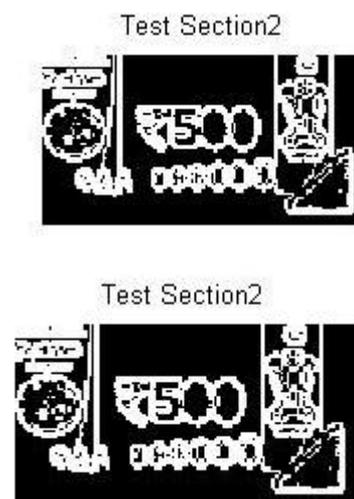


Figure 1.4 Feature extracted images

### E) CLASSIFICATION

Classification is the problem of generating decision boundary that can distinguish various classes in the feature space. It is the generation of non linear boundaries approximated by some providing minimum number.

### I) SUPPORT VECTOR MACHINE

SVM is used to detect if the given input test currency is legit or not. set of training examples, each marked as belonging to one or the other of two categories, an SVM training algorithm builds a model that assigns examples to one category or the other.

## II) FUZZY LOGIC CLASSIFIER

Fuzzy Classifier is utilized over SVM for this reason since it tends to be utilized generally for an enormous number of sources of info, where SVM can't manage it. Fluffy Classifier is more closer to genuine language determinations than SVM. Fluffy classifiers are quicker contrasted with SVM. Clarifying in straightforward terms, in the element extraction step, explicit surface highlights of different group monetary standards are extricated and put away in the framework. At that point Fuzzy Rule based classifiers are utilized to characterize them dependent on various calling capacity announced beforehand. A classifier is a calculation that appoints a class name to an article, in view of the item depiction. The article portrayal comes as a vector containing estimations of the highlights (properties) esteemed to be pertinent for the characterization task.

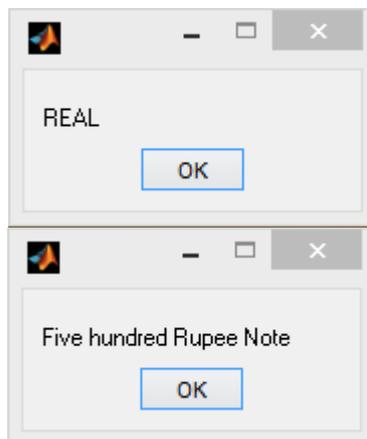


Figure 1.5 Classification

## CONCLUSION AND FUTURE WORK

In this period of incredibly very much created types of gear, it is very simple to deliver counterfeit notes. Counterfeit banknotes have turned out to be so profoundly implanted in the Indian economy that even bank offices and ATMs are dispensing fake cash. A portion of the evil impacts that fake cash has on society incorporate a decrease in the estimation of genuine cash, increment in costs (swelling) because of more cash getting coursed in the economy, a diminishing in

the worthiness of paper cash and misfortunes, when merchants are not repaid for fake cash distinguished by banks, regardless of whether it is appropriated. Along these lines, cash acknowledgment is required for the equivalent. The proposed framework works in finding counterfeit notes among the 100, 200, 500, 2000 Indian monetary forms. In this stage, picture procurement and pre-handling steps like sifting and dim scale change has been done. Future works will address the further strides of the proposed calculation. It incorporates Feature Extraction utilizing GLCM, Classification utilizing SVM and Fuzzy standard based classifier for distinguishing false and genuine monetary forms.

## REFERENCES

- [1] Trupti Pathrabe G and Swapnili Karmore 2011 Int. J. CompTrends Tech 152-156
- [2] Tanaka M, Takeda F, Ohkouchi K and Michiyuk 1998 IEEE Tran on Neural Network 1748-53.
- [3] Jahangir N, Ahsan Raja Chowdhury 2007 IEEE 10th Int. Conf. on Computer and Information Technology 1-5.
- [4] Rubeena Mirza, Vinti Nanda 2012 IFRSA Int.J. Computing 2 375-80
- [5] Junfang Guo, Yanyun Zhao and Anni Cai 2010 Proc IEEE Int. Conf Network Infrastructure and Digital Content 359-363.
- [6] Deborah M, Soniya C and Prathap 2014 Int J Innov Sci Engg & Tech 1 151-57.
- [7] Michalewicz, Z. (1996). Genetic algorithms + data structures = evolution programs. (3rd ed.). London: Springer-Verlag
- [8] Ji Qian, Dongping Qian, Mengjie Zhang –A Digit Recognition System

for Paper Currency Identification Based on Virtual Instruments|| IEEE Transactions, 1-4244-0555-6/06,2006..

Volume 13, Number 5 (2017), pp. 945-953 © Research India Publications.

[9] H. Hassanpour ,A. Yaseri, G. Ardeshiri –Feature Extraction for Paper Currency Recognition||, IEEE Transactions, 1-4244-0779-6/07,2007.

[10] KomalVora, Ami Shah, Jay Mehta, A Review Paper on Currency Recognition System, International Journal of Computer Applications (0975 – 8887) Volume 115 – No. 20, April 2015.

[11] SnehlataSahuToranVerma, Identification of Paper Currency Techniques: A Survey, International Journal of Science Technology & Engineering | Volume 2 | Issue 12 | June 2016 ISSN (online): 2349-784X.

[12] Pathrabe T, Bawane N.G, Feature Extraction Parameters for Genuine Paper Currency Recognition & Verification, International Journal of Advanced Engineering Sciences and Technologies, Volume 2, 85-89, 2011..

[13] Faiz M. Hasanuzzaman, Xiaodong Yang, and YingLi Tian, Senior Member, IEEE Robust and Effective Component-based Banknote Recognition for the Blind IEEE Trans Syst Man Cybern C Appl Rev. 2012 Nov; 42(6): 1021–1030 57

[14] Tuyen Danh Pham, Ki Wan Kim, Jeon Seong Kang, Kang Ryoung Park, "Banknote Recognition based on Optimization of Discriminative Regions by Genetic Algorithm with One-dimensional Visible-Light Line Sensor", Pattern Recognition (2017).

[15] Shaikh Ajj Amirsab, Mohammad Mudassir Mohammad Ismail, "An Automated Recognition of Fake or Destroyed Indian Currency Notes", International journal of advance scientific research and engineering trends volume 2 issue 7 jan 2017.

[16] SandeepKaur,SeemaBaghla, Sunil Kumar, "Enhancement of Sift algorithm to check authenticity of Indian Currency", International Journal of Computational Intelligence Research