INDIAN CURRENCY DETECTION AND DENOMINATION USING SIFT

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Abstract— In this paper, we are designing a system that helps in identification of Indian currency notes and to check whether it is a valid or invalid. This is to differentiate between the counterfeit notes and genuine notes. Currency features such as See Throught register, See Through register symbol or Identification mark, Security thread, Governer's signature, Microlettering, year of print. This features are segmented using 3x3 grid. This is done by the use of SIFT technique which helps in efficient matching of the features.

Index Terms—currency notes, segmentation, feature extraction, 3x3 grid SIFT method , GUI

I. INTRODUCTION

First paper money was introduced by the Government of India in the year 1861 by issuing 10 rupee notes. In the year 1864 20 rupee note, 5 rupees in 1872, 10,000 rupee in 1899,100 rupee in 1900, 50 rupee in 1907 and 1000 in 1909. At present, Indian currency system has the denomination Rs. 5, Rs. 10, Rs. 20, Rs. 50, Rs. 100, Rs. 500, and Rs. 1000. Indian currency notes are having their own features such as denomination, shape, color etc. Blind people also can identify the denomination of Indian currency based on special identification marks. At the top right end every Indian currency note has its fixed denomination that one can feel by sensitive touch. But marker may get fade after many circulations. It is very important to develop automated system to extract feature and recognize Indian currency note in different area such as bus station, railway station, shopping mall, banking and ATM machines. Reserve bank of India given useful tips to detect a fake Indian rupee note as given below:

- Optical Variable Ink
- Latent Image
- Security Thread
- Micro lettering
- Watermark

The best way to identify a note is the silver bromide thread that runs vertically through a currency note. Fake currency notes tend to have silver-colored band painted in place of the silver thread. A real note has a prominent thread with raised 'RBI' markings made on it in English and Hindi. Also, in a real note, the color of the thread shifts from green to blue when viewed from different angles [1].

Automated paper currency recognition system can be a very good utility in banking systems and other field of commerce. Since many years counterfeiting of paper currency challenges the financial system of every country in different sectors, India is also one of them. Modernization of the financial system is a milestone in protecting the economic prosperity, and maintaining social harmony. Automatic machines capable of recognizing banknotes are massively used in automatic dispensers of a number of different products, ranging from cigarettes to bus tickets, as well as in many automatic banking operations. The needs for automatic banknote recognition systems encouraged many researchers to develop corresponding robust and reliable techniques. The technology of currency recognition aims to search and extract the visible and hidden marks on paper currency for efficient classification. Until now, there are many methods proposed for paper currency recognition. The simplest way is to make use of the visible features of the paper currency, for example, the size and color of the paper currency. However, this kind of methods has great limitations as banknotes are getting worn and torn with the passing of time and they are even dirtier when holding by dirty hands or in dirt. If any banknote is dirty or it may be changed into any other color then the color content of banknote may change largely [5].

Automated paper currency recognition system can be a very good utility in banking systems and other field also. Fake notes in India in denominations of Rs.100, 500 and 1000 are being flooded into the system. Over the past few years, as results of the great technological advances in colour printing, duplicating, and scanning, counterfeiting problems have become more and more serious. Automatic methods for paper currency recognition become important in many applications such as automated teller machine and automated goods seller machines. This system is designed to recognize and verify the Indian paper currency. The approach consists of a number of steps including image acquisition, gray scale conversion, edge detection, feature extraction, image segmentation and comparison of images . This is a challenging issue to system designers. Every year RBI (Reserve bank of India) face the counterfeit currency notes or destroyed notes . Handling of large volume of counterfeit notes imposes additional problems. Therefore, involving machines (independently or as assistance to the human

experts) makes notes recognition process simpler and efficient [6].

II. PROPOSED METHODOLOGY
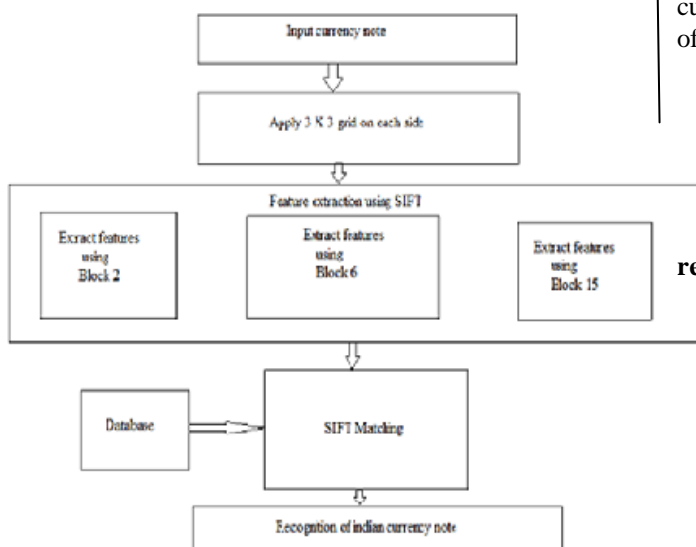
The methodology of this project is extracting unique features of the Indian currency note using grid. Grid divides the currency into nine parts on each side which helps to reduce the time complexity of the proposed model. Applying the preprocessing to each block to recognize and extract potential feature of Indian currency note. Grids 2, 6 and 15are cropped and potential features of currency notes are extracted.

In any Currency Recognition system following steps are performed:

Image Acquisition-Image acquisition is the formation of digital images, typically from a physical view. The image here is that of a currency note and is usually acquired by using digital camera. The image is then stored for processing.

Edge Detection- This is a basic tool in image processing, mainly in the area of feature recognition and extraction, which aims at identifying points in digital image at which the image intensity changes piercingly. The edge detection is essentially to restrict the currency note that is the region of interest.

 Image Segmentation-This sub divides the image into its ingredient regions or substance. Segmentation algorithm for dull images generally are based on two properties
a) Discontinuity
b) Similarity

 Feature Extraction-It is a difficult work in digital image processing. In any currency gratitude system, feature extraction is one of the most difficult tasks. The aim of this is

to study and identify the single and individual features of each denomination under a variety of challenging situations such as old notes, damaged notes and also under different illumination and environment.

Matching Algorithm- This step recognizes or classifies currency notes of different denomination based on a variety of unique features extracted

III. EXPERIMENTAL RESULTS

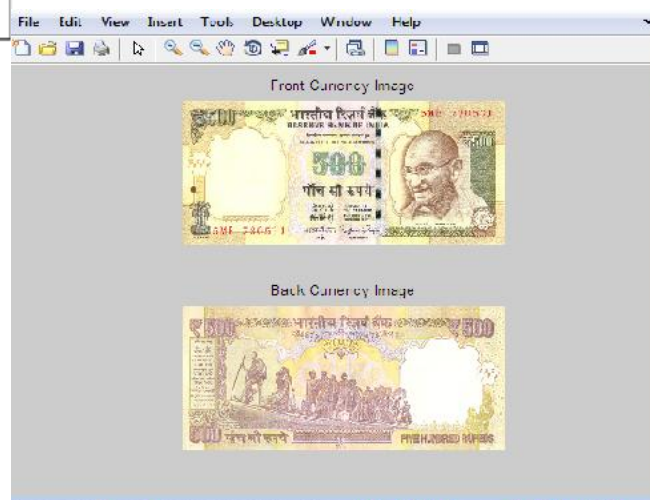**Here we are using graphical user interface to view the results**
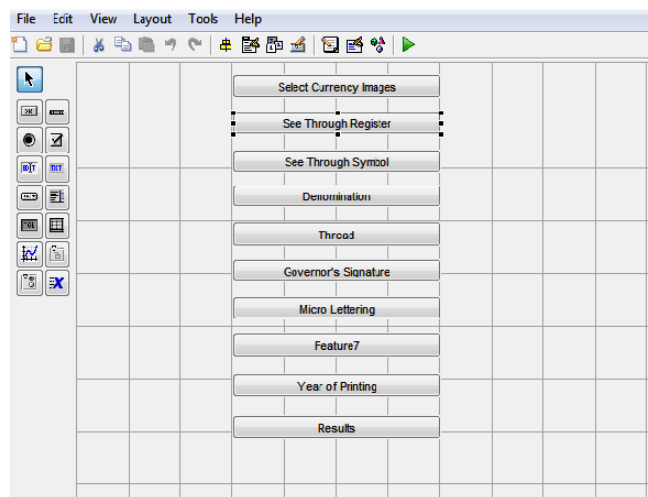

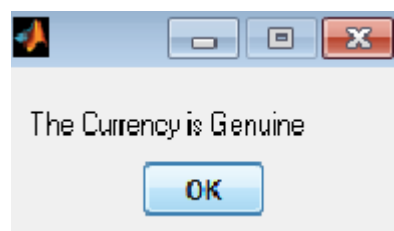**Fig: Sample currency image**

Fig : Feature extractio

Fig: Result

IV. CONCLUSION

In This paper we are extracting the features by using SIFT algorithm. Based on that features it is giving the result as genuine are fake note and it also identifies the denomination of the currency note the proposed method is experimented on our dataset and obtained the result.

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