Fake Currency Detection Using Image Processing

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ABSTRACT

Fake currency is always a crisis for normal people. The advancement of colour printing technologies has increased the fake currency notes printing and duplicating of currency notes. As a result, the issue of fake notes instead of the genuine ones has been increased very largely. It is very lengthy and confusing process to identify the currency note is genuine or not in manual way. This leads to design of a system that detects the fake currency note in a less time and in a more efficient manner.

In this paper, recognition of fake Indian currency notes is done by using image processing technique. The proposed system has got advantages like simplicity and high-performance speed. The result will predict whether the currency note is fake or not.

KEYWORDS:_"Fake Currency, Android application, Currency Notes, Image Processing, Python Programming Language"_

1. INTRODUCTION

Currency plays very important role in our daily life. Common problem about currency, is the insertion of fake currency in the system. Due to this each country facing the huge loss. These losses have a very bad effect on our economy and the economy collapse badly.

As technology increases day by day color printing, scanning and duplicating counterfeiting has become simple and dummy attacks have increases dangerously. Those fake currency are easily circulating in market. Important sections like banks, shopping malls, jewelry shops have large number of transactions daily. Those places are able to afford and find it feasible to buy machines that use UV light and other techniques to detect the genuineness of the currency. In banks there are staff who works for detecting the currency bases on their currency features but sometimes they can go wrong too, also for common people it is not easy to just identify whether the currency is fake or not and they may face losses. This system is designed so any person can easily use it and detect the authenticity of the currency. Later this system is converted in to app so it is available for all people. In future this system will be helpful for other countries to detect their fake currency.

Image processing is the base of the system. Performs some steps on an image, then we can identify whether the currency is real or fake. Here system include perfect feature of currency and then image will be going for processing and system gives accurate result.

So, in section II, there are short information on some related papers that are used for reviewing. In section III, the methodology is raised which define the different steps used in the whole process of currency detection. In section IV, the details of the proposed system are mentioned. Section V shows the result and conclusions. Section VI mentions the referred papers and links.

2. LITERATURE SURVEY

There are various methods of the paper currency identification system using image processing techniques.

I. Ms. Monali Patil, Prof. Jayant Adhikari, Prof. Rajesh Babu they proposed a system which uses image processing to distinguishes between features of an actual note and a genuine note. They used K-means algorithm for feature clustering and SVM algorithm to train their data model.[1].

II. MayadeviA. Gaikwad, Vaijinath V. Bhosle Vaibhav D Patil. In their research paper they have proposed a methodology of detecting fake currency from the real by comparing their visual features such as distance between Gandhiji's portrait and other notations. This methodology can be useful for a system purely based on software processing.[2]

III. Renuka Nagpure, Shreya Sheety, Trupti Ghotkar. They have suggested a system which uses the floral designs on the notes given by RBI to distinguish between real and fake notes.[3]

IV. Neeru Rathee ,Arun Kadian, Rajat Sachdeva ,Vijul Dalel, Yatin Jaie. In their paper they have proposed image processing along with supervised machine learning to learn the differentiating

feature of a real note from fake one which will increase the precision of this method.[4]

V. Akanksha Upadhyaya Research Scholar, Vinod Shokeen Associate Professor, Garima Srivastava. In their study they have proved that image processing along with logistic regression gives an accuracy of above 99%.[5]

3. METHODOLOGY

i. Most of the Fake currency Detection using Image Processing is used for commercial used only.

ii. By using MATLAB, we can perform image processing and detect currency is fake or not.

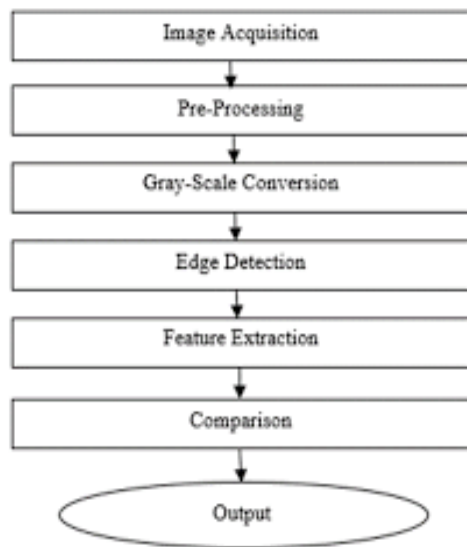iii. By using optical sensing and Approximate detection we find the currency is fake or not.

Fig: Flow-Chart of System

A. Image Acquisition:

Genuine currency is taken as an input for the system. By using this technique image is scanned and upload to the system.

B. Image Pre-processing:

The main purpose of used image pre-processing is improvement of the images data that improve some image feature for the further processing of data.In image processing salt and paper type if noise is removed.

C. Grey Scale Conversion:

In grey scale image color image is converted into single layer image. Color image is combination of red, green, blue That is RGB is converted into gray scale image That is Single scale image.The grayscale image intensity is stored as 8-bit integer giving 256 possible different shaded of gray from That is Black to White.

D. Edge Detection:

Image segmentation and edged detection are processed by edge detection. Edge detection is one of the image processing technique and used to find boundaries of object with an image. During Edge detection step the input step is gray scale image.In edge detection step the canny edge technique is used because this technique gives best result as compare to other techniques.

E. Segmentation:

By using segmentation, the image is divided into multiple parts. Digital image is are partitioned into multiple segmented. Image is divided to identify the objects or important relevant information.

F. Feature extraction:

Feature extraction is use for reduce dimensionality of the image and represent the interesting part of an image. This step is used when the dimension is large and image is reduced and comparison is done for the further step.Feature extracted is used for the next step i.e., comparison.

G. Comparison:

Extracted feature is used in this step.This step is used for compare stored feature to result feature and give proper Answer the currency is fake or Genuine. In comparison the system checks whether the currency contain portrait mahatma Gandhi at the center, Guarantee Clause, Governor 's Signature with Promise Clause, Ashoka Pillar emblem on the right and electrotype watermark, Year of printing of the currency on the left, Swatch Bharat logo with slogan and security thread, Number panel with numerals growing in size

4. PROPOSED SYSTEM

Manual testing of notes in transactions is very complicated process and also there is a chance of tearing while handling notes. So, it is very difficult to identify the genuine currency for common man. So, it required a system to identify the genuine currency for common man

we designed this system. Which is used to identify the genuine currency easily.

The Input for this system is just a ".png" or ".jpeg" image of the currency notes for recognition and performs various techniques for identifying genuine notes. Such as Image-processing, grey scale conversion, edge detection, segmentation, feature extraction.

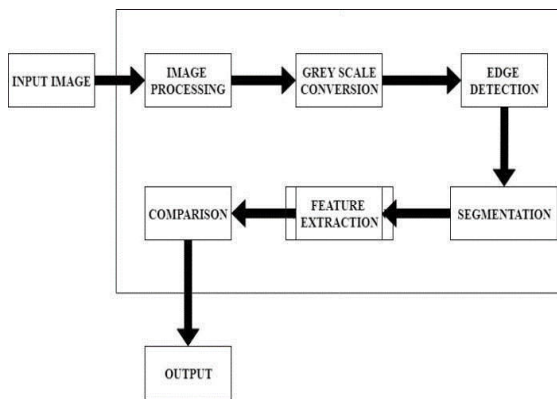Figure shows the Architecture of Proposed System:

Fig: Architecture of Proposed System

I. Image Processing:

This technique is important for input image. It enhances the feature of image for further processing. After Acquisition of image the digital image processing algorithms are applied to the image to avoid the noise and aberration.

II. Gray Scale Conversion:

Gray Scale Conversion reduces the intensity of the processed RGB image for better recognition. averaging method, luminance method, desaturation method, etc. are used for grey scale conversion. In which we are using luminance method for the conversion. It becomes easy to code for conversion because of this method.

III. Edge Detection:

Edge detection technique is used for specifying the boundaries of objects in the image. For better result this system is uses canny edge detection method. This technique is used for calculus and variations which finds functions for optimizing the image to extract useful structural information and vision.
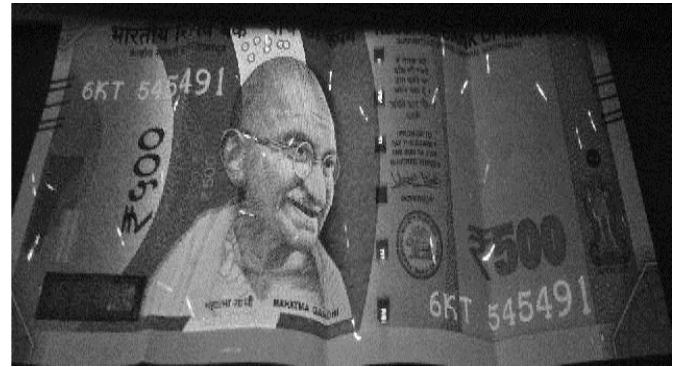

Fig: Edge Detection in Note

IV. Segmentation:

Image Segmentation is a process which partition an image into multiple segment such as set of pixels. There are thresholding and clustering methods are in segmentation but here we are using thresholding. It creates bi-tonal image from the grey scale image.
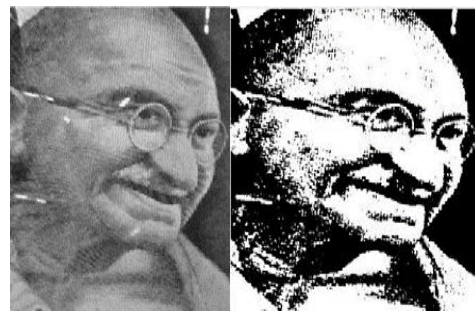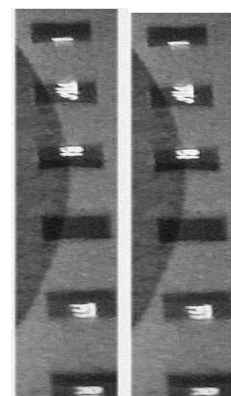

Fig: Segmentation in Mahatma Gandhi Logo

Fig: Segmentation in RBI Thread

V. Feature Extraction:

It is also known as pattern recognition. The main work of feature extraction is to obtain most relevant data from image. It is used for character recognition, in which it can recognize the images character and stored it in memory for further.

Fig: Feature in Currency Note

VI. Comparison:

In this Step the images characteristic is compared to the stored characteristics for identifying and obtain the result. For that the system uses SSIM (Structure Similarity Index Method). The currency is genuine or not

Fig: Features in 500 and 2000 notes

Output:

The above figure shows the different features of the currency for comparison and feature extraction. In the output system ask for currency image in which get this image from through camera or import from gallery. The output shows the two different images in first image the fake note image is there and another one has the genuine image. After that the system finally shows the captured currency image is genuine or not.
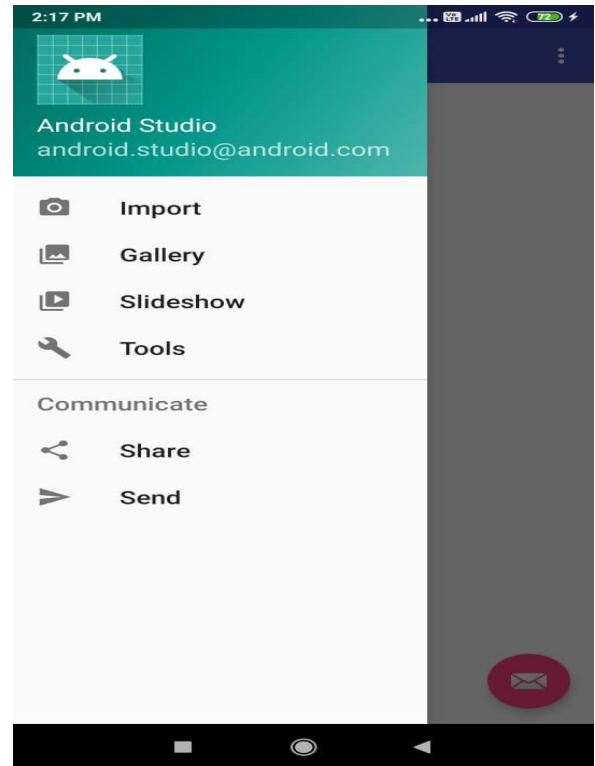

Fig: GUI of application

5. CONCLUSION

Currency plays very important role in our daily life but there is a problem of fake currency. Fake currency has always been an issue in economy. In India paper currency are used much more and hence a system to detect the fake currency is needed. This proposed system uses Image Processing to detect whether the currency is genuine or counterfeit. This system shows where the differences are in the currencies instead of simply displaying the result. Our system will be helpful for common people who is not involved technically, can easily handle and detect the authenticity of the currency.

This system can be further implemented for foreign currencies like Dollars, Euros, Taka, etc. as a future scope.

6. REFERENCES

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