AN EFFICIENT TECHNIQUE FOR DETECTING CURRENCY COUNTERFEIT USING IMAGE PROCESSING

P. Kurshidha Begam

PG Scholar, Department of Electronics and Communication Engineering
Pandian Saraswathi Yadav Engineering College, Sivagngai

Abstract

Finding a fake currency in any countries financial system is always a challenging one. The Reserve Bank is the one which issue bank notes in India. Reserve Bank changes the design of Bank notes for time to time. The Reserve Bank uses several techniques to detect fake currency. Currency circulation brings many problems among peoples like detecting whether the currency is fake or legitimate. Suppose a common people take few of fake currency without his/her knowledge to bank, in this case he/she has to take the blame as banks will not help that person. The government does not give authority to Counterfeit currency. The appearance of the legitimate currency is affected directly, by copying the currency in a manner similar to the reality. The main objective of the project is to identify the fake Indian currency based on the features present in the real note and fake currency by classifying the image of the currency weather it is fake or genuine. The problem of counterfeit currency increasing in our day-to-day life because of development of modern technology like scanning and color printing. In India to reduce fake paper currency notes of 100, 500, 2000 rupees etc, there is a need or necessary to detect fake currency.

Introduction

Computers and Mobile phones become most important technology in our day-to-day life. One of the most important technologies called Digitalization, which brings rapid increase in fraudulent activities in the financial sector. Nowadays modern counterfeit currency is similar to real currency. The production of fake notes affects the country's economy. Counterfeit currency Detection is a system used to find the fake notes by using some computer algorithms which must be easy to understand others and should be simple to implement. The project uses image processing technique to find the currency is real or duplicate. Image Processing is a method to perform some operations on the image in order to get an enhanced image. It will be considered as the vast and complex field for achieving good results. According to the literature, image processing is the most significant method in currency recognition area. The program is completely designed using Python language to perform the expected task. The proposed system determines the duplicate currencies based on their security thread. Here the image of currency is feed as input and gives the final result by applying various techniques and algorithms. This security thread appears to the left side of the Mahatma's portrait. The currency is scanned or captured by mobile and fed as input, based on the appearance of the security thread the algorithm detects the real currency and fake currency. 2. LITERATURE REVIEW Vipin Kumar Jain [2019] has proposed a paper Recognition of Fake currency detection by image processing technique. This paper based on Android Mobile Phone Using Digital Image Processing. This is convenient for Hand use, which captures image using android cell phone live in

type of video and it is feed into software and it is changed over in gray scale design, binary image and then it performs a task, finally block of each character from complete images was found. Amol A. Shirsat, S.D. Bharkat [2013] made a proposal of Currency Recognition System. It contains three sections. In first section the process is extracted by the feature of applying toolbox MATLAB. The second section is currency recognition such as neural network is used. And finally, the result is displayed on pc. S. S. Veling, Miss. Janhavi P. Sawal , Miss. Siddhi [2019] have proposed a paper Fake Indian Currency Recognition System by using MATLAB proposed under hyper spectral imaging mode with different lights and different wavelengths. The comparison of features used image processing algorithms.

Prof. Madhav Thigale, Lina Ladhane [2017] made a proposal to convert from Note to Coin using Image Processing. The Indian currency note will be identified by placing the note with the help of image processing. MATLAB algorithm is used for detection of the value of note using UV LED and photodiode. Ms. Monali Patil, Prof. Jayant Adhikari, Prof. Rajesh Babu [2021] they proposed a system which uses K-means algorithm to distinguishes between features of a real note and a fake note. Mayadevi A. Gaikwad, Vaijinath V. Bhosle Vaibhav D Patil [2021] In their research paper they have suggested a methodology purely based on software processing detecting from the real by comparing their visual features such as distance between Gandhiji's portrait and other notations. Neeru Rathee, Arun Kadian, Rajat Sachdeva, Vijul Dalel, Yatin Jaie [2022] They proposed a content image processing along with supervised machine learning to distinguish the currencies. Akanksha Upadhyaya Research Scholar, Vinod Shokeen Associate Professor,

Garima Srivastava [2022] In their proposal they used image processing along with logistic regression gives an accuracy of 99%. Deborah, Soniya and Prathap [2014] have proposed a paper Detection of Fake currency using Image Processing. In this proposal the image to be crop, smooth and adjust. Then convert the image into gray color. After conversion apply the image segmentation for comparison. Renuka Nagpure, Shreya Sheety, Trupti Ghotkar [2018]. They have proposed a system to find fake notes based on the floral designs provided by RBI. Eshita Pilania, Bhavika Arora [2020] proposed to compare images of currency with the stored data and used MATLAB to run and perform the operations of the system. The feature extraction focused on HSV values that divide the image into blocks and the operations are performed. P. Julia Grace, Ph.D., A. Sheema, [2019] the survey paper proposes a system to improve the currency detection system especially in commercial areas like banks, shopping malls, etc. Here radiometric corrections and Geometric corrections are used for correcting spectral errors. The results were provided based on the accuracy rate obtained by using different methods. Komal Vora, Ami Shah, Jay Mehta [2022] a system is proposed to detect fake currency based on different features that can be extracted for comparison. The features that were used for currency detection were RBI micro-print, security thread and serial number.

Existing Work

From the above observations it has been seen that distinguishing the original currency from the fake involves certain number of stages and also being used with bequest version of machine learning

algorithm. These stages are very important for counterfeit. Basically, it involves in four segments. For processing each segment, the front side of the currency is taken for considerations. The first stage is to capture the image and feed as input. The next stages are preprocessing, converting to gray scale, detecting edges and finally segmentation.

Proposed Work

The proposed work contains some advantages of existing system and discards the disadvantages. This proposed method will work and it is implemented by the following methods.

➤ Input feed of currency note using digital camera.
➤ Preprocessing the captured image
➤ Converting to grayscale
➤ Perform detection of security thread
➤ Perform comparison with legitimate image
➤ Identify the currency based on condition satisfied

Input Feed

The image of the currency is captured through mobile or is may be scanned.

Preprocessing

In this method the captured image is resized in a standard format for further processing.

Converting to Gray Scale

The intensity information is carried by gray scale which is ease for processing. So that conversion of gray scale is necessary. Also, time consumption is less.

Security Thread

The security thread appears to the left side of the Mahatma's image. It is fully embedded. The width of the security thread is 1.4mm and the fluorescence is yellow and also visible as a continuous line under UV light.
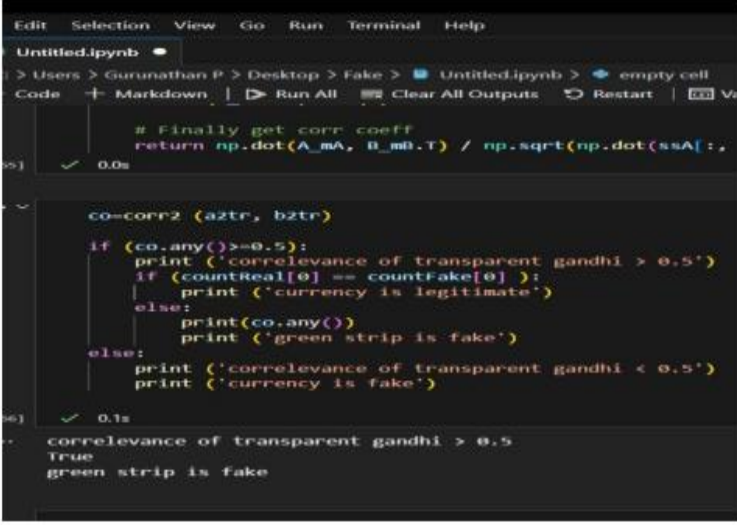
Comparison with Legitimate Image

By using Python programming and Jupiter notebook the currency is determined as fake or original.
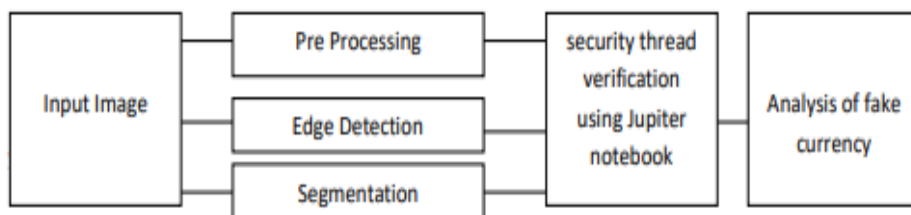
Figure 1 Proposed Work Flow Diagram

Result and Conclusion

From the currency image, it is concluded that the feed image is real or duplicate based on security thread. The program which is coded using jupyter notebook in python language. If the condition satisfied then the result will be displayed as:

References

1. M. Thakur and A. Kaur, "Various fake currency detection techniques," International Journal for Technological Research in Engineering, vol. 1, no. 11, pp. 1309-1313, July 2014.
2. K.K Debnath, S. Ahmed, Md. Shahjahan, K. Murase, "A paper currency recognition system using negatively correlated neural network ensemble," Journal of Multimedia, vol. 5, p. 560, 2010.
3. Dr. Vipin Kumar Jain "Fake currency detection" S.S. Jain Subodh P.G. College, Volume 10, Issue-II June 2019.
4. Amol A. Shirsat, S. D. Bharkat "Paper currency recognition system" Government College of Engineering, Volume 10, Issue-I April 2013.
5. S. S. Veling , Miss. Janhavi P. Sawal, Miss. Siddhi " Fake Indian currency Recognition using MATLAB " Shrikshan Prasarak Mandal's College of Engineering. Volume 7, Issue IV April 2019.
6. Prof. Madhav Thigale, Lina Ladhane "Note to coin converter using digital image processing" Dr. D. Y. Patil Institute of Engineering Management and Research, Volume 4, Issue III March 2017.
7. Zhou Wang, Alan C. Bovik "Image quality assessment: from error visibility to structural similarity" IEEE Transactions on Image Processing, Volume 13, Issue IV April 2004.

8. Vedasamhitha Abburu, Soumya Gupta, "Currency recognition system using image processing" National Institute of Technology, August 2017.

9. Vivek Sharan, Amandeep Kaur," Detection of Counterfeit Indian Currency Note Using Image Processing" International Journal of Engineering and Advanced Technology (IJEAT), Volume.09, Issue:01, ISSN: 2249-8958(October 2019)

10. Aakash S Patel, "Indian Paper currency detection" International Journal for Scientific Research & Development (IJSRD), Vol. 7, Issue 06, ISSN: 2321-0613(June 2019)

11. Archana M Kalpitha C P, Prajwal S K, Pratiksha N," Identification of fake notes and denomination recognition" International Journal for Research in Applied Science & Engineering Technology (IJRASET), Volume. 6, Issue V, ISSN: 2321-9653, (May 2018).