

Fake Currency Detection Application

Aakash Vidhate¹, Yash Shah², Ram Biyani³, Himanshu Keshri⁴ and Prof. Rupali Nikhare⁵

¹⁻⁴Student Dept. of Comp. Engineering, Pillai College of Engineering, New Panvel, Maharashtra, India

Abstract— Fake currency is the money produced without the approval of the government, creation of it is considered as a great Offence. The elevation of colour printing technology has increased the rate of fake currency note printing on a very large scale. Years before, the printing could be done in a print house, but now anyone can print a currency note with maximum accuracy using a simple laser printer. This results in the issue of fake notes instead of the genuine ones has been increased very largely. It is the biggest problem faced by many countries including India. Though Banks and other large organizations have installed Automatic machines to detect fake currency notes, it is really difficult for an average person to distinguish between the two. This has led to the increase of corruption in our country hindering the country's growth. Some of the methods to detect fake currency are watermarking, optically variable ink, security thread, latent image, techniques like counterfeit detection pens. We hereby propose an application system for detecting fake currency where image processing is used to detect fake notes. We are going to detect the variation in barcode among the real and fake one and also, we will find out dissimilarities between the image under consideration and the prototype. CNN classifiers will be used to detect fake currency. The proposed app for fake currency detection will be simple, accurate and easy to use.

Keywords—Fake currency, Offence, hindering, watermarking, optically variable link, counterfeit detection pen, application system, variation in barcode, local key points, CNN classifier, accurate, easy.

1. Introduction

Computers and mobile phones have become an unavoidable part of our lives. There are a lot of things which we can do with these technologies. With the rapid development of mobile phones and technologies come several services like **application creation** - (refers to the process of making application software for handheld and desktop devices such as mobile phones, personal computers and Personal Digital Assistants. Through the usage of apps, the user is provided with various features that will enable him to fulfil all his needs and much more. Apps should be interactive to the users, **Camera/webcam**

services- includes use of camera services for processing various aspects of image. Fake currency Detection is a system that can be used to overcome the limitations most of the people and our institutions of higher learning face with respect to making difference between **counterfeit currencies**- (is imitation currency produced without the legal sanction of the state or government, usually in a deliberate attempt to imitate that currency and so as to deceive its recipient) and real currencies. The project involves making use of Digital Image Processing Domain - Digital image processing is the use of computer algorithms to perform image processing on digital images.

2. Literature Survey

[1] The paper titled as “Fake currency Detection using Basic Python Programming and Web Framework” (2020) presented by Prof Chetan More, Monu Kumar, Rupesh Chandra, Raushan Singh. System proposed in this paper makes use of flask web framework (Flask is micro web framework of python and web programming) and is written in python programming language returned.

[2] The paper titled as “Detection of Counterfeit Indian Currency Note Using Image Processing” presented by Vivek Sharan and Amandeep Kaur in 2019 describes Detection of Counterfeit Indian Currency Notes using Image Processing. In this paper, three major features were taken into consideration; Latent image, Logo of RBI and denomination numeral with Rupee symbol with color part of the currency note. Using these three features they had applied an algorithm which detects counterfeit Indian currency notes.

[3] The paper titled as “Indian Paper currency detection “presented by Aakash S. Patil in 2019, introduced a new technique to improve the Recognition ability and the transaction speed to classify Indian currency. It involved making use of OpenCv library of computer functions mainly aimed at real-time computer vision which covered functions such as note identification, segmentation and Recognition and NumPy module of Python used for numerical processing, argparse to parse command line arguments cv2 for the OpenCV bindings.

[4] The paper titled as “Identification of fake notes and denomination recognition” presented by Archana MR, Kalpitha C P, Prajwal S K, Pratiksha N proposed Identification of fake note and denomination recognition in 2018 to reduce human power. This system is mainly divided into two halves: currency recognition & conversion system. They made use of a software interface which could be utilized for different types of monetary standards.

[5] The paper titled as “Fake currency detection using Image processing” presented by S. Atchaya, K. Harini, G. Kaviarasi, B. Swathi in 2017 gave the technique called Performance Matrix for the Fake currency detection using MATLAB image processing system. Neural networks and model-based reasoning are the two methods behind this technique. Various methods like water marking, optically variable ink, fluorescence, etc. are used to detect fake currency in this paper.

3. Existing System

From the observation of the papers we can say that there are certain stages which are very important in the existing system architecture. Firstly we have the step called image acquisition means we have to take input as the image only through the scanner and in this there is no use of any digital camera to capture the image in the real time system. In this existing architecture, only the front part of the note is taken into consideration and not the rear part. After that we have next step called as pre-processing method. In this there are basically 3 to 4 sub stages involved like pre-processing, grayscale conversion, edge detection and segmentation.

4. Proposed Work

The proposed system contains the advantages of the existing system and eliminates the disadvantages of it.

The project centers on the design and implementation of Fake Currency Detection Application for the Department of Computer Science, for Pillai College of Engineering. The scope of the project is to provide approaches and strategies, which have proved to be suitable when accessing the image of the desired currency note.

The scope of this project includes:

1. Study existing image detection schemes and concern on recognition base types.
2. Study the usability features of the existing fake currency detection methods from the general and ISO features.
3. Mapping between the recognition-based image

detection system methods and the usability features and extract a collection of usability features to be built in the new system prototype.

The basic plan behind the working of the project includes:

- Applying one of the Machine Learning Algorithms recognized for Image Detection and Processing.
- Training the machine using an already prepared dataset of currency notes, which will contain sample images of fake and real currency notes.
- Analyzing the content of the dataset, using the applied algorithm to extract required features which will help in recognizing other input images of similar format.
- Interpreting a given set of input images, to identify a proportion or distribution of features in it.

4.1 System Architecture

The system architecture is given in Figure 4.1. Each block is described in this Section.

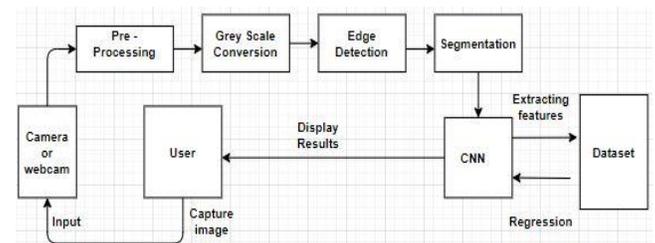


Fig. 4.1 Proposed system architecture

Input: A webcam or phone camera will be used to take the input image by the user. The input image then taken by the user will be used for preprocessing steps such as erosion, dilation and noise cancellation.

Image Processing: Further the input image will be moved into the system for processing wherein the image goes through an algorithm (C. N. N) and series of operations such as grayscale conversion, edge detection, image segmentation, feature extraction and then finally towards templates matching.

Template matching: The template matching will then be used to find the small parts of an image that is needed to be compared with a template/dataset image. It is basically used to assure quality control of image.

Finally, we get output whether the currency is fake or real

5. Requirement Analysis

5.1 Dataset and Parameters

Correlation is a measure of the degree to which two variables agree, not necessary in actual value but in general behavior. The two variables are the corresponding pixel values in two images, template and source. Cross Correlation is used for template matching or pattern recognition. Templates can be considered a sub-image from the reference image, and the image can be considered as a sensed image. An experiment is conducted in order to identify the input/output behavior of the dataset for the system. The sample dataset used in the experiment are identified and given in Table 5.1

Table 5.1.1 Sample Dataset Used for Experiment

Dataset	Source	Users	Items	Type
Indian Currency Notes	Kaggle	81,282	4000 files	Image dataset

5.2 Hardware and Software Specifications

Table 5.2.1 Hardware Details

Processor	Intel Core i3 or more
Storage	20-25 GB or more
RAM	4GB or more

Table 5.2.2 Software Details

Operating System	Windows (7, 8, 10) , Android 5+
Languages Used	Python, Java
Database	MySQL, SQLyog
Software Used	Anaconda, Jupyter Notebook, Android Studio

6. Implementation

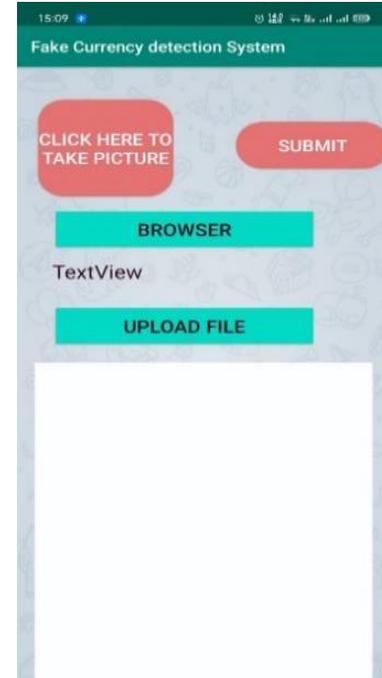


Fig. 6.1: Home Screen (Mobile App)

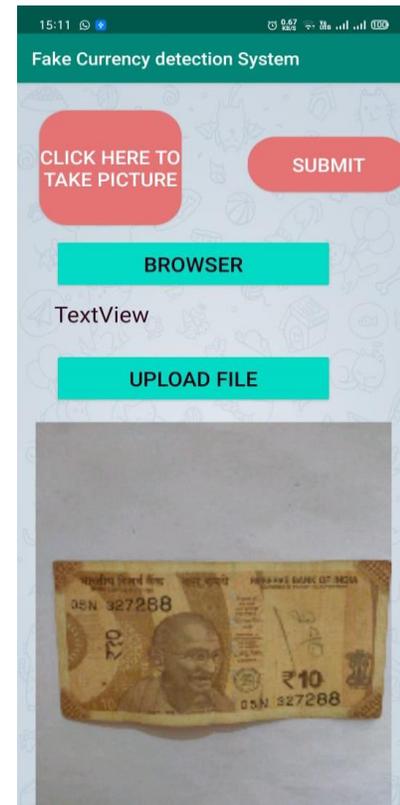


Fig. 6.2: Clicked Image

id	objectnamefound	Captured Image
575	10_new_front 95.66990733146667	
576	static//images1//1619679209461_3.jpg	
577	static//images1//1619679209461_4.jpg	
578	static//images1//1619679209461_5.jpg	
579	static//images1//1619679209461_6.jpg	

Fig. 6.3: Output



Fig. 6.5: Grayscale Conversion

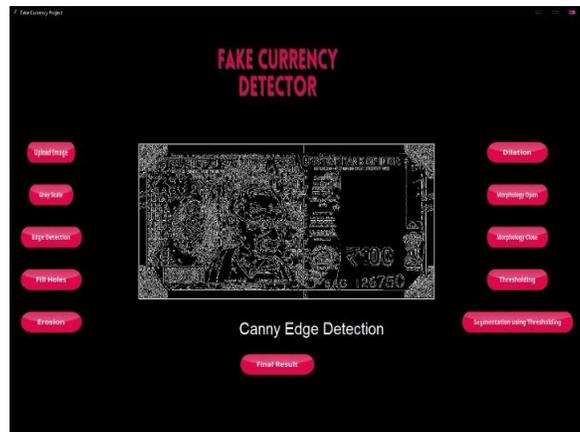


Fig. 6.6: Edge Detection



Fig. 6.4: Home Screen (Desktop App)

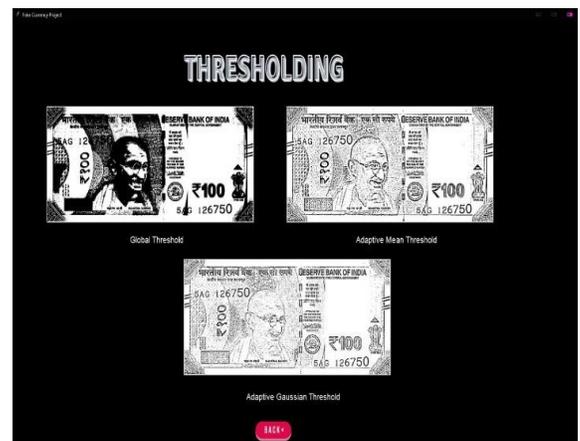


Fig. 6.7: Thresholding

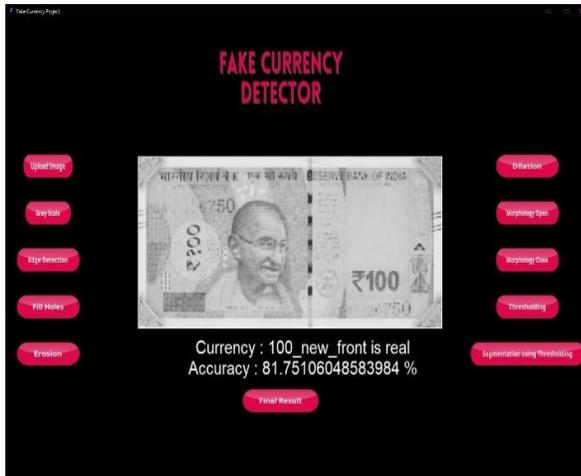


Fig. 6.8: Result (Currency is Real)



Fig. 6.9: Result (Currency is Fake)

current environment, we reviewed multiple research papers out of which we taper down to ten papers and selected five papers as our base research papers. We analyzed all existing architectures of our base papers and by understanding their working we have discovered some flaws in the currently existing system. We have kept all the prime features of existing systems as a primary focus with some of the additional features for our proposed system.

References

[1] Prof Chetan More, Monu Kumar, Rupesh Chandra, Raushan Singh, "Fake currency Detection using Basic Python Programming and Web Framework" IRJET International Research Journal of Engineering and Technology, Volume: 07 Issue: 04 | Apr 2020 ISSN: 2395-0056

[2] 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)

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

[4] 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)

[5] S. Atchaya, K. Harini, G. Kaviarasi, B. Swathi, "Fake currency detection using Image processing", International Journal of Trend in Research and Development (IJTRD), ISSN: 2394-9333 (2017).

Future Scope

Many different adaptations, tests and innovations have been kept for the future due to the lack of time. As future work concerns deeper analysis of particular mechanisms, new proposals to try different methods or simple curiosity.

1. In future we would be including a module for currency conversion.
2. We can implement the system for foreign currencies.
3. Tracking of device's location through which the currency is scanned and maintaining the same in the database.

Conclusion

We commenced with a brief introduction to our system and discussed the scope and objectives of our project. During the literature survey we got an opportunity to look closely into the problem that people are facing in the