

AN ANALYTICAL REVIEW ON IMAGE PROCESSING MECHANISM FOR CURRENCY RECOGNITION

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ABSTRACT

Money is an integral part of our needs so its originality is very important. Circulation of fake money or counterfeit currency can disturb the economic growth process of our country. The concept of fake currency is old as the concept of money itself. Circulation of fake currency can decrease its acceptability. The fake currency is one of the main reason for the economic losses to the countries in the world. Circulation of fake money causes much inconvenience to people. Many people are still not aware of how to detect fake notes and the measures which are to be taken into consideration. Fake currency detection is the biggest problem faced by many countries including India. Though bank and other large organizations have installed automatic machines to detect the 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 country's growth. Some of the methods to detect fake currency are water mark, optical variable ink, security thread, latent image etc. This develops the need to find a better solution, utilizable by common people to check the genuineness of the currency.

With this thesis, we are focusing on an advanced mobile based application that is used to identify fake money. By using it, anyone can easily detect fraud currency using their android mobile cell. Android devices are popular and are mostly portable, hence providing the handy feature of carrying the application with oneself. In the country, the problem is in acute situation and people want easier way to deal with it. As, there are number of android mobile phone users in the country are increasing per day; to provide an android application regarding fake currency detection is a good idea. After choosing the image apply pre-processing. In pre-processing the image to be crop, smooth and adjust. Convert the image into gray color. After conversion apply the image segmentation. The features are extracting and reduce. Finally, compare the image into original or fake.

Keyword: - Currency Recognition, Pre-Processing, Feature extraction, Neural network, Binarization, Image Processing etc....

1. INTRODUCTION

Currency Recognition is an image processing technique which is used by many countries to identify currency. The banknotes from Currency Recognition is an image processing technique which is used by many

countries to identify currency. The banknotes from each side and each direction should be able to recognize by this paper.

During circulation there are some notes which are defaced therefore it is required that the design system should be able to detect worn and torn notes.

There are many different currencies all over the world approximately 50, each of them were looking different. The size and the quality of paper is different, the same is the color and pattern of the currency.

To distinguish different types of currency it is not the easy job for the staffs who work for money exchanging as they have to remember the symbol of each currency.

This issue may cause many problems so it is required to make an efficient system for them. In India, we are habitually of keeping the money in cash format with us. Now-a-days because of the increasing growth in the smartphone or digital devices which is quite portable and easy to get we are enable do almost every work via our smartphones or our digital assistance. so to create a smartphones based application for determining the counterfeit currency is a great idea. This helps in supporting the "Digital India" mission which is being raised for the beneficial of the common man to get access to the internet world via smartphones or mobile phones. Now mobile phones can be made easily available to the people within the low cost. One of the system is proposed is "Survey of Currency Recognition system" Says that in India there is huge number of currency available and usage of that currency is not in good manner so sometimes it becomes hard to recognize it and identify it [1]. In the International Journal "Comparative study of Different Paper Currency and Coin Currency Recognition Method" it is stated that the currency image should be pre-processed by using the MATLAB to find the counterfeit note [2]. There was a novel based approached published on 2011 in ISSN states that identifying the image is known as recognition which should done by the visually impaired person by using the application to empower the use of digital device [3].

1.1 Overview

Modern economy is a money economy where all exchanges take place through money. Satisfaction of human wants is possible with a help of money. The intensity of want and the attainment of utility can be measured easily with the help of money. All economic activities relating to production, distribution, consumption etc. can be motivated by money. Savings and investments can be made in the form of capital information. Thus, money is important in the dynamic society for everything.

As our economy is moving towards the development there are many other things which are downsizing it. One of those things is production and usage of forged bank notes. The worst hit of this action is mostly average citizen as fake banknotes have become so deeply embedded in the Indian economy that even bank branches and ATMs are disbursing counterfeit currency. From petrol stations to the local vegetable vendor, everybody is wary of accepting banknotes in denominations of Rs.500 and Rs.1, 000 as a majority of them are almost impossible to tell from genuine banknotes.

1.2 Objective

The main objectives are :-

- To develop an android application for detecting fake Indian currency.
- Application should be able to detect the currencies in the denomination of 100, 500 and 2000.
- To implement Binarization, feature extraction algorithms for the processing of the note image.
- To improve the accuracy of the result.

2. Security Features of Indian Currency Note

2.1.1 See through register: The small floral design printed both on the front (hollow) and back (filled up) of the note in the middle of the vertical band next to the Watermark has an accurate back to back registration. The design will appear as floral design when seen against the light

2.1.2 Water Marking: The Mahatma Gandhi Series of banknotes contain the Mahatma Gandhi watermark with a light and shade effect and multi-directional lines in the watermark window.

2.1.3 Optically variable link: This is a new feature included in the Rs.1000 and Rs.500 notes with revised color scheme introduced in November 2000. The numeral 1000 and 500 on the obverse of Rs.1000 and Rs.500 notes respectively is printed in optically variable ink viz., a color-shifting ink. The color of the numeral 1000/500 appears green when the note is held flat but would change to blue when the note is held at an angle.

2.1.4 Fluorescence: Number panels of the notes are printed in fluorescent ink. The notes also have optical fibers. Both can be seen when the notes are exposed to ultra-violet lamp.

2.1.5 Security thread: The Rs.500 and Rs.100 notes have a security thread with similar visible features and inscription "Bharat" (in Hindi), and "RBI". When held against the light, the security thread on Rs.1000, Rs.500 and Rs.100 can be seen as one continuous line. The Rs.5, Rs.10, Rs.20 and Rs.50 notes contain a readable, fully embedded windowed security thread with the inscription "Bharat" (in Hindi), and "RBI". The security thread appears to the left of the Mahatma's portrait.

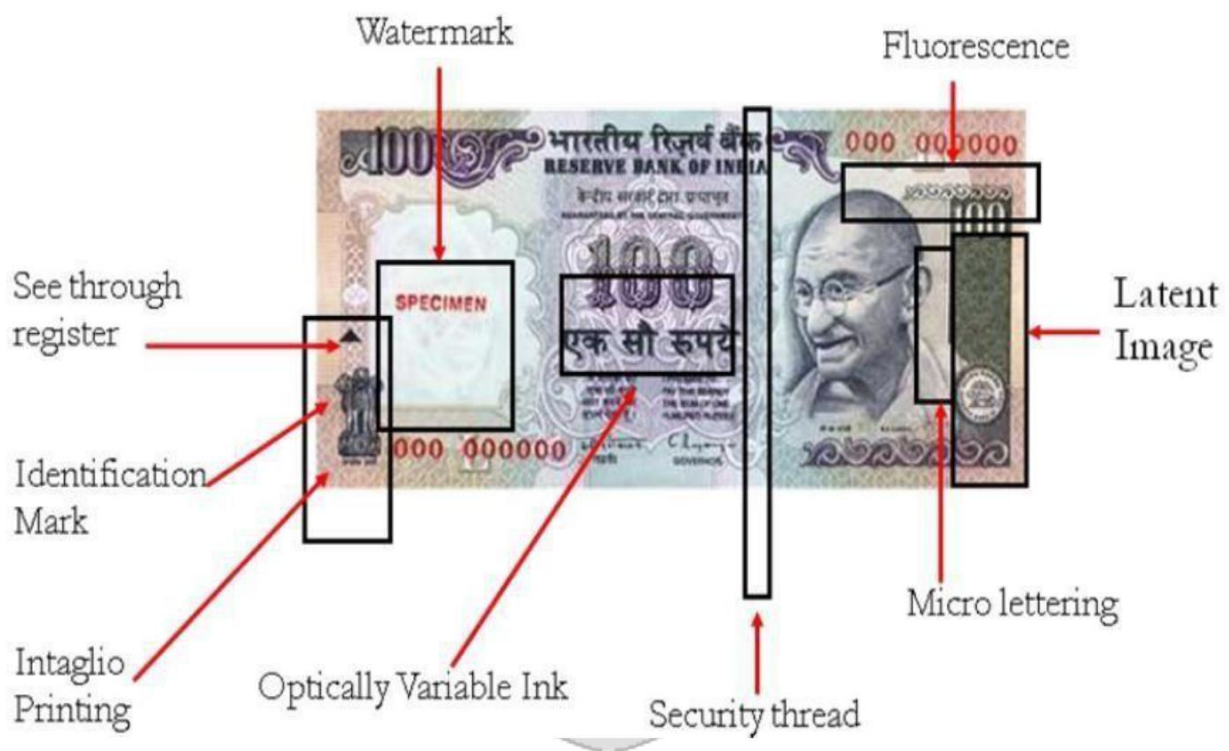


Fig -1: 100Rs note security features

2.1.6 Intaglio printing: The portrait of Mahatma Gandhi, the Reserve Bank seal, guarantee and promise clause, Ashoka Pillar Emblem on the left, RBI Governor's signature are printed in intaglio i.e. in raised prints, which can be felt by touch, in Rs.20, Rs.50, Rs.100, Rs.500 and Rs.1000 notes.

2.1.7 Latent image: On the obverse side of Rs.1000, Rs.500, Rs.100, Rs.50 and Rs.20 notes, a vertical band on the right side of the Mahatma Gandhi's portrait contains a latent image showing the respective denominational value in numeral. The latent image is visible only when the note is held horizontally at eye level.

2.1.8 Micro lettering: This feature appears between the vertical band and Mahatma Gandhi portrait. It always contains the word "RBI" in Rs.5 and Rs.10. The notes of Rs.20 and above also contain the denominational value of the notes in micro letters. This feature can be seen well under a magnifying glass.



Fig -2: New 2000 denomination security feature

2.1.9 Identification mark: Each note has a unique mark of it. A special feature in intaglio has been introduced on the left of the watermark window. This feature is in different shapes for various denominations (100-Triangle, Rs.500-Circle, and Rs.1000-Diamond) and helps the visually impaired to identify the denomination.

3. WORKFLOW

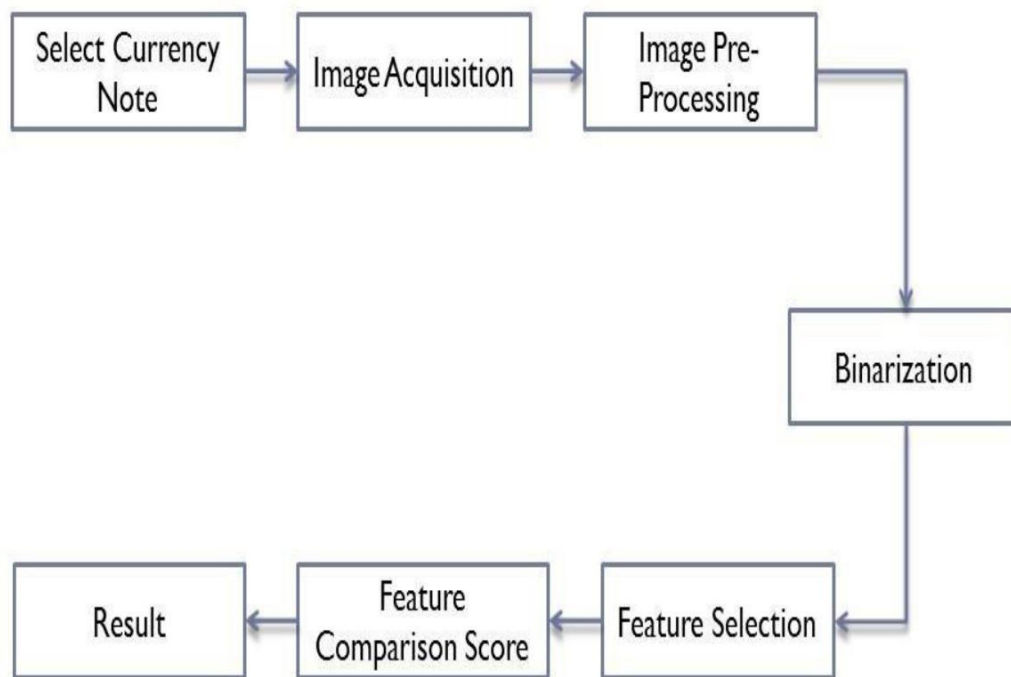


Fig -3: Block diagram

Following are the steps of proposed system:

3.1 Image Acquisition: An action of retrieving an image from source, such as hardware based source ids known as image acquisition. Image acquisition is the first step of processing no processing is possible without an image. With the help of any Digital device the image can be created. We can use the digital camera of the mobile phone to create an image for processing

3.2 Pre-Processing: This step is performed to destroy the unwanted distortions in the image and to enhance some important features of the images for further processing and analysis. It includes image adjusting and smoothening.

3.3 Binarization / Gray scale conversion: Binarization is also called as gray scale conversion algorithm. In this process, the captured image is converted into gray scale format. Usually the acquired image is in red, blue and green in color. This application converts it into gray scale format because it carries only the intensity information which is easy to process instead of processing RGB components. It helps to provide the optimal result.

3.4 Feature extraction: Feature extraction is also known as feature selection. It is the special form of dimensionality reduction. Feature extraction observes the visual content of the image for indexing and retrieval. This method simplifies the comparison of captured image with the legal stored image of the note by extracting features from the captured image of the note.

3.5 Feature comparison score: This step performs comparison of features between the captured and legal stored image of the note. It gives the result where all the extracted features are used to match with the original currency note. If it matches, application gives result as original otherwise gives result as fake.

4. CONCLUSIONS:

By using various methods of image acquisition, feature extraction and feature comparison, this application provides a base for the end users interested in currency recognition system.

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