



Android Application for Scan a Fake Currency: “Money Detector”

Harsh Sheth¹, Kushal Bhatt²

¹Computer Science & Engineering, B.H.G.C.E.T

²Computer Science & Engineering, B.H.G.C.E.T

Abstract — Forged or fake currency is the largest problem in the country like India. Forgery is intense in currency transactions also hard to detect in day to day life. Latest advancement in the printing has made it difficult for the layman & shopkeeper to recognize fake currency in monotonous routine. As far as smart phones are concerned every human has a smart phone with them. So an application which can detect fake currency notes it is a big advantage for people can be prevented from being victim of frauds. People can take it everywhere with them & it also provides service freely.

Keywords— Fake Money, Fake Currency Scanner, Prevent Money Fraud, Counterfeit Notes, Image Processing, Gray Scale Conversion, Edge Detector, Image Segmentation

I. INTRODUCTION

As far as the forgery is concerned, the problem is very rigid so the solution must be robust & efficient. Also the economy of the nation is concerned and is greatly challenged by forged currency. With the help of image processing, forgery can be minimized to a great extent. Advancement in the graphics & image processing can be helpful. Image processing uses pixels to identify the authenticity of the currency. Every pixel has the unique label attached to it. When same label is found on the pixel of scanned image with template image, the image gets verified and thus the results is displayed if the note is real or forged.

II. REASON BEHIND THE PRODUCT

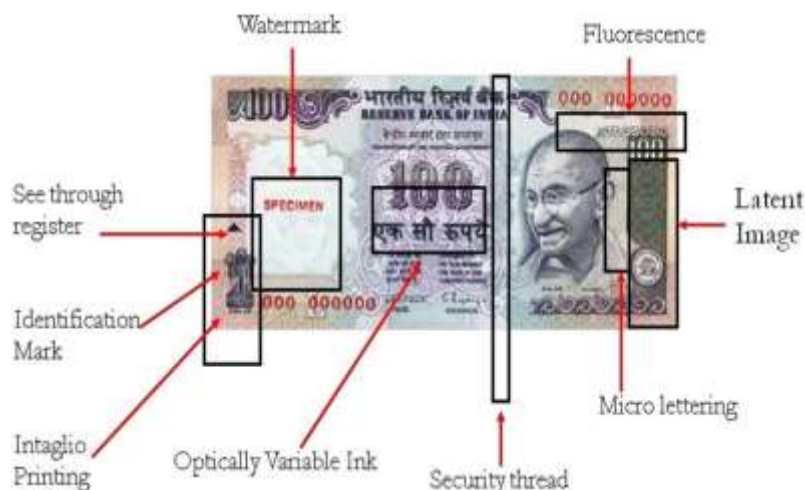
The reason behind the product is mainly money frauds occurred in India increasing more & more. The examples are given below

- 1) Lucknow bank hit by Rs 11 crore fake notes scam
Fake currency notes worth Rs 11 crore were recovered from an ICICI bank branch in Lucknow. [4]
- 2) Rs 10 crore fake notes found in ICICI bank currency chest. [5]

& many more examples we are watching in our day to day life. And to prevent them we are trying to make this type of product & get a chance to serve the nation.



III. SECURITY FEATURES OF INDIAN BANKNOTES [2][3]



3.1. Watermark

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.

3.2. Security Thread

Rs.1000 notes introduced in October 2000 contain a readable, windowed security thread alternately visible on the obverse with the inscriptions 'Bharat' (in Hindi), '1000' and 'RBI', but totally embedded on the reverse. 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. Notes issued prior to the introduction of the Mahatma Gandhi Series have a plain, non-readable fully embedded security thread.

3.3. 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.

3.4. Micro lettering

This feature appears between the vertical band and Mahatma Gandhi portrait. It 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 better under a magnifying glass.

3.5. 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.

3.6. Identification Mark

A special feature in intaglio has been introduced on the left of the watermark window on all notes except Rs.10/- note. This feature is in different shapes for various denominations (Rs. 20-Vertical Rectangle, Rs.50-Square, Rs.100-Triangle, Rs.500-Circle, Rs.1000-Diamond) and helps the visually impaired to identify the denomination.

3.7. 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.

3.8. Optically Variable Ink

This is a new security feature incorporated 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.

3.9. 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 one floral design when seen against the light.

IV. DESIGN FLOW OF AUTOMATIC RECOGNITION OF GENUINE AND FAKE INDIAN NOTES [1]

4.1. System Architecture

The below diagram shows step-by-step process of this paper currency verification system



Fig. 2 Design flow of automatic paper currency verification system

4.2. Modules

4.2.1. Image acquisition

The scanned picture is sent to image processing system falls under this image acquisition. This phase captures the image of the finest quality.

4.2.2. Gray scale conversion

This phases converts scanned image into gray image merely known as gray scale conversion. It includes gray of black & white conversion of the note.

4.2.3. Edge detector

This crops the scanned image from their images. This is done to identify the image at very basic level.

4.2.4. Image segmentation

This function separates image into various segments based on their brightness.

4.2.5. Characteristic extraction

This feature extracts the image at their pixel level. This feature is used to identify the correctness of the notes.

4.2.6. Comparison

This process or feature compares the scanned image with the template image . This is done by image processing system of the application.

4.2.7. Output

This is the final result which is given by the android application. This is the phase where the note or currency gets identified whether it is fake or not.

V. IMPEMETATION



Step: 1 – Starting page

This image shows the home screen of the android application which scans the notes.



Step: 2 – Menu page

The image shown here is the next page of the application. It merely has 3 features displayed.

1. Start scan
2. Manual
3. FAQ [frequently asked question].



Step: 3 – Manual page

The image shown is the 3rd page of the application. It has the following options:

1. Optical variable link
2. Water mark
3. Id mark
4. See through register

These all are the features which are available on the notes or currency for verification. By clicking on them user comes to know about various information.



Step: 4 – Water Mark page

This image shows the description of watermark on the 500 rupee note. This description is very useful to the users.



Step: 5 – Scanning page

This picture shows the option to scan the note or currency to facilitate the user.



Step: 6 – Result page

This screenshot shows that after inspection the note is fake & is displayed by the application. Hence user can know the correct result.

VI. FUNCTIONAL & NON FUNCTIONAL REQUIREMENT

6.1. Functional requirement

The android application should take the image & should be able to send it to the image processing system of the application. The counterfeit note must be recognized by the application and must be conveyed to the user after verifying.

6.2. Non-functional requirement

The android application should not have a lag or delay in the processing of the image. Moreover the application must have the accuracy as much as it can reach. The application must provide the satisfactory results for positive as well as negative test cases.

VII. LIMITATION

7.1. Input limitation

Image captured by the camera should be in the center of the screen. The image taken by the camera should cover 100% of the image. The note or currency should be of the decent quality & should not have the irrelevant marks on them.

7.2. Illumination limitation

The note or currency which needs to be scanned must have sufficient & good exposure to the light. The UV feature provided by the RBI must be checked in every note or currency so picture should be clicked in the low light with enhanced exposure to light.

VIII. CONCLUSION

We wish to provide the android application which can make difference between fake or forged currency. This is a step forward to serve the nation in a better way. Also various features will be provided in the application so that the layman & shopkeeper can easily find out the forged currency.

IX. REFERENCES

- [1] M.Deborah, C.Soniya, Prathap.M.E, "Detection of Fake currency using Image Processing", IJISSET - International Journal of Innovative Science, Engineering & Technology, Vol. 1 Issue 10, 2, December 2014.
- [2] Binod Prasad Yadav, C. S. Patil, R. R. Karhe, P.H Patil, "An automatic recognition of fake Indian paper currency note using MATLAB", International Journal of Engineering Science and Innovative Technology (IJESIT) Volume 3, Issue 4, 2, July 2014.
- [3] Reserve Bank of India - Security Features find at https://www.rbi.org.in/currency/Sec_fea_Rs500.html
- [4] Lucknow bank hit by Rs 11 crore fake notes scam find at <http://www.dailymail.co.uk/indiahome/indianews/article-2599990/Lucknow-bank-hit-Rs-11-crore-fake-notes-scam.html>
- [5] Rs 10 crore fake notes found in icici bank currency chest find at <http://www.dailypioneer.com/state-editions/lucknow/rs-10-crore-fake-notes-found-in-icici-bank-currency-chest.html>