International Journal of Modern Developments in Engineering and Science
Volume 1, Issue 5, May 2022
https://www.ijmdes.com | ISSN (Online): 2583-3138

A Review on Fake Currency Detection using Feature Extraction

Nikhat Yasmeen[1*], S. Nida[2], Nishath Fathima[3], Mohammad Aftab[4], N. R. Deepak[5]
[1,2,3,4]*Student, Department of Computer Science and Engineering, HKBK College of Engineering, Bangalore, India*
[5]*Professor, Department of Computer Science and Engineering, HKBK College of Engineering, Bangalore, India*

***Abstract*: Fake currency identification is a serious problem all around the world, affecting the economies of almost every country, including the United States. The prospective agreements are to make use of either the currency's synthetic qualities or make use of its physical look. The information presented in this study is dependent on physical conditions. The appearance of the Indian currency. It has been received those calculations are being prepared. Removing the highlights, such as security string, intaglio printing (RBI logo) and distinctive characteristics proof imprints, which have come to be accepted as Indian currency security highlights. To accomplish this, system that is becoming increasingly strong and precise. All three highlights have received a conclusive score. Intertwined to distinguish between authentic and fake monetary benchmarks The finding of counterfeit money The suggested system has an accuracy of one hundred percent. The mean square blunder, which is around 1%, is used to quantify the presentation of the proposed system. It may be accepted by ordinary persons as well, who are frequently faced with the problem of distinguishing between genuine and counterfeit monetary standards.**

***Keywords*: Fake currency detection.**

1. Introduction

Each country's monetary advancement is generally reliant on its currency, and each individual is a component of the economy; however, a portion of the unsocial gathering of individuals harms this procedure and unbalances the country's social concordance. As an example, Currently, in the process of demonetization, there are long lines in front of banks and ATM machines of ordinary citizens who contribute to our economy by covering regulatory obligations, yet many debased individuals are giving the cash legitimately through underhandedness sources, which is clearly affecting India's monetary status. As we all know, in India, the Ministry of Finance and the Reserve Bank of India (RBI) are authorized to issue currency notes and coins. Degenerate individuals, on the other hand, use cutting-edge printing and checking improvements to print counterfeit notes by utilizing cutting-edge equipment, devices, and processes. Finding the fake currency from the first one is what fake currency identification entails. Generally, currency recognition systems are used in banks, business firms, retail centres, railroad stations, government areas, and associations, among other places. [1] However, ordinary folks lack a source of cash location and are unable to distinguish genuine unique currency. This is the reason why the phoney currency misbehaviour has been accomplished. In our economy, we speak plainly. [2] To date, a large number of analysts have pledged their support in discovering a way for separating the genuine currency notes from counterfeit notes.

2. Literature Survey

Money counterfeiting is not a new phenomenon; it has existed since the Greeks began coining money around 600 B.C. During that time, the edges of coins were chopped off to get precious metal, which was then utilised to create counterfeit money. Paper money first appeared in China in the 1200s, when mulberry tree wood was utilised to manufacture money. During that period, guards were responsible maintaining mulberry woods, and counterfeiting money was punished by death. Money counterfeiting is an old evil, according to history. The problem persists in modern times, which necessitates the employment of various printing techniques and the use of various types of materials. Currency features have been included with the goal of making it easier to detect counterfeit [2]. However, as technology and the internet have advanced, as science progresses, new methods for detecting counterfeit emerge. Money is on its way, making this chore rather difficult. easier with a reasonable amount of precision Modern Holograms and multicoloured images are examples of approaches. stripes, a forgery of an iodine-containing pen (which interacts with the starch in paper currency) and the use of UV light to identify counterfeit currency [3,4]. However, all of the modern gadgets employed in banks today are inaccessible to non-experts, therefore the challenge of identifying fraudulent money persists. society. In this study, we propose a method. It has the potential to be used by laypeople to detect forged currency The application of digital images Processing for this purpose provides us with a cost-effective solution. option to making a strong counterfeit money detection system that can assist society as a whole. e. Image processing has been used to identify phoney Bangladeshi cash notes by Ahmed et al [5]. The authors of Ogeila et. al. [6] have also presented a method for detecting phoney currencies in electronic currency exchange. As far as ATM money deposit is concerned, the phoney

*Corresponding author: nikhatyasmeen06@gmail.com

currency identification had a tremendous impact [7]. Santhanam et. al. [8] explored a different strategy, combining image processing with polarisation idea and holographic detection technologies. Alshayeji et. al. [9] adopted bit-plane slicing approach for fake currency detection. A review of the recent methods for fake currency detection was presented in [10] and can be referred for detailed description. Recently, Lim et. al. [11] presented an approach named as hyper spectral imaging for currency counterfeit detection. Although the improved resolution resulted in superior performance, scanning at a slower rate was a disadvantage. Baber et al. [12] came up with a solution to the problem of sluggish speed by using image processing to identify the borders of the paper notes. As a result, we have developed new algorithms for extracting security aspects from the edges. We describe an image processing-based strategy for detecting fake cash, motivated by recent breakthroughs in the area of image processing and the availability of low-cost picture collecting equipment. Fake cash is detected by extracting numerous attributes from Indian currency. Figure 2 depicts the general layout of the planned project. Using an image capture instrument, the picture was taken. Multiple image processing methods were used to extract security characteristics, after which template matching was used to detect counterfeit money. The technique discussed here is unique in that it uses image processing to extract security characteristics from cash photos that have already been provided.

3. Currency Features

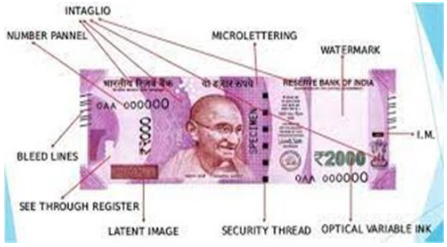

Fig. 1. Currency features

To make the broader public aware, we are publicizing some security aspects of currency notes so that counterfeit notes can be discovered.

1. Security Thread: The security thread is visible on one side of the Mahatma's portrait. The security thread is simple. Completely implanted security that is indecipherable thread. In any event, the has been in effect since October 2000. Rs. 2000 banknotes are distinguished by a windowed pattern. The security thread reappears on the face of the card. the words "RBI" and the years "2000" and "2001" are carved into the metal. All currency notes are threaded securely. There was a single continuous line of security thread when the notes were brought up to a light source.

2. Watermark: There are light and shadow effects and multi-directional lines in the Mahatma Gandhi watermark window on the banknotes of the Mahatma Gandhi Series.

3. Micro-Lettering: This feature appears between the vertical band and the image of Mahatma Gandhi. It has the word "RBI" in both Rs. 5 and Rs. 10. The denominational value of the notes is also printed in micro-letters on notes worth Rs.20 and higher. With the use of a magnifying glass, this characteristic can be clearly seen.

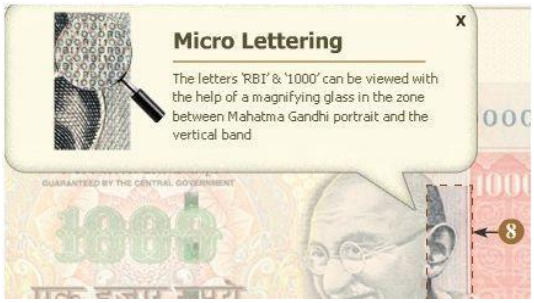

Fig. 2. Micro lettering

4. Latent Image: Right next to Mahatma Gandhi's face on obverse side of rupee banknotes is a vertical strip with a latent image representing the corresponding denominational value in numerical order. At eye level, when the note is held horizontally, a picture is seen.

Fig. 3. Latent image

5. Identification Mark: A specific intaglio feature has been introduced to the left of the watermark window on all notes in order to aid the visually impaired. Various forms and denominations are available for this occasion, such as Rs. 20 for a Vertical Rectangle, Rs. 50 for a Square, Rs. 100 for a Triangle, and Rs. 500 for a Circle.

6. Intaglio Printing: The images in figure 4's boxes were produced using intaglio printing, which produces raised print that can be felt with a light touch. This feature is included on bank notes for the benefit of blind people. This document's seal, guarantee and promise clause, and signature of the RBI Governor are all intaglio printed. The Ashoka Pillar Emblem is also printed in this manner, as is the Mahatma Gandhi picture.

Indian currency notes in values of Rs. 20, Rs.50, Rs.100, Rs.500, and Rs.2000 were printed in this manner.

Fig. 4. Intaglio printing

7. Optically Variable Ink or Colour-Changing Ink: It has been added to the Rs.1000 and Rs.500 notes since November 2000 as a new kind of security. The numeral numbers 2000 and 500 are written using optically variable ink, a color-changing ink, on the obverse of the Rs.2000 and Rs.500 notes. Green

appears on the number 2000/500 when held flat, while blue shows on the numeral when held at an angle.

8. See through Register: This feature is activated when the note is held up to the light.

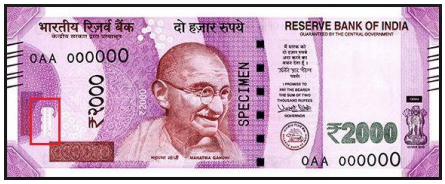

Fig. 5. See through register

Front-to-back registration is proper for the little floral design printed on both sides and center-to-vertical strip next to Watermark on both front and back of note.

9. Fluorescence: Fluorescent ink is used to print the note's number panels. The bills have optical fibres as well. Using an ultra-violet light, two notes may be viewed at the same time.

Fig. 6. Fluorescence

4. Conclusion

In this research, an effective method for extracting and recognizing the properties of Indian rupee notes is presented. The study also includes detection and identification of counterfeit cash. Our future work will focus on faster and more accurate fake currency identification with the use of modern image processing algorithms. Our future scope will include currency denomination conversion.

References

[1] Security Features of Indian Banknotes, Available at: https://www.rbi.org.in/scripts/ic_banknotessecurity.aspx

[2] D. Alekhya, G. D. S. Prabha, and G. V. D. Rao, “Fake currency detection using image processing and other standard methods,” International Journal of Research in Computer and Communication Technology, vol. 3, no. 1, pp. 128-131, January 2014.

[3] 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.

[4] Y.Q. Meng, “Study design on anti-fake detection method for CNY100. 00 banknote,” in Applied Mechanics and Materials, vol. 574, pp. 457-461, August 2014.

[5] Z. Ahmed, Y. Sabina, M. N. Islam, and R. U. Ahmed, “Image processing-based feature extraction of Bangladeshi banknotes”, Software, Knowledge, Information Management and Applications (SKIMA), 8th International Conference on IEEE, pp. 1-8, 2014.

[6] M. R. Ogiela and P. Sulkowski, “Protocol for detection of counterfeit transactions in electronic currency exchange,” Cryptography and Security Systems, pp.145-152, Springer Berlin Heidelberg, 2014.

[7] K. Satish, Y. K. Viswanadham, and I. Leela Priya, “Money to ATM–fake currency detection," International Journal of Computer Science and Information Technologies, vol. 3, no.5, pp. 5046- 5050, 2012.

[8] K. Santhanam, S. Sairam, V. Sriram, and A. M. Kumarasamy, "Counterfeit currency detection technique using image processing, polarization principle and holographic technique," in Computational Intelligence, Modelling and Simulation, 2013 Fifth International Conference on, pp. 231-235, 2013.

[9] M. H. Alshayeji, M. Al-Rousan, and D. T. Hassoun, “detection method for counterfeit currency based on bit-plane slicing technique,” International Journal of Multimedia and Ubiquitous Engineering, vol. 10, no. 11, pp. 225-242, 2015.

[10] A. Shah, K Vora, and J. Mehta, “A review paper on currency recognition system,” International Journal of Computer Applications, vol. 115, no. 20, pp. 1-4, 2015.

[11] H.T. Lim and M. V. Matham, “Instrumentation challenges of a pushbroom hyperspectral imaging system for currency counterfeit applications,” In International Conference on Optical and Photonic Engineering, pp. 95242I-95242I, July 2015.

[12] A. Babar, S. Jawalekar, K. Yadav, and D. B. Salunke, “Counterfeit currency detector,” International Journal of Technical Research and Applications, vol.3, no. 3, pp. 106-108, May 2015.

[13] B. R. Kavya and B. Devendran, “Indian currency detection and denomination using SIFT,” International Journal of science, Engineering and Technology Research, vol. 4, no. 6, pp. 1909- 1911, June 2015.