

A Review on Designing of Fake Currency Detection System

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Abstract –

The production of duplicate and fake currency has increased with a tremendous amount with the advancement in color print technology. Fake currency is a threat which cannot be easily recognized.

Currency detection is a critical problem in various applications such as ATMs, vending machine and currency detection machines. With the increasing globalization of the world economy there is growing demand for accurate and reliable currency detection systems.

The proposed system has practical applications in areas such as financial transactions, currency exchange and International trade. It is designed to be fast, accurate and scalable, capable of handling a wide range of currencies.

Our research paper introduces a currency detection project that utilizes computer vision techniques to detect and classify banknotes. The proposed system uses image processing and machine learning algorithm to recognize the currency denomination and authenticity. The dataset for training and testing the proposed system is collected and labeled to ensure the accuracy and reliability of the system. Practical outcomes prove that this system aims high precision rates for both currency denomination and authenticity detection, making it an efficient and reliable solution for currency detection.

Keywords: Currency Detection, Demonetization, Image Processing, features, System.

Introduction

Monetary development of any country generally depends on its currency, and each individual is a element of the element. Currency plays a vital

role in developing a country's economy. It can promote or even interrupt economic growth.

Fake currency detection is the process of identifying counterfeit money that looks similar to real currency but is actually fake. The detection of fake currency is important in order to prevent fraudulent activities such as counterfeiting and money laundering. Fake currency is manufactured without legal approval of Government or State for imitating the currency.

Let's take an example of India. India is a vast country with major of political issues like black money, corruption and fake currency. In 2016 Indian Government declared the demonetization of all 500 and 1000 Rupee notes. The main reason for this was to tackle fake currency and black money. Since the past century governments were taking the decisions of demonetization. Though the currency which was demonetized may differ, the major objective remained the same means to curb the circulation of fake currency. This decision was taken by keeping the national interests on priority. As the people were forced to deposit their cash in banks, which verified the authenticity of the currency, demonetization helped in curbing the circulation of fake currency notes.

The circulation of fake currency can cause several problems for individuals, businesses, and the economy as a whole. Some of the major problems caused by fake currency are - Loss of value, increased inflation, Loss of revenue, Legal issues, Damage to reputation and Funding illegal activities. It can undermine the stability and trust in the monetary system, leading to significant economic and social consequences. It is important to take measures to prevent and detect counterfeit currency to mitigate these problems.

The industries across the world lose large amounts to fraudsters. These losses affect the

manufacturers as well as involves communal expenses. Consumers are the ultimate victims of this unfair competition. Even at an excessive amount, they receive poor-quality services and are supposed to face health and safety related issues sometimes. There is increasing concern that imitating is related to other criminal activities, such as trade in narcotics and money laundering.

I. LITERATURE SURVEY

1. Paper titled "Counterfeit Currency Detection Using Basic Python Programming and Web Framework" (2020) Presented by Prof. Chetan More, Munu Kumar, Rupesh Chandra, Roshan Singh. The system proposed in this paper uses the Flask web framework (Flask is a micro-web framework for Python and web programming) and is written in the python programming language.
2. Paper titled "Counterfeit Currency Detection Application (2021)" presented by Prof. Rupali Nakhare, Akash Vidhate, Yash Shah, Ram Bayani, Himanshu Keshri. The proposed system uses CNN algorithm to detect counterfeit currency using image processing.
3. Ms. Zarina Begum, Dr. SA Qadri, Mr. Syed Muhammad Abrar Qazi presented a paper titled "Identification of Counterfeit Indian Currency" in 2021. The method is used in the system proposed in this paper it uses a method which is divided into two parts – currency identification and currency verification.
4. The title of this paper is "Research on Counterfeit Indian Currency Note Detection Using Image Processing (2021) Presented by I. Santhiya Irulappasamy. The currency validation module in the proposed system determines whether the input currency is real/fake using Structure Similarity Index Method (SSIM).
5. Prof. Deepak Sonjay, Alpana Sonjay, Harsha Patil presented a paper in 2021 titled "Banknote Authentication and Classification using Advanced Machine Learning Algorithms" in which advanced machine learning algorithms to detect counterfeit currencies.

6. Ms. Monali Patil, Prof. Jayant Adhikari, Prof. Rajesh Babu, proposed a system that differentiates the features of genuine notes and counterfeit notes using image processing. They used K-means algorithm for feature clustering and SVM algorithm to train their data model.

II. PROPOSED METHODOLOGY

Our system possess the advantages of already existing systems as well as it also removes the disadvantages of it. This system is mainly designed to focus on the implementation of fake currency detection system. Providing techniques to detect the fake currency is the objective of this project. In our system, we are implementing on the image of notes. Digital camera is used to capture the image. The implementation of our system is given below:

The first step is to capturing the image of note by digital camera or by scanning under uv light. The second step is to convert the RGB (red green blue)/colourful image into grayscale image. The image can be converted into grayscale image by using methods such as method of averaging, luminance and method of desaturation, etc. In our system grayscale conversion is performed using luminance method. Then edge detection process is performed on the grayscale image. Edge detection is defined as the process of identifying the points with discontinuities in digital image. Further the processing of image is done again and edges of grayscale image are identified. The process of image segmentation is performed on the image. Here segmentation is done using thresholding method. . The segmentation is a method of dividing an image into several parts. After that features of notes are cropped and divides. The characteristics such as shape, textures and colours are extracted. SVM (Support Vector Machine) is used to categorize the test picture of the note as real or fake.

Serial Number, Watermark, Security Thread, Identification mark are the characteristics used to authenticate currency notes. The characteristic that are used for extraction and comparison is displayed in the result. Firstly the user is asked to upload a picture of note. The output comprises of four types of images. The uploaded image is compared with the first image(original image). The second image is the image uploaded by the user. The third image is grayscale image with overlapping characteristics. The last image is the image of segmentation of the overlapped image. The result helps us to see difference between the real and uploaded image. The changes in

uploaded image are detected by the overlapping of these two images, if it is fake. The result displays the extracted characters of currency. At least 70% intensity is displayed in extracted features of real note. Finally the system shows whether the image is real or fake.

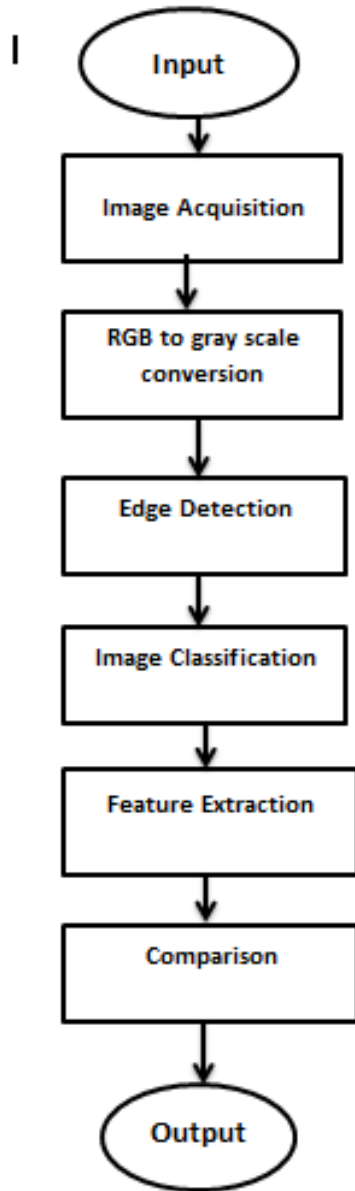


Fig1. Flowchart of Process.

III. SYSTEM FRAMEWORK

A system framework for currency detection typically involves the following steps:

1. Image acquisition: The system should be able to acquire images of banknotes from various sources, such as a scanner or a camera.
2. Preprocessing: The acquired images should be preprocessed to improve the quality of the image, such as removing noise, enhancing contrast, and resizing

the image.

3. Feature extraction: Features such as color, texture, and shape are extracted from the preprocessed image.
4. Classification: The extracted features are then used to classify the banknote as belonging to a particular currency. This can be done using MLA (machine learning algorithms) such as SVM (Support Vector Machine), or CNN (Convolutional Neural Networks).
5. Postprocessing: The output from the classification algorithm may require post-processing to improve accuracy, such as applying a confidence threshold or using a consensus of multiple classifiers.
6. User interface: Finally, a user interface should be developed to enable users to interact with the system, such as selecting an image to process, displaying the classification results, and providing options for further analysis or processing.

IV. CONCLUSION

It is always important to keep track of the originality of the currency as it is a necessity for survival. In India the use of paper currency is much therefore there is a need of fake currency detection system. The proposed system helps to detect the real or fake notes as the new notes are used in the market. As compared to other systems, our system uses more features for feature extraction than . Instead of simply displaying the result, it also shows where the differences are in the notes.

V. REFERENCES

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