

A

Project Synopsis

On

“Fake Currency Detector”

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1. Introduction

Technology is growing very fast these days. Consequently the banking sector is also getting modern day by day. This brings a deep need of automatic fake currency detection in automatic teller machine and automatic goods seller machine.

Fake currency can reduce the value of real money and cause inflation due to an unauthorized and unnatural increase in the money supply. Manual authentication of currency notes is a solution but it is a very time-consuming, inaccurate, and difficult process. Automatic testing of currency notes is, therefore, necessary for handling large volumes of currency notes and then, getting accurate results in a very short time span. In this project, we propose a fake currency note detection system using various image processing techniques and algorithms.

The proposed system is designed to validate Indian currency notes of denomination 500 and 2000 rupees. The system consists of three main algorithms and checks the authenticity of various features in a currency note. The first algorithm consists of several steps including image acquisition, pre-processing, greyscale conversion, feature extraction, image segmentation, comparisons of images and output, and uses advanced image processing methods such as ORB and SSIM. The second algorithm authenticates the bleed lines of the currency notes whereas the third algorithm authenticates the number panel of the currency notes. Finally, the processed output is displayed for each currency note.

This system provides a hassle-free way to authenticate currency notes quickly and accurately. This automated system can replace the existing manual methods and can be used by anyone easily to detect fake currency.

2. Literature Survey

[1] In this paper an automatic system is designed for identification of Indian currency note is fake or original. The image is goes from pre-processing such as g crop, smooth and adjust then convert the image into grey colour after conversion applies the image segmentation then extract features and reduce, finally comparing image.

[2] In this paper, An automatic recognition of fake Indian paper currency note using MATLAB is implemented and feature extraction with HSV colour space and other applications of image processing. The proposed architecture is as follows Image Acquisition, Gray-Scale Conversion, Edge Detection, Image Segmentation, Characteristic Extraction, Comparison, Output.

[3] In this paper two ways are used: one by using analysis through hyper spectral imaging and the second one is the Extraction of different features in fake and real currency notes and through comparing with each other we can able to differentiate the fake note from the real note

[4] In this paper two ways are used: one by using analysis through hyper spectral imaging and the second one is the Extraction of different features in fake and real currency notes and through comparing with each other we can able to differentiate the fake note from the real note. This system is divided into two parts. The first part is to identify the currency denomination through image processing. The second part is the oral output to notify the visually impaired person about the denomination of the note that he/she is currently having. The desired results will be in text and voice output of the currency recognized and verified

Advantages

1. **Accuracy:** The use of advanced machine learning and image processing techniques enables the system to achieve a high level of accuracy in identifying counterfeit currency notes.
2. **Real-Time Detection:** The project aims to provide real-time currency analysis allowing quickly authenticity of notes. This speed ensures seamless and efficient operations.
3. **Prevent Financial Loss:** By accurately identifying and rejecting currency the project help to prevent losses. This protection is especially crucial for businesses and banks dealing with large volumes of cash.
4. **Integration with Existing System:** The project can be integrated with existing system no need to setup new hardware or systems.
5. **User Friendly Interface:** The development of an intuitive user interface ensures that the system is accessible and easy to use for individuals.

Disadvantage

1. **Negative outcomes:** The model may produce inaccurate outcome in several cases. There is possibility of generating negative results for an original note.
2. **Need Clear images:** The image should have a proper resolution, proper brightness and should not be hazy or unclear. Blurred images and images with less detail may adversely affect the performance of the system.

3. Problem Statement

To test the authenticity of Indian currency notes by preparing a system which takes the image of currency bill as input and gives the final result by applying various image processing and computer vision techniques and algorithms.

Objectives and Scope

- The main objective of the project is to identify the fake Indian currency notes through an automated system by using Image
- processing and computer vision techniques.
- The system should have high accuracy.
- The system should be able to give the final results in a short time.

Research Gap

Although identification of fake currencies is a challenging task, it is getting improvising **automated currency note recognition system** is getting improvised more in recent years. As a result, it gains the attention of current research scholars in large volume. Since fake currency is becoming a challenging issue in many countries. In the past, only limited print houses have existed but now anyone can easily print **fake currencies using a laser printer**. So, many pieces of research successfully done to **accurately detect the fake currencies** and also currently using detectors in the bank, shopping mall, colleges, etc.

Although these detectors are useful it's not applicable for common people due to expensiveness. In order to overcome this issue, the current researches are focusing on **fake currency detection using the Matlab tool**. Since Matlab tool enables to development of any kind of image processing techniques.

On knowing the importance of this field, several currency detection approaches are widely introduced and more are in the developing stage. So, **the image processing and machine learning** fields are more benefitted. Here, we have given you a few important **learning algorithms** that highly used these fields, **especially in currency detection**.

4.Methodology

A. Preparation of Dataset

- The first step is the preparation of a dataset containing images of different currency notes (both fake and real) and images of different features of each of the currency notes
- The dataset will contain the following repositories: – Sub- dataset for Rs. 500 currency notes
 - 1) Images of real notes
 - 2) Images of fake notes
 - 3) Multiple images of each security feature (template) – Sub- dataset of Rs. 2000 currency notes (Similar structure)

B. Image Acquisition

Next, the image of the test-currency note is taken as input and fed it into the system. The image should be taken from a digital camera or preferably, using a scanner.

C. Pre-processing

Next, the pre-processing of the input image is done. In this step, first the image is resized to a fixed size. A fixed size of image makes a lot of computations simpler. Next up, image smoothening is performed by using Gaussian Blurring method. Gaussian blurring removes a lot of noise present in the image and increases the efficiency of the system

D. Gray- scale conversion

Gray scale conversion is mainly used because an RGB image has 3 channels whereas a gray image has only one channel. This makes the computation and processing on images much more easier in the case of gray scaled images.

E. Algorithm 1: For feature 1- 7

- 1) Feature detection and matching using ORB
- 2) Feature Extraction
- 3) Feature Comparison using SSIM
- 4) Assigning SSIM scores to each Feature

F. Algorithm 2: For feature 8 and 9

- 1) Feature Extraction
- 2) Image Thresholding
- 3) Calculation of number of black regions (bleed lines)

G. Algorithm-3, Feature

- 1) Feature Extraction
- 2) Thresholding (at multiple values)
- 3) Contour Detection
- 4) Finding Bounding Rectangles
- 5) Eliminating erroneous Rectangles
- 6) Counting remaining rectangles (Number of characters)

H. Displaying Output

Finally, the result of all algorithms is displayed to the user. The extracted image of each feature and the various important data collected for each feature is displayed properly in a GUI window. Further, the status (Pass/ Fail) of each feature is displayed along with the details. Finally the total number of features that have passed successfully for the input image of

5. Conclusion

In this paper, a fake currency detection model has been proposed for authentication of Indian currency notes of denomination 500 and 2000 and implemented using OpenCV image processing library in Python3. In this model, 10 features of the input currency note are considered and then analyzed using 3 different algorithms. The input image is taken through a GUI which allows the user to browse the image in his/ her system. Then the results of the implemented model are computed and the analysis of each feature is displayed in detail through a graphical user interface (GUI) created using Tkinter GUI library.

The model takes less time (about 5 sec- when only final results are shown leaving unnecessary details) for processing an input image. The results are also quite decent giving almost 79% accuracy in detecting genuine currency and 83% accuracy in detecting counterfeit currency.

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Declaration

We the undersigned have submitted the Synopsis report for the proposed Project work entitled “**Fake Currency Detector**”. We declare that we have submitted the Synopsis report after through Study& it is not copied from any other source.

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