

# DETECTION OF COUNTERFEIT INDIAN CURRENCY NOTE UTILIZING IMAGE PROCESSING

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**Abstract:** Detection of counterfeit notes is the biggest dilemma by many countries including India. Indian is a developing country, Production, and printing of counterfeit notes of Rs.200 is degrading economic growth of our country. From the last few years due to technological advancement in color printing, duplicating, and scanning, counterfeiting problems are coming into the image. Though banks and other organizations have installed automatic machines to detect fake currency notes, it is not possible for the average person to detect the counterfeit note. In this article recognition of paper currency with the help of digital image processing techniques are described. Some of the methods to detect counterfeit currency are image processing, image segmentation, security thread, latent image, and comparing images. This paper is an effort towards the security features Analysis of Indian currency that can be used for recognition and authentication of genuine currency notes using Image Processing in MATLAB.

**Keywords:** Counterfeiting, Image Acquisition, Security thread, Image Segmentation, Image Processing Techniques.

## I.INTRODUCTION

Production of currency without the legal sanction of Government is illegal and it causes serious threats for any country. Due to the advancement in technology, Counterfeiter produces counterfeit notes easily and circulates in our country and it becomes hard for the common people to differentiate between an original or counterfeit note. From petrol stations to the local vegetable vendor, everyday is wary of accepting banknotes in denominations of Rs.200 as a majority of them are almost impossible to tell from genuine banknotes. The usual effect of counterfeit on the economy is inflation. Therefore Image processing based technique is proposed for the detection of such notes.

For a country like India Counterfeit note is one of the biggest hurdles in cash transactions. Because of the fast developments in imaging, scanning, and printing technologies, it is very easy for a person to print fake currency notes with the use of the latest software and hardware tools. Currency recognition and verification have various potential applications including electronic banking, currency monitoring systems, etc.



Fig 1.1: Features of 200 rupees

Digital Image Processing is an area characterized by the need for extensive experimental work to establish the validity of proposed solutions to a given problem. It is pre-processing processes whose inputs and outputs are images of pre-processing that extract attributes from the image. The segmentation is used to fake and original images from the Indian currency note. Differentiate

the pictures are a more solid and broken line from the original image. It is the most techniques used for projection, smooth, and threshold value of the image. And then some methods used to black stripe and grayscale in the image. MATLAB is the computational tool of choice for research, development, and analysis. The image formats supported by MATLAB are JPEG, PNG, TIFF, BMP, GIF, etc. Some methods of image are challenging work and features of Indian currency notes in digital image processing.

## II.AIMS AND OBJECTIVES

1. To examine different protection features of the Indian currency note.
2. To extract the protection features with projection, smooth, and threshold imaging.
3. To acquire the Indian paper currency with the help of scanner or camera.
4. To segment the acquired image for image acquisition.
5. To recognize the correct denomination of the Indian currency.
6. To identify the fake and genuine currency paper.

## III.METHODOLOGY

The detection of counterfeit Indian currency note based on Image processing technique consists of few basic steps like Image Acquisition; it's Pre-processing, and finally results of the currency. Image processing generally involves three steps:

1. Import a currency image with a scanner or directly through digital camera.
2. Manipulate the image with the help of Image processing.
3. The Output of the result.

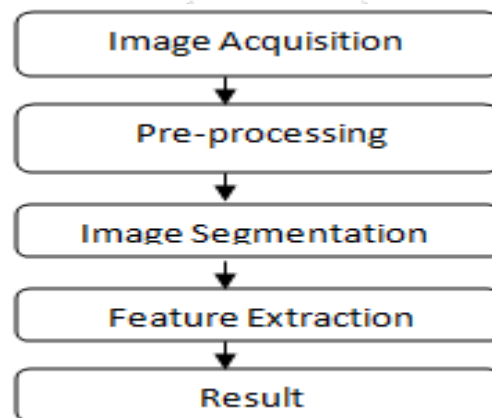


Fig 3.1: Design flow of detection of counterfeit currency

### 3.1 Image Acquisition

The first step of image processing is the Image Acquisition. There are several ways to acquire image such as with the help of camera and scanner. The image that is acquired is completely unprocessed and is the result of scanner which was used to generate it. Acquired image should retain all the features.

### 3.2 Image Pre-processing

The main objective of the pre-processing improves the appearance of images. Pre-processing removes undesired distortions or improves some image features that are essential for further processing or analysis. Image Pre-processing consists of image smoothing and image adjusting.

### 3.3 Image Segmentation

Image Segmentation is the process of partitioning a digital image into multiple segments. The aim of this method is to simplify or change the representation of an image into sub region that is more useful and easier to analyze. The segmented images are visualized using Projection, Smoothen and Thresholding.

### 3.4 Feature Extraction

Feature extraction is a special form of dimensional reduction. When the input data to an algorithm is suspected to be very redundant and too large to be processed and it is then the input data will be transformed into a compact representation set of features. Transforming the input data into the set of reduced features is called feature extraction. This approach is useful when image sizes are large and a reduced feature representation is required to quickly complete tasks such as image matching and retrieval.

### 3.5 Result

Now mean image of both color components of currency note and extracted features of currency note are compared with threshold value to conclude that the currency is real or fake.

## IV.EXPERIMENTAL RESULTS



Fig 4.1: Original Image



Fig 4.2: Pre-analysis Real Image



Fig 4.3: Pre-analysis fake Image

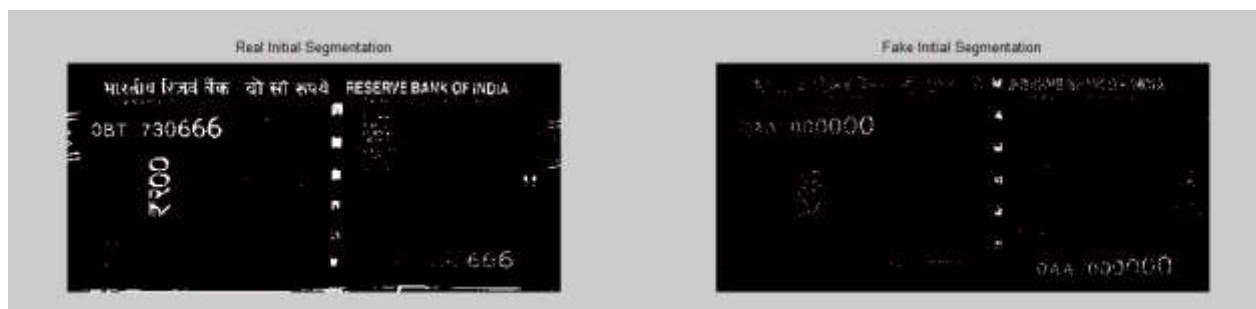


Fig 4.4: Initial segmentation Real and Fake Image

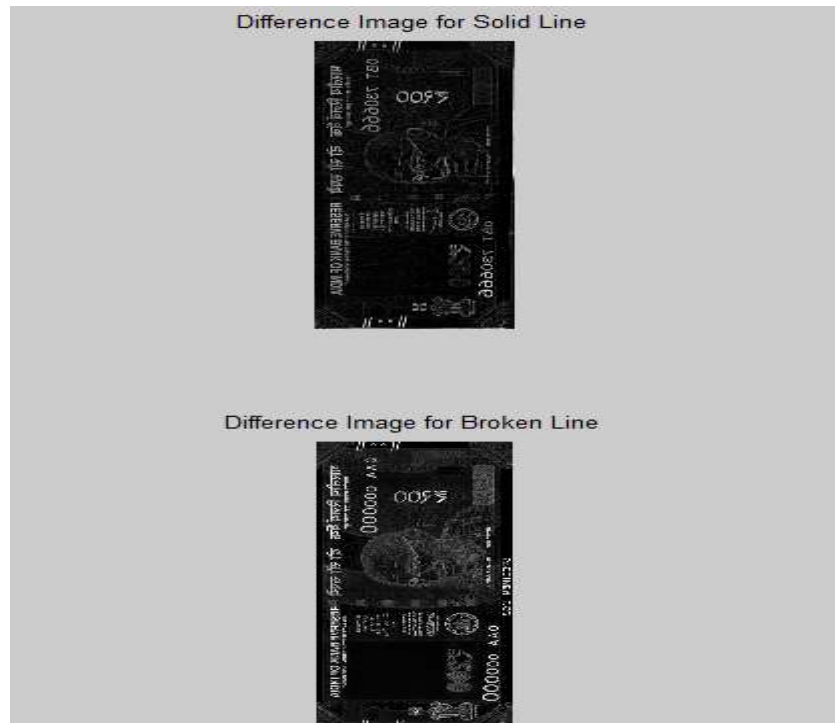


Fig 4.5: The difference gray-scale to contrast-enhanced-gray-scale

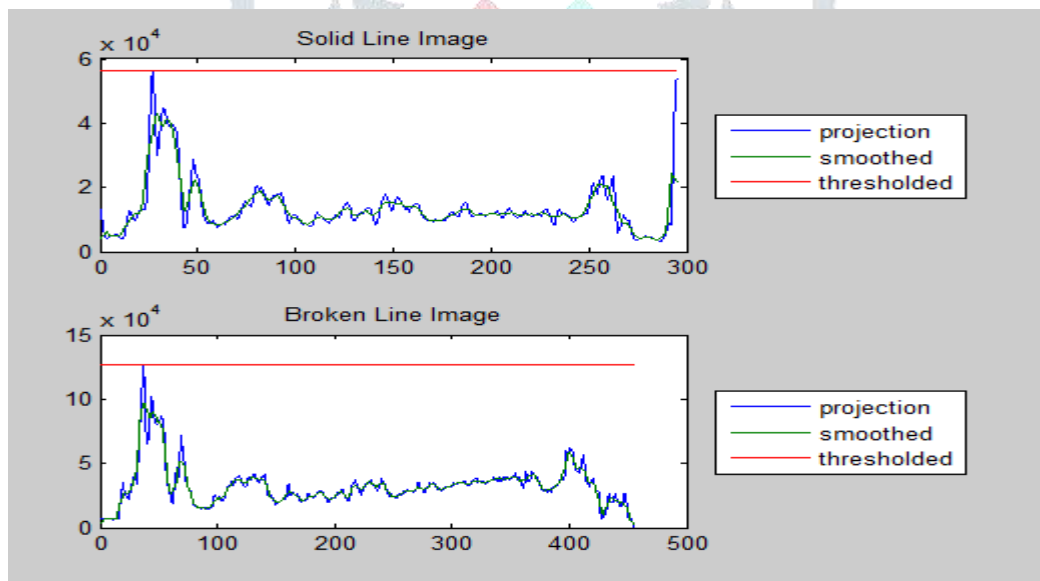


Fig 4.6: The Projection, Smooth and Threshold are the difference



Fig 4.7: Extract the black strips for each image





Fig 4.8: Convert into grayscale then threshold result

## V.CONCLUSION AND FUTURE WORK

The paper proposes for the detection of counterfeit Indian currency note utilizing Image Processing with MATLAB. MATLAB platform is used for this analysis. Day by day research work is increasing in this field and various image processing techniques are implemented in order to get more accurate results. It is worked effectively for extracting features of Indian currency images. The application-based system shall be designed to get proper a result whether the currency image is fake or it's genuine. The developed MATLAB code works for the Indian currency of Rs.200.

In the future this can be extended to check the recognition and authenticity of recently launched Indian paper currency like Rs.100, 50, other country paper currency, and different newly introduced denominations, etc. Further work can also be done to increase the accuracy of the system.

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