



# FAKE CURRENCY DETECTION USING IMAGE PROCESSING

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## Introduction

There are approximately 50 currencies all over the world, with each of them looking totally different. One common problem faced by many countries related to currency, is the inclusion of fake currency in the system. The technological advancements like advanced printers and new editing computer software have made a pathway for currencies to be duplicated such that it cannot be normally recognized. The problem arises as not every person finds it feasible to buy machines that use UV light and other techniques to detect the authenticity of the currency. This system is based on Image processing where a number of steps are used to process the image of a currency and give the result to the user that the currency is genuine or not.

The currency notes can be compared based on color, size and shape information. This system consists of the steps such as grayscale conversion, edge detection, segmentation, etc. which are performed using suitable methods and compare images of currency with the stored data and detect whether the currency is fake or genuine.

## Methods and Proposed System

In this, characteristics of currencies are employed which can be suitably used for differentiating different banknote denomination. The characteristics that can be used to check the authentication of currency note are-

Security Thread

Serial Number

Latent image

Watermark

Identification Mark

Below are the steps that can be followed for differentiating the currency notes:-

### Image Acquisition

Acquisition of image is process of creating digital images, from a physical scene. Here, the image is captured by a simple digital camera or scanner such that all the features are highlighted. Image is then stored for further processing.

### Gray Scale Conversion

Image acquired is RGB image and now is converted to grayscale image. It carries the intensity information.

### Edge Detection

It is a basic tool in image processing. It is widely used in area of feature detection and extraction. This process aim at identifying point in digital image at which image brightness sharply changes.

### Image Segmentation

This process sub divides image into its sub regions. The level of division depends on the problem. Segmentation algorithm for images which are monochromatic is based on properties of images like discontinuity and similarity.

### Feature Extraction

The aim is to extract and identify the unique feature of each Indian denomination under various challenging condition such as rough note, fold condition also under different background.

### Comparison

We will get the results, the graph can be plotted between the real note and the fake note and the stored data can be compared. Thereafter, we can obtain the threshold value which act as the centre between real notes and fake notes and can conclude the authenticity.

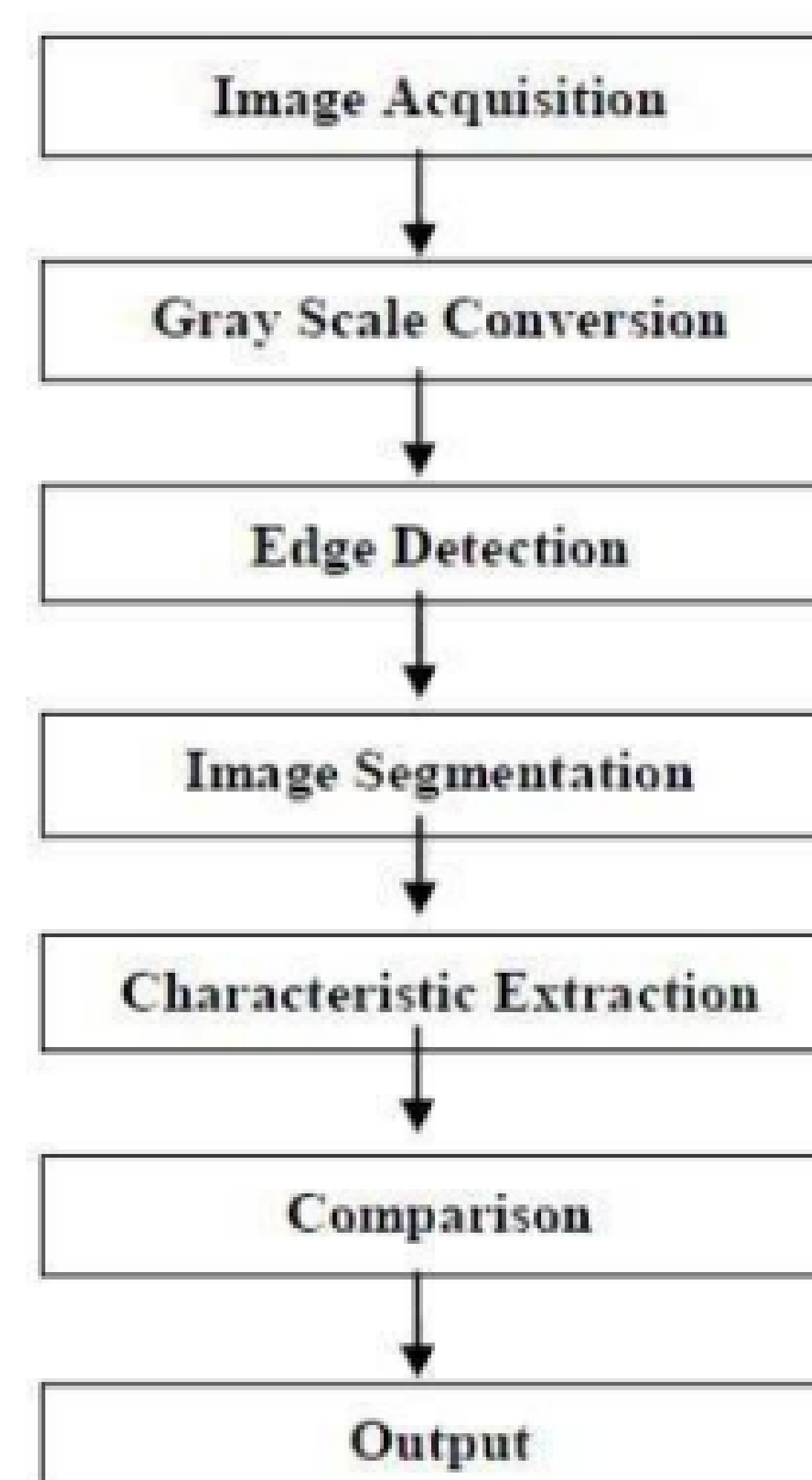


Figure 1: Proposed Steps to achieve the goal.

## Results



Fig- Resize Image



Fig RGB to Gray-Scale Image



Fig- Observe Side Feature of Indian note

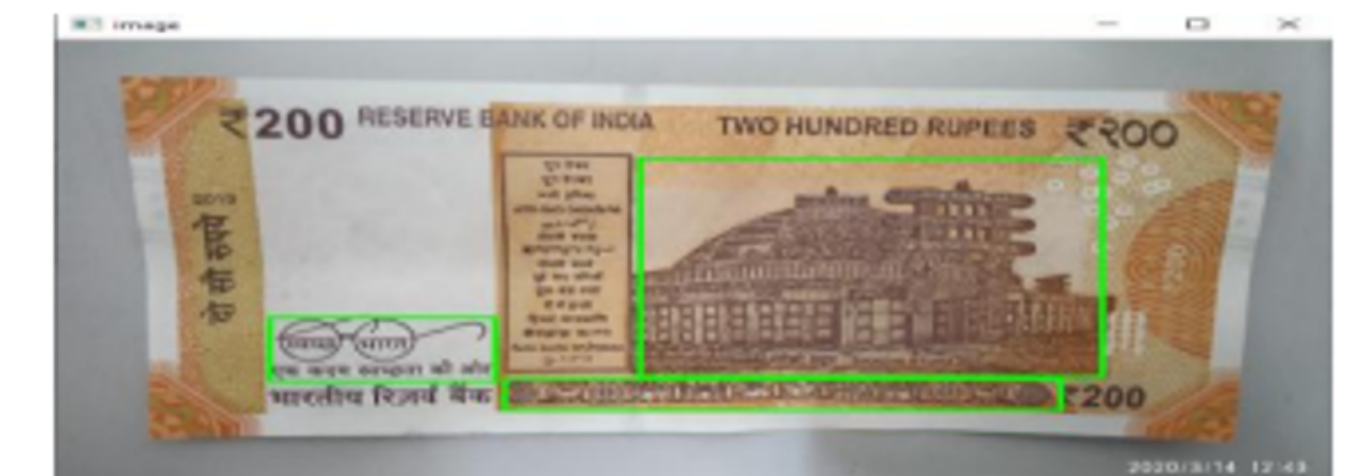


Fig- Reserve Side Feature of Indian note

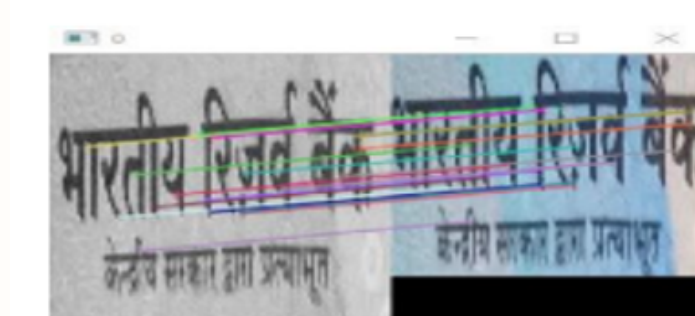


Fig : RBL\_HIN Matches

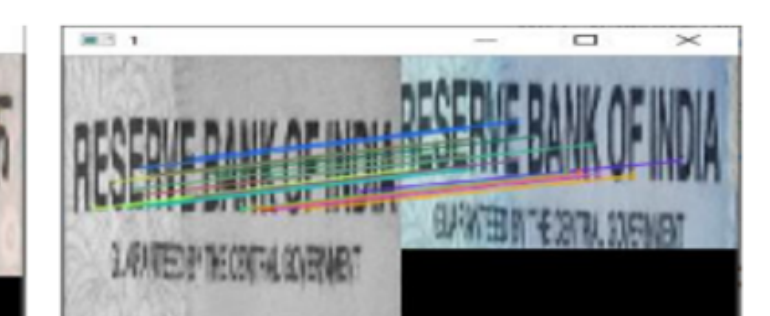


Fig : RBL\_ENG Matches

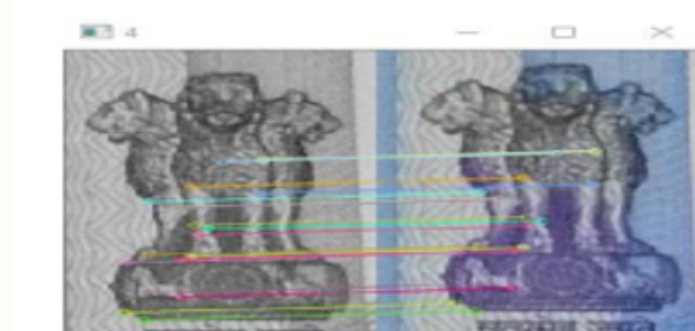


Fig- EMBLEM Matches

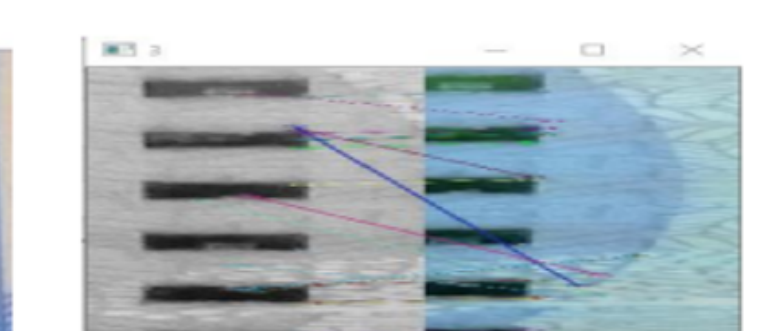


Fig : SEC\_THRE Matches

## Summary and conclusions

Now a days anyone can print a currency note with maximum accuracy using printers as simple as a laser printer. This system uses the features of the currency note like serial number, security thread, Identification mark, Mahatma Gandhi portrait. But, this way is not helpful if the note is dirty or torn. If a note is dirty, its color characteristic are changed widely. So it is important to extract the features of the image of the currency note and apply algorithms properly for better and accurate results. This can further be converted into an app so that it is accessible to more number of people and this system can be designed to detect currencies of other countries as well as a future scope.

For the complete report and outputs please scan the QR code given above

## References

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