



# Counterfeit Currency Detection using Image Processing

# Literature Survey

- International Journal of Research on Computer and Communication Technology (IJRCCT) – **“Fake Currency Detection Using Image Processing and Other Standard Methods”**.
- International Journal of Computer Science and Information Technologies(IJCSIT) – **“Indian Currency Denomination Identification Using Image Processing Technique”**
- International Journal of Engineering Science and Innovative Technology (IJESIT) – **“An automatic recognition of fake Indian paper currency note using MATLAB”**
- International Journal of Engineering Research and Development (IJERD) – **“Design and Implementation of Indian Paper Currency Authentication System Based on Feature Extraction by Edge Based Segmentation Using Sobel Operator”**

# Proposed Solution

The solution has been divided into two phases:

- Phase 1: This phase involves work on the image processing part on a system to detect, isolate, and identify the note and denomination.
- Phase 2: This phase involves work on the counterfeit analysis of the note and creation of a usable application and then integrating it with the result of phase 1.

# Implementation

- A paper has already been written on the work done in phase one. Its summary is as follows:

*The paper we proposes a solution that shall help visually impaired people identify*

*Indian Currency notes which shall then simplify monetary transactions for them. The*

*proposed solution involves doing image processing on an image of a currency note;*

*this process has been completed and its test results been elaborated in this paper.*

*Furthermore, a small comparison exercise between two edge-detection techniques*

*has been done, to decide which among them is best suited for the image processing*

*of a currency note. The results of this comparison have also been shown in this*

# Implementation

## Phase 1 Implementation:

### ► **Template Matching for Note Detection**

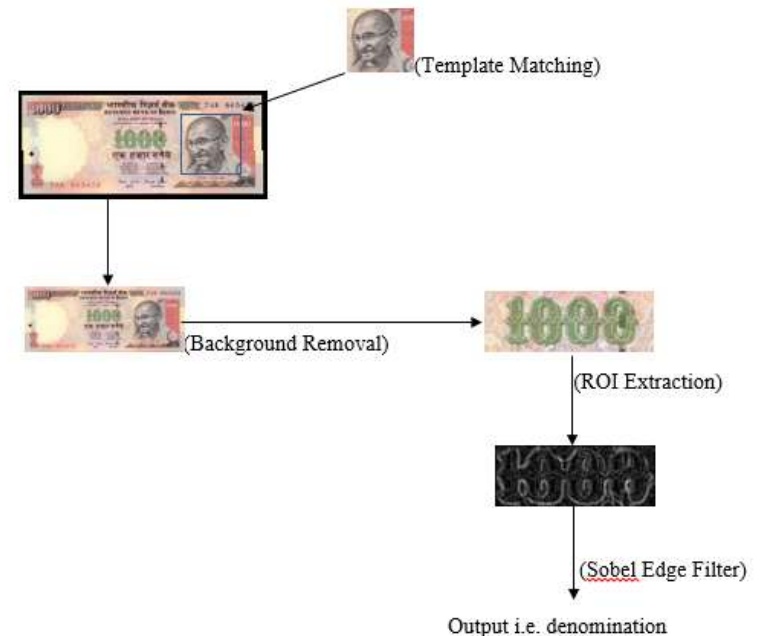
This step will be used to check whether the input image contains a currency note or not. We would store some images known as template in the database and match the template with the input image. If there is a match found then further process will be performed.

### ► **Image Segmentation**

Image segmentation shall be done to retrieve only the currency part of the image. This basically is removal of background and other unimportant visual information.

### ► **Feature Extraction**

After the image segmentation various features shall be extracted with the help of Sobel Filter and pattern

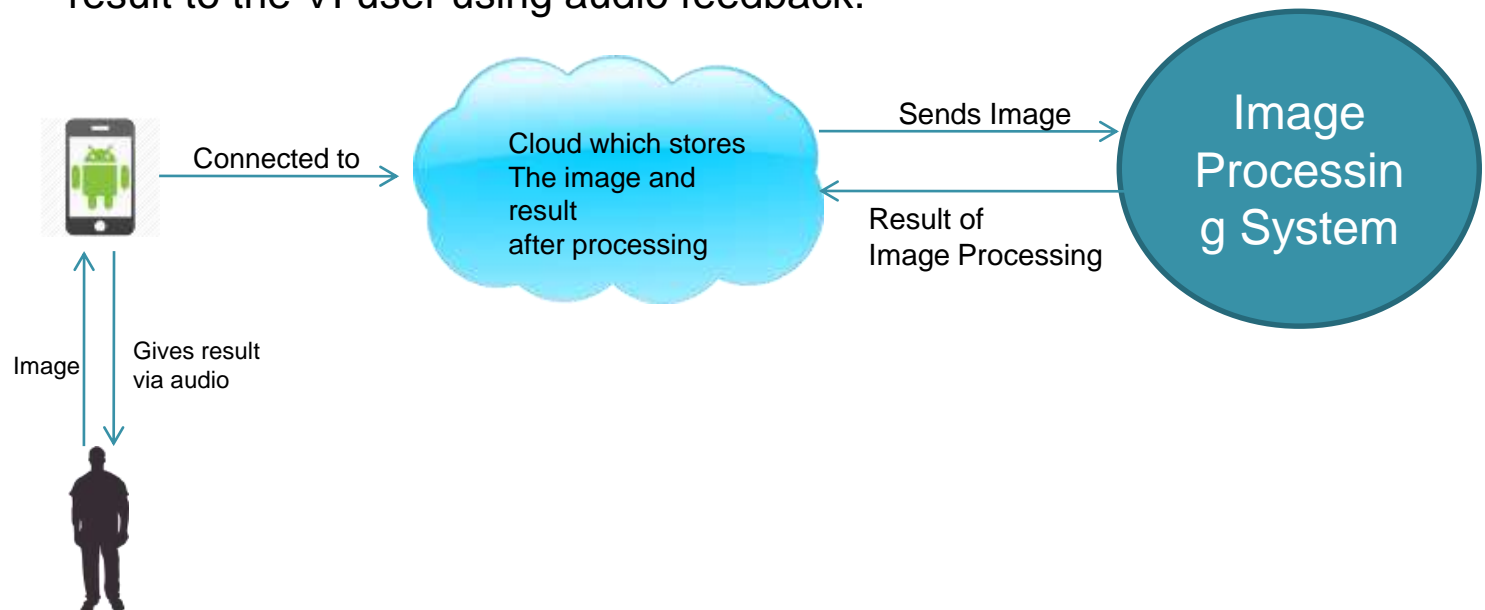


# Implementation

The phase 2 consists of two parts:

1. Creation of a Android application using Dropbox APIs

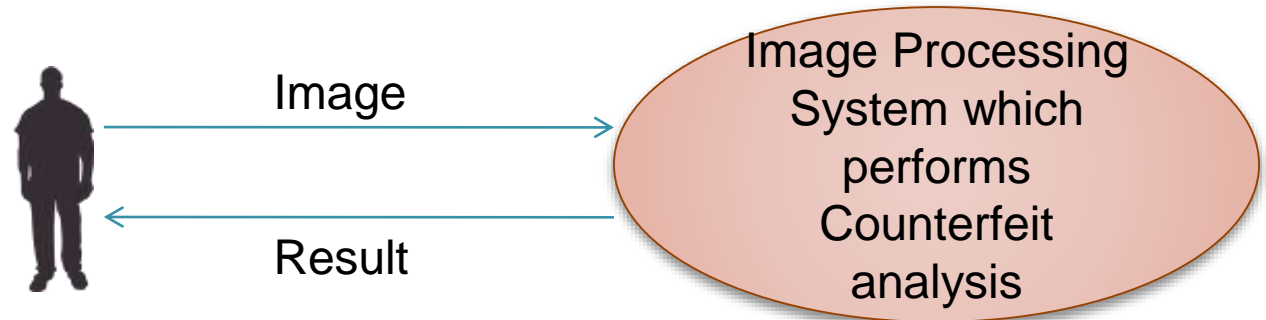
The aim here is to create an Android application that can take the image of the note and send it to the Image processing system via cloud. The system would then process the image and send the result (denomination value) back to the Android device via cloud. The application would then relay the result to the VI user using audio feedback.

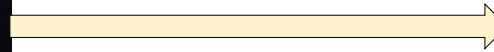
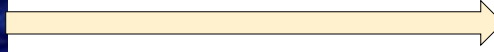
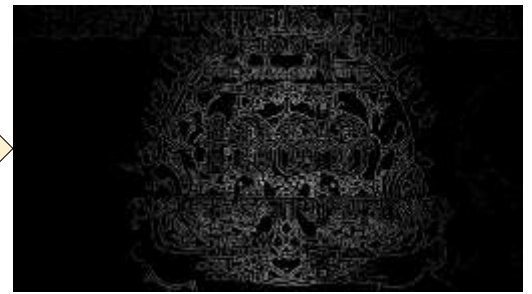
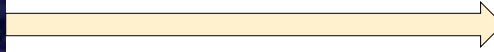


# Implementation

## 2. Counterfeit analysis of the currency note

In this module we intend to create a system application whose aim is to authenticate an Indian currency note. The application would use image processing and utilize various inherently present security features in the Indian currency note to achieve its goal. Security features such as Fluorescence, Security Thread, Serial number etc.







# Functional requirements

- An Android application that can take the image of the note and send it to the Image processing system via cloud.
- The application should be able to retrieve results stored on the cloud by the image processing system.
- The application should be able to relay the result to the VI user using audio feedback.
- The system application of module 2 must be able to detect counterfeit note after providing the name of the image in the system.



# Non-Functional Requirement

- There should be minimal lag between taking of the image and the result
- The image processing should be as efficient with maximum accuracy
- The system should give valid result for positive as well as negative test cases

# Limitations

The following are the limitation of the **phase one** which corresponds to image processing of currency image to give denomination of the result.

- Input Limitation – To have the application work effectively, the image taken by the camera must have the currency in the center and should occupy around 80 percent of the image area. Furthermore, the note should be front facing in the image. Another limitation is for note itself i.e. the note must be of decent quality and not have any significant unnatural marks on it.
- Accuracy – The next limitation is of accuracy. Including false positives and false negatives, after testing, the accuracy found to be around 70 percent. This also includes rare occurrences of one currency value being recognized as some other value.
- Lighting Limitation – For the application to have higher accuracy, it's better to have proper lighting conditions while capturing the image.

# Limitations

The following are the limitation of the **phase two** which corresponds to counterfeit currency detection image processing and the cloud based android application that has been developed to be integrated with phase one.

- Internet Connectivity and Speed- The android application needs internet connectivity and good upload and download speed to be able to get quick results.
- Lighting Limitation for Counterfeit Detection- For our proposed algorithm to work, the image of the ROI on the note must be taken in relatively dark conditions, so that the UV light illuminated features are easily discernable.



# Future Work

There is a lot of scope in terms of future work in this area. Most of the limitations mentioned in the previous section can be overcome by conducting appropriately directed research. Furthermore, the original idea of creating a wearable device can be pursued. The idea is of materializing a wearable device, which can be worn on the head with a camera mounted on it; the device can capture the image and send it to the android application built in this project. This if realized shall create a truly ingenious solution that shall be of immense use to the visually impaired population.



**THANK  
YOU**