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Automatic Recognition of Fake Indian Currency Note

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Abstract - *In this paper, the automatic system is designed for identification of Indian currency notes and check whether it is fake or original. The automatic system is very useful in banking system and other field also. In India increase in the counterfeit currency notes of 100, 500 and 1000 rupees. As increase in the technology like scanning, colour printing and duplicating because of that there is increase in counterfeit problem. In this paper, recognition of fake Indian currency notes is done by using image processing technique. In this paper, recognition of fake Indian currency notes is done by using image processing technique. In this technique first the image acquisition is done and applies pre-processing to the image. In pre-processing crop, smooth and adjust then convert the image into grey colour after conversion apply the image segmentation then extract features and reduce, finally comparing image.*

Key Words: **Fake currency, counterfeit detection, image processing, feature extraction.**

1. INTRODUCTION

Automatic recognition of fake Indian currency note is important in many applications such as automated goods seller machine and automated goods tellers machine. This system is used to detect the valid Indian currency note. The system consists of eight steps including image acquisition, grey scale conversion, edge detection, feature extraction, image segmentation, comparisons of images and output [1]. Automatic machine more helpful in banks because banks faces the problem of counterfeit currency notes or destroyed notes. Therefore involving machine makes note recognition process simpler and systematic.

Automatic machine is more important to detect fake currency note in every country. The system designed to check the Indian currency note 100, 500 and 1000 rupees. The system will display currency is genuine or fake and currency denomination. It is very important to grow automated system to get feature and recognize Indian currency note in various area such as banking, ATM machine, shopping mall, Bus station and railway station [1].

2. PROPOSED SYSTEM

Manual testing of notes in transactions is very time consuming and confusing process and also there is a chance of tearing while handling notes. Therefore automatic methods for bank note recognition are required in many applications such as automatic selling goods. In designing of this system one challenging case is to design system that is extraction of characteristics from currency image for accuracy of the automated system.

2.1 Microcontroller

The control of process is done by microcontroller. The work of controller is to clarify data from fake note detection unit to check weather currency is fake or genuine. Also control and synchronization of note feeding mechanism is done by microcontroller. The microcontroller gives instruction to PC to capture image using camera and interpret the data from PC.

2.2 PC

In PC the MATLAB is used for this system. This is used for image processing and to apply User Interface which runs on the PC. Communication with the microcontroller is done using serial communication.

2.3 Note Feeding Unit

It will accept note from the user. In note feeding unit rollers are used to take the note from user.

2.4 Fake Note Detection Unit

The system uses signal conditioning to identify whether the note is fake or real. For this, note goes through UV light to detect the originality of the note. The original currency absorbs the UV light and the fake currency reflects the UV light. The conditioning and testing is done using a UV LED transmitter and UV receiver.

2.5 Image Acquisition Unit

Camera is used for image acquisition. It will take picture of incoming note and picture is forward to processing unit. After suitable image processing signal will be produced.

2.6 Conveyor Unit

This unit is used to carry the note from note feeding unit to the sorting unit, after passing through the fake note detection and image acquisition units

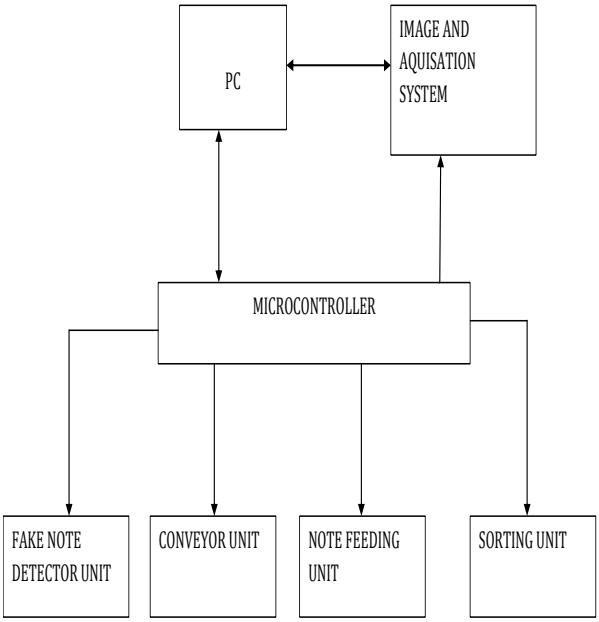

Fig -1: Block Diagram for Proposed System

2.7 Sorting Unit

On the basis of suitable processing, signal is produced and sent to the sorting unit. It makes use of a select and drop mechanism in the system. The select and drop mechanism is performed using a sorting table with a twister mechanism.

3. PERFORMANCE ANALYSIS

3.1 Design Flow of Automatic Recognition of Genuine and Fake Indian Notes.

The design flow of fake currency detection system consists of eight stages. This system works on two images one is original currency image and other is image of currency used for authentication purpose.

1) Image Acquisition

The camera or scanner is used for image acquisition. The acquired image should consist of all the features.

2) Pre-processing

In pre-processing the operations normally initial to main data analysis and extraction of information. In this unwanted distortion are suppressed and enhance some image features that are important to further processing. It includes image adjusting and image smoothening.

In image adjusting, when the image obtained from scanner the size of image is large therefore to reduce the size of image, image adjusting is used. In this for image adjusting interpolation is used [8].

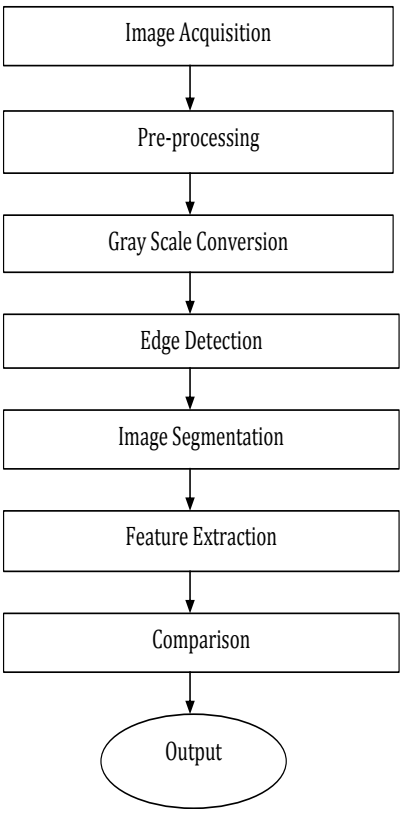

Fig -2: Flow Chart of Digital Image Processing Method to Detect Fake Note

In image smoothening, while using camera or scanner and perform image transfer, some noise will appear on the image. The important step of removing noise is done by image smoothening. For image smoothening convolution is used.

3) Gray Scale Conversion

The image obtained is in RGB colour. It is transformed into gray scale because it takes only the intensity information which is easy to process than processing of three components RGB [6].

4) Edge Detection

The Edge detection is a basic tool in image analysis, image processing, image pattern recognition and computer vision techniques. Edge detection is basic tool particularly in the area of feature detection and feature extraction [7].

5) Image Segmentation

In image segmentation, the image is divided into regions or objects depending on problem the segmentation is done. Segmentation algorithms for monochrome image are based on two basic properties of image intensity.

6) Feature Extraction

Feature extraction is the specific form of dimensionality reduction. It is the method of capturing the visual content of image for retrieval and indexing. When input to the algorithm is too large to be proceeding and it is having much data but not more information. Then input data will be converted into reduced representation set of features. Feature extraction makes simple the amount of resources required to describe the large set of data [7].

7) Comparison

In comparison, the extracted feature of input image and extracted feature of original image is compared.

8) Output

The output is currency is fake or original.

4. RESULTS

In this section result is obtained by performing image processing Operations. In the system image acquisition is done by using the camera and acquired image is send to the processing unit. As shown in the GUI the acquired image is the test image. After that we have to select the control button for respective denominations. Then the test image is then converted into gray scale image, segmented image, cropped image and resized image. Then comparison of cropped and resized image with the images saved in the data base is done. Then the result is displayed in the result panel.

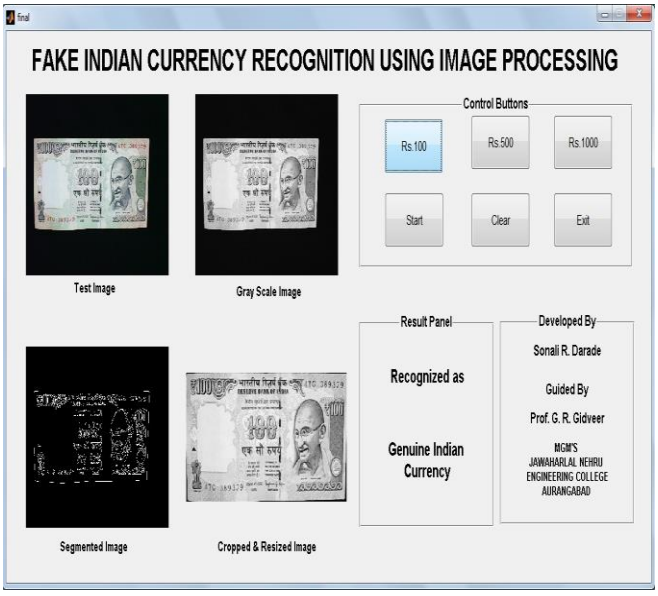

Fig -3: Recognition of Genuine Indian Currency Note

In the above image the 100 Rs Indian curreny note is Recognised as geniune indian currency. And recognition for fake indian currency for 100 Rs is shown in figure 4.

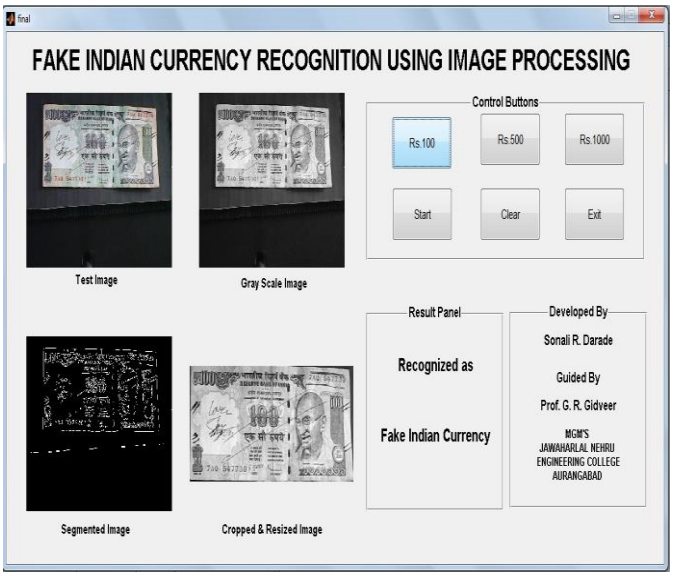

Fig -4: Recognition of Fake Indian Currency Note

5. CONCLUSIONS

In this project, detection of fake Indian currency note is done by using image processing principle. This is the low cost system. The system works for denomination of 100, 500 and 1000 for Indian currency. The system also provides accurate and valid results. The process of detection of fake note is quick and easy. In this system input is taken by CCD camera and output is displayed on PC.

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