Fake Currency Detection Using Digital Image Processing

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ABSTRACT –Fake currency is impersonation currency delivered without the legitimate authorization of the state or government. Delivering or utilizing counterfeit currency is form of wrong representation or forgery. During current years, because of the extraordinary innovative advances in color printing, copying and scanning, counterfeiting problems have raised positively . In this manner the issue of proficiently recognizing fake paper currency from certified individual by means of automatic Fake currency identification framework has turned out to be increasingly significant. Counterfeit currency discovery framework can be utilized in places, for example, shops, banks counter and mechanized teller machine, auto seller machines and so on. This paper based on Fake Currency Identification By Android Mobile Phone Using Digital Image Processing This is convenient use of Hand Written Character Feature Extraction, the cell phone gadget is utilized to capture image, it is accessible wherever The image captured by android cell phone live in type of video and it is spared there, again it is changed over in gray scale design, binariesed image and some morphological task performed on it, finally we found block of each character from complete images. .

KEYWORDS–Grayscale, Binarization, Digital Image Processing etc.

I INTRODUCTION

The fake notes are one of the most concerning issue happening in real currency exchanges. For nation like India, it is ending up enormous obstacle. Due to the advances in printing, examining innovations it is effectively workable for an individual to print fake notes with utilization of most recent equipment devices. Distinguishing fake notes physically progresses toward becoming tedious and chaotic procedure consequently there is need of computerization strategies with which currency recognition procedure can be productively done. Manual test processing of all notes in exchanges is very tedious and messy procedure and furthermore there is a chance of tearing while at the same time giving notes. In this manner Automatic strategies for certified note recognition are required in numerous applications, for example, programmed selling-goods and vending machines. Separating adequate currency related attributes from the currency image is fundamental for exactness and power of the computerized framework. This is a big problem to framework designer. Consistently Reserve bank of India face the fake currency notes or destroyed notes. Handling of huge volume of fake notes forces extra issues. In this manner, including machines (independently or as assistance to the human specialists) makes notes recognition process simpler and efficient. Automatic machines equipped for recognizing banknotes are enormously utilized in automatic allocators of various items,

going from cigarettes to transport tickets, just as in numerous programmed financial activities. The requirements for automatic banknote frameworks urged numerous specialists to develop relating strong and reliable systems [1-5].

The strategy we present here is basic, less mind complex and effective and can meet the rapid requirement in practical applications. DIP is an area described by the requirement for experimental work to set up the validity of proposed solution for the given issue. It has turned out to be affordable in numerous fields of research and in mechanical and military applications. Digital image preparing envelops forms whose information sources and yields are images and incorporates forms that concentrate ascribes from images up to and incorporating the recognition of ones items.

II SYSTEM OVERVIEW

There are so many features in Indian currency can be seen easily. Some of features are shown in figure below.

Fig.1 : Features of Indian Currency

There are too many features present in Indian currency which is decided by Reserve Bank of India.

A. See through Register

B. Water marking

C. Optically Variable Ink (OVL)

D. Fluorescence

E. Security Thread

F. Intaglio Printing

G. Latent image

H. Micro lettering

I. Identification Mark

III METHODOLOGY

The algorithm we apply here is basic and works properly. The image of the paper currency is obtained through Android Mobile Phone . Such live image gained by phone and phone associated with framework in Matlab. The methodology comprises of various points like image acquisition, gray scale conversion, edge detection, feature extraction, image segmentation and correlation of images. Image acquisition is the making of digital images, commonly from a image.

(1) Image Acquisition:

Performing image procurement in image processing is based the initial phase in the work process succession in light of the fact that, without a image, no rocessing is possible. There are different approaches to obtain image, for example, with the assistance of camera or scanner. Here we are utilizing Android Mobile Phone to gain image. Android Phone associated with framework and Matlab .

Fig.2 : Acquiring image by Android Mobile Phone

Fig. 3 : Original Indian 500 denomination

(2) Pre-processing:

The primary objective of the pre-processing to upgrade the visual appearance of images and improve the control of informational sets. Image preprocessing, additionally called imagerestoration, includes the correction of distortion, degradation, and noise introduced during the imaging procedure. Removing the noise is a significant step when processing is being performed. Anyway noise influences segmentation and pattern matching .

Fig.4 Indian 500 denomination after resizing the original image

(3) Binarization:

The image obtained is in RGB color. It is changed over into gray scale since it conveys just the intensity information   which is easy but difficult to process as opposed to handling three parts R (Red), G (Green), B (Blue).

Fig.5 Gray Scale Image

(4) Edge Detection:

Edge recognition is a image preparing procedure for finding the limits of objects inside images. It works by identifying discontinuities in brightness. Edge identification is utilized for image segmentation and information extraction in regions, for example,

image processing,computer vision, and machine vision. This can be accomplished by utilizing edge recognition and scan line algorithms in MATLAB.

Fig.6 : Edge Detection (Gradient magnitude of the image)

(5) Image Segmentation:

Image segmentation is regularly used to find objects and limits (lines, bends, and so on.) in images [15]. Segmentation algorithm for images by and large depend on one of the two essential properties of image intensity value

1) Discontinuity: Based on unexpected changes in intensity, for example, edges in a image.

2) Similarity: Based on apportioning a image into locales that are comparative as per a lot of predefined criteria [16].

(6) Feature Extraction:

Feature extraction is an uncommon type of dimensional reduction. At the point when the info information to a algorithm is too large to be in any way processed and it is suspected to be excess then the info information will be changed into a reduced representation set of feature. Transformation the information into the arrangement of feature is called include extraction. In the event that the feature separated are painstakingly picked it is normal that the features set will remove the significant data from the information so as to play out the ideal undertaking utilizing this reduced representation rather than the full size information.

Fig.7: Edge based segmentation of Identification mark of 500 denomination
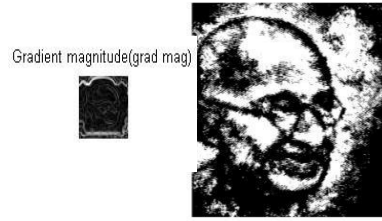

Fig.8: Edge based segmentation of Watermark of 500 denomination
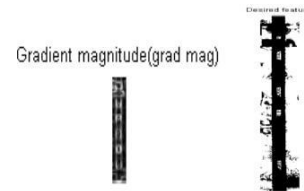

Fig.9. Edge based segmentation of Security Thread of 500 denomination

Fig.10 : Edge based segmentation of Numeral watermark of 500 denomination.
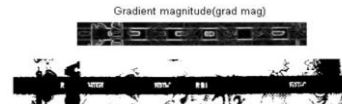

Fig.11: Edge based segmentation of micro lettering of 500 denomination

IV MATLAB CODE

1. Capturing Image in Matlab by using Mobile Phone live .

```
url = 'http://192.168.1.106:8080/shot.jpg';
ss  = imread(url);
fh = image(ss);
 while(1)
        ss  = imread(url);
        set(fh,'CData',ss);
        drawnow;
  end
```

2. Now Image is saved in Matlab.
3. READING IMAGES :
```
[imname,impath]=uigetfile({'*.jpg;*.png'});
im=imread([impath,'/',imname]);
```
4.PREPROCESSING ANDRESIZING IMAGE

im=imresize(im,[128 128]);

5. REMOVING NOISE AND SEPARATE CHANNELS

```
r_channel=im(:,:,1);
b_channel=im(:,:,2);
g_channel=im(:,:,3);
```

6. DENOISE EACH CHANNEL

```
r_channel=medfilt2(r_channel);
g_channel=medfilt2(g_channel);
b_channel=medfilt2(b_channel);
```

7. RESTORE CHANNELS

```
rgbim(:,:,1)=r_channel;
rgbim(:,:,2)=g_channel;
rgbim(:,:,3)=b_channel;
```

8. FEATURE EXTRACTION OF AN IMAGE

```
fet=totalfeature(rgbim);
load db;
k=length(currency);
for j=1:k
D(j)=dist(fet',currency(j).feature);
end
[value,index]=min(D)
if value
currency_name=currency(index).name;
fprintf('recognized currency is : ');
disp(currency_name)
else
disp('no matches found');
end
```

V CONCLUSION

By utilizing computerized image processing, examination of Currency picture is increasingly exact just as this strategy is proficient as far as expense and tedious contrasted with existing procedures. The proposed framework is worked adequately for separating highlight of Indian currency image. Separated features of cash picture will use for currency recognition system just as for its check. Application based framework will be intended to get appropriate outcome whether cash picture is fake or its real.

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