FEATURE EXTRACTION AND DETECTION OF INDIAN CURRENCY USING IMAGE PROCESSING

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Abstract: The main objective of this project is to detect fake currency using image processing. Fake currency detection is a process of finding counterfeit currency. The features are extracted from the image and are compared with the features of original image of currency. In this paper DBC is used for extracting features. This project consists of different steps such as image acquisition, preprocessing, segmentation and feature extraction. Finally compare the image into original or forgery.

Index Terms - *DBC (Directional Binary Code) , Pre-processing, feature extraction***.**

I. INTRODUCTION

Digital image processing is the use of computer algorithms to perform image processing on digital images. Digital image processing has many advantages over analog image processing. Digital image processing allows the use of much more complex algorithms, and hence, can offer both more sophisticated performance at simple tasks, and the implementation of methods which would be impossible by analog means. The digital image can be acquired by means of cam scanner. Since the retrieved image is a colour image we are converting that image into HSV image. This can be done in pre-processing. Then HSV image is partitioned into number of segments in segmentation using canny operator. And the features are extracted from that image using directional binary code. Feature extraction is a special form of dimensional reduction. Transforming input data into set of features is called feature extraction.

Ojala et al. proposed the local binary patterns (LBPs) for texture description, and these LBPs are converted to rotational invariant for texture classification. Zhang et al. proposed the local derivative pattern for face recognition. They have considered LBP as a non-directional first-order local pattern, which are the binary results of the first-order derivative in images.

Zhang et al. have proposed the directional binary code (DBC) for face recognition. The DBC encodes the directional edge information in a neighbourhood. To improve the retrieval performance in terms of retrieval accuracy, in this paper, we calculated the co-occurrence matrix on DBC patterns.

Then the characteristics of test image are compared with characteristics of original pre-stored image in data base. If it matches then the currency is genuine otherwise it is counterfeit.

II. Flow chart

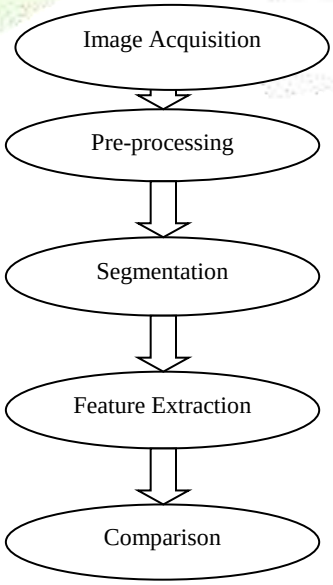

Fig 1: Flow chart

III. Algorithm

1. Load the input image.
2. Convert RGB to HSV image and divide into H, S, and V sub images.
3. Calculate the feature vector length by adding HSV.
4. After conversion, perform edge detection and segmentation by using canny operator.
5. Now perform feature extraction using DBC.
6. Perform the first-order derivative in 0, 45, 90, and 135 degrees directions.
7. Calculate the DBC and make them into rotational invariant.
8. Calculate the co-occurrence matrix.
9. Form the feature vector length by adding HSV and DBC co-occurrence matrix.
10. Compare the total FVL of any currency with the given value. The resultant will be either real or fake.

IV. Modules

1. Image acquisition:

Image acquisition is the first stage for any vision system because without an image no processing can be possible. After the image has been obtained, various methods of processing can be applied to the image to perform the many different vision tasks. Performing image acquisition in image processing is always the first step in the workflow sequence because, without an image, no processing is possible. The image can be acquired with the help of camera or scanner.

2. Pre-processing:

The main aim of the pre-processing is to improve the visual appearance of image. Pre-processing of the image contains the operations that are normally required prior to the main data analysis and extraction of information.

Pre-processing is also called as restoration .It involves the correction of distortion, degradation and noise introduced during the image processing. It increases the reliability of optical inspection.

3. Segmentation:

Segmentation is a process of partitioning a digital image into set of pixels. The goal of segmentation is to simplify the presentation of an image. It is mainly used to distinguish objects from background.

Segmentation algorithms for monochrome image are based on basic properties of image intensity.

4. Feature extraction:

Feature extraction is the spatial form of dimensional reduction. It is a method of capturing the visual content of image for retrieval and indexing.

Transforming the input data into set of features is called feature extraction. There are different methods in feature extraction such as LBP, LTP and DBC etc... In this paper, we are using DBC (Directional Binary Code) method for feature extraction. The DBC is proposed to encode the directional edge information in a neighborhood.

5. Comparison:

In this step, the extracted features of input image are compared with extracted features of original image. The features that are considered for comparison are security thread, Mahatma Gandhi portrait, floral design, unique numbers and strings.

V. Results

Fig 2: Image acquisition of real and fake

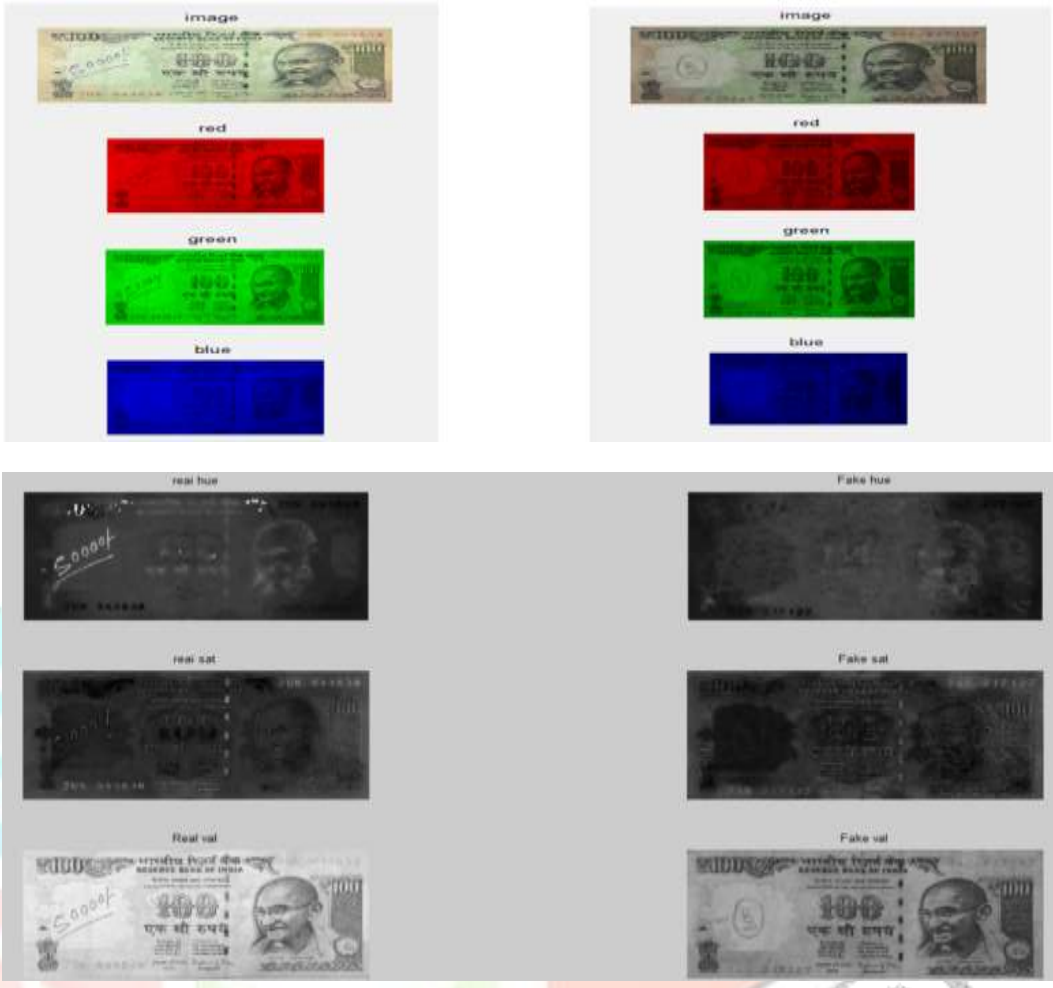

Fig 3: Pre-processing of real and fake

Fig 4: Segmentation of real and fake

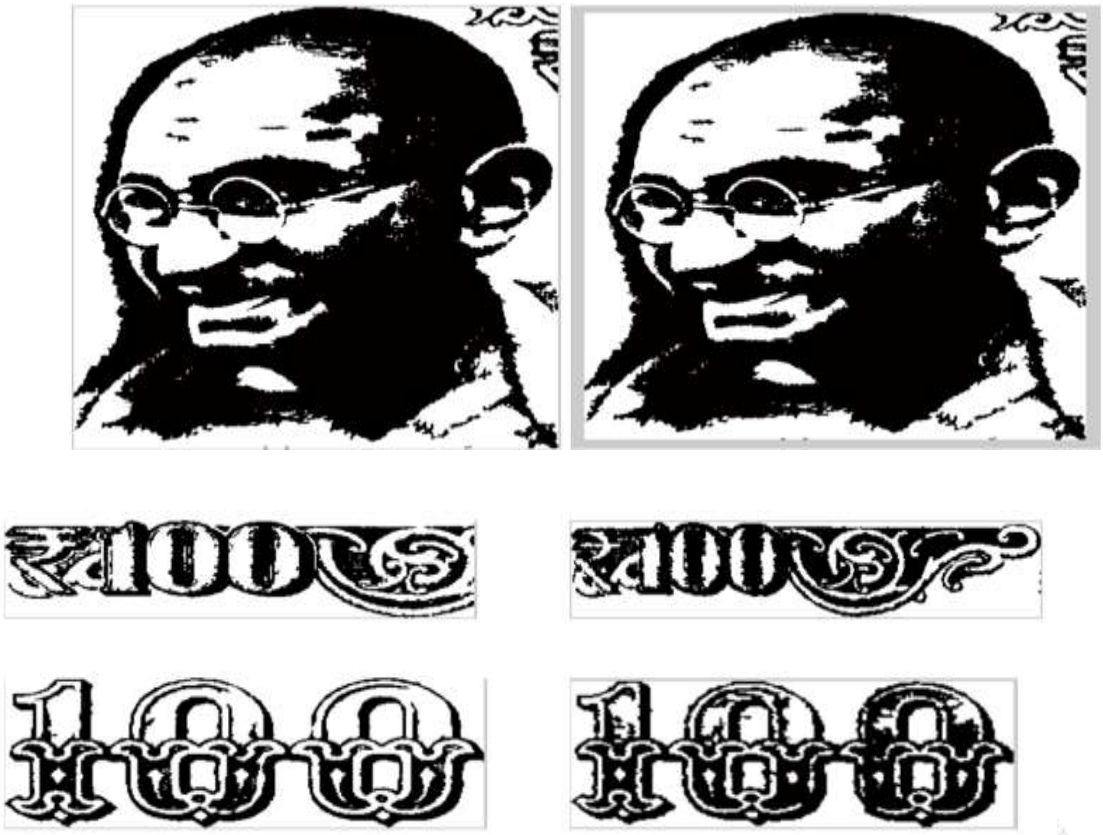

Fig 5: Feature extraction of real and fake

VI. Observed Values

PERFORMANCE METRICS	REAL IMAGE VALUES		FAKE IMAGE VALUES	
	MINIMUM	MAXIMUM	MINIMUM	MAXIMUM
MSE	1.29	19.24	1.11	8.34
RMSE	0.1136	0.4387	0.1052	0.2888
SNR	1.3626		1.6512	
PSNR	71.8926	78.9199	80.2514	100.45
ENTROPY	7.1564		6.8690	

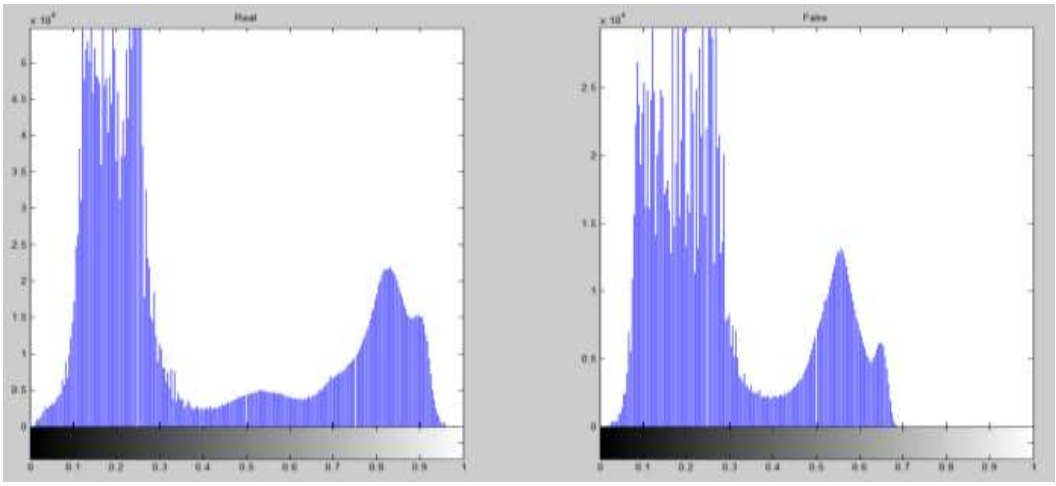

Fig 6: Histogram Outputs of real and fake

VII. References

1. Vipin Kumar Jain, Dr.RituVijay,"Indian currency Denomination Identification Using Image Processing Technique" IJESRT, Vol.2, Issue 1, pp.125-128, January 2013.
2. An automatic recognition of fake Indian currency note using MATLAB (IJESIT).
3. Reviews of various image processing techniques for currency note authentication (IJCERT).
4. H. Hassanpouri, A.Yaseri, G.Ardeshiri," Feature extraction For Paper Currency Recognition" 1-4244-0779-6/07/2007 IEEE.
5. Hanish Agarwal, Padman Kumar, "Indian currency note denomination recognition in color images", IJACEC, Vol. 1, ISSN 2278-5140.
6. Prof. Renuka Nagpure, Shreya Shetty, Trupti Ghotkar,"Currency recognition and fake note detection", IJIRCCE, Vol-4,2016.
7. Digital Image Processing by R.C.Gonzalez and R.E.Woods.