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Fake Currency Detection Using Image Processing

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Abstract— Color Printing technology has increased the rate of fake currency note printing on very large scale. Years ago, printing was done in a print house, but in present scenario anyone can print a currency note with high accuracy using a simple laser printer. This results in the issue of increasing fake notes instead of genuine ones. In banks and some organizations, they have automatic machines to detect fake currency notes. But for a normal person it is very difficult to differentiate the fake note from real one. We have some of the methods for detecting fake currency they are watermarking, optically variable ink, security thread, latent image and counterfeit detection pens. We use IMAGE PROCESSING to detect the fake notes. Here we are going to detect the change in barcode between real and fake notes. We will also find the dissimilarities between the image under consideration and prototype. We have to know about the different features of the currency note. MATLAB software is used to extract the features of the note. This fake currency detection will be simple, accurate and easy to use

Keywords—Fake currency, Offence, hindering, watermarking, optically variable link, counterfeit detection pen, application system, variation in barcode, local key points, CNN classifier, accurate, easy.

1. Introduction

Computers and mobile phones have become an unavoidable part of our lives. There are a lot of things which we can do with these technologies. With the rapid development of mobile phones and technologies come several services like **application creation -** (refers to the process of making application software for handheld and desktop devices such as mobile phones, personal computers and Personal Digital Assistants. Through the usage of apps, the user is provided with various features that will enable him to fulfil all his needs and much more. Apps should be interactive to the users,**Camera/webcam services-** includes use of camera services for processing various aspects of image. Fake currency Detection is a system that can be used to overcome the limitations most of the people and our institutions of higher learning face with respect to making difference between **counterfeit currencies-** (is imitation currency produced without the legal sanction of the state or government, usually in a deliberate attempt to imitate that currency and so as to deceive its recipient) and real currencies. The project involves making use of Digital Image Processing Domain Digital image processing is the use of computer algorithms to perform image processing on digital images.

2. Literature Survey

[1] The paper titled as "Fake currency Detection using Basic Python Programming and Web Framework" (2020) presented by Prof Chetan More, Monu Kumar, Rupesh Chandra, Raushan Singh. System proposed in this paper makes use of flask web framework (Flask is micro web framework of python and web programming) and is written in python programming language returned.

[2] The paper titled as "Detection of CounterfeitIndian Currency Note Using Image Processing" presented by Vivek Sharan and Amandeep Kaur in 2019 describes Detection of Counterfeit Indian Currency Notes using Image Processing. In this paper, three major features were taken into consideration; Latent image, Logo of RBI and denomination numeral with Rupee symbol with color part of the currency note. Using these three features they had applied an algorithm which detects counterfeit Indian currency notes.

[3] The paper titled as "Indian Paper currency detection "presented by Aakash S. Patil in 2019, introduced a new technique to improve the Recognition ability and the transaction speed to classify Indian currency.It involved making use of Open CV library of computerfunctions mainly aimed at real-time computer vision whichcovered functions such as note

identification, segmentation and Recognition and NumPy module of Python used for

numerical processing, raggares to parse command line arguments cv2 for the OpenCV bindings.

[4] The paper titled as "Identification of fake notes and denomination recognition" presented by Archana MR, Kalpitha C P, Prajwal S K, Pratiksha N proposed Identificationof fake note and denomination recognition in 2018 to reduce human power. This system is mainly dividedinto two halves: currency recognition& conversion system.They made use of a software interface which could beutilized for different types of monetary standards.

[5] The paper titled as "Fake currency detection using Image processing" presented by S. Atchaya, K. Harini, G. Kaviarasi, B. Swathi in 2017 gave the technique called Performance Matrix for the Fake currency detection using MATLAB image processing system. Neural networks and model-based reasoning are the two methods behind this technique. Various methods like water marking, optically variable ink, fluorescence, etc. are used to detect fake currencyin this paper.

3. Existing System

The existed system, that is used to identify fake money is by using an electronic device called a counterfeit detector pen. This type of pen will often change color when touched on particular parts of the currency. If you're not sure that your money is real, then try touching it with the pen in various areas. If the color of the note changes into yellow then the currency note is real note. If the color of the note changes to dark blue or black then the note is the fake note.

4. Proposed Work

The proposed system contains the advantages of the existing system and eliminates the disadvantages of it.

The project centres on the design and implementation of Fake Currency Detection Application for the Department ofElect & Comm, for Tirumala Engineering College. The scope of the project is to provide approaches and strategies, which have proved to be suitable when accessing the image of thedesired currency note.

The scope of this project includes:

1. Study existing image detection schemes and concern on recognition base types.
2. Study the usability features of the existing fake currency detection methods from the general and ISO features.
3. Mapping between the recognition-based imagedetection system methods and the usability.

4.1 Block Diagram

The system architecture is given in Figure 4.1. Each block is described in this Section.

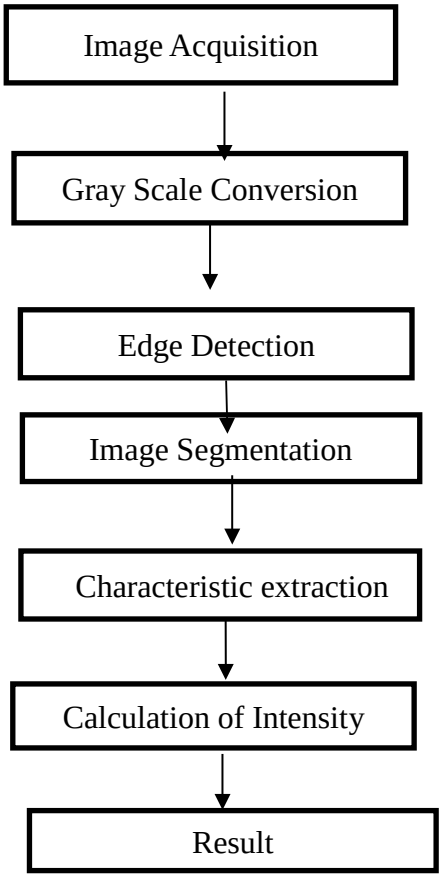

Fig. 4.1 Proposed system block daigram

Input: A webcam or phone camera will be used to take the input image by the user. The input image then taken by the user will be used for preprocessing steps such as erosion, dilation and noise cancellation**.**

Image Processing: Pre-processing is a common name for operations with images at the lowest level of abstraction - both input and output are intensity images. The aim of pre-processing is an improvement of the image data that suppresses

unwilling distortions or enhances some image features important for further processing, although geometric transformations of images (e.g., rotation, scaling, translation) are classified among pre-processing methods here since similartechniques are used.

Gray Scale Conversion: The luminance of a pixel value of a grayscale image ranges from 0 to 255. The conversion of a color image into a grayscale image is converting the RGB values (24bit) into grayscale value (8 bit).

Various image processing techniques and software applications

converts color image to grayscale image. Grayscale means that the value of each pixel represents only the intensity information of the light. Such images typically display only the darkest black to the brightest white. In other words, the image contains only black, white, and gray colors, in which gray has multiple levels.

Edge Detection: Edge detection is an image processing technique for finding the boundaries of objects within images. It works by detecting discontinuities in brightness. Edge detection is used for image segmentation and data extraction in areas such as image processing, computer vision, and machine vision.

Image Segmentation: In Image Segmentation, we divide the currency note into different parts or regions. The different

regions which are to be tested are listed below.

Calculation of Intensity: The image is in a variable. This is an array with rows and columns. The value of the array at each row and column is the intensity If the average intensity is greater than 70 then the note is Genuine or else the note is a fake note.

5. Requirement Analysis

5.1 Dataset and Parameters

It is used for template matching or pattern recognition. Templates can be considered a sub-image from the reference image, and the image can be considered as a sensed image. An experiment is conducted in order to identify the input/output behaviour of the dataset for the system. The sample dataset used in the experiment are identified and given in Table 5.1

6. Implementation

Fig. 6.1 Gray Scale Conversion

Dataset	Source	Users	Items	Type
Indian Currency Notes	Kaggle	81,282	4000 files	Image dataset

7. Result

Fig. 6.2
Edge Detection

Operating System	Windows (7, 8, 10), Android 5+
Languages Used	MATLAB
Database	WinRAR
Software Used	MATLAB-C

Fig. 7.1 Output of Fake Currency

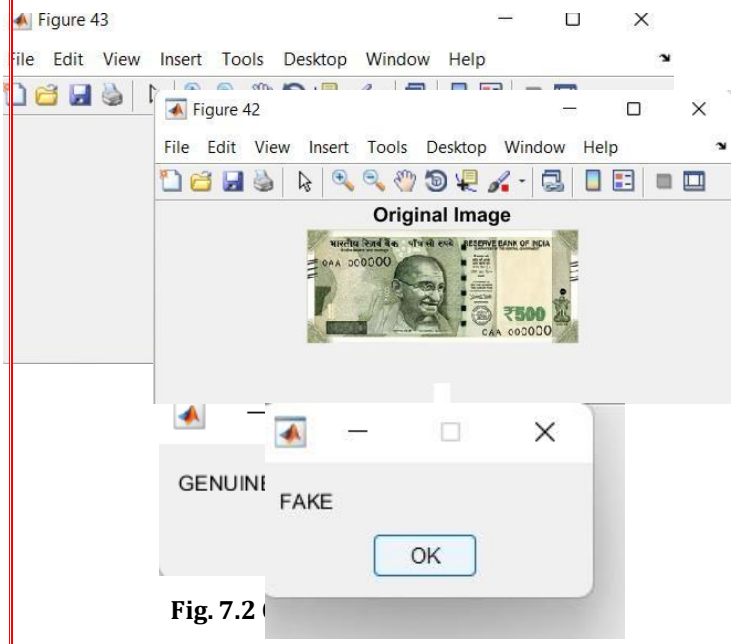

Fig. 7.2 (

Future Scope

Many different adaptations, tests and innovations have beenkeptfor the future due to the lack of time. As future work concerns deeper analysis of particular mechanisms, new proposals to try different methods or simple curiosity.

a. In future we would be including a module forcurrency conversion.
b. We can implement the system for the foreigncurrencies.

Conclusion

We commenced with a brief introduction to our system and discussed the scope and objectives of our project.During the literature

survey we got an opportunity to lookclosely into theproblem that people are facing in the current environment, we reviewed multiple research papers out of which we taper down to ten papers and selected five papers as our base research papers. We analysed all existing architectures of our base papers and by understanding their working we have discovered some flaws in the currently existing system. We have kept all theprime features of existing systems as a primary focus withsome of the additional featuresfor our proposed system.

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