IMAGE PROCESSING BASED FEATURE EXTRACTION OF CURRENCY NOTES

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Abstract - Counterfeit notes are a problem of almost every country but India has been hit really hard and has become a very acute problem. There is a need to design a system that is helpful in recognition of paper currency notes with fast speed and in less time. The recognition system is composed of two parts. The first is preprocessing, including detecting edges, compressing data dimensionalities, and extracting features. The second one is recognition, in which the core is a neural network classifier .I have used the MATLAB image processing tool box to develop a software for this purpose. Image Processing involves changing the nature of an image in order to improve its pictorial information for human interpretation, for autonomous machine perception.

Key Words: CURRENCY RECOGNITION,MATLAB IMAGE PROCESSING.

1.INTRODUCTION

Feature extraction of images is challenging work in digital image processing the feature extraction of Indian currency notes involves the extraction of features of serial numbers of currency notes. Feature extraction is that of extracting from the raw data the information which is most relevant for classification purposes, in the sense of minimizing the within-class pattern variability while enhancing the between-class pattern variability. Probabilities that the paper currencies of various countries are probably interweaved together therefore rises increasingly. It is a challenge for conventional paper currency recognition systems However, the focus of most of the conventional currency recognition systems and machines is on recognizing counterfeit currencies.

1.1 RELATED WORK

A distinctive point extraction method used a coordinate data extraction method from specific parts of a Euro banknote representing the same colour. In order to recognize banknotes, they used two key properties of banknotes:
direction (front, rotated front, back, and rotated back) and face value, neural network based bill recognition and verification method, the learning vector quantization (LVQ) method to recognize Italian Liras, 4 Robust and Effective Component-based method for Banknote Recognition by SURF Features. In another research work, a simple statistical test is used as the verification step, where univariate Gaussian distribution is employed, in another technique for paper currency recognition, three characteristics of paper currencies including size, colour and texture are used in the recognition.

1.2 System design

Our approach to feature extraction of Indian currency can be broadly divided into the
    1.Pre processing of currency image
    2.Binarisation
    3.Morphological filter
    4.Segmentation
    5.feature extraction

2. PROPOSED APPROACH

There is no well-developed theory for feature extraction; mostly features are very application oriented and often found by heuristic methods and interactive data analysis. It is not possible to give an overview of such interactive feature extraction methods; in any specific problem such as, e.g., character or speech recognition, there is an accumulated knowledge of the most feasible ways to

extract the relevant information. Speed and accuracy of processing are two the speed. Currently, there are a number of techniques for feature extraction which using important factors for feature extraction method. The accuracy may be more important than image processing.
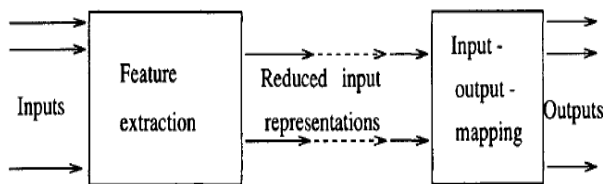

fig-1 : The Feature Extraction Approach

Thresholding method is used to separate object an two modes. The way to resolve both categories is by assigning a thresholding d background, which is divided image into valueT .Each point (x,y) which have value $f(x,y) >$ T is called point object, and each point (x,y) which have value $f(x,y) <$ T is called background object. A threshold image $g(x,y)$ is defined as,

$$g(x, y) = \begin{cases} 1 & \text{if } f(x, y) > T \\ 0 & \text{if } f(x, y) \leq T. \end{cases}$$

Mathematics morphology is a method for image analysis that is based on nonlinear neighborhood operation. The neighborhood is called structuring element Mathematical morphology analyses images by using operators developed using set theory

To display the results, we have built a graphical User Interface (GUI); where we are also providing a feature to calculate currency conversions for which we are trying to obtain the conversion rates from the Internet.

Graphical user interface designed for doing the above work is shown in figure 2. This GUI is designed in Matlab. It shows the various blocks of feature extraction of currency. Numerous Indian Currency notes of value 100 were analyzed in this work. The random results display the extracted serial number, segmentation of serial number, heuristic analysis of serial number of serial number and feature extraction.
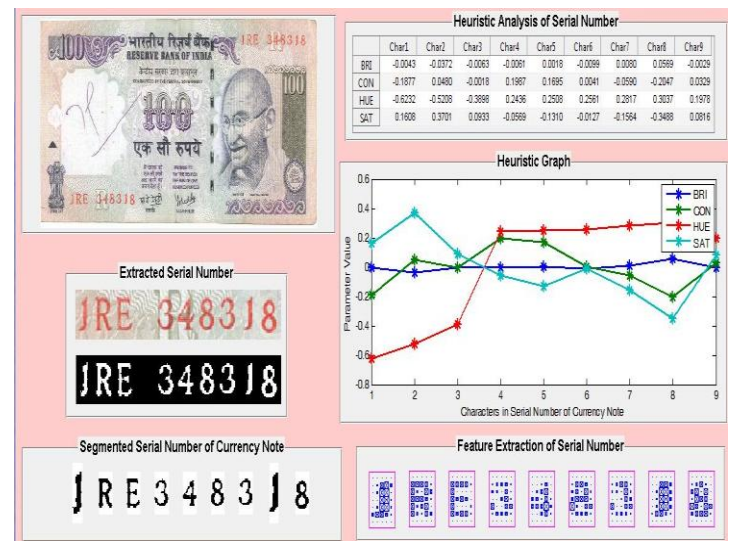

fig-2: GUI for feature extraction for Indian currency.

3. CONCLUSIONS

Approaches suggested from the beginning of scanning a document to converting it to binary image, thresholding, morphological filtering and word segmentation has been successfully stated In our current approach, the whole character itself was used as a feature. Selection of feature extraction method is single most important factor in achieving high recognition performance. In future, an inclusion of consistent pattern design of the note can help extraction using Neural Network methods with them trained on feature vectors obtained from above system.

REFERENCES

1] JiQian, DongpingQian, Mengjie Zhang, *A Digit Recognition System for Paper Currency Identification Based on Virtual Instruments"* 1-4244-0555-6/06 (© 2006 IEEE.
[2] Y. Y. Tang, H. D. Cheng, & C. Y. Suen, *"Transformation-Ring-Projection (TRP) Algorithm and Its VLSI Implementation"*, *Character & Handwriting.*
[3] http://rbi.org.in/currency/Sec_fea_Rs500.html
4] Foresti G.L, Regazzoni C, *A hierarchical approach to feature extraction.*