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Extraction of Serial Number on Currency Notes Using Labview

J Bhaskara Rao *, A SivaKumar

Department of Electronics Communication and Engineering, Anil Neerukonda Institute of Technology and Sciences,
Sangivalasa, Bheemunipatnam, Visakhapatnam, India

E-mail: janabhaskar@gmail.com; bhaskar.ece@anits.edu.in

Abstract: Currency has great importance in day to day life and therefore the currency recognition is a great area of interest for researchers. Image processing is the most popular and effective method of currency recognition. Image processing based currency recognition technique consists of few basic steps like image acquisition, its pre-processing and finally recognition of the currency. To recognize a character from a given currency image, there is a need to extract feature descriptors of such image. As an extraction method significantly affects the quality of whole OCR process, it is very important to extract features, which will be invariant towards the various light conditions, used font type and deformations of characters caused by a skew of the image. Heuristic analysis of characters is done for this purpose to get the accurate features of characters before feature extraction in currency.

Keywords: Currency note; Optical characters recognition; Lab view; Computer vision; Feature extraction

I. INTRODUCTION

Feature extraction of images is a challenging work in digital image processing. Feature extraction of Indian currency notes involves the extraction of features of serial numbers of currency notes. This is extraction from the raw data the information which is most relevant for the identification purpose, during which the dimensionality of the data gets reduced. This is almost and always necessary due to technical limit in memory and computational time. A good feature extraction scheme should maintain and enhance those features of the input data which make distinct pattern classes separate from each other. At the same time the system should be immune to variations produced due to human using it and the technical devices used in the data acquisition.

In the recent years, along with the accelerative developments of the world economics incorporation course, the start of euro area, and the increase of Asia economics, frontier trade and personal intercourse of various countries are frequently increasing. Travelling people always take many countries of paper currency. Probabilities that the paper currencies of various countries are properly interleaved together therefore rises increasingly. It is a challenge for conventional paper currency system. However the focus of most of the conventional currency recognition system and machines is recognizing counterfeit currency. It is not enough for practical businesses. The reason is that in most banks, especially the international banks, there are large quantities of cash belonging to many different countries needed to be processed and it is possible that all of them are real cash [1,2].

II. EXISTING DIFFERENT FAKE CURRENCY DETECTION TECHNIQUES

- a) See through Register
- b) Water marking
- c) Fluorescence
- d) Security Thread
- e) Intaglio Printing
- f) Latent image
- g) Micro lettering



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- h) Identification Mark
- i) Optically Variable Ink

III. OPTICAL CHARACTER RECOGNITION

Optical character recognition (OCR) is a process of converting a printed document or scanned page into ASCII characters that a computer can recognize. Computer systems equipped with such an OCR system improve the speed of input operation, decrease some possible human errors and enable compact storage, fast retrieval and other file manipulations [3-5]. The range of applications includes postal code recognition, automatic data entry into large administrative systems, banking, automatic cartography and reading devices for blind. Accuracy, flexibility and speed are the main features that characterize a good OCR system. Several algorithms for character recognition have been developed based on feature selection. Some of them have been found commercially viable and have gone into production like Omni Page, Word scan, Type Reader etc. The performances of the systems have been constrained by the dependence on font, size and orientation. The recognition rate in these algorithms depends on the choice of features. Most of the existing algorithms involve extensive processing on the image before the features are extracted that results in increased computational time. In this paper, we discuss a pattern matching based method for character recognition that would effectively reduce the image processing time while maintaining efficiency and versatility. The parallel computational capability of neural networks ensures a high speed of recognition which is critical to a commercial environment. The key factors involved in the implementation are: an optimal selection of features which categorically defines the details of the characters, the number of features and a low image processing time [6-8].

3.1 Methods of Optical Character Recognition

The main methods of the character recognition can be divided into the following groups by the used algorithm:

- a. Pattern systems
- b. Structural systems
- c. Feature systems
- d. Neuronal network system

IV. SYSTEM DESIGN

A technique is being deciphered which can extract the serial number on the currency notes and it is matched with the serial number of the note in the database which are initially entered into it as soon as they are printed, by using Lab VIEW.

4.1 Algorithm of The Proposed Work

- Step 1: Start.
- Step 2: Image acquisition from a file stored in a local hard disk.
- Step 3: Color plane extraction to convert the 32 bit color image into a 8 bit grey scale image.
- Step 4: BCG adjustment to ensure that it works satisfactorily for most lightening conditions.
- Step 5: Image mask to isolate part of an image for processing.
- Step 6: Histogram setup to describe the distribution of pixel intensities in an image.
- Step 7: Re-sampling of the image mask.
- Step 8: OCR session to train the software to identify the set of characters.
- Step 9: Result (Figure 1).

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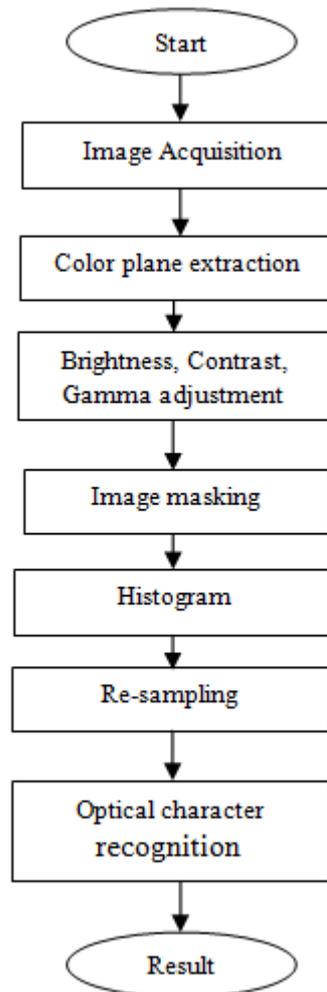


Figure 1: Flow chart of the proposed method.

V. RESULTS AND DISCUSSION

The proposed system consists of three major parts:

- Image acquisition (Figure 2)
- Extraction of serial number
- Optical characters recognition (OCR)

STEP 1: Image Acquisition



Figure 2: The original image along with the output for image acquisition.

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STEP 2: Color Plane Extraction (Figure 3)



Figure 3: Result for color plane extraction.

STEP 3: BCG Correction (Figure 4)



Figure 4: Result for BCG correction.

STEP 4: Image Masking (Figure 5)



Figure 5: Masked image of the currency notes.

STEP 5: Histogram Analysis

The graph obtained for histogram analysis (Figure 6):

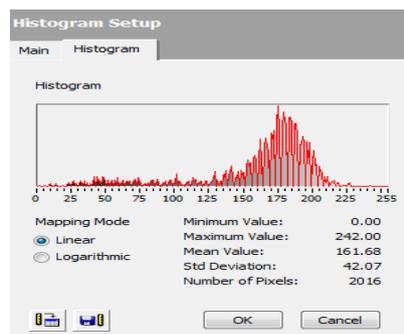


Figure 6: Histogram analysis of the masked image.

STEP 6: Optical Character Recognition (Figures 7-9)



Figure 7: Extracted masked image.

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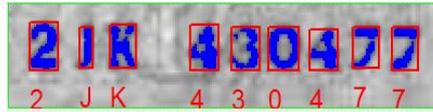


Figure 8: Optical character recognition of characters.

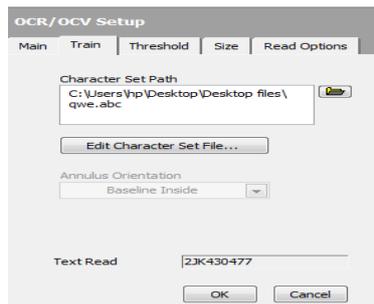


Figure 9: OCR setup.

Data Results Saved in an Excel File (Figure 10 and Table 1):

	A	B	C	D	E	F	G
1	F:\referen	21-04-201	13:48:15				
2		Classificat	Identifica	Left	Top	Width	Height
3	2	939		10	8	13	20
4	J	815		33	10	6	17
5	K	759		47	9	12	18
6	4	778		84	9	13	19
7	3	732		103	10	13	18
8	0	765		120	10	14	18
9	4	913		139	11	13	17
10	7	982		159	10	12	17
11	7	980		177	10	12	18

Figure 10: Excel file result.

S. No	Currency Note Images	Extracted Serial number of the currency note
1.		48K 924837
2.		8JA 09JJ81
3.		2CC*4J8323
4.		4AB 245J80

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5.		6AL 491487
6.		0AA 249343

Table 1: Tablular column containing the result of the extracted notes.

VI. CONCLUSION

Thus, image processing is the most popular and effective method of currency recognition which is of great importance in day to day life. The system that is designed here is computationally efficient as they make the computer see letters through a decidedly non-human set of eyes. During, the entire project we have chosen the parameters by checking with varying values and then applying the optimum values. The processes that are deciphered above are the optimum values which work satisfactorily for most lightening conditions. This paper presents a successful approach for currency recognition depends upon the feature extraction of currency images. This paper presents the heuristic analysis of characters and digits of serial number of the Indian currency notes to recognition of currency notes. The method of feature extraction of the currency notes using optical recognition is very efficient and with the advent the optical character recognition, the machines sport high accuracy and most high speed.

VII. REFERENCE

1. RS Parminder, K Gopal, et al. Image Processing based Heuristic Analysis for Enhanced Currency Recognition. International Journal of Advancements in Technology 2011; 2.
2. Q Ji, Q Dongping, et al. A Digit Recognition System for Paper currency Identification Based on Virtual Instruments. IEEE Information and Automation 2006.
3. K Thomas, Image processing with Lab VIEW and IMAQ vision. Technology and Engineering 2003.
4. Lab VIEW Machine Vision and Image Processing Course Manual. National Instruments Corporation 2004.
5. NI Vision Assistant tutorial manual. National Instruments Corporation 2011.
6. K Jsvinder, A Monika, A Lab VIEW approach to detect the theft of Indian currency notes. International Journal of Advanced Research in Electronics and Communication Engineering 2013; 2: 84-88.
7. GL Foresti, C Regazzoni, A hierarchical approach to feature extraction and grouping. IEEE Trans Image Processing 2000; 9: 1056-1074.
8. GC Rafael, Richard WE, Digital Image Processing. Prentice Hall 2002.