

**INTERNATIONAL JOURNAL OF ENGINEERING SCIENCES & RESEARCH
TECHNOLOGY****WEBCAM BASED OPTICAL CHARACTER RECOGNITION USING MATLAB****Dhiraj Kumar Jasrotia^{*1} & Aarti Malik²**^{*1}M.TECH., ECE, Electronics And Communication Engineering, Gurukul, Banur² ASSISTANT PROFESSOR, ECE, Electronics And Communication Engineering, Gurukul, Banur

DOI: 10.5281/zenodo.1336727

ABSTRACT

Webcam based Optical Character Recognition by using Template Matching is a system which is useful to recognize the character or alphabets in the given text by comparing two images of the alphabet. The objectives of this system prototype are to develop a program for the Optical Character Recognition (OCR) system by using the Template Matching algorithm. This system has its own scopes which are using Template Matching as the algorithm that applied to recognize the characters, which are in both in capitals and in small (A – Z), and the numbers (0 -9) used with courier new font type, using bitmap image format with 240 x 240 image size and recognizing the alphabet by comparing between images which are already stored in our database is already. The purpose of this system prototype is to solve the problems of blind peoples who are not able to read, in recognizing the character which is before that it is difficult to recognize the character without using any techniques and Template Matching is as one of the solution to overcome the problem

Keywords: OCR, Webcam, Template Matching Feature Extraction.**I. INTRODUCTION**

The Optical Character Recognition is implemented on MATLAB and it requires only MATLAB supportive laptop or pc.[1]also It can implement on smart mobile phones of android platform. This paper combines the functionality of Optical Character Recognition and. The objective is to develop user friendly application which performs image to words conversion system using MATLAB. The OCR takes image as the input, gets text from that image and then converts it into words. This system can be useful in various applications like banking, legal industry, other industries, and home and office automation. It mainly designed for people who are unable to read any type of text documents. In this paper, the character recognition method is presented by using OCR technology and laptop with higher quality camera. [2]OCR is the acronym for Optical Character Recognition. This technology allows to automatically recognizing characters through an optical mechanism. Webcam based Optical Character Recognition techniques associate a symbolic identity with the image of character. In a typical OCR systems input characters are digitized by an optical scanner. Each character is then located and segmented, and the resulting character image is fed into a pre-processor for noise reduction and normalization. [3]Certain characteristics are the extracted from the character for classification. The feature extraction is critical and many different techniques exist, each having its strengths and weaknesses. After classification the identified characters are grouped to reconstruct the original symbol strings, and context may then be applied to detect and correct errors.

II. LITERATURE REVIEW ON OPTICAL CHARACTER RECOGNITION

As per reference, IJETAE Volume 4, Issue 5, May 2016[1] this paper explains comparative analysis between Random Transform and Hough Transform, which are applied for error detection and correction. This paper explains implementation of OCR in Matlab, compared with current working method of OCR. This system achieved recognition rate near about 92%.

As per reference, IJSR Publications, Volume 2, Issue 6, June 2015 [2] this paper discusses recognition of off-line English character. This explains a new model Hidden Markov Model (HMM) for character recognition. The Novel feature Extraction method is used for implementing HMM. By collecting 13000 samples from 100 writers they have tested performance of OCR technique and got accuracy of near about 94%.

As per reference, IJARECE Volume 2, Issue 5, May 2013 [3] this paper implements the OCR technique in Matlab. This paper explains how matlab is more convenient and effective for OCR technique. The performance of OCR has been tested with samples in this approach.

As per reference, European Academic Research, Volume I, Issue 5/ August 2013 [4] this paper discusses the OCR technique with its components. This achieved a good recognition rate by implementing Particle Swarm Optimization Approach.

Optimization (BFO). In this proposal PSO and BFO are used to achieve most advantageous harmonic compensation. This paper also discusses the efficiency of both approaches PSO and BFO by comparing them.

As per reference , IJERA Volume 1, Issue 4, pp. 1736-1739 [7] this paper presents an overview of the various O.C.R. systems for Gurumukhi which are developed for handwritten isolated Gurumukhi text. This paper discusses details of different feature extraction methods with its comparative analysis.

As per reference, International Journal of Advanced Research in Computer Science and Software Engineering Volume 4, Issue 1, January 2014[8] this explains OCR technique for both handwritten and printed Gujarati script. For this implementation, linear recognition technique has been used. This paper explains how linear recognition technique is efficient in OCR for error detection and correction.

As per reference, International Journal of Computer Application, volume 23, no.1, pp. 21-24, 2011.[9] This paper not only explain OCR for different font size and style, but also tests the performance of proposed OCR system with four groups of different font size and style. This proposed system achieved recognition rate near about 96%.

III. METHODOLOGY WORK

Now a days, globalization is reaching to a great level. In this globalized environment, character recognition techniques also getting a valuable demand in number of application areas. OCR is an effective technique which converts image into suitable format such that data can be edit, modify and stored. This technique performs several operations such as, scans the input image, processes over the scanned image thereby image gets converted into portable formats .For instance, the hard copy of old historical books, novels, etc. .cannot be stored safely for a long time. Rather, its safety has limitations. If we apply OCR technique for such cases, the different historical documents can be stored, modified for a longtime. OCR also having variety of applications in almost all fields, including security. OCR implementation helps us to edit, store and process over the scanned data more effectively. User can handle the stored data whenever he wants with the internet support. So we use Optical character recognition is most successful application used in pattern recognition. purposed OCR system consists of the following basic components:

1. Input Image
2. Pre-processing
3. Feature Extraction
4. segmentation
5. word extraction

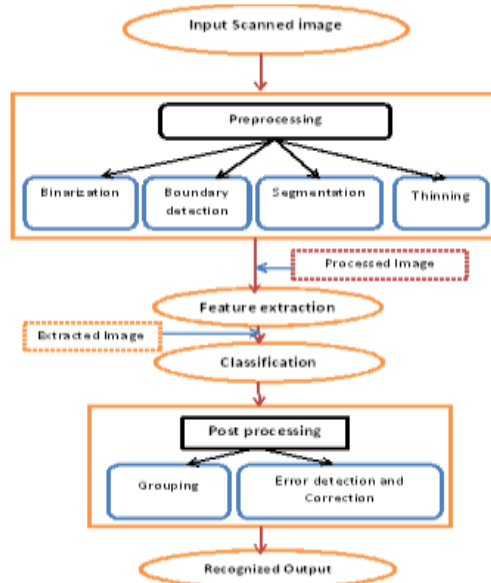


Fig- 1: Processing Stages of OCR Technique

3.1 Input Image

Firstly, image of input data is optically scanned. The scanned image can be any document of different dimensions. This scanned input image is fed to pre-processing section so as to process over that scanned image.

3.2. Pre-Processing

Pre-processing includes several operations over the scanned image, so that input image becomes suitable and comfortable for applying to further sub sections. Basically the objective of pre-processing is to improve the quality of scanned input image. Noise removal, mathematical operations can also be processed in this Pre-processing section. It includes binarization, boundary detection, segmentation, thinning. It performs the several operations over the scanned input data.

3.3 Binarization

Binarization plays an important role in pre-processing. It is necessary to convert a color image into black and white format. So we can process over that black and white image. Basically separation of background and actual image area referred as foreground of a scanned image is called binarization.

3.4 Boundary Detection & noise removal

The binarized image is now applicable for boundary detection noise removal. In this operation the boundaries of scanned image is detected. It detects all the boundaries of image. It is necessary to detect the boundaries so as to select an individual character.

3.5 Segmentation

This is important operation of OCR as rate of recognition is directly proportional to segmentation. In this process, every individual character is separated. This isolates the different sub-parts of an image. It is used to separate pixels of an image as per the contents in data like words, paragraph etc.

3.6 Feature Extraction

For the accuracy of OCR system, the appropriate Feature Extraction method should be selected. While processing over the image some features should be separated. The typical features are Edges, Corners, Ridges, etc. This method of separation is called as Feature Extraction. The accuracy of an OCR technique depends on selection of proper feature extraction method.

3.7 Classification

The feature extracted data must have gone through the process of Classification. This process classifies the extracted individual character in proper way.

3.8 Post-Processing

This is the last and an important phase of OCR technique. It includes different operations like Grouping, Error detection and correction. Whatever the data being operated through different operations such as, binarization, segmentation, Feature extraction, Classification etc. is fed to post-processing. That means different features of input scanned image are extracted. That feature extracted data is an individual character. It is unable to get detailed information from that individual character. So, it is necessary to collect individual character in appropriate and sequential manner. The process of collecting individual characters of the same contents to form a string is termed as Grouping. By using error detecting and correcting algorithms, errors can also be eliminated. Finally, we get the recognized output character.

Our Flow Chart

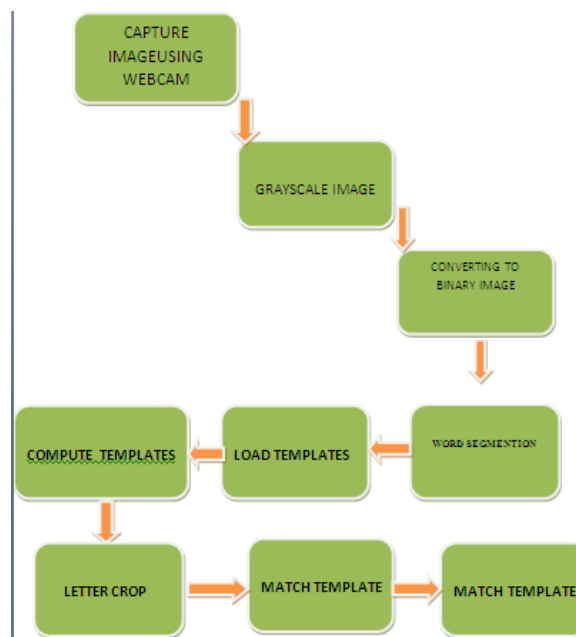


Fig- 2: Our Flow Chart

3.8 Input Image Using Webcam

To acquire an image, any one of the two methods can be followed. In the first one, image is capture using webcam in order to make it machine editable. The image can be of any specific format like jpeg, bmp etc.

3.9 Grayscale Image

After the image is acquired, Image processing toolbox comes into play. Image is first converted into a greyscale image

3.10 Image Binarization

Image binarization converts an image of up to 256 gray levels to a black and white image. Frequently, binarization is used as a pre-processor before OCR. In fact, most OCR packages on the market work only on bi-level (black & white) images.

3.11 Boundary Detection

The binarized image is now applicable for boundary detection. In this operation the boundaries of scanned image is detected. It detects all the boundaries of image. It is necessary to detect the boundaries so as to select an individual character.

IV. RESULT OUTPUT

Finally, we get the recognized output character.



Figure-3 Project Main Home Page



Figure-4 Input Image In Gui(Graphical User Interface)



Figure-5 Noise Removal Boundary Detection

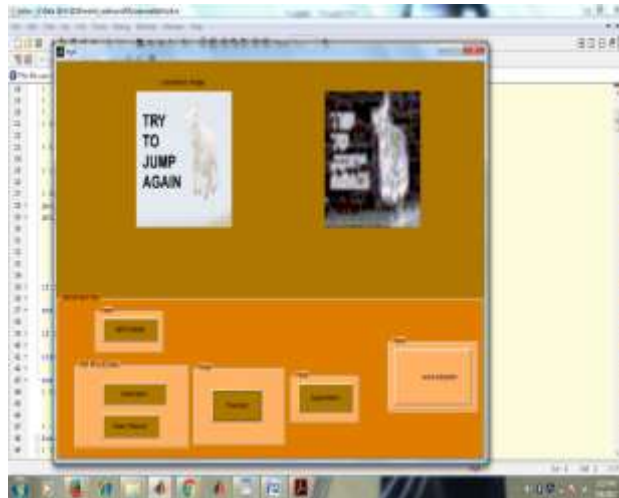


Figure-6 images Thresholding

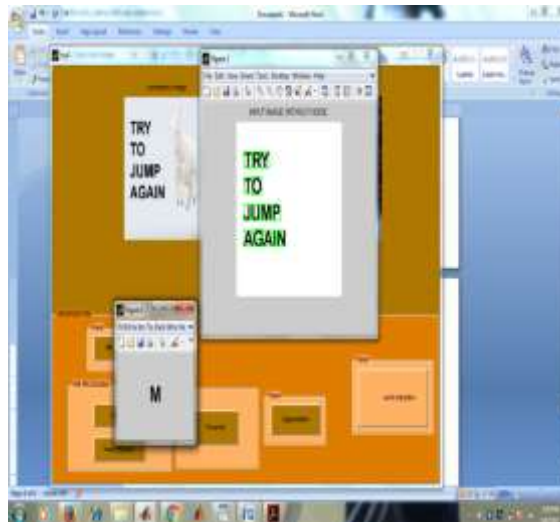


Figure-7 Image Segmentation

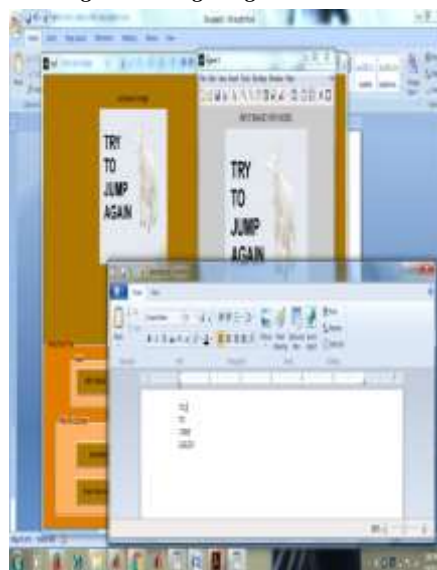


Figure-8 Multiple Charter Recognize

V. CONCLUSION

This is important operation of OCR as rate of recognition is directly proportional to segmentation. In this process, every individual character is separated. This isolates the different sub-parts of an image. It is used to separate pixels of an image as per the contents in data like words, paragraph etc. Segmentation of fixed-pitch fonts is accomplished relatively simply by aligning the image to a uniform grid based on where vertical grid lines will least often intersect black areas. For proportional fonts, more sophisticated techniques are needed because whitespace between letters can sometimes be greater than that between words, and vertical lines can intersect more than one character. Preprocessing makes it easy to recognize the given data

REFERNCES

- [1] **Jagruti Chandarana, Mayank Kapadia:** Optical Character Recognition International Journal of Emerging Technology and Advanced Engineering Volume 4, Issue 5, May 2016
- [2] **Binod Kumar Prasad, Goutam Sanyal:** A model Approach to Off-line English Character Recognition International Journal of Scientific and Research Publications, Volume 2, Issue 6, June 2015
- [3] **Sandeep Tiwari, Shivangi Mishra, Priyank Bhatia, Praveen Km. Yadav**[May 2013] Optical Character Recognition using MATLAB International Journal of Advanced Research in Electronics and Communication Engineering (IJARECE)Volume 2, Issue 5, May 2013
- [4] **Majida Ali Abed Hamid Ali Abed Alasadi** Simplifying Handwritten Characters Recognition Using a Particle Swarm Optimization Approach European Academic Research, Volume I, Issue 5/ August 2013
- [5] **Mahesh Goyani, Harsh Dani, Chahna Dixit** Handwritten Character Recognition – A Comprehensive Review International Journal of Research in Computer and Communication Technology, Volume 2, Issue 9, September -2013
- [6] **Sushree Sangita Patnaik and Anup Kumar Panda** Particle Swarm Optimization and Bacterial Foraging Optimization Techniques for Optimal Current Harmonic Mitigation by Employing Active Power Filter Applied Computational Intelligence and Soft Computing Volume 2012, Article ID 897127.
- [7] **Pritpal Singh, Sumit Budhiraja** Feature Extraction and Classification Techniques in O.C.R. Systems for Handwritten Gurumukhi Script – A Survey International Journal of Engineering Research and Applications (IJERA) Volume 1, Issue 4, pp. 1736-1739.
- [8] **Lipi Shah, Ripal Patel, Shreyal Patel, Jay Maniar** Skew Detection and Correction for Gujarati Printed and Handwritten Character using Linear Regression International Journal of Advanced Research in Computer Science and Software Engineering Volume 4, Issue 1, January 2014
- [9] **Ritesh Kapoor, Sonia Gupta, and C.M. Sharma,** “Multi-font/size character recognition and document scanning,” Int. J. of Computer Application, volume 23, no.1, pp. 21-24, 2011.
- [10] **X. Zhai, F. Bensaali and R. Sotudeh,** 'Real-time optical character recognition on field programmable gate array for automatic number plate recognition system', IET Circuits, Devices & Systems, vol. 7, no. 6, pp. 337-344, 2015.

CITE AN ARTICLE

Jasrotia, D. K., & Malik, A. (2018). OCR, Webcam, Template Matching Feature Extraction. *INTERNATIONAL JOURNAL OF ENGINEERING SCIENCES & RESEARCH TECHNOLOGY*, 7(8), 216-222.