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Book Search by Capturing Text from Digital Images Using Optical Character Recognition

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***Abstract*—Now-a-days Image Processing has been the most interested subject for research. This paper presents the idea of recognizing the characters in digital image using Optical Character Recognition. The Optical Character Recognition process involves several aspects such as segmentation, feature extraction and classification. MATLAB provides a variety of functions that way providing the capabilities of developing applications and new algorithms in the field of image processing. This paper shows how to use MATLAB and its image processing toolbox functions in order to recognize characters in an image. We implement this using MATLAB for segmentation using edge detection, identification of characters, and storing the vector of characters. Optical Character Recognition (OCR) service enables application to retrieve the text that appears in a photograph. We have to first preprocess the image and image extraction as followed to find characters in a photograph. The resulting vector can be used in many applications. OCR is used in many categories like processing checks in banks, invoice imaging etc., we wish to develop this process for developing an application for searching a book, based on the characters recognized in the input image (usually the cover page of the book).**

***Keywords*—OCR (optical Character Recognition), preprocess, segmentation, feature extraction.**

I. INTRODUCTION

Image processing has been the developing trend in the field of research because of its applications in various fields like banking & security etc. Recognition of characters form a digital image is one part of the image processing which can be applied in many fields like banking, postal, searching etc. As it would also reduce the error in typing and reducing the delay in typing the text and helps in automation of various process including the clearance of checks in banking. Optical character recognition (OCR) is the mechanical or electronic translation of scanned images of handwritten, type written or printed text into machine-readable text. It is widely used for converting real world books or documents into electronic files, to computerize the record system in an office, or to search a text on a website. OCR makes it possible to edit the text, search for a word or phrase, store it more compactly, display or print a copy free of scanning effects, and apply techniques such as machine translation, text-to-speech conversion and text mining to it. OCR has been a field of research in pattern recognition, artificial intelligence and computer vision. The process of OCR involves several steps including segmentation, feature extraction, and classification.

A. Advantages of using this approach:

With the help of this system,
Human errors while typing will be reduced.
The time lapse in typing the text will also be reduced. Automatic search of text captured can be automated.

I. An over view of the system

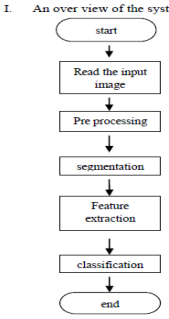

Fig 1. An overview of the Proposed system

Figure 1 shows an overview of the system, where in we take a scanned copy of the text or an image taken by a camera and preprocess it before passing it to segmentation process and on the next step pass the segmented glyphs for feature extraction and finally the extracted features are classified into individual characters. The individual characters once classified can be used in computerization of the text or to search the text over the internet. We intend to use this process, by taking the image of the cover page of a text book and use the classified text and search for similar books on the same concept by different authors.

I. PROCESSES/STEPS INVOLVED IN TRAINING

1) *Image acquisition/reading the input image:* Here we select the image we want to test our system. The image may be acquired either by scanning the document or taking a picture of it in a digital camera and loading it into the computer.

2) *Pre-processing:* Here we change the properties of the image into our corresponding format like

resizing,
converting it from gray scale to binary scale (binarizing the

image),etc.

3) *Segmentation:* Segmentation refers to the process of partitioning a digital image into multiple segments or glyphs. The main objective of segmentation is to simplify the representation of an image into something that is more meaningful and easier to analyze. Segmentation of images is typically used to locate objects and boundaries (lines, curves, etc.) in images. Segmentation is so far the most important aspect of the pre-processing stage. It allows the system to extract features from each individual character like its font, curves, color etc. The result of this image segmentation is a set of segments (glyphs) that collectively cover the entire image, or a set of boundaries of characters are extracted from the image. Each one of the pixels in a region is similar to some characteristic or property, such as color, intensity, or texture. Adjacent regions vary significantly with respect to the same characteristic(s) when compared to the previous characters.

4) *Feature Extraction:* Feature extraction is the process applied when the input data is very large and is supposed to have redundant data to reduce the data to be processed by transforming the data into reduced set of representations. This transformation greatly simplifies the resources that are needed to describe the large set of input data accurately. Because of this feature extraction the same process can be applied to various fonts and styles. The accuracy of the system depends on the training of the system and the similarity in the shapes of the images.

5) *Classification:* With the process of Classification we individually classify the characters in the image. Classification assigns corresponding levels with respect to groups with homogeneous characteristics, thus separating multiple characters from one another.

II. APPLICATION

With the help of the above process we can get the text as output. We can use the text in various applications like automation or computerization of records, searching the text online. In this paper we propose to use the text to search for similar kind of books by processing the cover page of the text book as the input image and results are as follows:

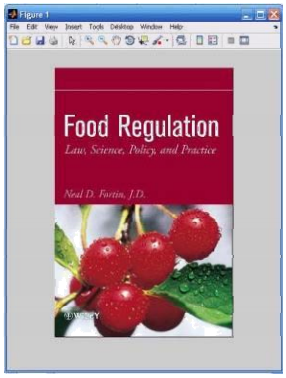

Fig 2. A sample input image

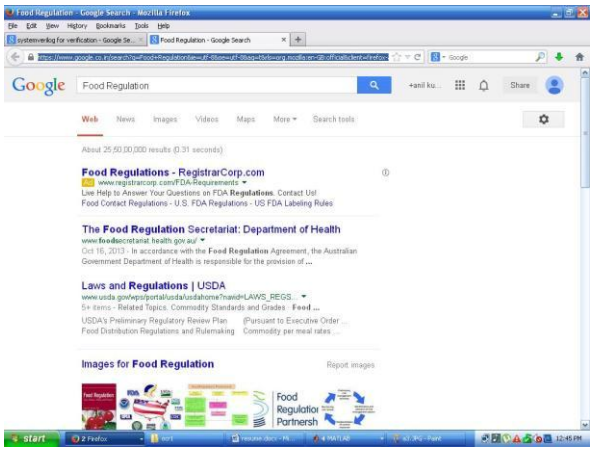

Fig 3. The output search result

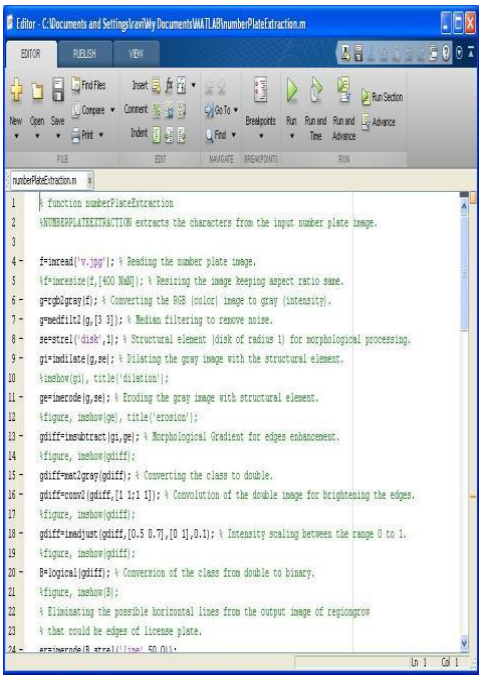

Fig. 4 a snap shot of matlab

III. CONCLUSION

In this paper we proposed a system that searches for similar kinds of books based on the text recognised form the input cover image of the text book. It is mainly proposed to reduce the typing errors and to save the time in typing the large names of the text books. This application can be much useful when one wanted to search for the same topic in different books by differnet authors for much better understanding of the concept they are studying. Our process involves the important processes like RGB to Gray conversion (Binarization), segmentation of the title part of the book, feature extraction, classification and searching the text from the resultant process directly. Regarding the results our system has been tested on varous kinds of text books of different sizes and fonts and it gave satisfactory results.

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