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License Plate Detection Using Colour Illumination Based Classification

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ABSTRACT

The electronic conversion of images typewritten or printed text into machine-encoded text from an image is defined as Text Extraction. Text Extraction basically deals with the recognition of optically processed characters. Optical Recognition of characters is done only when the printing and writing is completed. This paper proposes an high minded method for the recognition of text or characters from the image using morphological algorithm. This algorithm will be used in case of Toll plaza applications, highly restricted area like military zones and government offices like Parliament, Supreme Court, Cold drink industries etc in which the image will be shown with the help of camera and using morphological algorithm the extraction of text and characters from that captured image.

Index Terms- Image Processing, Mid Filtering Method, Morphological algorithm, Text Extraction, OCR, Vehicle Identification.

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I.Introduction

Text Extraction through Image belongs to the family of techniques performing automatic identification. The (ANPR) Automatic Number Plate Recognition was invented in 1977 at the Police Scientific Development Branch in the UK (United Kingdom). However, it gained much interest during the last decade along with the improvement of digital camera and the increase in computational capacity .Below we discuss these different techniques and define TEXT EXTRACTION's position among them.
1 ID (Identification Automatically) -The traditional way of entering data into a computer is through the keyboard. However, this is not always the best nor the most efficient solution. In

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many cases automatic identification may be an alternative. Various technologies for automatic identification exist, and they cover needs for different areas of application.

2 BC (Bar Code) -The bar code consists of several dark and light lines representing a binary code for an eleven-digit number, ten of which identify the particular product. The bar code is read optically, when the product moves over a glass window, by a focused laser beam of weak intensity which is swept across the glass window in a specially designed scanning pattern. The reflected light is measured and analysed by a computer. Due to early standardization, bar codes are today widely used and constitute about 60 % of the total market for identify automatically. The bar code represents a unique number that identifies the product, and a price look-up (PLU) is necessary to retrieve information about price etc. The binary pattern representing the barcode takes up much space considering the small amount of information it actually contains. Also, the barcodes are not readable to humans. Hence, they are only useful when the information can be printed elsewhere in a human readable form or when human read-ability is not required. Laser-scanning of barcodes is therefore only in a few cases an alternative to optical character recognition.[1]. A computer vision and character recognition algorithm for a license plate recognition (LPR) is presented to be used as a core for intelligent infrastructure like electronic payment systems (toll payment, parking fee payment), freeway. . Moreover, as increased security awareness has made the need for vehicle based authentication technologies extremely significant, the proposed system may be employed as access control system for monitoring of unauthorized vehicles entering private areas. The license plate remains as the principal vehicle identifier despite the fact that it can be deliberately altered in fraud situations or replaced (e.g., with a stolen plate)[2]. Mathematical Morphology is a powerful tool for dealing with various problems in image processing and computer vision. It was introduced as a technique for analyzing geometric structure of metallic and geologic samples. It was extended to image analysis.. Mathematical morphology is a very important theory, whose operation must be defined by set arithmetic. Therefore, the image which will be processed by mathematical morphology theory must been changed into set. Mathematical morphology is composed by a series of morphological algebraic arithmetic operators. The basic morphological operations, namely erosion, dilation, opening, closing etc. are used for detecting, modifying [3]. In erosion, every object pixel that is touching a background pixel is changed into a background pixel. In dilation, every background pixel that is touching an object pixel is changed into an object pixel. Erosion makes the objects smaller, and can break a single object into multiple objects. Dilation makes the objects larger, and can merge multiple objects into one. [4].

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The rest of the paper is organized as follows: section 2 will present the Literature Reviews of the paper. Section 3 discusses the Methodology and section 4 will end the paper with future works.

II. LITERATURE REVIEW

In [1] the authors proposed that Text Extraction through Image is the electronic and mechanical conversion of images of typewritten or printed text into machine-encoded text. It is widely used as a form of data entry from printed paper data records, whether passport documents, invoices, bank statements, computerized receipts, business cards, mail, printouts of static data, or any suitable documentation. It is a common method of digitizing printed texts so that it can be electronically edited, searched, stored more compactly, displayed on-line, and used in machine processes such as machine translation, text-to-speech, key data and text mining. TEXT EXTRACTION is a field of pattern recognition, artificial intelligence needed to be trained with images of each character, and worked on one font at a time. Advanced systems capable of producing a high degree of recognition accuracy for most fonts are now common. Some systems are capable of reproducing formatted output that closely approximates the original page including images, columns, and other non-textual components.

In [2] the authors proposed that a new algorithm for vehicle license plate identification is proposed, on the basis of a novel adaptive image segmentation technique (sliding concentric windows) and connected component analysis in conjunction with a character recognition neural network. The algorithm was tested with 1334 natural-scene gray-level vehicle images of different backgrounds and ambient illumination. The camera focused in the plate, while the angle of view and the distance from the vehicle varied according to the experimental setup. The license plates properly segmented were 1287 over 1334 input images (96.5%). The optical character recognition system is a two-layer probabilistic neural network (PNN) with topology 108-180-36, whose performance for entire plate recognition reached 89.1%. The PNN is trained to identify alphanumeric characters from car license plates based on data obtained from algorithmic image processing. Combining the above two rates, the overall rate of success for the license plate-recognition algorithm is 86.0%. A review in the related literature presented in this paper reveals that better performance (90% up to 95%) has been

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reported, when limitations in distance, angle of view, illumination conditions are set, and background complexity is low.

In [3], the authors proposed that Edge detection is one of the important pre-processing steps in image analysis. Edges characterize boundaries and edge detection is one of the most difficult tasks in image processing hence it is a problem of fundamental importance in image processing. Edges in images are areas with strong intensity contrasts and a jump in intensity from one pixel to the next can create major variation in the picture quality. Edge detection of an image significantly reduces the amount of data and filters out useless information, while preserving the important structural properties in an image. Conventionally, mathematical morphology edge detection methods use single and symmetrical structure elements. But they are difficult to detect complex edge feature, because they are only sensitive to image edge which has the same direction of structure elements. This paper proposed a novel edge detection algorithm based on multi-structure elements morphology of eight different directions. The eight different edge detection results are obtained by using morphological gradient algorithm respectively, and final edge results are obtained by using synthetic weighted method. The experimental results showed that the proposed algorithm is more efficient for edge detection than conventional mathematical morphological edge detection algorithms and differential edge detection operators.

In [4] the authors described that the identification of objects within an image can be a very difficult task. One way to simplify the problem is to change the grayscale image into a binary image, in which each pixel is restricted to a value of either 0 or 1. The techniques used on these binary images go by such names as: blob analysis, connectivity analysis, and morphological image processing (from the Greek word morphe, meaning shape or form). The foundation of morphological processing is in the mathematically rigorous field of set theory; however, this level of sophistication is seldom needed. Most morphological algorithms are simple logic operations and very ad hoc. In other words, each application requires a custom solution developed by trial-and-error. This is usually more of an art than a science. A bag of tricks is used rather than standard algorithms and formal mathematical properties.

In [5] the author proposed that an algorithm is proposed for detecting texts in images and video frames. It is performed by three steps: edge detection, text candidate detection and text refinement detection. Firstly, it applies edge detection to get four edge maps in horizontal,

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vertical, up-right, and up-left direction. Secondly, the feature is extracted from four edge maps to represent the texture property of text. Then k-means algorithm is applied to detect the initial text candidates. Finally, the text areas are identified by the empirical rules analysis and refined through project profile analysis. Experimental results demonstrate that the proposed approach could efficiently be used as an automatic text detection system, which is robust for font size, font color, background complexity and language.

III. METHODOLOGY

The Procedure followed is:

- Browse any image from the system
- Convert RGB image to Greyscale image
- Reduce Noise using Mid Filtering process
- Heighten Contrast Using Histogram Equalizer
- Detect Text area and adjust edges of that particular region
- Segmentation of characters and numbers in the extracting fields.
- Extract the text and create a notepad file.

A. Text Extraction

Task Extraction is the task of automatically extracting structured information from unstructured and/or semi-structured machine-readable documents. In most of the cases this activity concerns processing human language texts by means of natural language processing (NLP). Recent activities in multimedia document processing like automatic annotation and content extraction out of images/audio/video could be seen as information extraction. Text extraction is the task of automatically extracting structured information from unstructured and/orsemi-structured machine-readable documents. In most of the cases this activity concerns processing human language texts by means of natural language processing (NLP). Recent activities in multimedia document processing like automatic annotation and content extraction out of images/audio/video could be seen as text extraction. Text Extraction is the part of a greater puzzle which deals with the problem of devising automatic methods for text management, beyond its transmission, storage and display. The

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discipline of text retrieval has developed automatic methods, typically of a statistical flavor, for indexing large document collections and classifying documents

B. Mid Filtering Method

The median filter is a nonlinear digital filtering technique, often used to remove noise. Such noise reduction is a typical pre-processing step to improve the results of later processing (for example, edge detection on an image). Median filtering is very widely used in digital image processing because, under certain conditions, it preserves edges while removing noise.

The main idea of the median filter is to run through the signal entry by entry, replacing each entry with the median of neighboring entries. The pattern of neighbors is called the "window", which slides, entry by entry, over the entire signal. For 1D signals, the most obvious window is just the first few preceding and following entries, whereas for 2D (or higher-dimensional) signals such as images, more complex window patterns are possible (such as "box" or "cross" patterns). Note that if the window has an odd number of entries, then the median is simple to define: it is just the middle value after all the entries in the window are sorted numerically. For an even number of entries, there is more than one possible median.

C. Morphological Algorithm

It was introduced as a technique for analyzing geometric structure of metallic and geologic samples. It was extended to image analysis.. Mathematical morphology is a very important theory, whose operation must be defined by set arithmetic. Therefore, the image which will be processed by mathematical morphology theory must been changed into set. Mathematical morphology is composed by a series of morphological algebraic arithmetic operators. The basic morphological operations, namely erosion, dilation, opening, closing etc. are used for detecting, modifying [3]

The decision to remove a pixel is based on four rules, as contained in the subroutine. All of these rules must be satisfied for a pixel to be changed from black to white. The first three rules are rather simple, while the fourth is quite complicated. The four rules are as follows:

1. Rule one: The pixel under consideration must presently be black. If the pixel is already white, no action needs to be taken.

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2. Rule two: At least one of the pixel's close neighbors must be white. This insures that the erosion of the thick ridges takes place from the outside. In other words, if a pixel is black, and it is completely surrounded by black pixels, it is to be left alone on this iteration.
3. Rule three: The pixel must have more than one black neighbor. If it has only one, it must be the end of a line, and therefore shouldn't be removed.
4. Rule four: A pixel cannot be removed if it results in its neighbors being disconnected. This is so each ridge is changed into a continuous line, not a group of interrupted segments[4].

IV. FUTURE WORK

In this paper, we propose an approach for Number Plate Recognition. Automatic Text summarization has become an integral part of daily life due to the availability of large volume of information, that need to be summarized for humans so that they can read important contents in short time. It has been said for decades (if not centuries) that more and more information is becoming available and that tools are needed to handle it. Only recently, however, does it seem that a sufficient quantity of this information is electronically available to produce a widespread need for automatic summarization. It is important to extract crucial information or compact the whole data in order to minimize amount of time invested to review this huge information. One of the ways to deal with this problem is Text Summarization. There are longer sentences in extract than average length. Therefore, sometimes even the part of sentences which is not important is also included, which results in space consumption. Important or relevant information is usually spread across sentences, and extractive summaries cannot capture this (unless the summary is long enough to hold all those sentences).

In this Paper, the automatic vehicle identification system using license plate is presented. The system use series of images processing techniques for identify the vehicle from database stored in the computer. The system is work on Matlab & its performance is checked on real images. The system helps to identify the Number plate in any of the entrance of vehicle in a highly restricted areas.
We use high Resolution camera in it to increase the clarity of result. The Camera helps to capture the image from any of size of plate &its angle. The statistical Analysis can be used to define the Probability of detection & Recognition of License Plate of Vehicle.

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A general approach to addressing these issues involves post-processing extracts, for example, replacing pronouns with their antecedents, replacing relative temporal expression with actual dates, etc.

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