

MSER region based Number plate recognition system

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ABSTRACT

A Number plate recognition system is one kind of an intelligent transport system. During the last decade it has gained much interest along with the improvement of digital cameras and improvement in computational capacity. It is used widely in highway electronic toll collection, traffic monitoring systems and parking in smart cities. In this paper we have used MSER technique to clearly show the number plate's alphanumeric data in coloured way.

KEYWORDS: ANPR, MSER, RGB

INTRODUCTION

The process of vehicle number plate recognition manually requires a very high degree of accuracy when we are working on a very busy road or parking which may not be possible manually as a human being tends to get fatigued due to monotonous nature of the job and they cannot keep track of the vehicles when there are multiple vehicles are passing in a very short time. To overcome this problem, many efforts have been made by the researchers across the globe for last many years. The ANPR (Automatic Number Plate Recognition) [1-2] is a system designed to help in recognition of number plates of vehicles. This system is designed for the purpose of the security system. Detection of the number plates of the vehicles, processing them and using processed data for further processes like storing, allowing vehicle to pass or to reject vehicle are the applications of ANPR. Such systems require the localization of number plate area in order to identify the characters present on it. Effective set of hardware and software components are the requirement of ANPR system, most preferably efficient infra-red cameras and powerful computers to provide high quality images. ANPR can be done through methods like Artificial Neural Networks [6], Fuzzy Logic [4] etc.

The Number Plate of the vehicle can be recognized in different steps. Figure 1 shows the Number Plate Recognition System.

IMAGE ACQUISITION

Image can be captured using electronic devices such as camera. The images are stored in coloured (RGB) format as JPEG or PNG. Further the image is gone through computational and mathematical processing and image is converted to RGB to gray scale format.

IMAGE PRE-PROCESSING

After capturing the image focus is to concentrate on the desired part of the image and remove the noises and other

non-significant parts. Reason behind such pre-processing is that recognition rate will be increased.

RGB TO GRAY SCALE CONVERSION

Nowadays the images which are acquired by cameras are in coloured format. In this stage the coloured RGB image is converted into gray scale image. Following formula is used to convert colour image into Gray Scale

$$G(x,y) = 0.3R + 0.59G + 0.11B$$

EDGE DETECTION BY SOBEL OPERATOR

Edge detection [7, 10-11] refers to the process of identifying and locating sharp discontinuities in an image. The Discontinuities are abrupt changes in pixel intensity which characterize boundaries of objects in a scene. Edge detection is an important tool which is providing the important information related to the shape, colour, size etc. To find out the true edges to get the better results from the matching process. That's why it is necessary to take the edge detector that fit best to the application. The Sobel-Feldman operators [8-9] convolves the image with a small, separable and integer valued filter in horizontal and vertical direction. The benefit of this method is that it detects edges and their orientation. Also it is simple method.

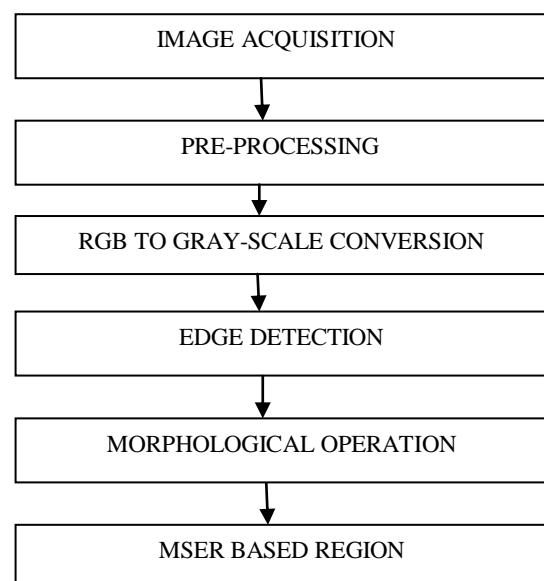


Figure 1 Number Plate Recognition System.

MORPHOLOGICAL OPERATION

Morphology [5] is a topological and geometrical based approach for image analysis which provides powerful tools for extracting geometrical structures and representing shapes in many applications.

The number plate of the vehicle can be detected in various steps. Figure 1 shows the Automatic Number Plate Recognition System. Steps followed in Number Plate Recognition System are Image Acquisition, Pre-processing, RGB to Gray-scale Conversion, Edge Detection, Plate Region Extraction and MSER Based Region.

MSER BASED REGION

The MSER [3] feature detector works well for finding text regions. It works well for text because the consistent colour and high contrast of text leads to stable intensity profiles.

RESULTS



Figure 2(a). Number Plate taken for MSER



Figure 2(b). Number Plate taken for MSER



Figure 3 (a). MSER region based Coloured Number Plate



Figure 3(b). MSER region based Coloured Number Plate

Here two images are taken for Number Plate Recognition as shown in figure 2(a) and figure 2(b). After extracting the Number Plate region from the images MSER is applied and the Alpha-numeric values of the Number plate are becoming coloured. Figure 3(a) and 3(b) shows the Coloured Numbers of the Number plates

CONCLUSION

The license plate recognition systems have two main points: The quality of license plate recognition software with recognition algorithms used and the quality of imaging technology, including camera and lighting. The method used above is detecting the Number plate region from the image of vehicle and then displaying the Number Plate in coloured format. This can be further used in extracting the numbers individually.

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