

License Plate Recognition Using Convolutional Neural Network

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ABSTRACT

The new upcoming technologies which leads to our ease and comfortable life style, we also demand a comfortable travelling life, be it private or public vehicle. The increasing number of vehicles every day, it is very difficult to keep track of every vehicle manually to keep check on law enforcement, traffic control, stolen cars etc. Using OCR technology, we will automate the manual work of noting down the car place number then verifying it later which is time consuming and a tedious job especially with the ever increasing number of vehicles. This system first will capture the image of the car, then it'll expire the image to OCR software which firstly recognizes the situation of car place in the image then extracts the car place from it. After extracting the license plate, we will do a number of image processing steps to enhance the image to get better result later on. Then we'll perform character segmentation in order that we will recognize each character individually. After getting the segmented character, we will recognize the characters using CNN which is trained on large number of data sets. Artificial Neural Networks increases the success rate quite the template matching technique of recognizing the character getting used earlier.

Keywords: ALPR, Character Segmentation, Convolutional Neural Networks, Edge Detection, carplace Extraction, Morphology, OCR.

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I. INTRODUCTION

Optical Character recognition is a technology that is mainly used for recognizing machine printed or human written text in scanned documents, images then converting into editable form. Expanding its application we can use OCR in computer guided traffic system i.e. an intelligent traffic system which will work on its own with little or no human intervention. License plate reorganization will play an important role for building any intelligent traffic system. Due to increases in number of vehicles, the major problem that arises is the traffic management issue and the ever increasing vehicle information which is required to be processed for stolen cars as in, traffic rule violation .Hence it's necessary to possess a system that reduces the load on human operators.

II. PROBLEM STATEMENT

An efficient methodology for license plate recognition system using various algorithms. License plate recognition

can be done using four methods Input Image, Preprocessing, Edge detection and Segmentation and Character recognition. It can be used in many applications such as Traffic control, parking control etc.

III. OBJECTIVES

The objective of this paper is to detect license plate for various applications such as smart parking system, road traffic monitoring, detecting invalid license plates, and automatic toll payments.

IV. MOTIVATION

To develop a technique to recognize number plate of a vehicle using algorithms such as pre-processing, edge detection, segmentation, character recognition. For character recognition template matching algorithm is used.

V. LITERATURE SURVEY

The author Prathamesh Kulkarni, Ashish Khatri, Prateek Banga, ushal Shah propose to Automatic Number Plate Recognition System for Indian conditions. So in this paper [1], the system which was designed for Indian plates used feature-based number plate localization for locating the car place from image and for character segmentation image Scissoring technique was used and statistical feature extraction was used for character recognition, for locating the car place within the image, salient features were used. Feature projection was went to segment the characters within the license plate. [1]

The author He Rajesh Kannan Megalingam, Prasanth Krishna, Pratheesh somarajan propose the Extraction of License Plate Region in Automatic License Plate Recognition. As per the paper [2], mathematical morphology concept was use for extracting plate region from the input image. Segmentation of car place was done using digital image labeling and character recognition was done using template matching. Edge detection algorithm and vertical projection method was used for extracting the plate region. For segmentation, there were several steps of filtering, thinning, vertical and horizontal projection [2]

The author K. K. Kim, K. I. Kim, J. B. Kim, and H. J. Kim, propose to the Learning-based approach for license plate recognition so as per the papersome of the trivial method used in the field of character recognition using various methods that made the system unreliable and time complex. The below given references gave methos which further made the previous system more advanced and reliable [3].

The author R. Girshick, F. Iandola, T. Darrell, J. Malik, propose to the Deformable PartModels are Convolutional Neural Networks. Conventional so as per the paper license plate recognition system has three stages, including car place localization, character segmentation, and character recognition. The first stage of license plate localization belongs to the object detection approach, including object localization, feature extraction, and image classification in three stages [4].

VI. SYSTEM ARCHITECTURE

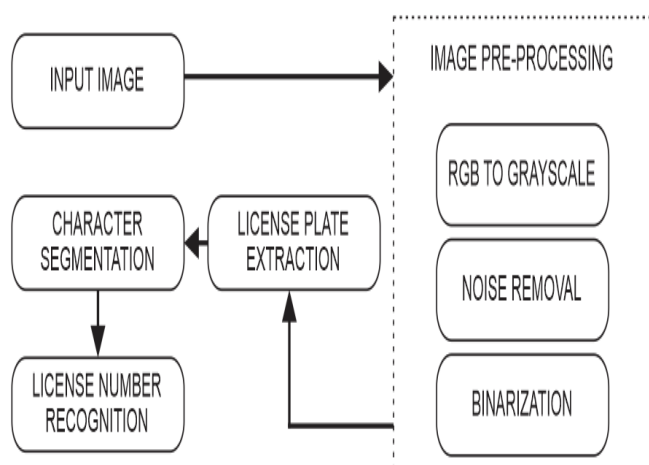


Fig 1. Architecture of proposed system

Input Image:-

In this work, image is capture using high resolution camera at different distance, different resolution conditions.

Preprocessing:-

Gray scale conversion: - Firstly we need to convert image RGB to grey scale. We convert the image into gray scale because for many application of image processing color information of image does not help to identify important edges or other features.

Edge Detection and Segmentation:-

After converting image into grayscale next task is to extract number plate from image using edge detection algorithm. After capturing license plates, we have to cut out the area outside the characters, filter out noise, and divided it into single characters for later identification using segmentation.

Character Recognition:-

After the segmenting characters next step is to find which character is present on number plate for this template matching algorithm is used. To Template matching search most similar patterns or objects matching with an image.

VII. CONCLUSION AND DISCUSSION

The automatic license plate recognition may be a wide field which may be implemented using many various algorithms and techniques. Every method has its own advantages and disadvantages. Our proposed methodology initially does the pre-processing steps which incorporates RGB to grayscale conversion, noise removal, and binarization of the image. After which the car place is extracted using Sobel's edge detection algorithms. Then the character are segmented using horizontal scanning which is given as input to the cnn in order to recognize the character correctly. Training our system with the assistance of ANN made our system more reliable and efficient so as to acknowledge the characters correctly. Although we will see that numerous algorithms are implemented in various previous projects, so as to form a strong system for automatic car place recognition, there are still many loop holes left within the system which may be filled so as to form the system more future-proof and reliable. Our project however works on the straightforward font styles which is getting used normally on license plates of the cars as per the principles made by the governing bodies of traffic department. But in order to handle the cases where people don't follow these rules, it can be handled in future projects being implemented during this field of car place recognition.

VIII. REFERENCES

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