Number Plate Recognition using OCR

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ABSTRACT

Technology has the power to streamline and improve the efficiency of a job over human's, in this paper we go through the problem of solving a particular problem in the Indian road systems i.e Toll booths. The paper discusses a rather simple and cost efficient method to streamline the process of toll booths with the help of detecting vehicle registration number using OCR to overcome the cost factor of present day systems by using IP cameras. Generally human intervention may cause some financial malpractices, which leads to huge loss of revenue. So to overcome this problem, there is a requirement of a system which automatically detects the number plates of those vehicles. So the main intention of this project is to get the registration information from the image efficiently.

Keywords: Number Plate Recognition, OCR, Toll Booth.

I. INTRODUCTION

A. Need of the system

In India toll booths are usually employed for classification of vehicles. Generally we see many people violating the traffic rules and causing inconvenience which also sometimes leads to many accidents. But because of rampant malpractices in the society, such people are not being punished or charged. This leads to great loss of proceeds for the firms using these toll booths and the inconvenience to the people on the roads is still continuing. For automatically classifying those vehicles in the background and tally the results, toll booths employed a new system using fibre optic sensors. But this new tollbooth system being so pricey and sophisticated, we aim to study about various types of systems which can replace this system with cheaper and efficient alternative.

Due to poverty and unemployment problems in India, it is infeasible to go for a completely automatic tollbooth. To ensure that the interference of a human doesn't involve any further illegal activities, the management needs an automatic vehicle classification system. The corporation lack a system that runs in the present environment and purely keeps a quality assurance on the standard. Apart from the main concerns of high cost and maintenance, the organization adopting these fibre optics genetically possesses a considerable number of complications. Even though an IR curtain system lessens the tariff undoubtedly, it is still quite extravagant and reasonable substitutes are desired. Because each and every toll booth handles cameras for direction of freedom, it was felt that the utility of a system using IP cameras should be tested

B. Scope of System

For vehicle identification purposes, one of the

techniques we use commonly is License Plate recognition . The main intention of this project is to recognize the registration information from the digital image (which has been obtained from the camera) in the most efficient way. This process mainly consists of three steps. First step is extraction of license plate from any size or orientation. The second step is the character segmentation and last step is the character recognition from the license plate. To achieve faster character recognition of the license plate Image processing, Resizing, Defragmentation and Character localization are the steps involved in character recognition process that are required to be performed on the image in order for Template Matching to be done.

II. BACKGROUND KNOWLEDGE

For detecting moving vehicles, high performance fibre optic sensors are used. A typical installation consists of receiver (photo detector), an interface device with transmitter (LED) and light guide connection cable (feeder) and fibre optic sensor. The sensors which give the signal levels after the passing of vehicles over it may changes randomly. The output signals produced by fibre optic sensors are given to a signal processing and data evaluation unit which comprises of the algorithm that computes axle count, axle spacing, distance formula, amount of micro bending and vehicle lengths and vehicle classes based on time.

An IR curtain contains basically an infrared transmitter and receiver. When a vehicle passes through the IR curtains they create the clear profile of the vehicle. The entire profile of the vehicle cannot be obtained by using just one strip of IR curtain, because the speed of the vehicles that passes the gate may different with each other. Thus it is important to know the vehicle speed and time used by vehicle to pass the gate. We can calculate the speed of the vehicle using the distance between the

curtains and the time. Thus, the correct profile of the vehicle can be determined by the speed of the vehicle and the frequency of pulses.

III. PROPOSED METHODOLOGY

The System ordinarily comprise of the accompanying units:

Camera(s) - pictures of the vehicles will be taken (front side and rear). Illumination - number plate can be lit up with assistance of controlled light which permits day and night activity. It is undetectable to driver much of the time in light of the fact that the brightening is Infrared (IR) . PC - ordinarily a PC running Windows or Linux. Software - the application and the acknowledgment bundle. Hardware - various input/output boards used to interface the external world

There are some of challenges that the product must almost certainly adapt to. Those include:

Poor picture resolution, due to the plate being too far or a low-quality camera. Low contrast or lighting due to overexposure, reflected image or obscuration. An item which is clouding the plate, regularly a soil on the plate. An alternate textual style. Absence of planning or strategy between nations or states. Different vehicles from various states and countries can have a similar registration number. Some of these issues can be resolved inside the product; it is mostly left to the equipment side to figure out answers for these troubles.

OCR is abbreviated as Optical character recognition is the mechanism which converts electronic images of typed text, handwritten message or printed lines into machine-translated text, either from a document which is scanned, or a photo of a document, a scene-photo (for example the text on signs and billboards in a landscape photo) or the

image on which the subtitled text is superimposed (for example from a television broadcast, which checks each gathering of pixels and appraisals regardless of whether it could be a letter and replaces the pixels with the ASCII code for the letter. For example the ASCII code for the lowercase 'a' is 01100001. In this way, the software filters the entire report and creates a page of letters precisely equivalent to however you had composed them in, which can be altered or controlled in any capacity.

As the vehicle is nearing the camera, it takes 'snapshots' and stores them in a record. At the point when the number plate is of adequate size for the OCR programming the frame is filtered and the number plate is changed over to ASCII code and held in a list[1]. This is the beginning of the process of capturing and processing the number plate, this absolutely depends on the right set up of camera, focal point, brightening, edge of view and equipment. Further with a successful capture, it converts the images into ASCII characters. Hence obtaining and detecting the number plate.

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A. Camera Positioning

In the event that the camera isn't set straight towards the moving vehicle the ANPR framework must be counseled. The camera position is the most vital factor to be considered for the effective activity of ANPR system.The camera area can fluctuate the level of acknowledgments to number of vehicles from 30% or 40% to close on 100%.The variables that characterizes the camera area are: Single camera covering a boundary entrance: Likely the best position is for a camera and illuminator in a 1M high support seeing specifically at the moving toward vehicle.

B. Single camera covering one path

The camera ought to be mounted to a shaft at 15M to 25M from the vehicle. Single or various cameras covering numerous paths: This is a unique application requiring contribution from the ANPR supplier. Another thought is that the placement of camera would not be at the ideal for ANPR. The factors like angle of skew and rotation are progressively focused to acquire an adequate level of precision. To begin detail or distinguishing proof info is given by the ANPR supplier to the uncommon application and it additionally requires nearby authority. These are regularly shading cameras which is another extraordinary application requires contribution from the ANPR supplier, mounted on a swivel mount. It can take the pictures of the vehicle to the front or either sides of it. To keep away from the blockage or arraignment in the application it is important to have the traditional picture of the vehicle. To have such regular picture a different camera most likely mounted alongside ANPR camera either adjacent to or only beneath to it .ANPR camera spares the review picture in the wake of enlisting the number plate from the picture. This at that point adds a shading picture to a similar record for future reference. It is commonly a bogus economy to endeavor to join the number plate acknowledgment and outline utilizing a solitary camera for every minute of every day task.

IV. RESULTS AND ANALYSIS

After capturing the image,it is processed step by step i.e first it is converted to grayscale immediately after inputting the image.Then the image edges are detected using sobel operator and image partitioned in threshold image and in morphed image, image is converted to some shape like rectangle,square etc.Then the plate is cleaned here and the text is detected.That detected plate can be used for getting the registration details of vehicle owner using the data stored in the database.In this way we detect the number plate using ocr.

A. Input Image

The image of the vehicle in which the number plate is to be detected is taken as input.

Figure 1. Input image

B. Grayscale Image

In grayscale images there are no colors but only the shades of gray.Input image is converted into shades of gray.

Figure 2. Grayscale Conversion

C. Sobel Image

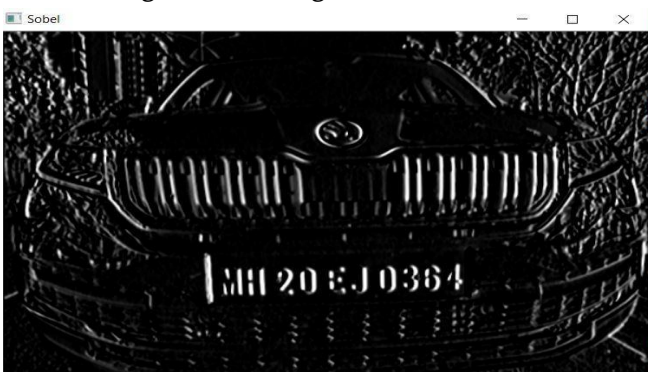Here sobel is used to detect edges.We can see the detected edges in the image.

Figure 3. Edge Detection

D. Threshold Image

It is an image segmentation technique used to partition the image into foreground and background.It also isolates objects by creating binary images from grayscale images.

Figure 4. Threshold image

E. Morphed Image

It is the special effect in which the image is converted to some shapes like rectangle etc through seamless transition.
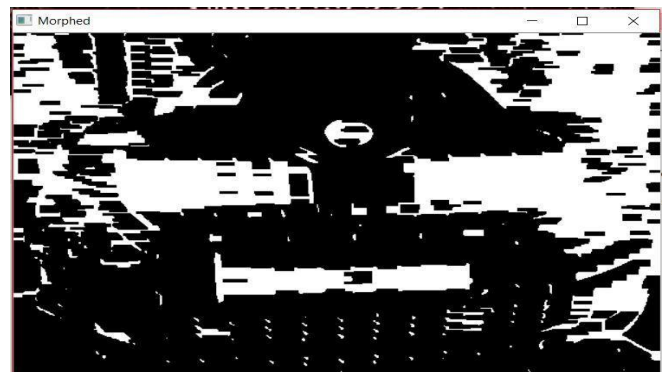

Figure 5. Morphed image

F. Function Test image

It allows macroscopic observations to evaluate the results to determine number plate.

Figure 6. Function test

G. Cleaning Plate Image

It cleans the plate and the result is obtained accurately[2].

Figure 7. Cleaning Plate

H. Detected Plate Image

Finally the plate is detected here as shown in the figure 8.

Figure 8. Detected Plate

I. Detected Text Image

From the detected plate,the text is detected as shown below.

```
Python 2.7.15 |Anaconda, Inc.| (default, May  1 2018, 18:37:09) [MSC v.1500 64
bit (AMD64)]
Type "copyright", "credits" or "license" for more information.

IPython 5.8.0 -- An enhanced Interactive Python.
?         -> Introduction and overview of IPython's features.
%quickref -> Quick reference.
help      -> Python's own help system.
object?   -> Details about 'object', use 'object??' for extra details.

In [1]: runfile('C:/Users/sayee/.spyder/main.py', wdir='C:/Users/
sayee/.spyder')
DETECTING PLATE . . .
Image Imported...
Threshold done...
Contours done...
Clean and Read
CLEANING PLATE. . .
Detected Text :  :MH 20 EJ 0364
```

Figure 9. Detected Text

V. CONCLUSION

This technology has provided an action to perceive the enrolment info from the picture which has been captured by the camera in the cheapest and the most efficient way. This system has also improved the performance of number plate recognition. This technology has provided excellent results in an effective and efficient manner. As there is no involvement of human beings, this system ensured that there are no more financial malpractices and illegal activities i.e. it provided us a safer and a secure route to overcome these financial issues. This system also ensured that there is great improvement in national income. As this technology is not so expensive, we can use this system at every toll booth and achieve good results. Future research aim to create many different applications such as:

● Extracting the information from the images of a video
● Getting information from different styles of documents
● Processing the information from the documents(which are historical)

VI. ACKNOWLEDGEMENT

VII. REFERENCES

[1]. Gisu Heo, Minwoo Kim, Insook Jung, Duk Ryong Lee, Il Seok Oh, "Extraction of car license plate regions using line grouping and edge density methods", International Symposium on Information Technology Convergence, 2007, pp. 37-42

[2]. Feng Yang, Zheng Ma, Mei Xie, "A Novel approach for license plate character segmentation", ICIEA, 2006, pp.1-6.

[3]. Ch. Jaya Lakshmi, DrA.Jhansi Rani, Dr. K. Sri Ramakrishna, M.Lantikiran, V.R. Siddhartha", A novel Approach for Indian License Plate Recognition System", IJAEST, Vol 2 Issue I, 2011, pp 010-014.

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