Vehicle Tracking Using Number Plate Recognition System

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Abstract----- In Traffic surveillance, tracking of the vehicle is a vital job. We are proposing a real time application which recognizes license plates from vehicles to track the vehicle path. It is very difficult to identify the lost vehicle and also the vehicles which violate traffic rules. It is not possible to track the vehicle, by the user because they may not be able to identify the number from the moving vehicle. Therefore, it is necessary to capture the number plate of the vehicle and use this captured number to track the path of the vehicle. In order to track the path we need to extract number from the captured image, using JAVA OCR-libraries. Number plate identification is helpful in finding stolen vehicles, identification of vehicle in traffic etc..,

Key Words: Sensor, Camera, Number plate extraction, Path estimation.

I. INTRODUCTION

Vehicle tracking system is very important in present scenario and is used to find the lost vehicles, to monitor and regulate the traffic. Number plate extraction for vehicle tracking has been developed, but each has its advantages and disadvantages. It is assumed that this system worked on images which have been captured in different climatic conditions.

An automated system for extracting text is developed using JAVA in which, if we would like to extract and verify text from an image then we use OCR (Optical Character Recognition) technology. OCR software extracts all the information from the image into easily editable text format.OCR is a system of converting scanned printed/handwritten image files into its machine readable text format. OCR software works by analyzing a document and comparing it with fonts stored in its database and/or by noting features typical to characters. There is good number of free OCR software tools. As our preferred program is Java, we can use one of the Java OCR libraries to extract text from an image. We used ASPRISE OCR-java library.

This extracted text is then used to find the path of the vehicle, i.e.., whenever the police man gives the vehicle number can get the details of the vehicle and the path of the vehicle in which it travelled. A sensor here senses the vehicle while it is approaching the traffic signal and also activates the digital camera so that the camera captures the image and vehicle number is extracted from the captured number plate. This extracted text can be stored in a text file for further verification. Here, conversion from image to text is important because direct image comparisons may produce wrong results as images are captured in different climatic conditions. We compare this extracted number with other numbers which are captured at different traffic signals. By doing so, we get the details of the vehicle like the path in which the vehicle travelled etc..,

II. OCR MODEL
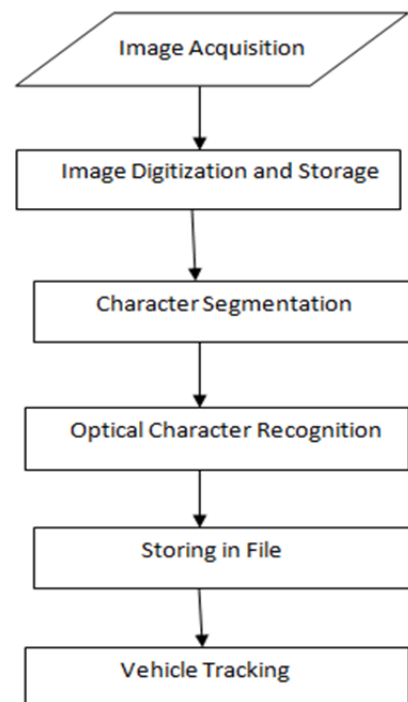
FIG-1: Procedure of extracting text from an image

Image acquisition:
The digital camera is used to capture the image. A sensor is used to detect the vehicle approach and activates the digital camera as to stand ready to capture the image. The captured image is then passed for identification or recognition purposes.

Image Digitization and Storage:
After the image acquisition we have to perform Image digitization. Digitizing is the way of storing images in a form which is suitable for transmission and computer processing, which is nothing but storing in the form of bits.

Character Segmentation:

Firstly Thinning will be applied to the plate in order to get the single pixels of each character that lies in the number plate image. Character segmentation is usually slicing the extracted image according to individual characters that lie on the plate image. Horizontal segmentation eliminates the unnecessary top and bottom parts of the license plate image. Vertical segmentation helps in separating each character on the license plate picture.

Optical Character Recognition:

OCR software extracts all the information from the image into easily editable text format. Optical character recognition (OCR) is a system of converting scanned printed/handwritten image files into its machine readable text format. It is commonly used for passport documents, bank statements, computerized receipts, business cards etc.., It is a familiar technique of digitizing printed texts so that it can be electronically edited, searched, stored easily.OCR is a field of research in pattern recognition, artificial intelligence and computer vision.

Storing in File:

After the Optical character recognition is completed the acquired information is then stored in to the text file.

Vehicle Tracking:

With the obtained results, we track the path of the vehicle in which it has travelled by comparing the vehicle details at different traffic signals.

* This is a small demonstration of the conversion process. This below figure shows the captured image and the number is extracted from it and stored in the form of text file. This conversion is made using OCR libraries.
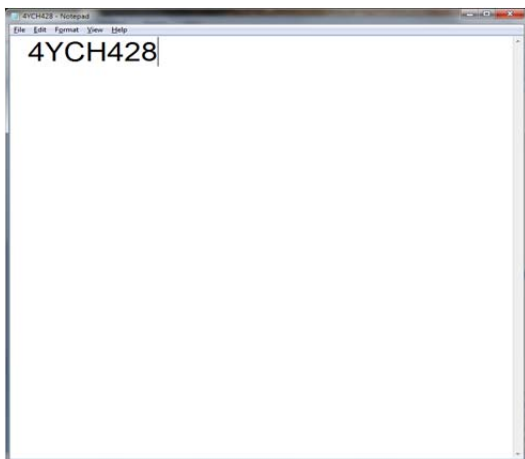

FIG-2: Captured number plate

FIG-3: Extracted number from image

III. PROPOSED METHOD

Currently, there is no such system which automatically gives the path in which the vehicle travelled. We need to manually check the vehicle numbers which are captured in cameras at different locations. But our system automatically identifies the path in which the vehicle travelled by comparing the images of the number plates at different locations. Here comparison is made by converting image to text. Sensor is used as the vehicle detector that detects the vehicle approach and activates the digital camera as to keep it ready to capture the image. We extract the number from the captured image. After getting the number, we compare this image with the other images which are captured at different locations. So that, we get the details of the vehicle like the path in which the vehicle travelled etc.., Number plate identification is helpful in finding stolen cars, car parking management system and identification of vehicle in traffic. The reason for converting image to text is to overcome the problems like diversity of plate formats, different scales, rotations and non-uniform illumination conditions caused during image acquisition.
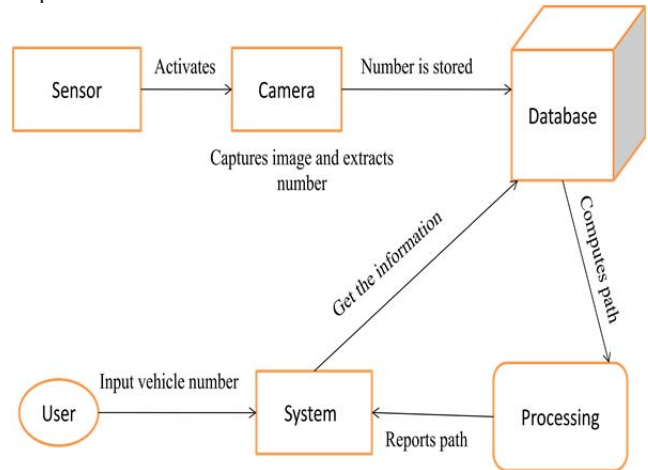

FIG-4: Architecture for vehicle tracking system

The procedure of tracking the vehicle in our system is explained below with the help of screen shots.
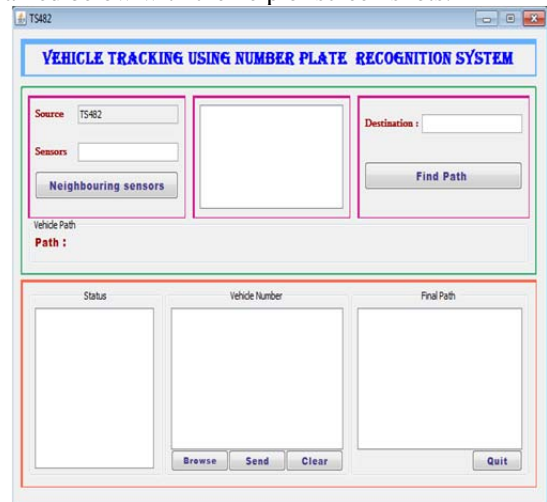

FIG -5: Node creation

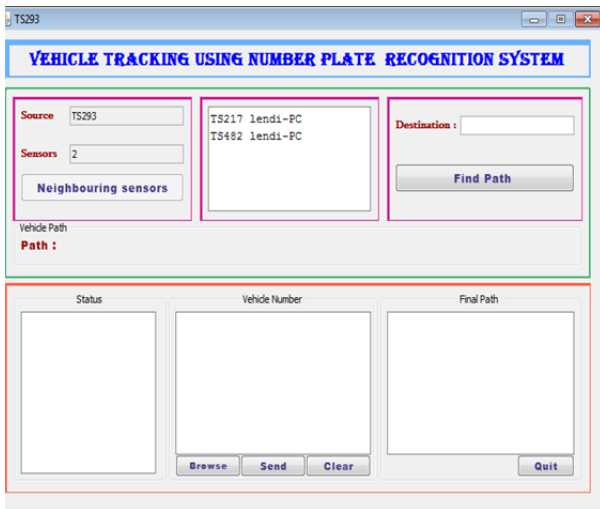* Here node creation represents the activation of the sensor.

FIG-6: Finding nearest sensors

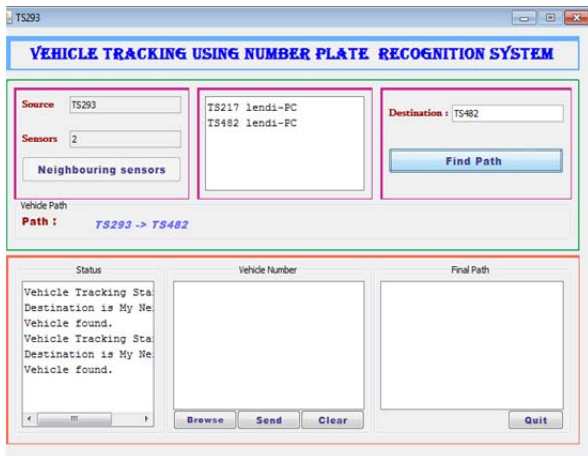- Here we can find the nearest sensors to the source.

FIG-7: Tracking vehicle

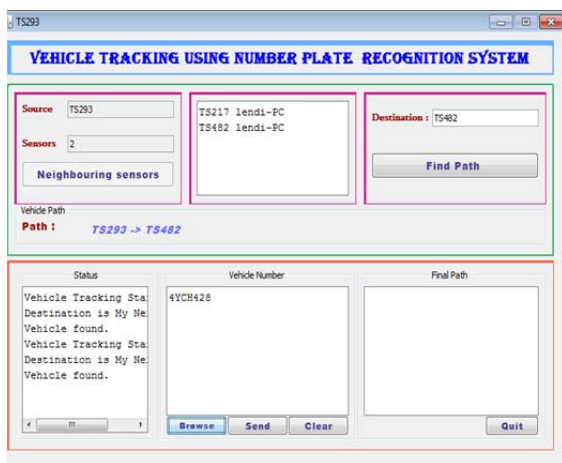- Now we will start tracking the vehicle by entering the destination.

FIG-8: Browsing vehicle number

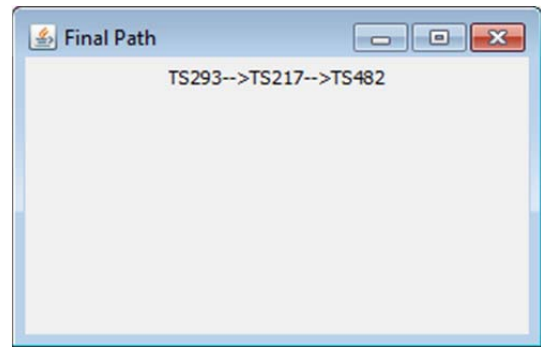- Now we have to browse the vehicle number.

FIG-9: Reporting the vehicle path

- Now we have to report the vehicle path to the user.

Challenges:

There are a number of possible difficulties. These include:

- Poor file resolution, usually because of the use of a low-quality camera.
- Blurry images, particularly motion blur.
- Poor lighting and low contrast due to overexposure, reflection or shadows.

IV. CONCLUSIONS

Some of the applications of our system are tracking stolen cars, traffic monitoring, managing parking toll, and red-light violation enforcement. The main objective of this paper is to produce better results in vehicle tracking by overcoming those above mentioned difficulties. Some of the issues like stains, blurred regions, differences in font styles and sizes are need to be taken care of. This work can be further extended to minimize the errors due to them.

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