

Automated Number Plate and Over-speed Detection

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Abstract— The paper proposes a system to automatically detect number plate and the speed of vehicles. And if over-speeding occurs, extract license number of vehicle and send alert to the concerned authorities to charge fine. The message alert will send to the owner, nearest police station and control room. So policemen can catch people having over speed within the next signal itself. As the importance of public transit system increases an Automatic License Plate Recognition (ALPR) has turned out to be an important research subject. It is very useful in traffic control areas .so through our project we are reducing the work of police men.

IndexTerms— Image segmentation, GSM module, Harris corner detection algorithm, Filtering algorithms, Doppler Effect, ALPR (automatic license plate recognition)

I. INTRODUCTION (HEADING 1)

Now-a-days we hear news about accidents on Highways very frequently. And in most of the cases main reason of accident is over speed. Although all highways do have signboards indicating maximum speed limit for the sake of driver's safety, but still people does not obey highway speed limit. Our proposed project aims to develop a system that detects vehicles driving at speeds over specified limit and inform concerned authorities immediately. Road accidents occurrences have increased recently so there needs to be a system that allows to detect over speeding vehicles. Current speed detection systems are handheld guns held by police personnel that allow them to check car speed and then manually inform authorities about the vehicle. Whereas this proposed system does not need any human interception and records car speed as well as wirelessly informs authorities of over speeding detections. Methods used include roadside speed traps set up and operated by the police and automated roadside 'speed camera' systems which may incorporate the use of an automatic number plate recognition system. Traditionally, the police would have used stopwatches to measure the time taken for a vehicle to cover a known distance, but more recently, they have had speed guns and automated in-vehicle systems at their disposal.

II. NUMBER PLATE RECOGNITION

For the implementation of vehicle number plate recognition system, many plate detection and segmentation algorithms have been proposed. The algorithm for detection can be classified into the following three types: on the basis of edges, on the basis of colour, on the basis texture. Edge based technique for detecting the location of the plate depends on the high contrast between the region containing the text and the background. Colour based approach uses the colour or gray scale characteristics of the text. ALPR equipped with many intelligent surveillance systems like, road traffic management, security management, automatic toll collection system, etc. A license plate detection method was produced to find number plates of all the vehicles in various conditions such as, non-uniform illumination, vehicle speed, background and foreground color, different weather condition, occlusion from image. The singular advantage of ALPR system is that it can hold an image record of a vehicle for further process if required. For real time application the speed and accuracy of the systems need to be amended. The ALPR System is equipped with a video camera which continuously captures the image of all the incoming and outgoing vehicles and with the help of an automatic image processing algorithm, the License plate of vehicle were extracted and stored in the memory which will be useful for identification or logging purpose. The quality of the acquired image(s) is a major factor in the success of the ALPR. Also needed to design an automated speed detection system which can detect the speed of vehicles if over-speeding occurs, extract the license number of vehicle and send it via email to the concerned authorities to charge fine. In general, an ALPR system consists of four processing stages. In the image acquisition stage, some points have to be considered when choosing the ALPR system camera, such as the camera resolution and the shutter speed. In the license plate extraction stage, the license plate is extracted based on some features such as the color, the boundary, or the existence of the characters. In the license plate segmentation stage, the characters are extracted by projecting their color information, by labeling them, or by matching their positions with template. Finally, the characters are recognized in the character recognition stage by template matching, or by classifiers such as neural networks and fuzzy classifiers.

III. IMAGE PROCESSING

The detection of a license plate from an image, corner features based on Harris algorithm is used. The advantages of the algorithm are high speed, accuracy and less complexity. The License plate was extracted successfully from an input image file. The comparison is made between the wavelet transform based algorithm and Harris corner algorithm on the basis of accuracy of multiple license plate detection. A corner can be defined as the intersection of two edges. A corner can also be defined as a point for which there are two dominant and different edge directions in a local neighborhood of the point. Doppler effect phenomenon is used for the speed measurement. In image processing before the extraction of the license plate characters from the complex scene, we need to locate the license plate from the captured image. An algorithm based on morphological operations with an adequate threshold value and pixels statistics, which is sensitive to specific shapes and colors of the captured image has been developed for this purpose. Most of the localization process of the license plates is achieved by this algorithm. It is a better performing algorithm for pre-processing to extract the license plate in the images with complex background.

The license plate extraction stage influences the accuracy of the system. The input to this stage is a car image, and the output is a portion of the image containing the potential license plate. The license plate can exist anywhere in the image. Instead of processing every pixel in the image, which increases the processing time, the license plate can be distinguished by its features and therefore the system processes only the pixels that have these features. The features are derived from the license plate format and the characters constituting it. The isolated license plate is then segmented to extract the characters for recognition. An extracted license plate from the previous stage may have some problems such as tilt and non uniform brightness. The segmentation algorithms should overcome all of these problems in a pre-processing step. The extracted characters are then recognized and the output is the license plate number. Character recognition in ALPR systems may have some difficulties. Due to the camera zoom factor, the extracted characters do not have the same size and the same thickness. Resizing the characters into one size before recognition helps overcome this problem. The characters' font is not the same all the time since different countries' license plates use different fonts. Extracted characters may have some noise or they may be broken. The extracted characters may also be tilted. Filtering algorithms are used here to reduce noise. Mid-filter processing is then applied for the effective removal of unexpected noise. This process aims at increasing and improving the visibility of the image. Then we crop the image and this recognition process extracts the smallest rectangle that contains the edge of the license plate and license plate itself. Since the surrounding of license plate is not important, the cropping process significantly increases the speed of image processing.

GSM module is used present in this paper. In **GPS tracking system** the location of vehicle is sent to remote place and it is done by GSM modem. Global Positioning System (GPS) modem requires minimum 3 satellites to calculate the exact location. This modem communicates only in single way with 8051 microcontroller. This means that it can only transmit data to microcontroller. GPS Modem does not receive any data from microcontroller. At the same time GPS modem does not send data to Satellite, it only receives signal from satellites.

IV. ACKNOWLEDGMENT

The preferred spelling of the word "acknowledgment" in America is without an "e" after the "g". Avoid the stilted expression, "One of us (R. B. G.) thanks . . ." Instead, try "R. B. G. thanks". Put applicable sponsor acknowledgments here; DO NOT place them on the first page of your paper or as a footnote.

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