Enhancing Management Security by using License Plate Recognition System

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Abstract: Due to the increasing number of vehicles accessing higher education campus nowadays, it is difficult to check the rule regulations, enforcement and security. Currently, the security checkpoint is still using the manual procedures to track vehicle driver's entrance. At the same time, it is time-consuming for an officer to check the car sticker/plate every day physically. Also, it is not workable for a hire full-time security officer just to check on the sticker/car plate. As a solution, an artificial intelligence system to identify the car plate has been building up. By implementing this intelligence system, it's capable of enhancing the management, security and controlling of vehicles accessing by using license plate recognition. If a vehicle approaches the entry gate, the recognition system will initialize and execute license plate numbers to the database system. During the exits through the departure gate, the same method repeated. The archives of vehicle entries and departures imposed for parking fee calculations and marketing statistics. Additionally, the list can be compared at any time with actual parked cars for security reasons.

Keywords: artificial intelligence, management data base security, artificial license plate recognition

I.INTRODUCTION

Vehicle plate recognition system is a system which aided a human in reading car plate number in an efficient way which saves energy and time. Before emerge of the computer-based vehicle plate recognition, human record vehicle plate number manually by using pen and paper until the introduction of the high technology in the photo-enforcement industry, which is after the war. Considering the license plate system can distinguish the vehicle individually, it is considerable concern in recent technology using a computerized system for this purpose. By using image processing technique that called Automatic license plate recognition (ALPR), the system can identify the vehicle owner by using license plate only. The technology concept assumes that there is no additional communication system, appliance is required to be placed inside the vehicle considering all vehicle data before have been identified using the license plate.

The system employs a digital camera to take the image of the vehicle license plate number. After that, using special software to analyze the images and extracts the license plate parameter. The data will be utilized for vehicle authorization or time management record for the systematic vehicle entry.

Vehicle license plate systems used globally, both in overseas and locally. In our country, even so, the usage of the car plate recognition system is restricted to the regular car plates, and it implements only for parking system. It indicates the system is unable to detect he particular types of license car plates and entrance system by recognition a vehicle license plate number doesn't exist. Thus, this method intended for the application of a recognition system for Malaysian license vehicle plates and entrance security access control.

An ALPR system consists of three principal steps:
a. License Plate Localization.
b. Segmentation of the character.
c. Character/number identification process.

The detection of license plate location will follow with the segmentation of the character is an essential pre-processing step before identification of characteristics, where every aspect of the detected License Plate will segment before the recognition. Finally, the characters are segmented from the License plate so that just valuable data is preserved for identification where the image form converted into characters [1].

Many researcher's investigations have investigated and good discover about the knowledge about ALPR based applications. ALPR systems simply based on standard methods like Artificial Neural Network [2,3] and Optical Character Recognition [5,3].

II.METHODOLOGY

The extent of this research is to generate an algorithm to identify the characters from the license plate by using the MATLAB software. The mechanisms for this project are using a personal computer by integrating all the software, and a camera is used to capture the image into a personal computer for license plate recognition and extraction process. Next, there is no occlusion and broken characters on vehicle plate when the vehicle image is captured. Besides that, there is only one direction when the vehicle picture is obtained, which is a degree from the camera to the vehicle. Last, this project will focus on the process of recognition and extraction on the vehicle license plate by using image pre-processing and database connector method in MATLAB. This project involves uses of admin and security management.

The system comprises two principal elements, 1) Digital video data source. 2) The system reinforcement that generated using MATLAB software.

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The illustration diagram of the suggested system drawn in Figure 1
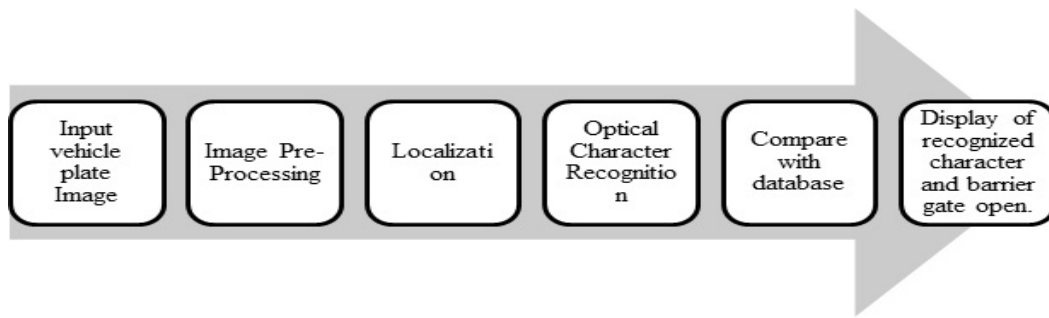

Fig. 1 Block diagram of system for vehicle number plate recognition

The digital video taking source locates at the entry post of security entrance which is able in producing a live feed of certain accuracy even in poor lighting. The digital video source situated in a place which can take the entire vehicle, and the required stages consisting of the vehicle are consequently chosen.

The full operation of ALPR system presented in two general sections. The hardware part and the software part. The working mechanism of all the elements described in details below. The first and an essential part of this process is the software model. The software model uses the image processing technology. The programs are performing in MATLAB, and the algorithm divided into following parts: capture images, image pre-processing, vehicle plate region extraction, segmentation of vehicle plate number character in the extracted number plate, Character recognition, comparison with database and indicate the result. Flowchart of vehicle license plate recognition system implementation was using Matlab R2014, and detail work are presented in the following figure. The workflow process is briefly defined below.

Input image

The first step is the captured image. The image captured by electronic devices such as digital camera or webcam. The image obtained is stored in image format and converted into a gray image in Matlab.

Pre-Processing

Pre-processing is the process of capturing the images of vehicle plate number. Unfortunately, obtaining the image will bring a lot of disturbances and noises present in the image for which the image can't be used correctly. So, in this step, the noises from the image are required to be cleared to obtain an accurate result. Later, an image analysis software will examine the images and extracts the license plate data. The data collection can furthermore use by the authorised the registration vehicle plate number to open a gate automatically.

I. Gray Processing: This step involves the convention of the image into gray levels. Color images converted into a gray image from the R, G, B value in the image; it will calculate the amount of gray image value and obtains the gray image at the same time.

II. Median Filtering: Media filtering is the step to remove the noises from the image. Gray level cannot eliminate the noises, so to make a sure image are free from the noise median filtering is used.

Optical Character Recognition

To balance the character with a set of regular model characters employing pattern matching, we adjust the obtained area to area of the test set extending the shape from the original position. If the target is greater than the original, some pixels must copy more than one time (stretching). Oppositely if the original is greater than the target, some pixel need be neglected (compressing). This deformation step could adjust the shape quality. Consequently, some areas of the acquired character could be vague, and the algorithm applies a weight to calculate the accuracy of acquired sample character.

Compare with database

The optical character recognition is presently utilized to differentiate any character upon the whole alphanumeric database and compared with the validated database file. If both values are equal, it will illustrate approved. Oppositely, it will display the unapproved.

Display of recognised character and barrier gate open

The vehicle, with the license plate number, was the departure from the secured area and were indented up by the ALPR system which identifies it is an authorized vehicle and opens the gate. Information displayed the vehicle license plate number and driver personal details. A hardware model illustrated in figure 2 & 3.
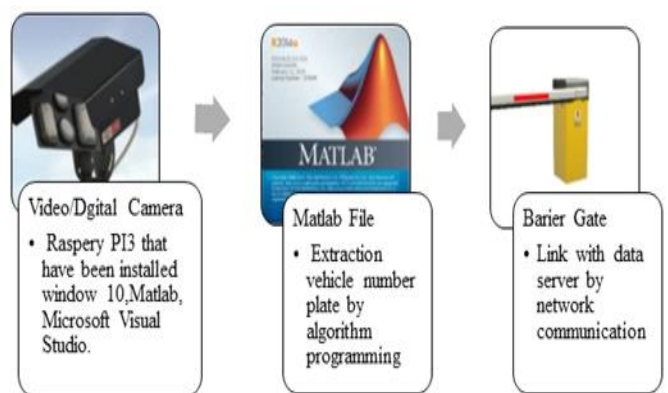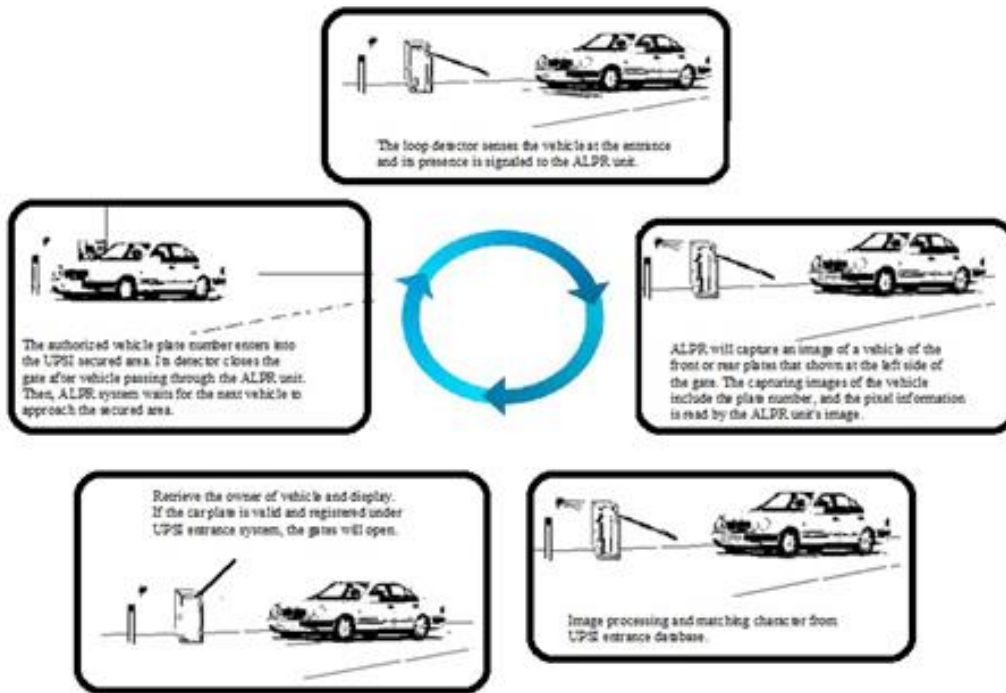

Fig. 2 Hardware development model in real time

Fig. 3 SALPR= structure in real time
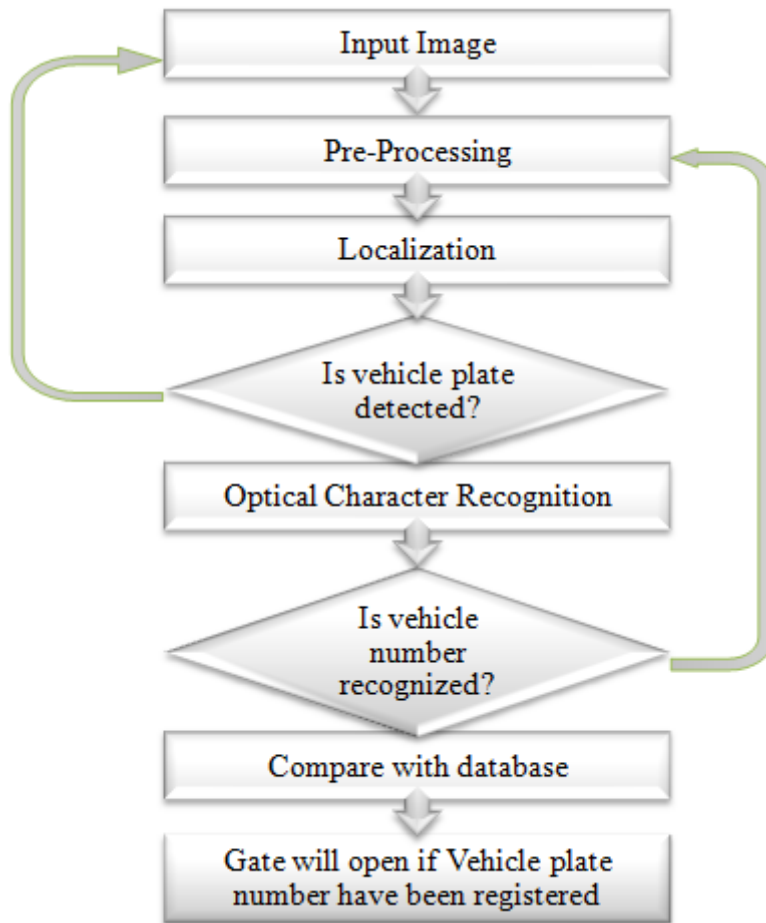
III.RESULTS

Fig. 4 Flow chart of ALPR

The process of identification in the data experiment were illustrated in figure 4.

Fig. 5 Results of Proposed Block Variance Algorithm

Figure 5 shows the process when the input image car1 where image being applying an operator (edge detected image) and by removing low variance blocks and also after morphological operation finally showing connected detected license plate.

Table. 1 Table of % efficiency for 10 weeks

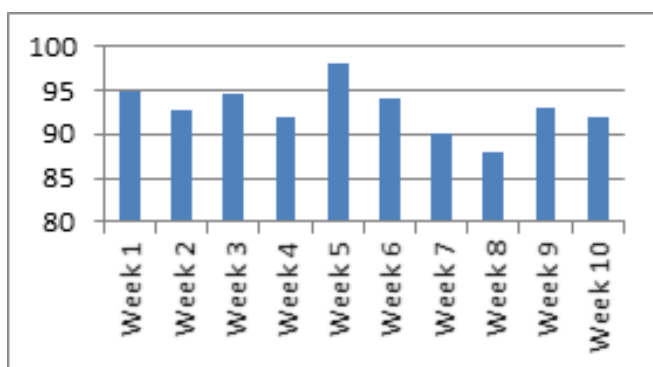| Week 1	95
Week 2	92.7
Week 3	94.5
Week 4	92
Week 5	98
Week 6	94
Week 7	90
Week 8	88
Week 9	93.1
Week 10	92

Fig. 7 Table of % efficiency for 10 weeks

By referring to table 1 and figure 7 shown the system efficiency which is vary according to due to environment or condition of the day, by the given plot data we can observe percentage efficiency of system as per given data.

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