An Implementation of Automatic Vehicle License Plate Recognition for Security System

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ABSTRACT:

In Transportation, vehicles play a vital role nowadays because of population growth and human requirements the usage of vehicles is increasing. Therefore it is a very problematic task to control the vehicles and much more troublesome to solve. For reading the number plates of a car many constraints are faced like- presence of noise, blurred image, uneven illumination, dim lighting and foggy scenarios. Now a day's people's lives have noteworthy influence of Intelligence Transportation System (ITS). The systems that are included in ITS are- Intelligent infrastructure systems, intelligent vehicles systems etc. in this current era of information technology, there is unrestricted sweeping of in use of automations and intelligent systems. Vehicle number plate recognition has rigged out to be an important research topic. Some of the functions of VNPR in traffic monitoring system are – controlling of traffic volume, generating tickets for vehicles with no human control, vehicle tracking, vehicle policing, and vehicle security and so on. The paper categorizes various ALPR methods according to the features used for every stage and a comparative analysis is done in terms of pros and cons for recognition of accuracy and processing speed. The paper presents the algorithms for localization of yellow coloured license plates using morphological operations, character segmentation using histogram and intensity projections and Optical Character recognition using Template matching. Furthermore, an object enhancement method has been discussed which enhances the performance of the complete system. At the end it has also been discussed the various other approaches of implementation and proposed improvements in the used algorithm which can further improve the entire efficiency and accuracy.

INTRODUCTION

In past or earlier days more traditional means of license recognition access control were used. Automatic number plate recognition ALPR system is a mass surveillance method that uses optical character recognition on images to read vehicle registration plates. They can also be used at an existing closed-circuit television or road-rule for enforcement cameras, or ones specifically designed for the task. They are used by various police forces and as a method of electronic toll collection on pay-peruse roads and cataloguing the movements of traffic or individuals. ALPR can be used to store the images captured by the cameras as well as the text from the license plate, with some configurable to store a photograph of the driver. These recognition Systems commonly use infrared lighting to allow the camera to take the picture at any time of the day. ALPR technology tends to be region-specific, owing to plate variation from place to place. Concerns about these systems have centred on privacy fears of government tracking citizens' movements, misidentification, high error rates, and increased government spending.
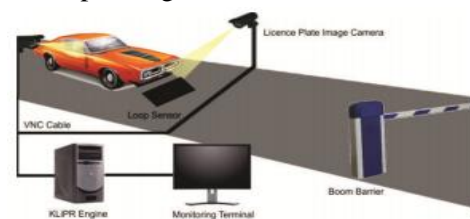
Fig.1 ALPR Based System

LITERATURE SURVEY:

Automation is the most frequently spelled term in the field of electronics. The hunger for automation brought many revolutions in the existing technologies. This project makes use of an onboard computer, which is commonly termed as Raspberry Pi processor. It acts as heart of the project. This onboard computer can efficiently communicate with the output and input modules which are being used. A fore mentioned identification or recognition process using raspberry pi processor will change slightly between different products and systems. These Standard systems are comprised of a USB camera for the automated information resource of the License plate adds a new vital dimension to decision making for Access control at toll gates and traffic junctions. License plate recognition system can be easily integrated with any physical access control device like boom barriers and sliding gates for seamless access. To perform this task, Raspberry Pi processor is programmed using embedded "Linux".Linux is a Unix-like computer operating system assembled under the model of free and open source software development and distribution. The defining component of Linux is the Linux kernel, an operating system. The Linux Standard Base (LSB) is a joint project by several Linux distributions and is based on the POSIX specification, the Single UNIX Specification, and several other open standards, but extends them in certain areas.
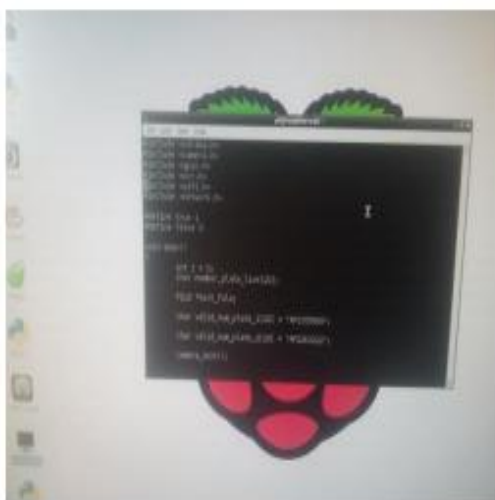
**Fig. 2 Embedded Linux programming screenshot**

PROPOSED SYSTEM:

In this project we propose a completely automated license plate recognition system. The project aims at designing a system which automatically captures the image of the number plate of a vehicle and these details were verified using Raspberry Pi processor for authentication. The system also alerts the authorities when any unauthorized or crime or theft vehicle image of number plate was detected using buzzer alarm system and also send sms to the police. When the authorized vehicle was detected then the system operates the gate using DC motor.

BLOCK DIAGRAM DESCRIPTION AND WORKING:

Raspberry Pi processor:

In the Proposed ALPR system we used the Raspberry Pi is a credit-card-sized single-board computer developed in the UK by the Raspberry Pi Foundation. The Raspberry Pi has a Broadcom BCM2835 system on a chip (SoC), which includes an ARM1176JZF-S 700 MHz processor, Video Core IV GPU, and was originally shipped with 256 megabytes of RAM, later upgraded to 512 MB. It does not include a built-in hard disk or solid-state drive, but uses an SD card for booting and long-term storage.

BLOCK DIAGRAM:
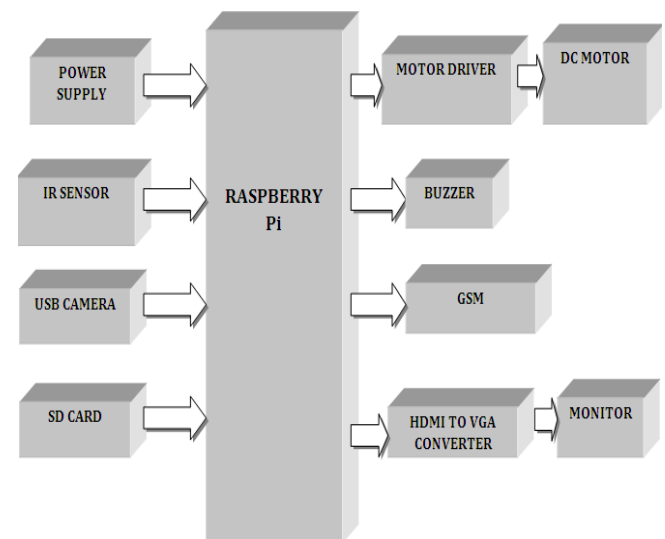
Fig. 3 Block Biagram

Working

In the proposed system the IR sensor detect the vehicle and send the information to the raspberry pi, then the processor get the image from camera and extract the vehicle number from the image. The processor will compare the number with data base, if the number belongs to authorized it will open and close the gate. If the number plate is unauthorised / crime / theft then it activates the buzzer and send the information to the police through GSM.

USB camera

A webcam or USB camera is a video camera that feeds its image in real time to a computer or computer network. Unlike an IP camera which uses a direct connection using Ethernet or Wi-Fi, a USB camera is generally connected by a USB cable, FireWire cable, or similar cable. The common use as a video camera for the World Wide Web gave the webcam its name. Other popular uses include security surveillance, computer vision, video broadcasting, and for recording social videos. Webcams are known for their low manufacturing cost and flexibility, making them the lowest cost form of video telephony. They have also become a source of security and privacy issues, as some built-in webcams can be remotely activated via spyware.

Fig. 4 USB Camera

DC motor:

This motor is used to produce the electrical energy to mechanical energy, and very typically through the interaction of magnetic field and current carrying conductors. The reverse process can produce electrical energy to mechanical energy accomplished by an alternator. Basically the DC motors have two features one is rotating part that is called armature and the stationary part that includes coils of wire called the field coils.

Fig. 5 DC Motor

GSM

In the proposed system the GSM modem is used to send the alerts related to theft/crime vehicles to the authorized persons or police.

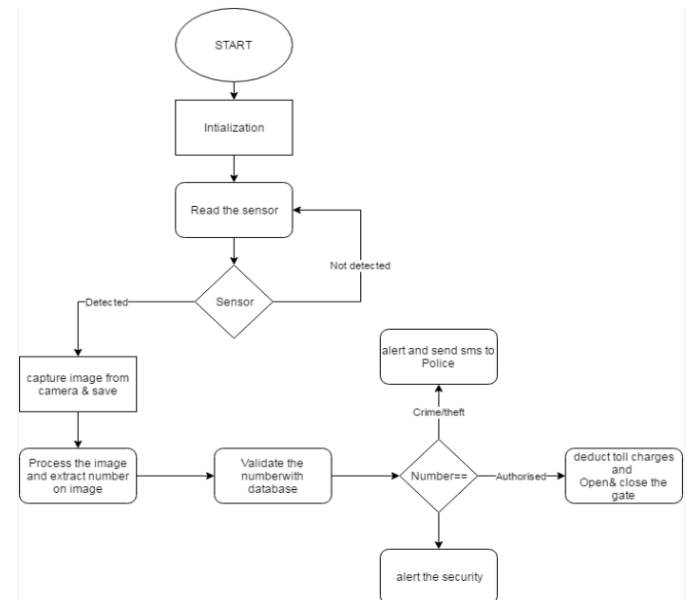The working flow of the proposed system is as follows.

Flowchart:

Fig 6 Flow Chat

RESULT ANALYSYS

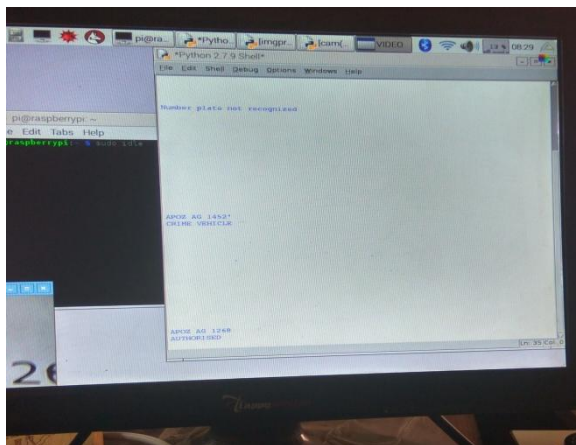The proposed system was fully developed and tested to demonstrate its feasibility and effectiveness. The

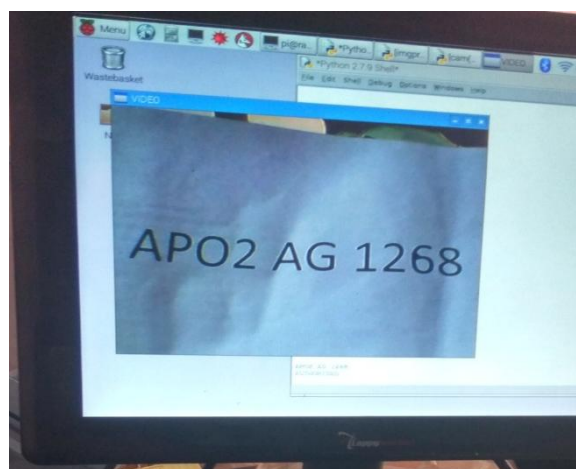screenshots of the smart home app developed has been presented in Figure below

Fig7. Original Hardware Design

Fig 8. Monitor showing the detection of vehicle based on number plate

Fig9. USB Camera capturing the number plate of particular vehicle

Fig10. Topview of hardware design showing Raspberry Pi board, GSM module, IR sensors, buzzer and DC motor

CONCLUSION AND FUTURE SCOPE

The existing ALPR recognition system of license plate is an Integrating feature of all the hardware components been used and developed in it with Arm-11 Raspberry pi processor. The Presence of each and every module has been reasoned out and placed very carefully. Hence the contributing to the best working unit for an automatic license plate recognition system has been designed perfectly. Secondly, using highly advanced IC"s like ARM1176JZF-S 700 MHz processor, Linux operating system technology with the help of growing technology, the project has been successfully implemented with a unique idea. Thus the project has been successfully designed and tested.

The project "Automatic license plate recognition ALPR" was designed such that the system captures the image of the number plate of a vehicle and these details of number plate were verified with the predefined details using Raspberry Pi processor for authentication. The system also alerts the authorities when any unauthorized image of number plate was detected through camera using buzzer alarm system. And GSM intimates the authorities and the owner of the vehicle if the license plate recognized was unauthorized.The project can be extended using 3G technology and GPS , 3G technology is used to have a photograph of the person who with unrecognized number plate based vehicle which helps a lot in

security issues. GPS receiver which can give the location of the number plate recognition details in case of emergencies. The vehicle location and also tracking can be done using this project idea.

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