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Licence Plate Detection System Using Image Processing With Vehicle Count

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ABSTRACT: Traffic law violation has been recognized as a major cause for road accidents in most parts of the world with majority occurring in developing countries. Even with the presence of rules and regulations stipulated against this, violators are still on the increase. This is due to the fact that the rules are not properly enforced by appropriate authorities in those parts of the world. Therefore, a system needs to be designed to assist law enforcement agencies to impose these rules to improve road safety and reduce road accidents. This work uses a Vehicle Plate Number Recognition system which is a real-time embedded system to automatically recognize license plate numbers. We planned to implement this with SOC . With the advent of powerful and low cost Single Board Computers (Sock), developing fully automated systems is becoming a trivial task. We can sense objects and capture images by using embedded systems to process and perform action accordingly. License Plate (LP) recognition systems use optical character recognition techniques to detect number plate on vehicles. These systems are important to control traffic, speed, theft, toll payment and parking lot access for vehicles.

KEYWORDS: Image Processing.

I. INTRODUCTION

Automation is the most frequently spelled term in the field of electronics. Due to automation, revolution has occurred in the existing technologies. This paper makes use of an onboard computer, which is commonly termed as raspberry pi2 processor. It acts as heart of the project. This onboard computer can efficiently communicate with the output and input modules which are being used. The raspberry pi is a credit-card sized single board computer which was firstly developed in uk by the raspberry pi foundation. Basically, the operating system for the detection of vehicle number plate using raspberry pi is the caspian jc. For the recognition purpose, raspberry pi model3 is used. Raspberry pi is a soc (system on chip) device has inbuilt 1.2 ghz bcm 2837 arm cortex processor. The arm cortex processor is 64 bits. Raspberry pi has 1gb ram. The overall average power is ranging from 1.5 to 6.7 watt. Raspberry pi has 40 digital input output pins in which 27 pins are gpio (general purpose input output). It has operating system which is installed in external sd card for booting and long term storage. Here in this system raspberry pi is the heart of the project. In many industries unknown vehicles are not allowed. There security is very important for them our system is going help to recognize number1963 unknown vehicle on gate. The same system can be used in such areas where security is the most important. The recognition of vehicle number plate is working in four steps. The first one is image acquisition, second is license plate extraction, third one is license plate segmentation, and last one is character recognition. Ocr is the process which converts image into text.

II. RELATED WORK

In License Plate Recognition System we apply different techniques on image to detect and extract license plate. This process is divided in two parts. In image processing techniques, Hear-like features are used to recognize objects from image. If our proposed system is selected to detect only license plates then the Hear-like features are used for this purpose and no further processing is done. This technique is old and laborious and more over needs a large database to store the collected samples nearly about 10000 images of the plates and characters.[1] This research intertwines two terms - license plate and privacy. Each state has a defined appearance of the license plate and it represents an official document, together with the vehicle documents. License plate is unique and there are no two of the same. Because of this uniqueness, the vehicle owners can be clearly identified. Registration number belongs to a single owner in a certain time period. This is the reason why a license plate represents private information.[2]Considering actual conditions, there is much interference in original car images such as the size of the image, lighting, and imaging quality, which infuence the recognition performance seriously. In order to locate the license plate quickly and accurately, preprocessing of original images needs to be carried out. Here, the original images are captured at a high resolution (1250×750), which ensures that both the small license plate

and small characters on them can be processed and recognized using the proposed algorithms.[3]Some protocol developed previously will be discussed in this section. A significant amount of work has been done over the last couple of years on image processing technique and deep learning for object detection purpose. Several different recognition and detection algorithms for vehicle reconnaissance have evolved in this field.[4]Automation is the most frequently spelled term in the field of electronics. Due to automation, revolution has occurred in the existing technologies. This paper makes use of an onboard computer, which is commonly termed as Raspberry Pi2 processor. It acts as heart of the project. This onboard computer can efficiently communicate with the output and input modules which are being used. The Raspberry pi is a credit-card sized single board computer which was firstly developed in UK by the Raspberry pi foundation. Basically, the operating system for the detection of vehicle number plate using Raspberry pi is the Raspbian JC. For the recognition purpose, Raspberry pi model3 is used.[5]Raspberry pi is an credit card sized single board computer Raspberry pi has total 40 pins in which 27 pins is of GPIO (General purpose input and output) and remaining 13 pins are used for VCC and GND. Video Core IV GPU and 1GB RAM. It is the minicomputer which it has inbuilt operating system, but it requires inbuilt SD card for booting and long term storage. The Camera capture the image automatically of the number plate and is passed to the Raspberry Pi with the help of USB cable.[6]The feature extraction is a process of transformation of data from a bitmap representation into a form of descriptors, which are more suitable for computers. The recognition of character should be invariant towards the user font type, or deformations caused by a skew. In addition, all instances of the same character should have a similar description. A description of the character is a vector of numeral values, so called descriptors or patterns.[7] The Raspberry Pi is a credit-card-sized single-board computer developed in the UK by the Raspberry Pi Foundation with the intention of promoting the teaching of basic computer science in schools. The Raspberry Pi is manufactured through licensed manufacturing deals with Newark element14 (Premier Farnell), RS Components and Ego man.[8]The proposed system is built on a Raspberry Pi with a USB camera to capture a traffic scene. It makes use of a PIR motion sensor which detects infrared energy radiating from objects (plate number) within its field of vision.)e PIR sensor sends an input signal to the Raspberry Pi which in turn triggers the USB camera to capture the image. the Raspberry Pi extracts the number plate part of the image.[9]Automatic License Plate Recognition(ALPR)is a technique to extract the license plate number from a still image or a video of a moving or stationary vehicle. It is a useful approach for vehicle surveillance. Robust ALPR has many use cases in combating thefts, illegal vehicles classification, customized electronic toll collection, cataloguing the movements of traffic in a premise, catching speed limit violators, determining what cars belong in a parking garage, expediting parking by eliminating the need for human. [10].

III.PROPOSED SYSTEM

The paper aims at designing a system which captures the image of the number plate automatically of a vehicle and these details were verified using Raspberry Pi processor for authentication. The system also alerts the authorities when any unauthorized image of number plate is detected using Mail alert system. Automation is the most frequently spelled term in the field of electronics. The hunger for automation brought many revolutions in the existing technologies. This paper 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. The Raspberry Pi is a credit-card-sized single-board computer developed in the UK by the Raspberry Pi Foundation. When the button is pressed, the image of the number plate of every vehicle is captured using camera. The image of the number plate details are fed as input to the Raspberry Pi processor. The Processor takes responsibility to check the vehicle number and mail to the authority.System analysis is the act, process of profession of studying an activity typically by mathematically means in order to define its goals or purposes and discover operation and procedures for accomplishing them most efficiently.
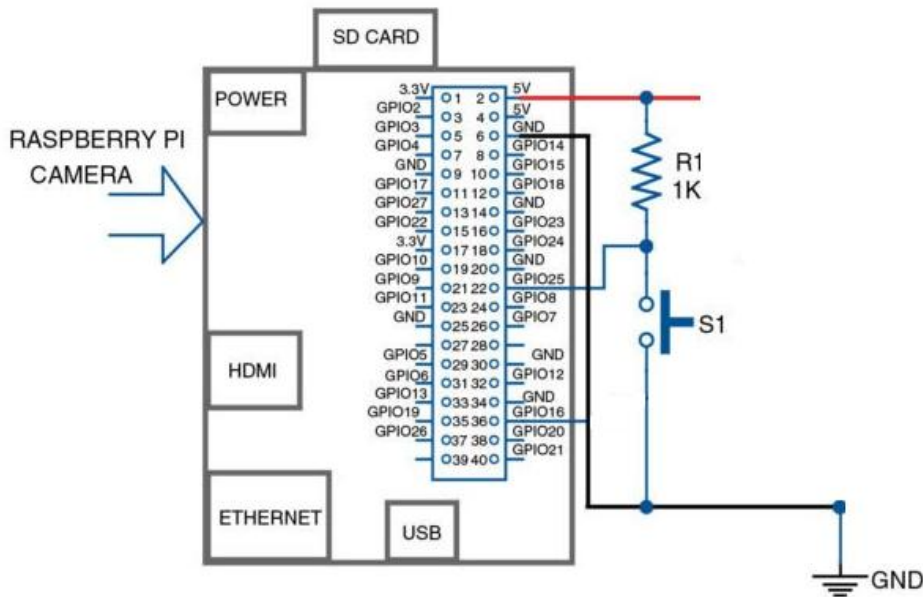
Fig.1 Block Diagram

IV.HARDWARE REQUIREM ENTS

The hardware requirements for the system are as follows
PCB Designing And Introduction:
Design and Fabrication of Printed circuit board Printed circuit boards, or PCBs, form the core of electronic equipment domestic and industrial. Some of the areas where PCBs are intensively used are computers, process control, telecommunications and instrumentation.

Drilling
PCB drilling is a state of the art operation. Very small holes are drilled with high speed CNC drilling machines, giving a wall finish with less or no smear or epoxy, required for void free through hole plating.
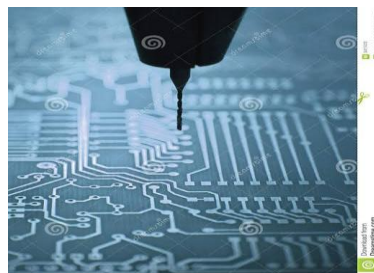

Fig.2 Drilling

Plating

The heart of the PCB manufacturing process. The holes drilled in the board are treated both mechanically and chemically before depositing the copper by the electro less copper platting process. However this system is expensive complicated and requires high maintenance. We aim to study the various systems that can be used to replace such a system with a cheaper and efficient alternative.
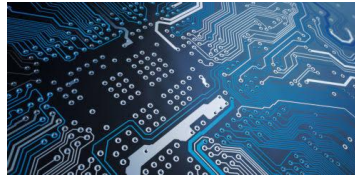
Fig.3 Pinning

Etching

Once a multiplayer board is drilled and electro less copper deposited, the image available in the form of a film is transferred on to the outside by photo printing using a dry film printing process. The boards are then electrolytic plated on to the circuit pattern with copper and tin. The tin-plated deposit serves an etch resist when copper in the unwanted area is removed by the conveyor's spray etching machines with chemical etch ants. The etching machines are attached to an automatic dosing equipment, which analyses and controls etch ants concentrations.
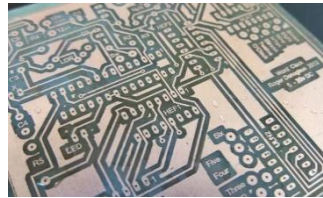

Fig.4 Etching

Solder mask

Since a PCB design may call for very close spacing between conductors, a solder mask has to be applied on the both sides of the circuitry to avoid the bridging of conductors. The solder mask ink is applied by screening. The ink is dried, exposed to UV, developed in a mild alkaline solution and finally cured by both UV and thermal energy.

Work Breakdown Structure

A Work Break down structure is a result oriented family tree that captures all the work of a project in an organised way. It is often portrayed graphically as a hierarchical tree; however, it can also be a tabular list of element categories and task or the intended tasks list that appears in a Gantt chart schedule.
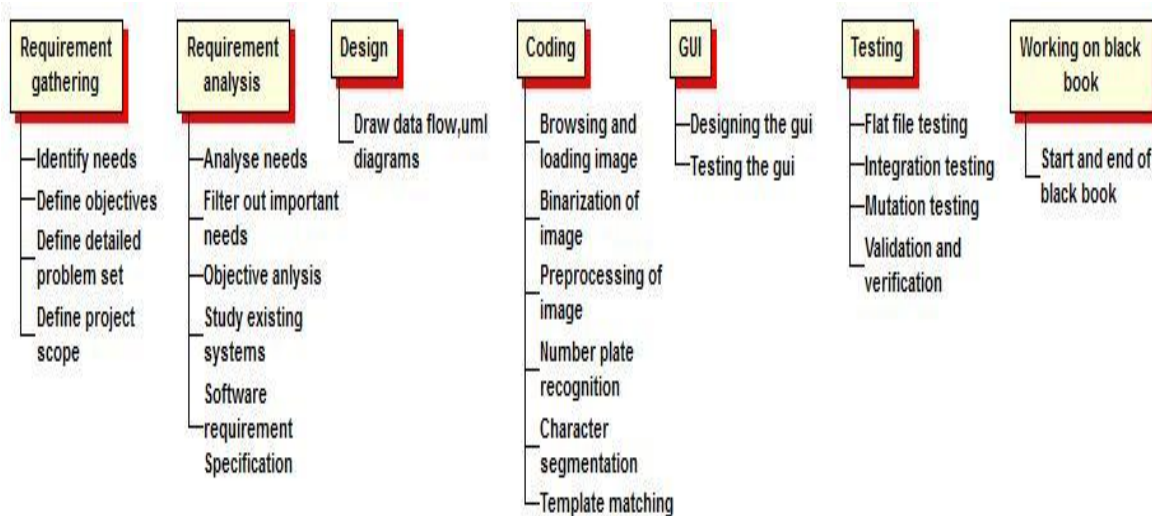

Fig.5 Gantt Chart

V.RESULT AND CONCLUSION

The algorithm was tested using different license plates having various background conditions, light condition and image quality. Some of the output results are shown below.

Fig.6 Output

VI.FUTURE ENHANCEMENT

The performances of the system make it a valid choice among its competitors especially in those situations when the cost of the application has to be maintained at reasonable levels. This paper is helpful for the identification and detection of vehicle number plate. Here the focus is given to detect position of the characters and it can be done by using OCR technique. There are several approaches taken to achieve this. In future, the cloud computing can be used, which will be very helpful for storing the data permanently.

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