IDENTIFICATION OF FAST CARS BY DEVELOPING SMART NUMBER PLATE RECOGNITION SYSTEM WITH WEB APPLICATION

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Abstract - In most parts of the world, it has been established that breaking traffic laws is a significant factor in road accidents. It mostly happens in developing nations. Despite the laws governing traffic, a rising number of people continue to violate them. This is because the authorized authorities in various regions of the world do not properly enforce the rules. As a result, a mechanism must be created to help law enforcement authorities enforce these regulations in order to increase road safety and decrease accidents. This work makes use of a real-time embedded technology called a Vehicle Plate Number Recognition (VNPR) system to automatically identify license plate numbers. By utilizing the OpenCV open-source library, it offers a VPNR substitute. The system's primary goal is to employ image processing to identify automobiles that are breaking the law by their license plate numbers. For locating the car, it has an IR sensor. A minimum amount of time was specified during testing for the sensor to identify the object, which the CPU then logged. When the timer reached its present value, the camera was activated to record the plate number and save the picture to the Raspberry Pi. The Raspberry Pi processes the image after it has been captured in order to extract the numbers on the image.

*Key Words***:** Number Plate recognition, Image recognition, PIR sensor, Web application, Image processing.

1.INTRODUCTION

Since there are more cars on the road, it is harder and harder to trace them down and practically impossible to determine who owns them if a traffic law is broken. Traffic issues have increased as a result of the increase in traffic congestion. Kidnapping, hit-and-runs, robberies, smuggling, and on-road fatalities are all too common, and this is because these cars are difficult to spot, especially when they are driving quickly. The necessity to create a system that can address these challenges has resulted from this. It is a smart system for recognizing license plates.

Vehicle identification by license plate number in a real setting and use of the data for practical purposes have always been necessary [1]. An IP address was used to examine the numbers on the captured capture on a web page. If the system is put into operation, it can be utilized to improve traffic management in developing smart cities. Additionally, it will be utilized to impose the proper penalties on those who violate traffic laws. As a result, numerous methods and vehicle identification systems have been created for a variety of purposes, including security, automation, and traffic control.

2. PROBLEM STATEMENT

To monitor and regulate traffic, including pedestrians, motor vehicle drivers, and cyclists, traffic rules and equipment are put in place. As is generally known, there are many traffic rule violators in our country today, which has resulted in several accident incidences without any consequences being applied. These traffic lawbreakers operate with freedom and assurance because the necessary systems are not in place, and they are aware that they might never be caught. Traffic grid locks, traffic accidents, and even death have been results of breaching traffic laws while involved in deadly incidents. It goes without saying that we require effective methods to identify and track down traffic offenders in order to make our roads safer.

Currently, it is difficult to distinguish fast-moving automobiles by their license plate numbers [2]. Real-time vehicle image capture that allows for the recognition of the license plate number can be incredibly challenging. The existing systems examined above have implemented several plate number system capture techniques [3]. Most of them were successful in getting the license plates of moving cars. The effort that is most like this one, which combines Python and OpenCV, was successful in detecting the plate number but did not include a database to track down the offender.

3. OBJECTIVES AND SCOPE

The primary objective of the system is to identify the fast cars by developing smart number plate recognition system with web application.

• To indicate fast moving cars with the help of IR sensor and capture the image immediately.

• To analyze the image using the web application through the Raspberry Pi.

• To process the image and extract the number plate through the web application and provide the number plate in the LCD display. Which eventually helps the system to find the fast-moving cars and notify them.

4. HARDWARE DESCRIPTION

The Raspberry Pi is the Hardware device that connects camera, sensor, power supply and LCD screen and works with Raspberry Pi OS installed. The Passive Infrared Sensor works by detecting the change in infrared lights and works with temperature difference. High quality Raspberry Pi camera is connected through Raspberry Pi cable. Power supply of 12.5W USB for all Raspberry Pi computer. To display the recognized number plate which proceeds to the database.

5. EXISTING METHODOLOGY

In existing system, recognition of fast-moving vehicles is an important aspect of Intelligent Transportation System (ITS).

Limitations in the existing methodology includes, Cameras with low quality could not capture image properly, the system was unable to sense moving vehicles had no presence of database to record information collected. The major limitation of the system was the difficulty in implementing system in larger areas like cities.

6. PROPOSED METHODOLOGY

Our suggested system will be a cutting-edge system that makes use of the current OpenCV code, written in Python, but will also include a web page that will show the outcome of the saved plate number, which can be used to query a database for the identification of a defaulter. All vehicles' license plates will be entered into the database and searched to identify the defaulter. The system created will detect fast-moving cars with a highly methodical approach, using strategies that are economical and producing excellent results.

A web application using Hardware components as Raspberry Pi 3. Raspberry Pi 3 initiates all the functionalities in the system design [4]. Raspberry Pi 3, must be connected power supply to do any functions.

Raspberry Pi 3 got a lot of advantages in connecting with hardware like camera, PIR Sensors, LCD Screens. Additionally, the Raspberry Pi 3 is well connected to database to identify the information about the individual of the fast-moving cars that is detected using the camera.

The Raspberry Pi 3 is connected to a SD Card that contains the Operating system supporting it. Raspberry Pi 3 accepts Raspbian OS to run any functions using it. The simulation starts with the PIR Sensor that sends a signal to the Raspberry Pi 3 then to the camera that captures the fast-moving cars and then the image detection and character recognition happens with the help of software installed using the python programming language as well as the libraries and packages installed with it.
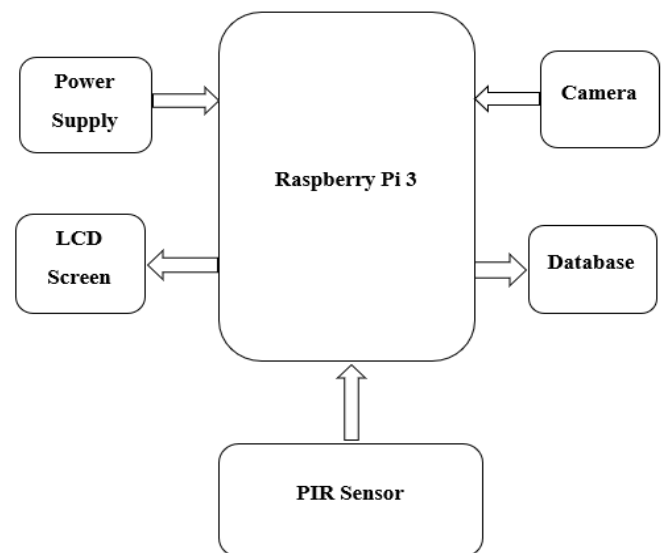

Fig.6.1. Block Diagram of Proposed system

7. SOFTWARE RESULT

We used Anaconda to create our software program and thus provides the web application to recognize and extract the number plate.
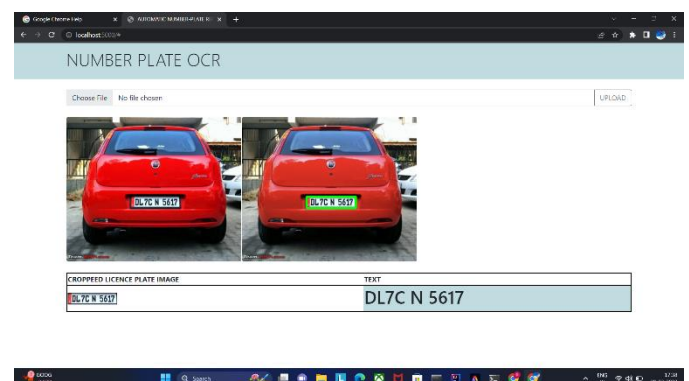

Fig.7.1. Software Result

8.RESULTS AND DISCUSSION

In recent years, there is an increase in cases of accidents and traffic law violations which are mainly caused by fast moving cars. This also gives issues with finding the exact car which violates the traffic rules and laws. This system provides a helping hand in finding the fast-moving cars with the web application installed in the hardware to detect and recognize the number plate of the car. This system is portable and cost less and also provides a great advantage in finding the number plate of the fast-moving car accurately.

It is also the needed system to track all traffic law violators. As a result, adopting this in the future will be an advanced technology.
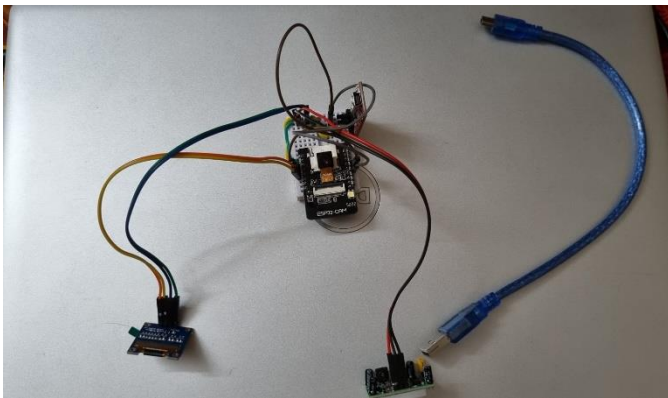

Fig.8.1. Hardware Implementation

Fig.8.2. Results shown by LCD

9.CONCLUSION

To overcome the biggest issue in reducing the traffic law violation is the automatic number plate recognition of fast cars with web application. This system uses smart IR sensor to detect moving objects, camera to capture the image, extract the text from the image, and save the text on a web page. The major component selected to do the main work in the system is the Raspberry Pi. OpenCV was used together with python programming, for the character segmentation and recognition. This was

configured on the Raspberry Pi, including the required library that is required to make the hardware components of the system to work with the Raspberry Pi. Due to the calibration of the IR sensor, it is able to detect fast-moving cars and also able to log different cars at different times using a tag for each data it receives and having a unique saving sequence. The system is by far one of the cheapest means for the actualization of traffic management in a smart city

10.FUTURE SCOPE

To evaluate all created or suggested algorithms using live scenarios rather than previously recorded photos. High resolution cameras must also be included for algorithms to speed up processing and improve recognition abilities.

This must be tested in real time as examples to prove to be detecting the fast-moving cars in the traffic areas. This project can work as a base for future improvements in the field of image processing, especially in license plate extraction and plate number recognition.

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