ANPR BASED ALERT SYSTEM FOR PIRATED VEHICLE DETECTION

Mr Thiyagarajan S[1], Sandeep B.P[2], Sivaaranjithan G.V[3], Karthiksabari S[4]

[1]*Assistant Professor, Department of Electronics and Communication Engineering, Sri Ramakrishna Institute of Technology, Coimbatore, Tamil Nadu, India.*

[2]*Final Year Student, Electronics and Communication Engineering, Sri Ramakrishna Institute of Technology, Coimbatore, Tamil Nadu, India.*

[3]*Final Year Student, Electronics and Communication Engineering, Sri Ramakrishna Institute of Technology, Coimbatore, Tamil Nadu, India.*

[4]*Final Year Student, Electronics and Communication Engineering, Sri Ramakrishna Institute of Technology, Coimbatore, Tamil Nadu, India.*

---***---

Abstract - A large amount of pirated vehicles are being observed in recent times. The toll gates can play a major role in controlling this condition by identifying the pirated vehicles passing through it. The developed system which can be implemented in toll gates identifies the suspicious vehicles by carrying out the certain processes. A vehicle's number plate is captured by a camera and the registration number is extracted from it. By surveying the database, the developed system will be able to identify the suspicious vehicles passing through the toll gates. Hence, by implementing the developed system usage of pirated vehicles can be controlled.

Key Words: ANPR, OCR, NODE MCU, PYTHON

1.   INTRODUCTION

The increase in suspicious vehicles has created a high demand with advancement in technology for traffic management and monitoring. It's important to travel between two places in a predetermined amount of time. We can see that the area is filled with vehicles. For a variety of reasons, everyone needs a vehicle. The percentage of vehicles in the population has dramatically increased over the last 20 years. However, it causes problems and difficulties for people to live their lives. In addition to other issues, it causes traffic jams, loud noise, and criminal activity such as vehicle theft and accidents. In order to avoid the aforementioned societal issues, it is crucial to regulate and manage vehicles. Many initiatives are being developed as a result of minimizing the challenges related to automotive mobility[11].

The vehicle plate recognition system is the most intriguing study subject, according to the latest researcher. A VPR system's aim is to discover the vehicle so that it can be used an existing database to locate. Typically, the identification system will be installed at the entrance to a residential neighbourhood, a factory, a parking lot, a toll gate, a university, or other high security buildings like nuclear power plants and defence institutes. The camera displays the presence of a vehicle. It captures a picture of the vehicle for use in post-processing. A vehicle registration plate is a plate that can be either metal or plastic and is frequently placed to the front or back of a vehicle.

A combination of digits and letters make up the vehicle plate number. The vehicle's first two letters are used as a prefix for the state location, and the following two numerals represent the neighbourhood where the automobile is from. An Indian vehicle's licence plate is formatted as LLNN LLNNNN, where L denotes a letter and N denotes a number. Manual vehicle identification will result in more mistakes, less effectiveness, and a slower process. The proposed system can be artificially created using the tools presented in the following chapter, which will be more efficient and less expensive.

2. LITERATURE SURVEY

Many nations have adopted ANPR systems, including Australia, Korea, and a few others. Strict enforcement of licence plate regulations in these countries has supported the early development of ANPR systems. These systems make use of common licence plate characteristics, such as the plate's size, border, colour, and character font, to make it easier to locate the number plate and determine the vehicle's registration number[3].

A camera, a frame grabber, a computer, and specially created software for image processing, analysis, and recognition make up the system for automatically recognising car licence plates. The widely used optical character recognition (OCR) technique was used to convert scanned images of printed text into machine-encoded text. Here, a feed-forward neural network-based OCR technique is described, which trains and tests the neural network using two sets of non-overlapping real character picture data. In this paper, they have used template matching for image recognition and segmentation process but we have used Python software for image acquisition and segmentation process[4].

When an uniform plate size and font are upheld, which makes recognition simple, the number plate recognition technique is frequently employed to identify vehicles worldwide. Many problems, such as the use of hundreds of distinct font styles, the failure to maintain plate size, the use of five different number plate colours, the use of multiple line number plates, etc., arise when number plate recognition is used, particularly in India. In this paper, they have used traffic signals CCTV camera for the image but in our project we have used PICSYS camera. For prototype we have used zebronics webcam[5].

In general, ANPR algorithms consist of four steps: (1) Capturing a vehicle's image; (2) Finding licence plates; (3) Segmenting characters; and (4) Recognizing characters. It is quite challenging to take a real-time picture of a moving vehicle while making sure that nothing, notably the licence plate, is missed. In many systems nowadays, the processing time for number plate detection and recognition is less than 50 ms. The effectiveness of the second and third steps in locating the car number plate and separating each character determines the outcome of the fourth step. These systems employ several strategies to identify the car's licence plate and then extract the vehicle number from the resulting image[7].

By utilising an automatic number plate recognition system, the suggested system will automatically identify unauthenticated vehicles. The database will contain a record of each authenticated vehicle that is in a residential area. When a car pulls up to the parking system, the sensor recognises its presence, and the camera snaps a picture while reading the licence plate number. The registered database is compared to the recognised plate number. If the number does not match, admission is refused to the car as an unauthenticated entry, which keeps the gate locked and causes the alarm to buzz, which then sends a message to the parking management authority through GSM. In our project we have used NodeMCU for transmitting message to the nearest control room. The alert message can be viewed by using Bylnk IoT application[8].
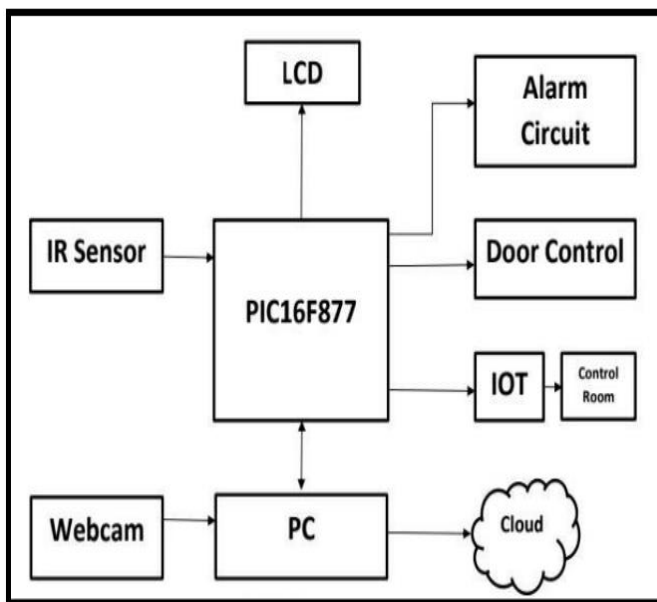
3. WORKING PRINCIPLE

Fig 3.1 Block Diagram

When a vehicle approaches the toll station. The vehicle will stop by the gate, and the camera will capture an image of it. The camera sends the picture of the viewable vehicle to the computer. Data from identity plates and segmented characters are extracted. Additionally, it acknowledges the use of Python software for information gathering. The gate won't open for that vehicle if it appears to be a stolen one, according to the database. All at once, the alarm goes off, a message is transmitted to the police station, and it's displayed on the LCD screen of the toll booth. But, if indeed the database does not contain the image of the vehicle that was captured, the door will open without any buzz or ring. On the toll plaza, effective vehicle detection is hence maintained throughout the day. Automated Number Plate Recognition (ANPR), an image-processing technology and significant area of study, extracts the number plate information from the image of the vehicle or from a collection of images without the aid of a human.In order to identify the vehicle in front of the toll barrier, the PIC 16F877a micro controller must first receive the output from the IR sensor. To capture a licence plate from a moving vehicle, the camera is positioned so that it can only record number plates. The computer is then given the captured image and uses Python to separate it into its component parts.

4. RESULTS AND DISCUSSION
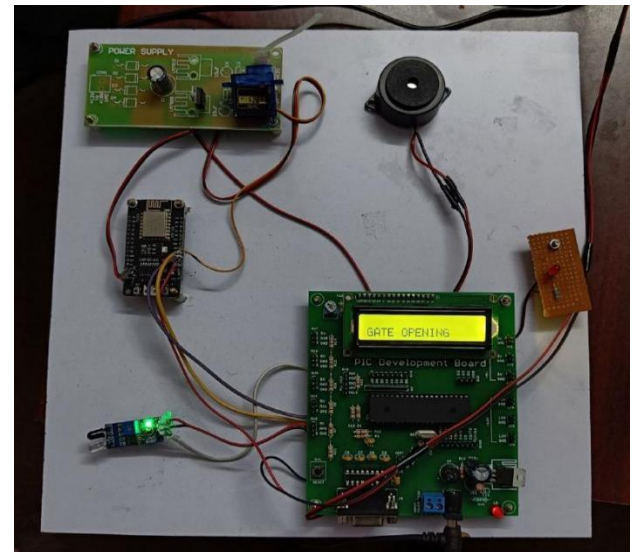
4.1 NON PIRATED VEHICLE

Fig 4.1 Non Pirated Vehicle

The vehicle entering the toll gate is recognized using an IR sensor, after which the vehicle's picture is captured using a camera, and the image is processed to extract information such as the license plate, the type of vehicle, and the color of the vehicle. For the storage of vehicle information, there will be two databases, one lists registered vehicles, the other lists pirated vehicles. The gate opens to allow the vehicle to pass if the database matches the information that was extracted from the captured image, indicating that the vehicle is not pirated.
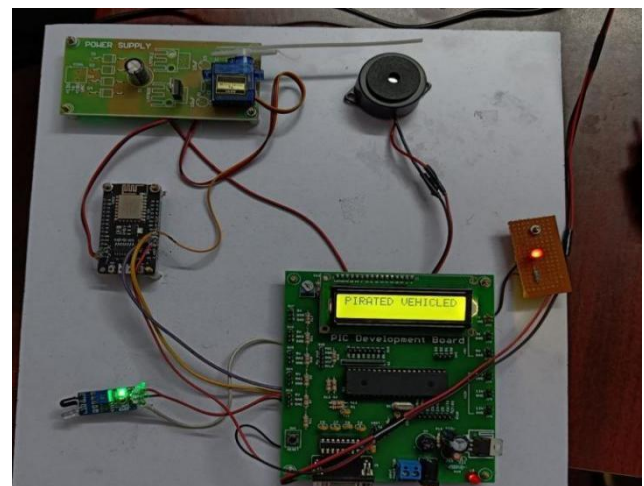
4.2 PIRATED VEHICLE

Fig 4.2 Pirated Vehicle

The vehicle approaching the toll gate is detected using an IR sensor, after which the vehicle's picture is captured using a camera, and the captured image is processed to extract information such as the license plate, the type of vehicle, and the color of the vehicle. There will be two databases for storing vehicle informations, one with a list of registered vehicles and the other with a list of pirated vehicles. A message is sent to the nearest control room, and a buzzer is played to alert the toll if any of the information extracted from the image doesn't match with the database, In this case the gate remains closed.
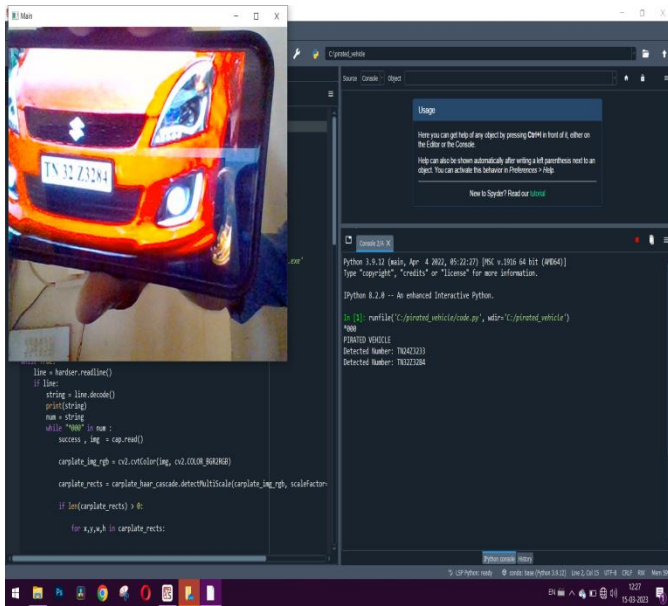
4.3 SOFTWARE ANALYSIS

Fig 4.3 Software Results

5. CONCLUSION

Vehicle detection is becoming quite important and used in many real-time, everyday applications. In this field, numerous studies have been conducted, and numerous approaches have been created. However, there are certain restrictions with the current models. So, an efficient algorithm has been proposed which gives better output in all the situations based on the results. A real-time data set of approximately 50 photos is used to simulate the suggested technique. By examining the outcomes and the accuracy plot that are displayed and covered in the preceding part, it is clear that this algorithm performs better in every circumstance. Even if this method is not flawless, the results are nevertheless superior than those of other algorithms. The vehicle in the shade is not recognized by this model, as seen in the output image. To get around this, we can employ deep learning techniques, where the initial training is carried out utilizing a dataset of vehicles. Additionally, we can adjust threshold values that are suitable for picture intensities by utilizing fuzzy logics to recognise automobiles at various times of the day.

6. REFERENCES

[1]. Xiaojun Zhai, Faycal Bensaali and Klaus McDonald-Maier, "Automatic Number Plate Recognition on FPGA", IEEE 20th International Conference on Electronics, Circuits, and Systems (ICECS), 2013

[2]. Norizam Sulaiman, Kamarul Hawari, "Development of Automatic Vehicle Plate Detection System", IEEE 3rd International Conference on System Engineering and Technology, 19 - 20 Aug, 2013

[3]. Prathamesh Kulkarni (Student Member, IEEE), Ashish Khatri, Prateek Banga, Kushal Shah, "Automatic Number Plate Recognition (ANPR) System for Indian conditions", 2009 19th International Conference Radioelektronika, 2009

[4]. Aniruddh Puranic, Deepak K. T, Umadevi V, "Vehicle Number Plate Recognition System: A Literature Review and Implementation using Template Matching", International Journal of Computer Applications, 2016

[5]. Ajay kumar Singh, Souvik Roy, "ANPR Indian system using Surveillance Cameras", Eighth International Conference on Contemporary Computing (IC3), 2015

[6]. Raluca Marina Sferle, Elisa Valentina Moisi, "Automatic Number Plate Recognition for a Smart Service Auto", 15th International Conference on Engineering of Modern Electric Systems (EMES), 2019

[7]. Chirag Patel, Dipti Shah, PhD, Atul Patel, PhD, "Automatic Number Plate Recognition System (ANPR): A Survey", International Journal of Computer Applications, 2013

[8]. Banihan Gunay, YalcÕn Albayrak, Mehmet Saltan, "Area-wide ANPR coverage with a small number of instrumented vehicles", International Conference on Models and Technologies for Intelligent Transportation Systems (MT-ITS), 2015

[9]. Shraddha S. Ghadage, Sagar R. Khedkar, "A Review Paper on Automatic Number Plate Recognition System using Machine Learning Algorithms", International Conference on Models and Technologies for Intelligent Transportation Systems (MT-ITS), 2015

[10]. Chaithra B, Karthik K.V, Ramkishore D, Sandeep R, "Monitoring Traffic Signal Violations using ANPR and GSM", International Conference on Current Trends in Computer, Electrical, Electronics and Communication (CTCEEC).

[11]. Aromal A, Brinda H, Soumya K S, Shilpa J, Sreebala S, "Theft Vehicle Detection using Automatic License Plate Recognition", International Journal of Engineering Research & Technology (IJERT).