RED LIGHT VIOLATION DETECTION SYSTEM

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ABSTRACT:

All the metropolitan cities face traffic problems specially in the industrial area. Normal Cities can be transformed into "Smart cities" by exploiting information and communication technology. Artificial Intelligence (AI) plays a vital role in development of smart cities. This paper will give us brief introduction about how we can integrate AI and some smart devices to analyze the traffic and sieve a vehicle who violate traffic signals. this paper will also provide information about system which will automatically deduct a penalty from bank account of vehicle driver for crossing traffic signal when its red.

Keywords: *ALPR, Raspberry pi, image processing, OCR, flex cube, red light violation*

1. INTRODUCTION:

The growth of industrialization and urbanizationcauses the tremendous increase in the traffic. Traffic management has become one of the severe problems today. With the increase in traffic there arise several problems such as heavy traffic jams, violation of traffic rules, long waiting times, loss of fuel and money etc. It is therefore necessary to have a fast, economical and efficient control on the violation of traffic rules. The problems of conventional traffic light Controller are as mentioned.

A. Wastage of time in taking pictures of number plate of rule breakers. With increasing number of populations also increasesvehicles. on road, heavy Traffic jams then violation of red light are also happened usually at the main junctions commonly before and after office hours in the morning and in the evening. The main effect of this is increased time wasting of traffic police on the road by catching, arguing and taking picture of vehicle with number plate. The solution for this problem is developing the system which auto deduct the penalty from the account of the violators. This system can be installing at the main busy traffic junctions. It will help to reduce corruption as well as people will try to follow traffic rules
B. Need to wait till they show their documents and pay expected penalty.

Manual system must wait till violators shows their documents and pay the penalty, but in this structure other culprits can easily ablyescape.

C. Detect Fake document and stolen vehicle.
Detection of fake document and stolen vehicle is very difficult task while you work manually. It will be easy which system will work automatically with AI.

In the past few years, Violation of traffic signals is increased tremendously. Due to the late reachability of police officers the penalty which should be paid by the driver is not been collected on time. because of which corruption has also been increased. This paper will demonstrate that how we can collect the penalty from driver automatically. This includes the following scenarios:

1) Jumping Red Light (Signals).
2) Overspeeding of vehicle.
3) Illegal U turn or Wrong turn.
4) Automatic identify vehicle license text and figures.
5) Improve traffic efficiency.
blending of some smart devices with the advanced technology like AI will give us solution to the problem. Realization of such invention has some drawbacks such as installation issues, cost, complexity etc.

2. LITERATURE REVIEW:

Satadalsaha, Subhadip Basu, MitaNasipuri, Dipak Kumar Basu have designed and developed a system for generating a list of vehicle who cross the signal and captured images from the video using ANPR cameras. The developed system can successfully track 92% images of vehicles with violations on the traffic regulation [1].Bahrnu m. Gebregeorgis ,dipti Kapoor sarmah have designed system who focuses on issue of traffic by implementing smart traffic light controlling system. The system designed to switch traffic lights on the basis of the count if the vehicles on the road. It also focuses on how to detect traffic violations such as a lane change violation, stop line violation and red light violations using violation detection system that will work simultaneously with the traffic light controlling system [5].

The war warzaw, ohnmar win made a system which detects a traffic light sequence, stop line and detection region to detect moving vehicle and capture the vehicles beyond traffic lights with their data like date and time and venue. [6]. Prof.R.U.Yawale , Kiran Modak, Parmeshwar S. Shivshette, Snehal S. Vhaval along with their students made a project based on the Smart Traffic Control System , this makes use of sensors along with the embedded technology. The timings of the red and green light will be smartly decided based on the traffic on adjacent roads. As compared to the fixed mode traffic light

controller this new system is more efficient and flexible. It also has an intelligent traffic control system to pass the emergency vehicles such an ambulance, fire brigade etc. and also detect and track the stolen vehicles [2]. Mrs. Vidya Bhilawde , Dr. L.K.Ragha has made a project on Intelligent traffic control system . They made use of an embedded system along with the sensors to recognize the traffic situation depends on the density of vehicles on the road the traffic lights will automatically managed [3].

3. OBJECTIVES:

Primary objective of such systems is to track down vehicles that violated traffic regulations using surveillance cameras and intelligent image analytic software's. With the advancement in technology especially in Image processing and Machine Learning, it is possible to make these cameras smarter by training them to process information from the Video feed. The objective of the current research work is to develop an automated system to localize vehicles violating the traffic "Red" light signal and capture the images of such vehicles with date, time and location information and make people more disciplined, spread awareness about the importance of traffic regulation to avoid penalty payment. Executing system will inform to respective personand the deduction of the penaltywill happen immediately from car's owner bank account. System like RLVD can avoid violation of regulations by the means of some high-resolution camera and some AI methods and modules.

4. CONCEPTUAL FRAMEWORK:

The concept behind this system is that, Police can recognize who and how violate traffic norms. Camera recognizes the number plate and detect number on it. Then it sends that image to the server via Raspberry PI. Using OCR (Optical Character Recognition). Automatic penalty deduction system helps police staff to deduct penalty from directly owners bank account. There are chances that information that is been given by the owner of the car can be not appropriate or any fraud happened then the number of that particular vehicle will get displayed on the next signal's screen. This displaying of the number will help traffic police to catch a driver and charge him with penalty.

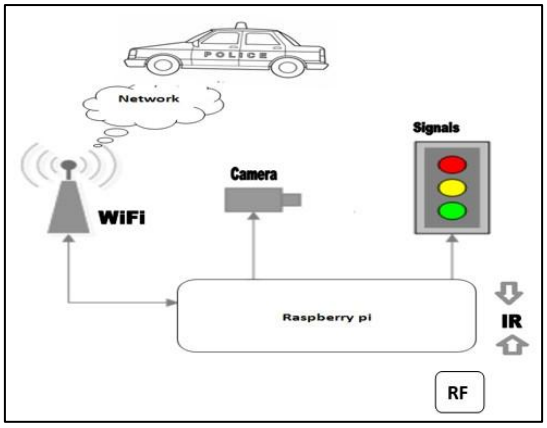

Fig.1: Actual system implementation

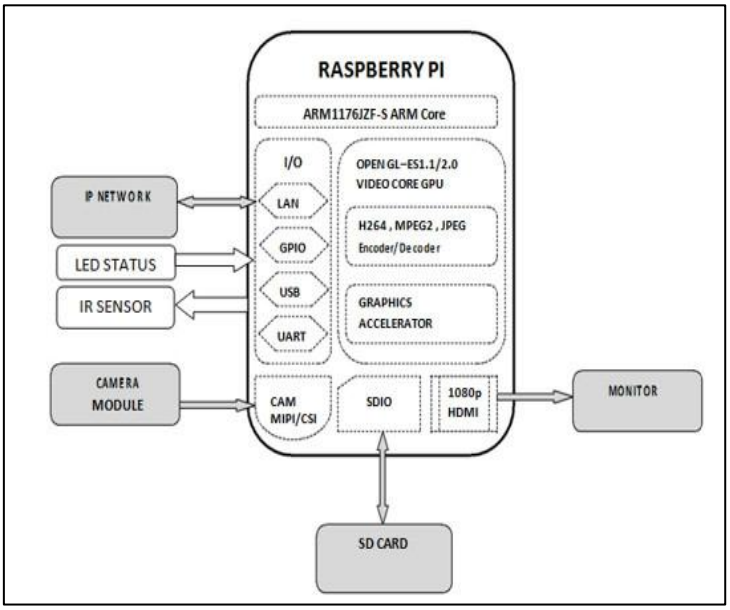

Fig.2: Basic design to connect raspberry pi with camera and server

5. IMPLEMENTATION:

For maximum effectiveness of license plate recognition, a camera supporting this functionality should be installed in a suitable manner, so that the images of the plates on cars are appropriately captured. Depending on the manufacturer, the **LPR** functionality may be also named **ALPR** (Automatic License Plate Recognition) or **ANPR** (Automatic Number Plate Recognition). There can be differences in requirements for placing the cameras and the required numbers of pixels. Before choosing the installation place, the user should consider some guidelines that must be met, such as the right viewing angle of the camera, the distance at which the camera should be mounted to the site of detection, and the corresponding size of the license plate in the image. Here are some common installation requirements for Hikvision cameras dedicated for license plate recognition.

- The width of the image of license plate should be within 130 - 300 pixels (optimum: 150-200 pixels)
- Maximum vertical viewing angle: 30°
- Maximum horizontal viewing angle: 30°
- The angle difference between the horizontal edge of the image and the horizontal edge of the plate (tilt) should not exceed +/-5°

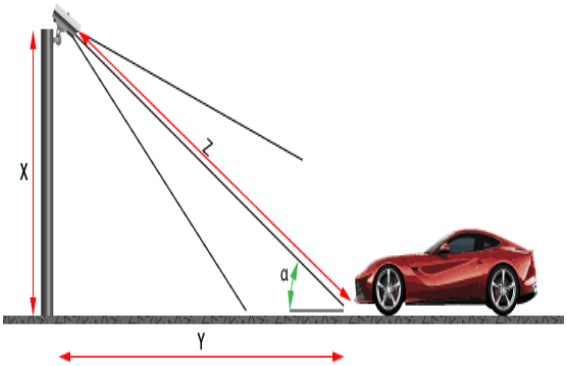

Fig.3: Camera Installation

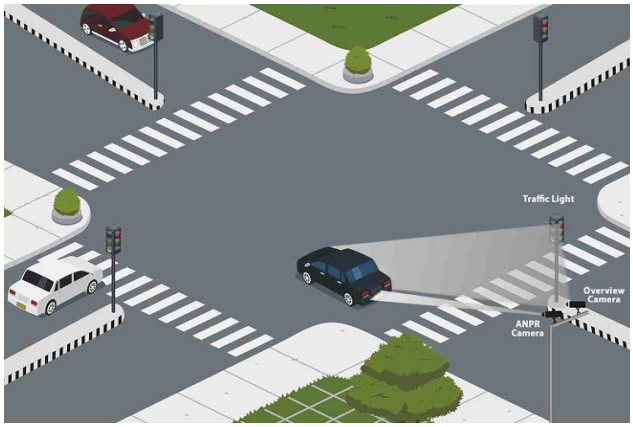

Fig.4: Detecting vehicle while crossing traffic red light

6. WORKING:

Red Light Violation Detection (RLVD) system is one the best in class video based red light enforcement systems and comprises an overview camera and the ANPR camera. The overview camera shows the entire violation scenario and the ANPR camera captures the image of the number plate of the violating vehicle. The system takes input from traffic lights and starts capturing red light violation as soon as the traffic signal turns red. It comes with a state-of-the-art, user-friendly Graphical User interface (GUI) for seamless operation. The GUI provides images of the vehicle, the number plate, text conversion of number plate after OCR, and date, time and location of the offence.

SERVER SIDE:

The licensed no is then sent to server through python on server side that data is stored in database. The data can be seen using server ip, on any browser. That data will be processed to with the help of Machine learning or deep learning to find the owner of the vehicle.

Fig.5: Number plate recognition with the help of OCR (Optical Character Recognition)

7. RESULT:

The result of this system is to send request to bank for penalty deduction from vehicle's owner bank account and if owner is not genuine or owner's documents is not linked with any bank account then vehicle number will be forwarded to next signal will help to catch violator.It will reduce manual work and the rate of traffic red-light violation.

8. CONCLUSION:

Conclusion In this work, the designed Automatic Traffic Violation Detection and Automatic Penalty Deduction system is presented. The system is designed to provide continuous detection of traffic violation via cameras on the road and ensures full road safety that enforces the people to obey the traffic norms.

9. REFERENCE:

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