# Red Light Jump Detection and Number Plate Recognition

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*Abstract*- Now a days we see that various types of accidents happens on the road. In India many accidents are caused due to human negligence. Detecting the license plate plays a major role in the traffic surveillance. This system could be implemented in different areas like Parking, traffic signals, and mostly where the Security issues are needed. The extraction and recognition of the vehicle license plate is done using Matlab. The images are taken from the digital camera. The alphanumeric on the vehicle license plate is extracted and recognized using the database of the alphanumeric characters. The extracted characters on the vehicle license plate are printed on notepad for verification purpose. .In this paper, we try to give an enhance view of the signal jump detection and recognition of number plate.

*Keywords*- Signal jump detection, number plate detection, Plate Recognition, Image processing

## Introduction

With the growth of the urbanization, industrialization and population, there has been a tremendous growth in the traffic. There is occurrence of bundle of problems too, these problems include signal jump, traffic jams, accidents and traffic rule violation. Number plate recognition is an essential stage in intelligent traffic systems. Nowadays vehicles play vital role in transportation. Also the use of vehicles has been increasing because of population growth and human needs in recent years. Therefore, control of vehicles is becoming a big problem and much more difficult to solve.

Automatic vehicle identification systems are used for the purpose of effective control. Number plate detection is a form of automatic vehicle identification. It is an image processing technology used to identify vehicles by only their license plates. Real time LPR plays a major role in automatic monitoring of traffic rules and maintaining law enforcement on public roads. Since every vehicle carries a unique license plate, no external cards, tags or transmitters need to be recognizable, only license plate. A red light violation occurs when a vehicle try to cross the intersection at the red traffic light. So to give the punishment to the drivers of these vehicles, we must identify the vehicle that violates the traffic light signals.

### EASE OF USE

### A. *Using of microcontroller ATmega16*

Standard for a microcontroller based low cost platform. It consists of an Atmel ATmega16 is a low power CMOS 8-bit microcontroller based on the AVR enhanced RISC architecture. By executing powerful instructions in a single clock cycle, the ATmega16 achieves throughputs approaching 1 MIPS per MHz allowing the system designed to optimize power consumption versus processing speed. The AVR core combines a rich instruction set with 32 general purpose working registers. All the 32 registers are directly connected to the Arithmetic Logic Unit (ALU), allowing two independent registers to be accessed in one single instruction executed in one clock cycle. The resulting architecture is more code efficient while achieving throughputs up to ten times faster than conventional CISC microcontrollers, selectable power saving modes. 1) Atmega16 run at 16Mhz clock.8051 run at lower clock speed. 2) Atmega16 has inbuilt ADC.8051 doesn't has ADC. 3) RAM and ROM memory of Atmega16 is more than 8051. 4) Form Factor of Atmega16 is cheaper than the 8051.5) Programer for Atmega16 is cheaper than the 8051. 6) Atmega16 have 16kb flash memory and Atmega have 32 kb. 7) Atmega have 1kb SRAM and Atmega have 2kb SRAM 8) Atmega have 512bytes EEPROM and Atmega have 1kb.In this project we doesn't need more memory and RAM so we are not using Atmega32. And the cost of Atmega32 is also high.

## B. Using of IC-MAX 232(Level shifter)

MAX 232 converts signals from a RS 232serial port to signals suitable for use in TTL-compatible digital logic circuits. The MAX232 is a dual transmitter / dual receiver that typically is used to convert the RX, TX, CTS, RTS signals. The drivers provide TIA-232 voltage level outputs about ±7.5 TO 12 Volts from a single 5-volt supply by on-chip charge pump and external capacitors. When a MAX232 IC receives a TTL level to convert, it changes a TTL logic 0 to between +3 and +15 V, and changes TTL logic 1 to between −3 and −15 V, and vice versa.

## C. Using of IR Sensor

IR stands for infrared sensor.IR Sensors work by using a specific light sensor to detect a select light wavelength in the Infra-Red (IR) spectrum. By using an LED which produces light at the same wavelength as what the sensor is looking for, you can look at the intensity of the received light. When an object is close to the sensor, the light from the LED bounces off the object and into the light sensor. This results in a large jump in the intensity, which we already know can be detected using a threshold. A electronic remote device mainly consists of this IR transmitter and receiver. The IR signal is modulated during transmission. And demodulator during reception.

## D. Using of GSM module

The GSM module has the SIM900A microcontroller, a SIM slot, a 12V input, RS232 (Serial) interface and Pin outs for interfacing with controllers. It is suitable for SMS, Voice as well as DATA transfer application in M2M interface.

### Block Diagram of Signal Jump Detection
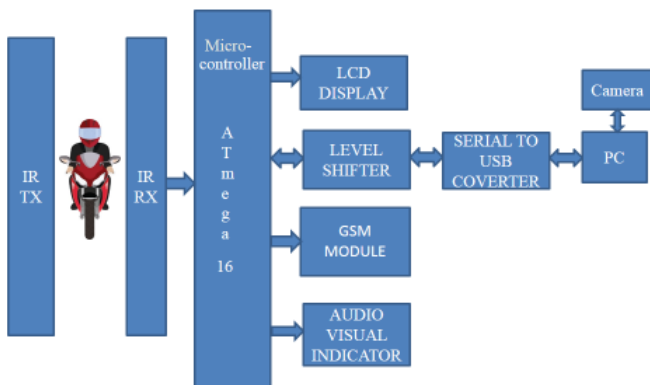


## A. Working

IR Tx and Rx connected face to face of each other on the two sides of the road. After a zebra crossing if the person cross the zebra crossing we consider as jump the signal. If the vehicle are between Tx and Rx there is deflection in output of IR receiver and this signal give to microcontroller. After the sensing is done the signal will be received by the Atmega 16 microcontroller which is used in interfacing the sensors and the pc which is used to find the number of the vehicle. The audio and visual indicator is there to give help to the traffic inspector on the signal that someone has broken the signal. As the signal is broken by the vehicle the Atmega 16 will start working and the lcd display connected is there to display that from where side the signal is broken.

At the output of Atmega there is level shifter connected to it. The level shifter is mainly connected to increase the voltage level as pc runs on 12v and the output of the Atmega 16 is approx. 5-6v. And if the level shifter is not connected there will be garbage value or unwanted results appearing. The pc is used to find the number in the number plate. The tool which we are using to for NPR (number plate recognition) is MATLAB12.0 .The main drawback or disadvantage of Mat lab is this tool is not 100% accurate, it works according to the input given to it by the user. But negligent this disadvantage MATLAB is very important and useful tool to work with. The process which will be there in MATLAB is given below in flow chart.

## A. PC, MATLAB AND CAMERA
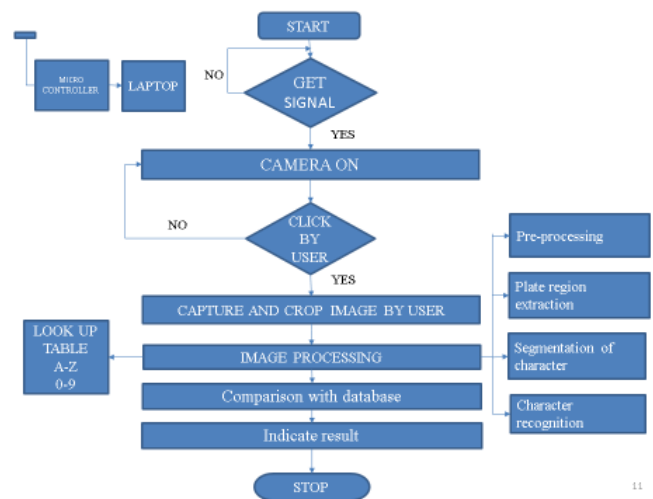


The main and the most important portion of this system is the software model. The software model use series of image processing techniques which are implemented in MATLAB.

The NPR algorithm is broadly divided into following parts:
1. Capture image.
2. Pre-processing.
3. Plate region extraction.
4. Segmentation of character.
5. Character recognition.
6. Comparison with database.
7. Indicate result.

## a. *Capture Image*

The first step is the capturing of an image using electronic devices such as camera, webcam can be used to capture the images. For this project, vehicle images will be taken with a Laptop camera. The images will be stored as colour JPEG format in the Laptop. Next, we might proceed in using the Matlab function to convert the vehicle JPEG image into gray scale format.



Fig Original Image

## b. *Pre-processing*

Filtering: When images are saved in laptop there is lot of noises present in image. To remove noise from the image median filters are used so that image becomes free from noise. Noise removal is necessary step in License plate recognition system because it greatly affects the recognition rate of the system.

Gray Processing: It involves conversion of color image into a gray image. The method is based on different colour transform. According to the R, G, B value in the image, it calculates the value of gray value, and obtains the gray image.



Fig Grey scale image

## c. *Plate Region Extraction*

The third step of the ANPR algorithm is the extraction of the number plate in an image.   Number plate extraction is the key step in ANPR system, the goal of this phase, given an input image, is to produce a number of candidate regions, with high probability of containing number plate and validate for true number plate. In this step extract vehicle number plate from eroded image.

A number plate can be extracted by using image segmentation method. There are numerous image segmentation methods available in various literatures. In most of the methods image binarization is used.
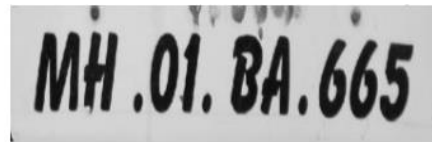


Fig Croped Image Number Plate



Fig Filtered extracted Number Plate

## d. *Segmentation of Character*

In this step get the o/p of extracted number plate using labelling components, and then separate each character  and split the each and every character in the number plate image by using split and also find the length of the number plate, then find the correlation and database if both the value is same means it will generate the value 0-9 and A - Z, and finally convert the value to string and display it in edit box, and also store the character in some text file in this code.



Fig Character Segmentation

### e. Character recognition and Comparison with database

The segmented character is now used to compare with individual character against the complete alphanumeric look up table. It match individual character and finally the number is identified and stored in string format in a variable. The string is then compared with the stored database for the vehicle authorization then recognized number plate string is compare with authenticated database file, , if the both value is same means it will display the authorized otherwise it will display the unauthorized
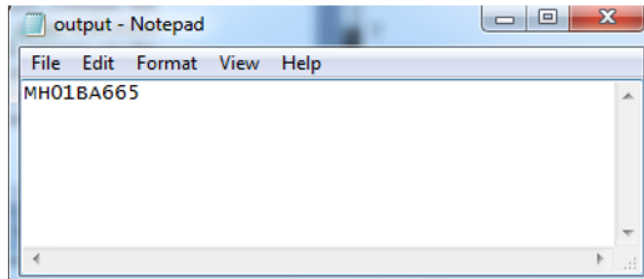


Fig Recorgnize number plate

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