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# RFID Based Automated Control and Detection System for Traffic Violation

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**ABSTRACT:** Safety and comfort of road users is becoming mandatory. Hence a reliable and safe system for traffic control and management is required. The objective of this project is to introduce a system which detects stop line violation during red light running and thereby we can trace each individual vehicle. It also captures the invalid license, road tax, FC, insurance and chassis of a vehicle. The proposed system includes 2 modules namely vehicle unit, traffic unit. Vehicle unit consists of [2, 3] PIC (Peripheral Interface Control), GSM(global system for mobile communication),RFID tag whereas in traffic unit it consists of MAX232, RFID reader.

**KEYWORDS**: PIC, GSM, RFID, MAX232

## I. INTRODUCTION

Traffic Control and Management System is important nowadays so as to have a safer and much reliable system. However the existing system needs manual monitoring of traffic rule violation and proposed system includes tracing vehicles automatically without manual help. It is done with the help of active [1] RFID tag and reader. RFID tag is also called as transponders receive a radio signal and in turn response to it by producing a radio signal. Here the tag stores the related information about vehicle i.e license number, road tax, Fc and their expiration details reader reads all the details and sends those details to RTO unit with the help of GSM using UART. Messages are sent to user and RTO, vice-versa when the traffic rules are violated by the user. All the user details are stored in RTO PC which is easy to verify all the documents and examine then and there accordingly. If the vehicle crosses the red signal first time then the message will be sent to the user of the vehicle and RTO with penalty details. The penalty should be paid within the specified due date or else the vehicle will be blocked by the RTO unit. When the same vehicle crosses the red signal disobeying[4,5] traffic rules for the second time then a indication message is send to RTO unit and RTO will send a message to the appropriate vehicle user to slow down and stop the vehicle via GSM.Two LCD's are placed in the vehicle. One is to show the message for slow down and stop the vehicle while crossing the red signal for second time and for[6] speed violation to avoid accident. Second one is placed in place of number plate available in front side of the vehicle to display the RC number and there is a connection between LCD and Motor driver. The proposed system also has a DC motor where the rotor of DC motor is connected to wheel of the vehicle, in case if the user tries to disconnect the DC motor which is connected to the wheel of the vehicle, both the LCDs will be in the off condition and so the user is caught to the traffic policeman while driving.

## II. SYSTEM DESIGN

We are proposing 3 units in our design it consists of 1.Vehicle unit 2.Traffic junction unit 3.RTO unit

### 2.1. Vehicle Unit:

This unit consist of PIC microcontroller, motor, GSM, speed sensor, RPS, LCD display for speed control and another LCD display to display RC number and then active RFID tag. The PIC microcontroller is used for data processing and then the speed sensor is used to measure the speed of the vehicle. GSM is used to receive message in this unit and then the DC motor is used which is connected to the wheel of the vehicle, then RPS is used for power supply. Here the RFID tag is connected to the vehicle unit and as a whole this block is fixed in the vehicle. When the vehicle stands in the traffic junction or when the vehicle is going to reach the traffic junction the tag present in the vehicle unit is read by the RFID reader in the traffic junction unit.

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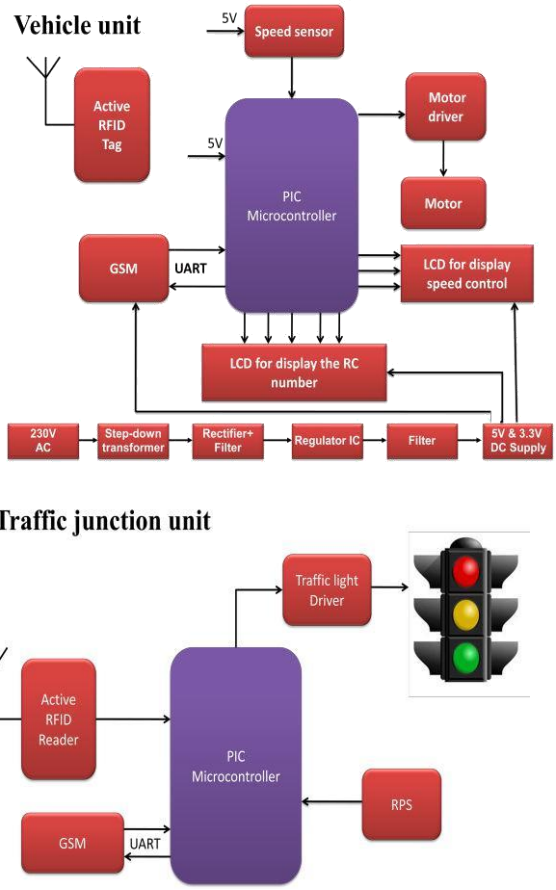
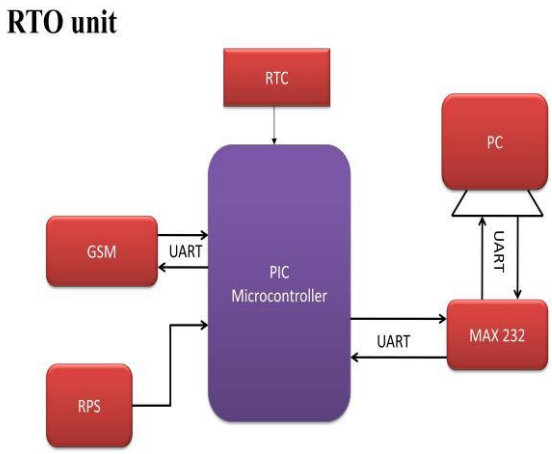



**2.2. Traffic Unit:**

Traffic unit is the combination of traffic junction unit and RTO unit. In traffic junction unit it consists of PIC microcontroller, GSM, RPS, Active RFID reader, Traffic light driver. Active RFID reader is used to read all the details about user's document that has been loaded in RFID tag present in the vehicle unit. GSM used in this unit act as both transmitter and receiver since it sends information to user and RTO vice-versa.



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In RTO UNIT it consists of PIC microcontroller, GSM, RPS, RTC, MAX232, PC. Here GSM is used as transceiver it transmit messages to user in case if they violate the traffic rules and during rash driving. It receives messages from traffic junction unit about user's document. Finally these details about user documents are stored in the PC.MAX232 is used to convert the voltage level of RS232 to desired TTL and vice versa. Here it converts 3.3V DC TO 9V AC.RTC is used to have synchronization.

## III.HARDWARE

### 3.1. PIC Micro-controller:

Peripheral interface controller is a microcontroller that is used for low power consumption .PIC microcontroller belongs to 16F887 family. RISC (reduced instruction set computer) architecture is used to give instruction to microcontroller. Serial communication is done with the help of UART(universal asynchronous receive and transmit) operating frequency of pic microcontroller is 20MHZ and the operating voltage is 2 to 5.5V DC. PIC microcontroller has separate data memory and program memory and is used to control all the operations .the advantage of PI microcontroller is low cost and it occupies less space.

### 3.2. MAX232:

max232 is an IC designed by maxim integrated circuits and is used in RS232 communication system for the voltage conversion. max 232 is 16 pin DIP(dual inline package) that has dual drivers ( 2 transmitter and 2 receiver) which is used to convert the voltage level of RS232 to desired TTL and vice versa. It can control all the voltage level (transmitter, receiver, CTS, RTS) .It is used as an hardware layer convertor for the two system to communicate simultaneously .It has a charge pump that pumps the voltage to desired level in the proposed system max232 is used to convert 3.3V DC TO 9V AC.

### 3.3. GSM:

Calculating Global system for mobile communication is used to transmit data wireless .The proposed system uses SIM 900that uses quad band with operating frequency from 800MHZ to 1900MHZ. GSM-SIM900 is compact and can transmit data over a long distance and it is also used for machine to machine communication. It consumes less power. GSM uses AT COMMAND to communicate with microcontroller.

### 3.4. RFID:

The transmission Radio Frequency Identification is automatic identification that uses RFID tags to store and retrieve data. It has large data storage capacity(2kb).the proposed system uses active RFID READER that has coverage area of about 100m that works at UHF(300MHZ-3GHZ).RFID is based on J2EE(Java-2 enterprise edition).using RFID requires less labor and amount of lost stock in decreased.

## IV.SOFTWARE

### 4.1. Proteus:

Generate It is a software that is used for design and simulation of electronic circuits .it includes ISIS (intelligent input schematic system) which is used for circuit design and ARES (advanced routing and editing software) which is a PCB designer. ISIS has more than 10,000 components and 6000 simulation models .new component can be created and added to the library. ISIS has VSM (virtual monitoring system) that provides graphical SPICE circuit simulation and design directly in the ISIS spice simulator is based on the berkeley SPICE3F5 model.

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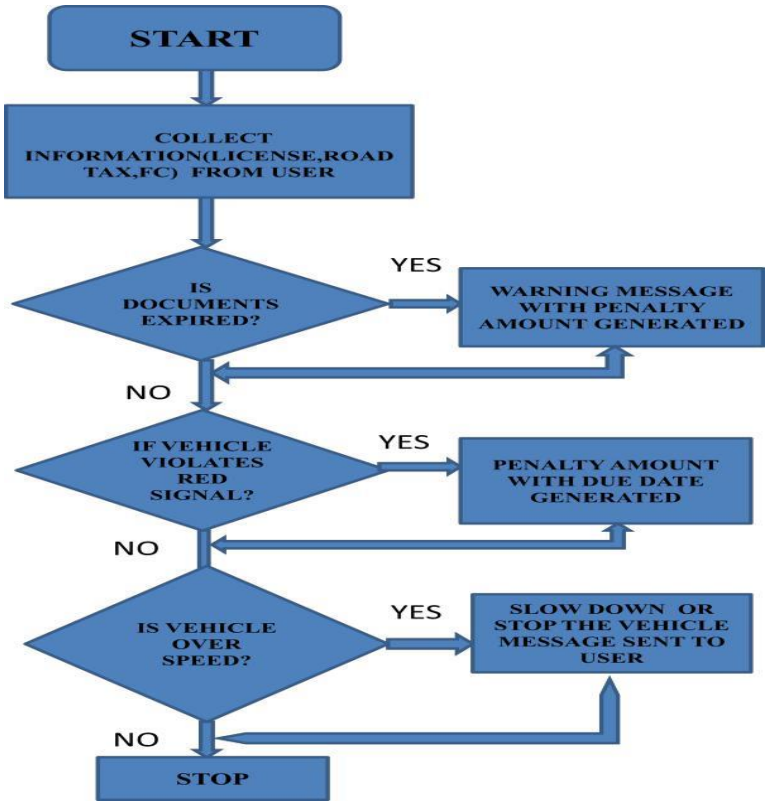


## V. RESULTS AND DISCUSSION

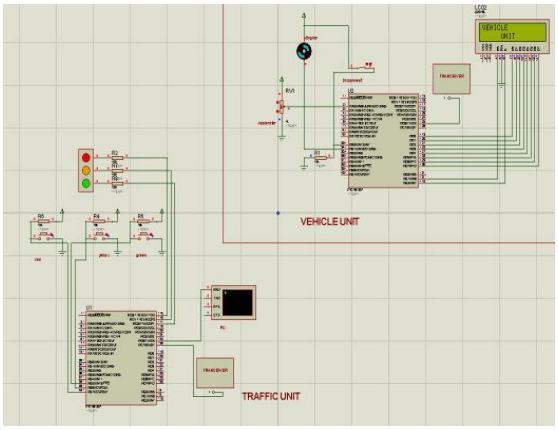


**Figure 1:** Consists of vehicle and traffic units.

The total simulation view is shown in the figure1 that is as per our project we have simulated three blocks namely vehicle unit, traffic junction unit and RTO unit. The left corner block is known as the traffic unit and the right corner block is known as the vehicle unit as displayed in the LCD. We have placed a tri-color traffic lamp connected to the microcontroller used in traffic unit and then the virtual terminal of RTO is also connected to the same microcontroller and then the engine, speedometer and then the switch is connected to the microcontroller of the vehicle unit. Now three cases are shown in the simulation.

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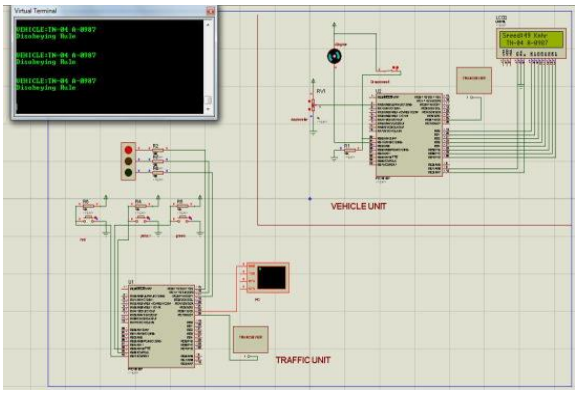
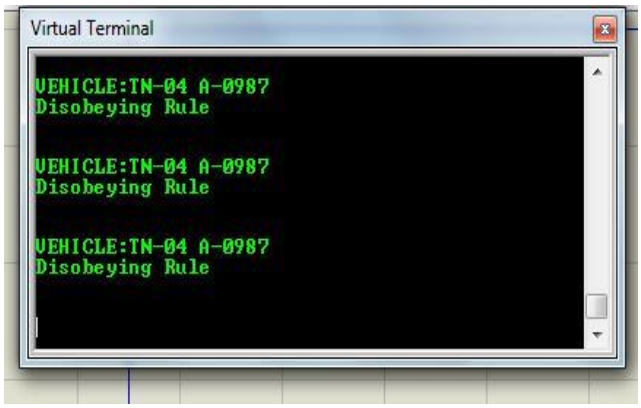
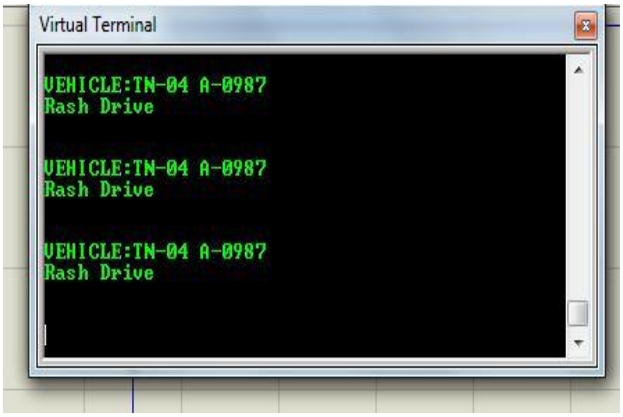
**5.1. CASE1:**

In the figure2 the first case of the simulation is shown and the first case of the simulation is DISOBEYING TRAFFIC RULE .As per the rules if the red light is in the on condition no vehicle should cross the stop-line and so if the vehicle crosses the stop-line and the vehicle user tries to ride his vehicle the message disobeying rule is sent to the RTO unit and so amount and the due date to pay the amount and so in the figure 2 the red light is in the on condition and the engine is also in the running condition disobeying rule is displayed in the virtual terminal.




**5.2. CASE2:**



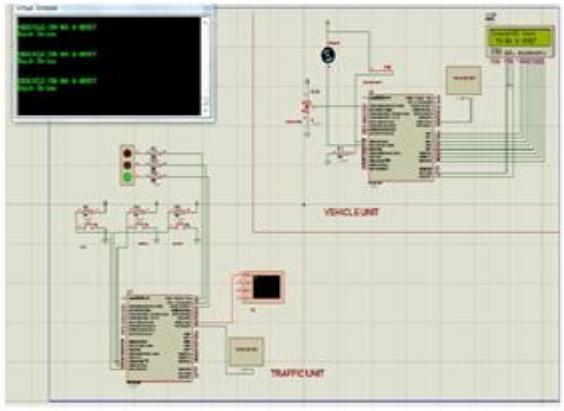
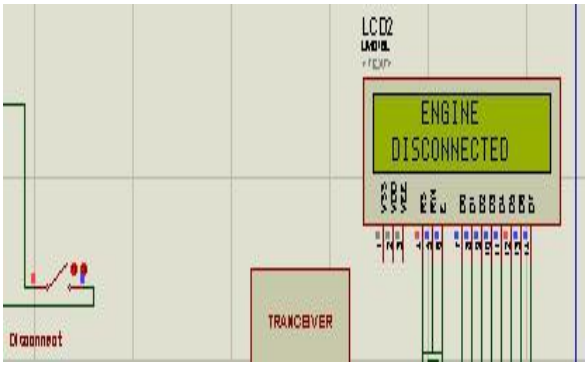




**Figure 3:** Displaying of rash drive message.

**5.3. CASE3:**



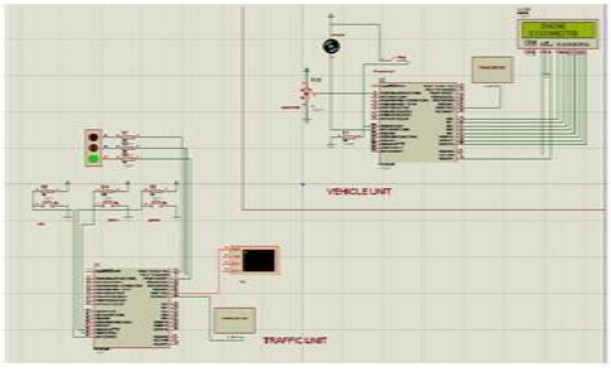




**Figure4:** Displaying of Engine disconnected Message.

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In the figure3 the second case of the simulation is shown and the second case of the simulation is RASH DRIVE. When the vehicle's speed exceeds to some extent it is considered to be rash drive. In our project the limit is set to 70 and when the vehicle's speed exceeds more than 70 then the message rash drive is sent to the RTO and then the RTO sends the message to the concerned person to slow down the vehicle's speed or to stop the vehicle. In the simulation the vehicle's speed is detected and then message displays as rash drive in the virtual terminal.

## V. CONCLUSION

According to road user's safety and to have a comfortable travel a system is designed so as to meet and satisfy all those present constraints. This system is designed with low power consuming devices. The information are transmitted and received using active RFID tag and reader. Usage of active RFID device added up an advantage to this system so that it can have a better coverage area. Along with verifying necessary documents speed is also monitored and warns the user to have a safe drive. We did three simulation experiments with the help of proteus software. This result helps to attain a feasible solution for traffic system design. In figure4 the fourth case of the simulation is shown and it is ENGINE DISCONNECTED. In our project if the user tries to disconnect the engine from the motor the LCD will be in the off condition and so the vehicle is caught by the police officer and then in the figure4 we have shown the condition engine disconnected when the switch connection is removed the case engine disconnected is displayed in LCD .

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