_____

AUTOMATIC PENALTY CHARGING FOR TRAFFIC REGULATION

Nikita Prabhu[1], Ameya Vedpathak[2], Nikita Vedpathak[3], Smita Kulkarni[4]

[1,2,3]*Student, Electronics and Telecommunication Engineering, MIT Academy Of Engineering,Pune, Maharashtra, India,*
[4]*Assistant Professor, Electronics and Telecommunication Engineering, MIT Academy Of Engineering, Pune,*
Maharashtra, India.
[1]*nikita7591@gmail.com,* [2]*avedpathak@gmail.com,* [3]*nikita.vedpathak@gmail.com,* [4]*sskulkarni@entc.maepune.ac.in*

Abstract: **The research, 'Automatic Penalty Charging for Traffic Regulation', is an attempt to design a system which will automatically incur penalty to the car driver and owner for violation of traffic rules. There are 3 units to be designed. One will be a standalone system attached to the ignition mechanism of the car, the other will be a standalone system which will be attached to the traffic signal points and the third will be mainframe RTO unit. For car ignition the driver has to place his RFID driving license card near to the reader. The design aims to reduce bribery, corruption, pollution, congestion in a city.**

_____*****_____

1. INTRODUCTION

Now-a-days, increasing population and increasing traffic have constrained smooth flow of traffic, resulting into traffic jams and has encouraged people to violate traffic rules, thereby creating a complete chaos.

So this causes a great inconvenience for public travelling day-to-day. Also the current traffic rule regulations are not very stringent and the implementation techniques are severely flawed. Due to these, bribery has become rampant. Although the government has introduced smart card driving licenses it has not proved much useful in eradicating corruption.

1.1 Background

The Maharashtra State Motor Driving License has introduced License with smart card to replace the traditional paper driving license. These driving licenses include various parameters stored in it:

1. Vehicle Type

2. Date of issue (D.O.I) and Date of Expiry.

3. Name, signature, Address and Date of birth of the owner.

4. Signature and ID of the issuing Authority.

The Driving license provides all the essential details about the driver. On the basis of this theme, we have extended the level

of information and brought up an idea of "Automatic penalty charging for traffic regulation." So far in the market only the devices measuring different parameters are available, which are all stationary, but this paper aims to send this information wirelessly over the long distance using GSM unit.

1.2 Relevance

So the **"Automatic penalty charging for traffic regulation- A good cause against pollution and corruption"** consists of additional information which will help the traffic governing bodies to avoid pollution and corruption with proper traffic regulations.

With the information provided with the driving license we have clubbed some additional information about the car which the owner drives.

The parameters like:

1. The primary information including all that provided with the license i.e. name, address, vehicle type, validity is basically essential and collected.
2. The P.U.C certificate and its validity is taken into account for pollution control. The proper renewal must be done for using the car. If the P.U.C gets expired the owner will be unable to use the vehicle and has to renew the P.U.C. for the use of vehicle.
3. The basic safety parameters are taken into account for the driving authority due to increasing accidents which are

_____

_____

fatal. So the 'insurance' of the driver is to be checked and maintained for safety precautions.

4. The Traffic Rules violation is to be checked at the traffic signal with the help of the RFID tags and information is to be collected with the Traffic Governing Bodies.

5. The proper maintenance of P.U.C and the insurance is to be maintained at the   R.T.O and the traffic governing bodies. So for smooth functioning the driving authorities have to maintain all the parameters mentioned above and the driver has to follow all the rules and regulations prescribed by the Traffic Governing Bodies.
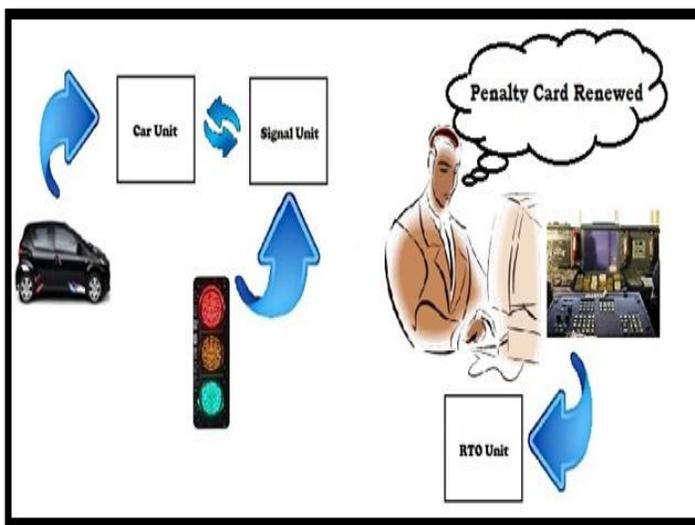
2. WORKING OF THE SYSTEM

Fig -1: Block Diagram

How the system works**:**

If the car is on zebra crossing, PUC has expired or if there is illegal signal crossing, Penalty will be charged to the convict with assign limit of 10 times. If the limit is crossed car ignition will be blocked by control unit. In this condition car owner has to pay the penalty through R.T.O office, to make smartcard reusable.

There are 3 units in this project:

1. One will be a standalone system which will be attached to the ignition mechanism of the car.

2. Second will be a standalone system which will be attached to the traffic signal points.

3. Third will be a standalone system which will be attached to the RTO office centre.

Car Unit - For car ignition the driver has to place his SMART CARD near to the reader. If license is suspended, the car will not start, if the car has crossed its penalty limit, then the car won't start. To perform these operations, AVR controller will be used in the car.

RF module is for continuous transmission of car details like PUC, registration number, drivers license number is attached to the AVR controller. The RF ID transmitter is placed below bumper for detection of zebra crossing. There will be relays, buzzer and LCD interfaced with the AVR processor.

1. Relays are used to give indication for cars ignition system.

2. Buzzer will be ON when penalty is charged to the car.

3. LCD will display the penalty charged to the car.

There will be RTC time circuit also which will give all the details of the date and time of PUC which will thereby give the details of PUC expiry.

Signal Unit - The RFID reader will be situated at zebra crossing and Tran's receiver will be situated at the signal pole. RFID reader will detect the car when it stands on the zebra crossing. The RF module will take all detail information of the car and charges penalty according to the rules.

RTO Unit - The main control unit is placed at RTO. This will assign the owner his penalty on detecting the smart card and recover the blocked smart card using the special code word. As well as it reads and can renew the PUC information.
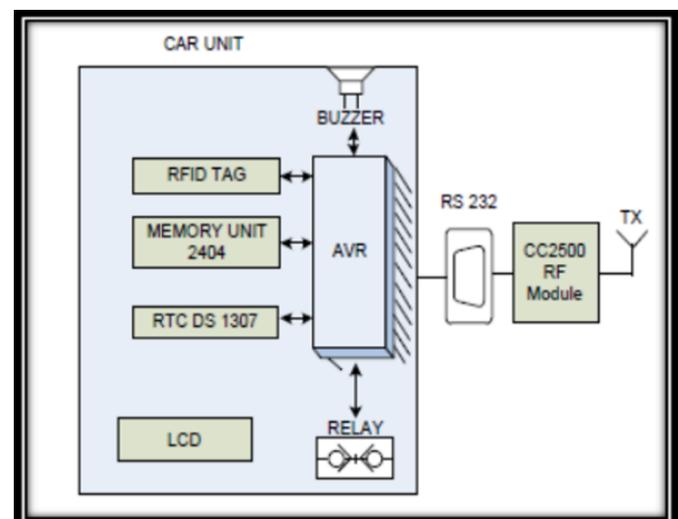
2.1 Car Unit

Fig -2: Car Unit

_____

RFID TAG: The tag is used for identifying the vehicle which has violated the traffic rule. Passive RFID tag is used for this identification. The tag will be mounted on the vehicle.

Memory Unit: The smart card stores the car information like P.U.C expiry date, Insurance, Expiry Date and the fine incurred. EEPROM chip 24C04 is used as memory SMART CARD. It contains 500 bytes memory.

RTC: DS 1307 is used as a real time clock to keep track of expiry dates.

Microcontroller: AVR ATmega16 microcontroller is used to control and co-ordinate all the module activities. It is responsible for all the in/out bound activities of the car module.

LCD: LCD is used to display the messages to the driver when he violates a traffic rule. The penalty incurred is displayed on the LCD and the reason for license suspension is also displayed.

Relay: The car unit is linked with the car ignition system. The relay is open circuit if the card is suspended and closed if the card is not suspended.

Buzzer: It is used to indicate that the license is suspended.

RF transceiver: CC2500 module used to connect and exchange information with the signal pole unit wirelessly. It is connected to car module through MAX232.
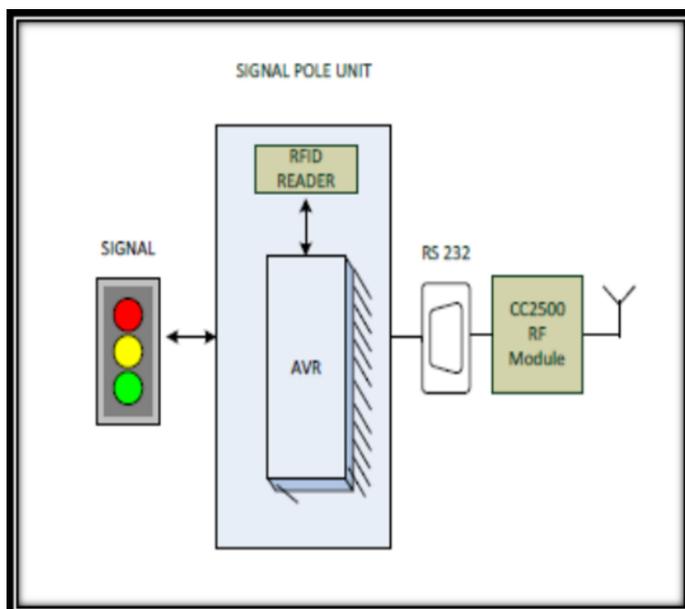
2.2 Signal Unit

Fig -3: Signal Unit

Signal Unit: It is used for displaying the normal operation of a traffic signal. It consists of LEDs controlled by AVR.

Microcontroller: AVR ATmega16 microcontroller is used to control and co-ordinate all the module activities. It is responsible for all the in/out bound activities of the car module.

RFID reader: It is used to read the tags of the vehicles which violate traffic rules. This unit then transmits the information to the microcontroller.

RF transceiver: CC2500 module used to connect and exchange information with the signal pole unit wirelessly. It is connected to car module through MAX232.
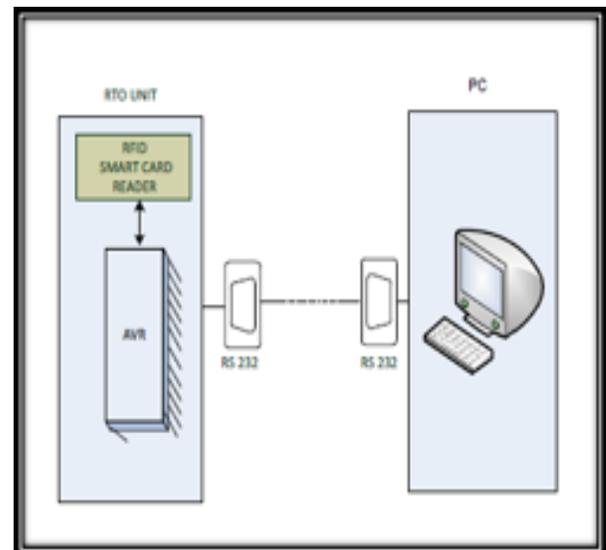
2.3 RTO Unit

Fig -4: RTO Unit

Microcontroller: AVR ATmega16 microcontroller is used to control and co-ordinate all the module activities. It is responsible for all the in/out bound activities of the car module.

Smart Card reader: This block reads the information from the smart card inserted which is a suspended smart card. This unit is connected to AVR.

PC: PC is used to store the database. GUI is provided through VB. The smart card record is cleared if the owner pays his dues.

2.4 Flowchart of the system:
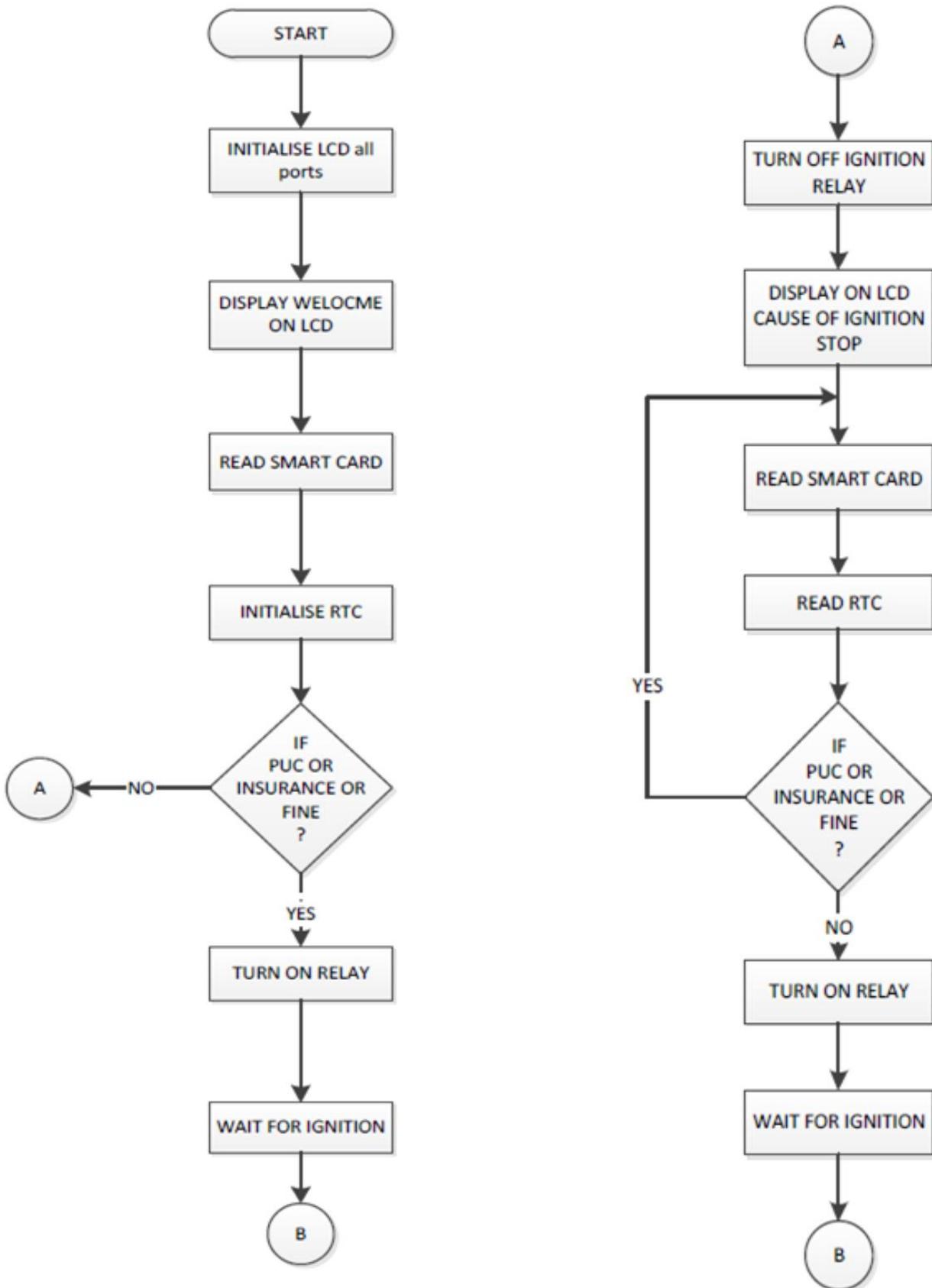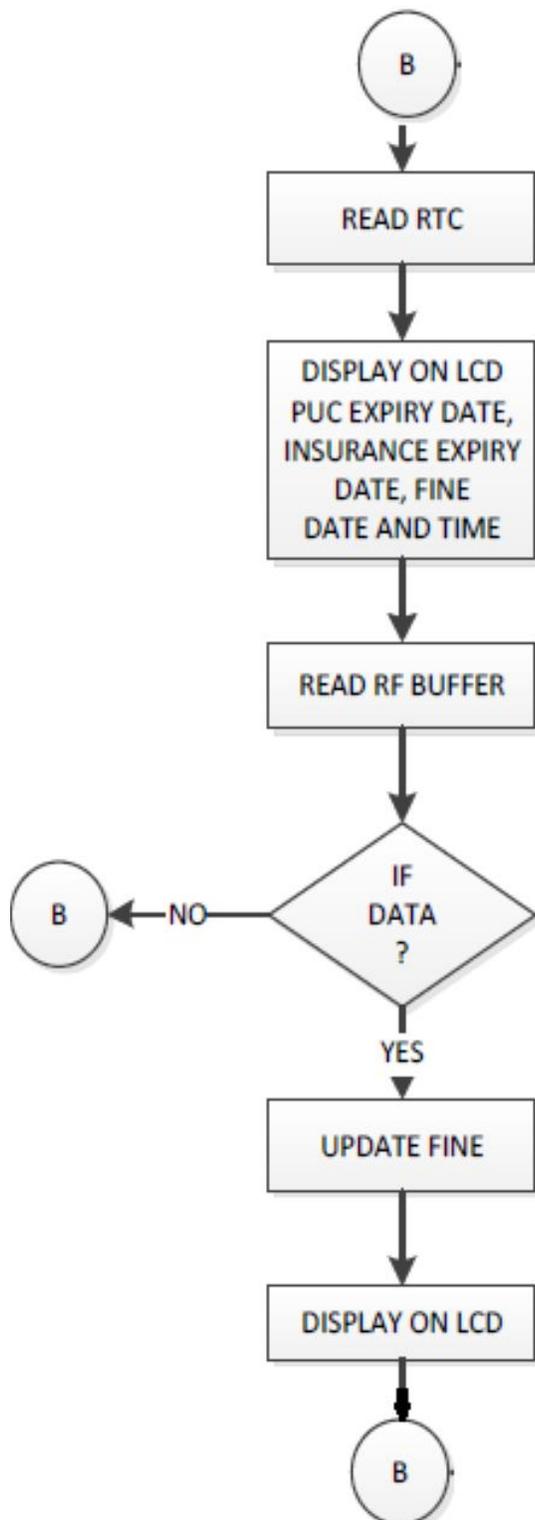
3. APPLICATIONS

1. TRAFFIC REGULATION & MANAGEMENT: The main objective is to provide a congestion free journey.

2. TRAFFIC MONITORING: This project will keep a track record of driver regarding parameters like insurance, license and also PUC of car.

4. FUTURE DEVELOPMENTS

CURRENT FEATURES AND BENEFITS OF THIS PROJECT:

1. Compact and portable units:

The proposed units in the project are portable and can be easily installed and maintained.

2. Reliable Vehicle Identification: The RFID module used is capable of identifying a particular vehicle regardless of the traffic. Even if multiple vehicles crossover at same time, there is no ambiguity in vehicle identification.

3. Elimination of Paper work: The project proposes a computer database to be prepared which will reduce paperwork.

4. Tamper proof system: AVR will be programmed using software lock which will make the system software secured and the system tamper proof.

5. Easy Fine Payment: Fine collecting centres will be conveniently located and the drivers have to carry only a smart card.

FUTURE DEVELOPMENTS:

1. Database: The medicinal and traffic records of the drivers can be maintained precisely in the database.

2. Traffic manipulation: The traffic analysis for a region can be carried out by manipulating the traffic flow.

3. Emergency: The emergency situations can be tackled efficiently.

CONCLUSION

This project can thus:

Drastically reduce bribery, pollution, traffic bottle necking.

Reduce paperwork involved.

Develop a tamper proof traffic regulation system.

• The project can be further extended by incorporating toll-collection, Petro-card, emergency medical treatment systems into it.

• Also the drivers medical records can be saved in the database and suitable treatment can be given in case of emergencies.

• This will completely revolutionize the travelling experience.

REFERENCES:

RS232

- www.datasheetcatalog.org/datasheet/texasinstruments/max232.pdf

- en.wikipedia.org/wiki/RS-232

- www.wisegeek.com/what-is-rs232.html

AVR:
- www.avrfreaks .com

- www.datasheetcatalog.com/datasheet/atmega16

RFID:
- http://en.wikipedia.org/wiki/Radio-frequency identification

- D. Sen et al., RFID For Energy and Utility Industries, PennWell Corp., 2009ISBN 978-1-595370-105-5, pages 1-48

- http://en.wikipedia.org/wiki/RFID

- Stephen A. Weis, RFID (Radio Frequency Identification): Principles and Applications, MIT

- http://www.rfidjournal.com/article/view/3321

- http://www.tollroadsnews.com/node/4513

- "Authorization of Spread Spectrum Systems Under Parts 15 and 90 of the FCC Rules and Regulations" (TXT). Federal Communications Commission. June 18, 1985. Retrieved 2007-08-31.

- http://www.acq.osd.mil/log/rfid/index.htm

DATASHEETS:
- www.alldatasheets.com

BOOKS

- AVR Microcontroller and Embedded Systems: Using Assembly and C –By Muhammad Ali Mazidi, Sarmad Naimi, Sepehr Naimi.