

# RFID Based Car Parking Security System Using Microcontroller IC89c52.

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**Abstract** - Radio Frequency Identification (RFID) is one of the automatic identification and non line of site technology. In this technology communication is in between the tag and reader. The tag is movable object like a smart card and any type of material object. Each tag have magnetic strip with the specific code and tag is read by RFID reader module. One RFID reader module is simultaneously communicate with the number of tag but one tag is not communicate with the number of RFID reader module. In this project provide the car parking area security with the help of RFID technique. When user show his RFID tag to the RFID reader. Reader read the code information which available on the tag and with the help of microcontroller program memory, display required comment on LCD. If the code is match then open the door of parking and if code is reject by the reader then closed door of parking as well as buzzer ON. In the project, alcohol detection system also required for the safety of human and cars in parking area. Alcohol sensor MQ-3 is gas sensor which is more sensitive about alcohol and lower conducting in atmospheric clean air.

**INDEX TERM**- Microcontroller 89C52, RFID technology, Alcohol detection, security.

## I. INTRODUCTION

Today's technical world security is one of the main issue various types of security is implemented with the help of technology [1]. The project is constructed on Automatic Identification and Data capture (AIDC) principal, it is the part of RFID. RFID tag have two type passive tag and active tag. This is a very good project for Industries. The project will be used in the electronic devices, and RFID reader, which is latest technology used for identify the authorized vehicle. When an authorized RFID Tag comes in front of RFID reader, then reader reads information about that vehicle from its unique RFID Tag and record into system [1]. RFID reader performs the whole task. The main components of project are IR sensor, 89C52 microcontroller, RF module, alcohol detector. We use 89C52 microcontroller as main controlling unit. It is high performance, low power, 8 bit microcontroller. RF module used as transmitting and receiving unit. We choose RF module used because it is wireless, accessibility is fast and less time is wasted, accuracy is greater than 99% and cost is effective than running cables. The car was sensed by

using IR sensor. This sensor detects car by using principle of photo-emission of IR LED. In this project we proposed following working: Interface RFID module for sending message to microcontroller, Interface LCD display to display the vacancy of slot location, Interface alcohol sensor to detect person drink or not, Interface buzzer to alert the person drink or not, Interface IR sensor to detect car.

## II. LITERATURE REVIEW

RFID technology has several applications in extend beyond the retail sector. RFID tags are embedded in passports for security and personal identification in ID cards to control access to buildings. Tags are used for electronic payment for transportation system and other payment systems, for example credit cards and smart cards. It has several medical uses including tracking of new born babies in hospital, storing information of surgical patients, procedures, and tracking medical equipment.

RFID systems used in toll collection, transport payments and logistics management systems by using conventional RFID system. When the capability of RF communication is accurately analyzed, it can be seen that there are more possibilities beyond that. After considering the characteristics and behaviors of RF communication, it is possible to design some new applications that improve the safety, security, comfort-ability, and productivity in eco-friendly manner [8].

Automated Vehicle Identification process determines the identity of vehicle. At the toll gate there is limited number of gates facilities. So creates many problems. In this AVI system, barcodes are fixed in each vehicle which is read by objective tag on toll booth. This system is closely related to Vehicle Classification System. The Vehicle Classification System used for different types of vehicles had different charge rate at passing through toll facilities but it is limited users, more variety of sensors used to provide the presence of vehicle. Violation Enforcement System used for reducing unpaid toll or used to determine toll violaters. In this system, number plate recognition is done in form of image [6].

This car parking security system is developed with the help of microcontroller and RFID technology. Existing applications are using conventional RFID tags and store only a unique number and the data related to the tag is taken from the proprietary databases. Though the RF tag can play a big role to achieve safety, security, productivity and comfort ability in our project, current usage of them is not up to the maximum possibility due to many reasons. If user used RFID technology with one more important design that is car parking security system.

The RF tag can play a vital role to achieve safety, security, productivity and comfortability. The importance of RFID system is that, it gets verification from the Road Transportation Office (RTO). The user will require an authentication to get proceed to the thumb registration module by which the efficiency of thumb is enhanced using Pattern Matching Algorithm (PMA). Face recognition system is a technique in which will be used after the thumb registration system. At the last, this system allows the user to drive the car and for emergency, a key insertion slot will be placed in this system through which user can insert the key. In emergency mode of operation the camera captures the driver's image and sends it to the owner's mobile as Multimedia Messaging Service (MMS) and the owner will provide the authentication password. Global System for Mobile communication (GSM) module is kept inbuilt for tracking purpose [8].

The system used contactless smart card to limit the entries of unwanted persons. Contactless smart card has information stored in which when come in the field of RFID reader it reads the information stored in the card. Reader recognize information and match with the information stored in it. If this reader has the information about card it will allow the card user to enter in area. If reader does not find information in tag in its memory it will not allow. [1]

### III. METHODOLOGY

In this section RFID systems operates from very low frequency(VLF) to extremely high frequency(EHF). RFID system operating in low frequency range make use of electromagnetic wave propagation to communicate their data, these use passive tags.

#### A. OPERATING PRINCIPLE

RFID systems operating in low frequency range operates on principle of near field coupling between tag and reader. In operating principle of RFID, Faraday's principle of electromagnetic induction is the basis of near field coupling [3]. In near field RFID system, electromagnetic waves are transmitted by reader or interrogator which propagates outwards with spherical wave front. Tags placed within field collect some energy. Then exchange of data between tag and reader takes place. The amount of energy available at any particular point is related to distance from the transmitter as expressed as  $1/d^3$  [3] where d is distance from the transmitter.

### B. BLOCK DIAGRAM

When RFID card is inserting, RF module uses Radio Frequency (RF) transmitter which is single bit transmitter. It works on 433MHz frequency. With the help of antenna, RF transmitter convert electrical signal into electromagnetic signal. At the receiver side, RF receiver used to convert Electromagnetic (EM) signal into electrical signal. Then when signal go to microcontroller execute the program and transmit signal for display on LCD. Alcohol detector used if person is not drinking then buzzer is off and person take drink buzzer is on. Buzzer used in this project is piezoelectric buzzer.

When capacity of parking system is 5 vehicles, it shown on LCD and also shows the vacancy of the slots. Car sensor used is IR sensor which works on the principle of photoemission. Then its output is given to comparator. Comparator compares sensed output with predefined threshold level. At the exits gate and entry gate there is IR sensor and this sensor sense the car and open the gate.

### C. HARDWARE SYSTEM

#### 1. Microcontroller 89c52:

The 89c52 is commonly used microcontroller have 8K byte programmable flash memory. 89c52 has the less complex features, easily available and cheap in comparison of other microcontrollers..

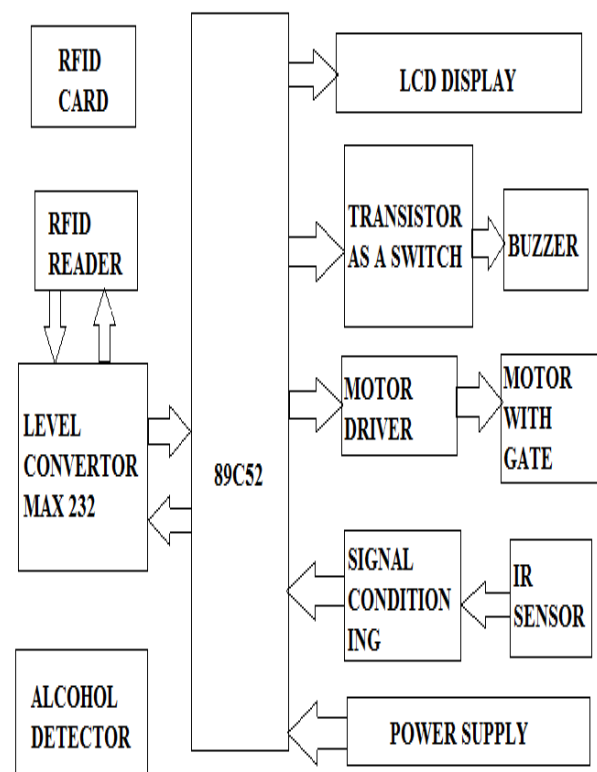


Figure 1. Block Diagram of RFID car parking security system

### 2. RFID-Card:

RFID card is composed of a microchip containing identifying data which is single binary bit or large array of bit and an antenna that transmits this data wirelessly to reader. We use passive tag have no their own power source. At its most basic, the chip will contain a serialized identifier, or license plate number, that uniquely identifies that item, similar to the way many bar codes are used today.

### 3. RFID-Reader:

It work as transceiver. RFID card is comes in contact of the RFID reader placed at entrances. Reader is electronic device which is produce electromagnetic field. With the help of electromagnetic field it provides power to the tag to read the stored information. When the transponder Tag draws power in this way the resultant interaction of the RF fields causes the voltage at the transceiver antenna to drop in value. This effect is utilized by the Tag to communicate its information to the reader. The Tag is able to control the amount of power drawn from the field and by doing so it can modulate the voltage sensed at the Transceiver according to the bit pattern it wishes to transmit.

### 4. Motor Driver IC L293D:

It is 16 pin quad push-pull drivers and delivering output current to 1A per channel. It is dual pair bidirectional motor driver IC. It is available in 16 pin Batwing dual in package DIP packages. Each channel is controlled by Transistor Transistor Logic (TTL) compatible logic input and each pair of drivers is equipped with an inhibit input which turns off all four transistors.

### 5. Level convertor (MAX 232):

It is 16 pin IC .It is used as a level convertor. As AVR uses Transistor Transistor Logic (TTL)/Complementary metal oxide semiconductor (CMOS) levels and Global service for mobile (GSM) works on RS232 standard. So to establish link between them we use MAX232. MAX232 uses 2 drivers. Drivers are used to convert TTL/CMOS levels into RS232 levels. Receivers are used to convert RS232 levels into TTL/CMOS levels.

### 6. Infrared (IR) sensor:

For sensing the car we are using LTH1550 sensor. This sensor has IR transmitter and IR Receiver. IR signal use to detect the car by measuring intensity of reflected signal. By using this sensor and its related circuit diagram we can control the gate of parking system.

### 7. Alcohol detector:

MQ-3 gas sensor use here, which is having high sensitivity of alcohol and conductivity is also higher. Alcohol detection rang is 10~1000ppm.

## IV. EXPERIMENTAL RESULT:

Top view of hardware of RFID based parking security system is shown in figure 2, when RFID reader and passive tag are the main components used and each passive tag has different serial number stored in microchip inside the tag [4]. The serial number is given by manufacturer. We have stored serial number information in programming; we have used here six passive tags. Corresponding to each serial number, stored flat number allowed to enter the parking area.

When press the enter switch, LCD display "RFID card please." After place there card in field of reader then LCD display "card ok and allow" to park then door is open it show in figure 4 and LCD status for the condition one car is park which is shown in figure 3. At the exit gate IR sensor gives signal to controller and LCD display " exit is allow" which is shown in figure 5.

Two cards are invalid. When this card will be shown on door does not open and "access denied" message is displayed in LCD display [5]. This system also shows the person is take alcohol or not with the help of alcohol detector.

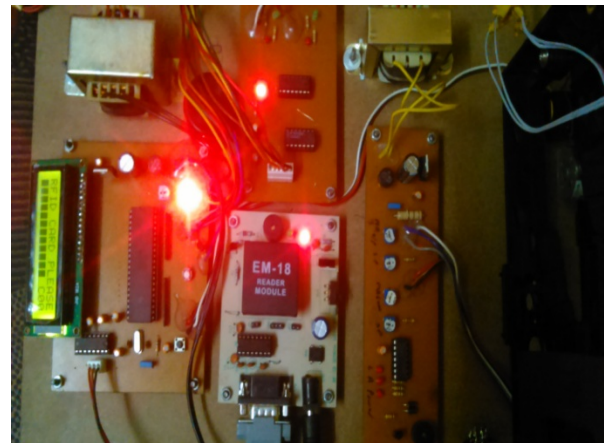


Figure 2. Top view of hardware of RFID based parking security system.

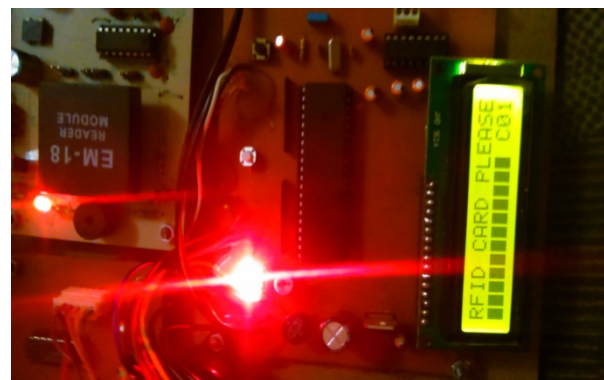


Figure 3. LCD status for the condition one car is park and ready to next one car.



Figure 4. LCD displays shown card is ok and allow to park

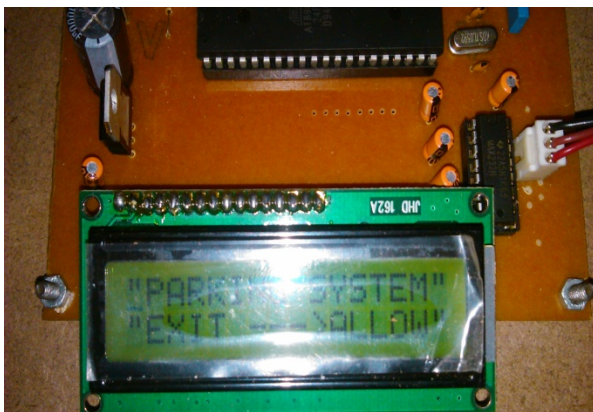


Figure 5. LCD displays allow to Exit

## V.SYSTEM DESIGNNG FLOW

Steps:

- I. START.
- II. User RFID tag sends it code to RFID reader.
- III. RFID reader decodes data.
- IV. If RFID code is match then entry of that person is accepted otherwise entry will be rejected by the system.
- V. Alcohol detection test.
- VI. If test is positive , entry reject and
- VII. If test is negative, Entry accepts.

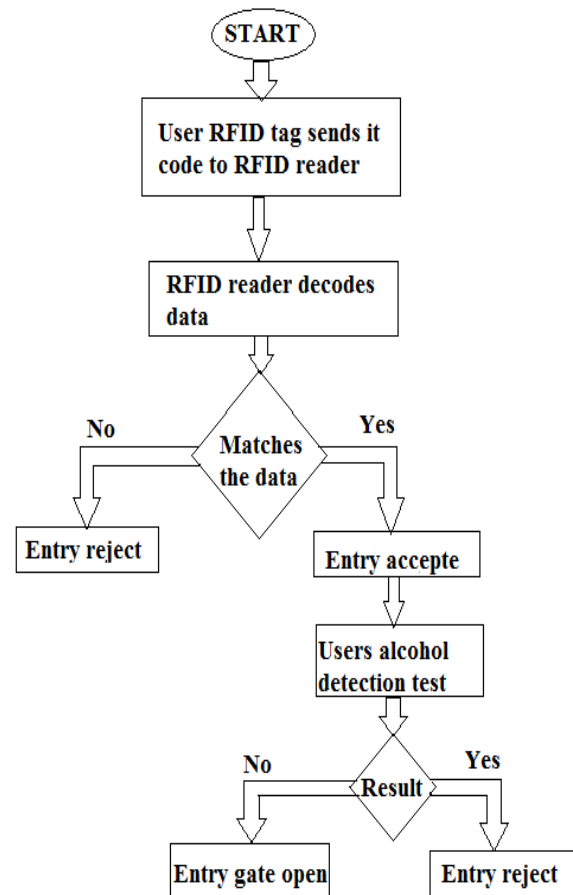


Figure 6. Flowchart of project system

## VII. CONCLUSION

This project utilizes the password by RFID card and then the cars are park at the particular location. The system will provide excellent security, avoid accident in parking area and get accurate information about parking. This system aims at saving a large amount of man-hours caused by problems those are created in parking area, where prevention can save lives and property. By using project we can avoid the robbery. We can also reduce the congestion of the traffic in parking area as well as the vehicle thefts. We can create project using electronic devices, hardware, real time application and software knowledge.. RFID is increasingly used as biometric technologies for security purpose. The advantage of all types of RFID systems is the non-contact, non-line-of-sight in nature of the technology. Hence, this project can be useful and can be implemented in real time applications for recording the attendance. By integrating both RFID and microcontroller generates a project with wider boundaries and effective solutions. The system can be improved by increasing the range of reader in which the tag can be read. Improvement can be done by using this system in which the tag encrypts its ID and then sends to the RFID reader, which will eliminate the capturing of the tag IDs and hence cloning the tags. It offers a valuable detailed database records and preference to developer and investigators. The RFID based security system could plays important role in

providing sensitive environments at low cost. In future this system we can develop by using PIC and Advance technology, by installing camera. user can make it simpler and If RFID card is loss then block the service of that card and give new card immediately then we can improve the range of reader. As we know that the work of thumb registration system and the face recognition module are in progress. We will extend its security for the human beings to safe guard their valuable life from accidents. These ideas will be implemented in future.

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