Design of RFID Car Parking System

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ABSTRACT

As we can see that in today's life number of vehicles are increasing day by day so to park those vehicles demand for parking is there in a secured and effective way so to overcome this problem in urban and semi-urban cities there is a need to design a parallel parking. Parking cars instead on road one person will be able to park car rapidly in a parking lot.

In this paper a solution is there to solve the problem encountered regarding parking lot management that is by the help of RFID TECHNOLOGY. RFID Technology is the one which is effective and much more safer .RFID System is used to help parking of car automatically in the parking lot. RFID System uses RFID Tags, Reader makes it easier for 'in' and 'out' of parking subscribers. Personal cost will be reduced using the technology. It will be possible in future to make unnamed, secure and atomized parking-lots functioning with RFID technology. Check-in and check-out of car will be handled in a much faster manner as driver will show his RFID Tag car to reader through which automatically balance will be deducted from card and car will be made to get in the parking lot. This helps in increasing security and ticket jamming problem that occur at parking area when a person used to park car in parking area.

Keyword:- Multilevel Parking Entry Gate, RFID Tags, RFID Reader, Microcontroller.

1. INTRODUCTION

If parking is done at the road sides of the street it consumes more timing during parking traffic jam is created which kills the time of a person. To occupy a space for parking it is another problem as high prices of land. To overcome such problem we can use multilevel parking using RFID Technology. In such multilevel parking a lift is installed through which after car entered in parking area is sent to a proper parking lot which is free to retrieve car lift is used. RFID is here used to reduce manual work and to increase the security of parked car in the parking lot.

RFID is much more preferred in parking management due to its various features that gains attention as its good transmission range, high speed detection.

There are several techniques that can be used but among them RFID is much better.

Bar code Technique

Bar Code is technique that is most commonly used in day to day life. This is a technique that uses twelve digit identification numbers for data collection. It is most commonly used in departmental stores where a track of items is to be made as barcode is placed on each item in the departmental store. It is normally used in departmental stores to make the checkout process faster & to keep a track on the items. It is the technique slower than RFID but its cost is much lower. Bar codes are read only where as RFID is read/write.
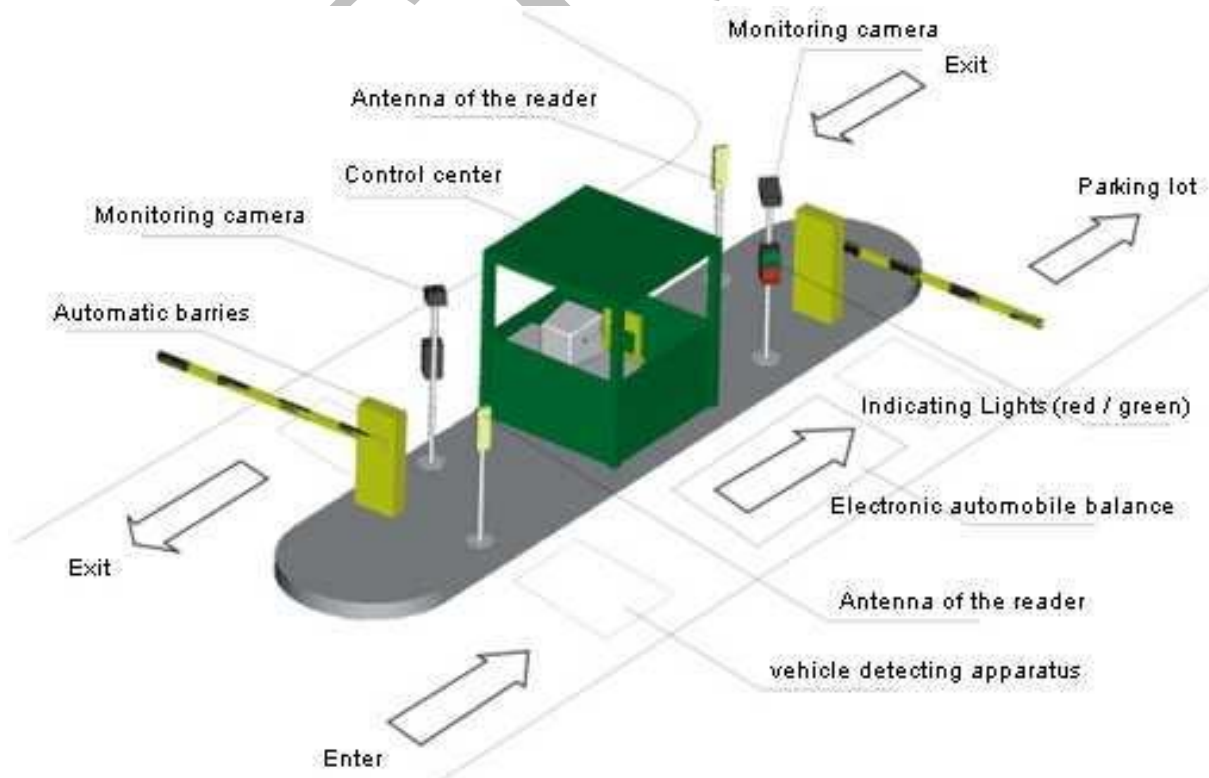
NFC Technique

NFC is a subset of RFID, It is provides security to a greater extent as compared with Barcodes & RFID. NFC has limited range of communication to within centimetres or 2-4 inches. It is possible to replace the manual nature of the check out process. Staff at the checkout would require to swipe each NFC tag as they are doing in bar codes. The RFID uses electromagnetic energy as a medium to send information. RFID is implemented in pet's identification. A tag is fixed in the object that is to be tracked.

Further the paper is divided in various sections as Section 2 tells us about RFID system and its uses Section 3 & 4 tells about the block diagram of RFID system model and finally Section 5 defines about the conclusion of paper and future direction.

2.   RFID OVERVIEW

RFID is a radio frequency identification system. This is an ADC technology. The RFID system is much faster, reliable and do not require any physical contact between tag and reader. RFID is automatic identification method wherein the data stored on RFID tags or transponders is remotely retrieved. RFID is a technology that uses electromagnetic or electrostatic coupling in radio frequency (RF) portion of electromagnetic spectrum to uniquely identify an object, animal, or a person. RFID technology is much more advanced to magnetic card, bar code. An RFID system consists of three components i.e. RFID TAG, RFID READER and an ANTENNA. RFID tag can be read from a distance, right through your clothes, wallet, backpack or purse. RFID TAG consists of a UNIQUE ID for each tag.

RFID SYSTEM has two configurations: - one is a Passive Reader Active Tag (PRAT) system and another is Active Reader Passive Tag (ARPT). The RFID tag includes a small transmitter and a receiver.

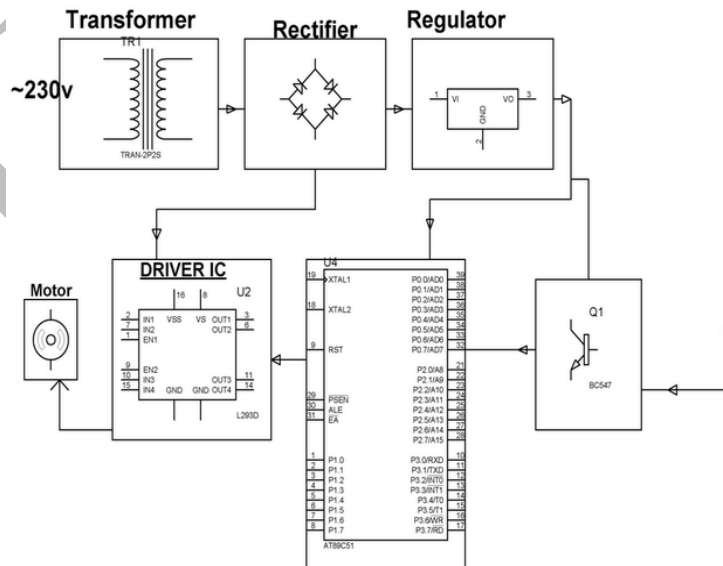**A DIAGRAM OF RFID CAR PARKING SYSTEM**

3.   SYSTEM OVERVIEW

For the design of this system model as we have discussed earlier a RFID tag and a RFID reader is used. In this system the owner of car will have a card with RFID tag or tag being installed in the cars. At the entrance of the parking lot gate a reader is fitted with a antenna so that the tag may be readied accordingly. When the car has to park in the parking area the RFID tag is placed near the RFID reader which is installed near the entry gate of the parking area. As soon as the tag is read by the reader, system automatically verifies the data if the data is authentic the car is allowed to enter the parking area. At the same time when car enters the parking lot the balance in RFID tag is decreased and parking counter increments by one. Similarly when car exit the counter is decreased by one. There are some precautions that are to be taken while designing the project as program errors may occur. Further if a car tries to check-in and parking lot is full then it is not allowed to enter the parking area.
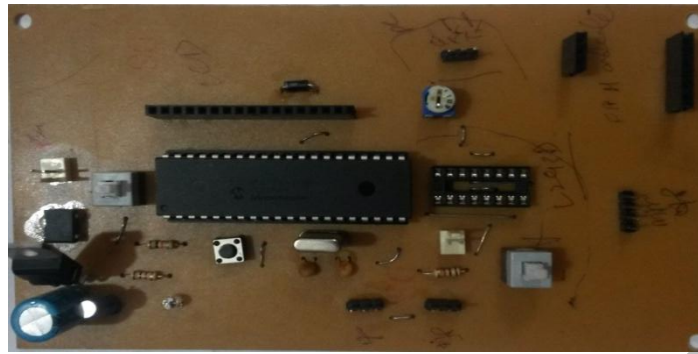
Figure showing how RFID TAG attached in a vehicle.
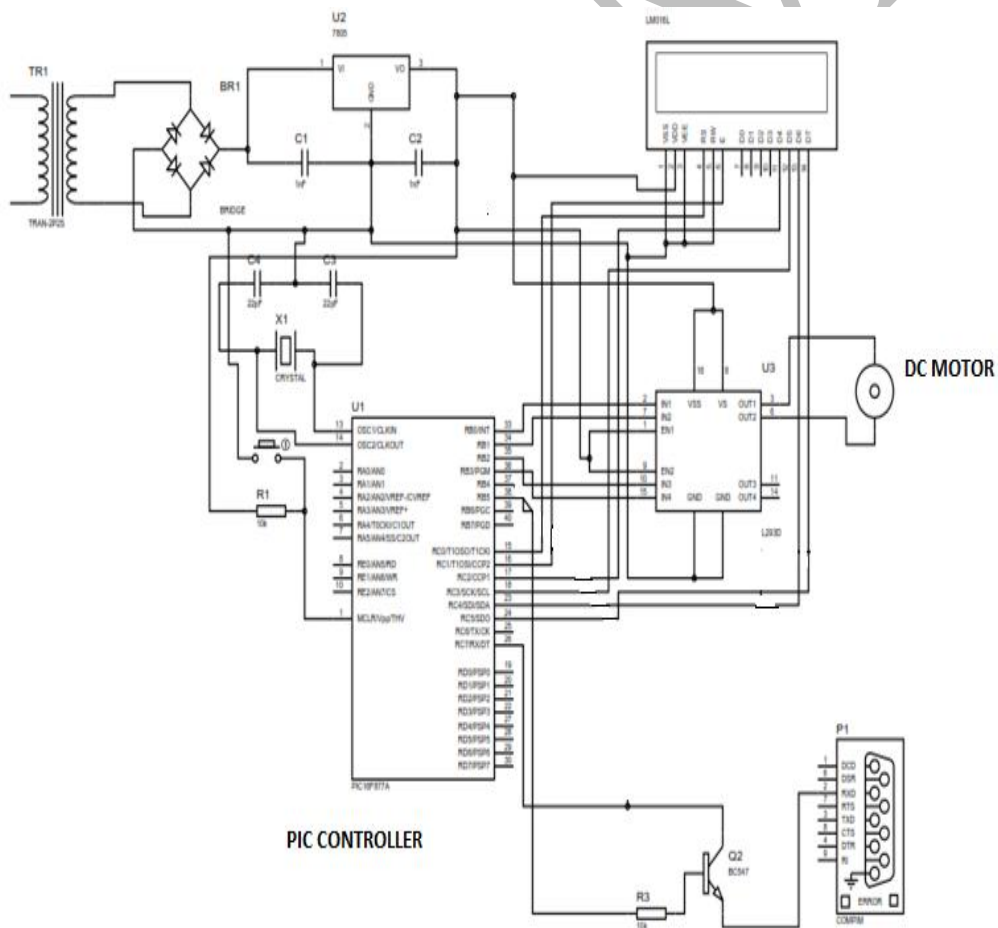

RFID TAG ATTCAHED IN A VEHICLE

4.   BLOCK DIAGRAM

ARCHITECTURE

5.   CIRCUIT DIAGRAM

6.   CONCLUSION

The system model proposed is successfully created and tested. In this a car with tag is permitted to enter the parking lot else a car with no tag or invalid is made to be restricted for the entry in the parking lot.

The process of accessing the vehicle ID will take time in microseconds. Hence this is a less time consuming technique. The proposed system results a reliable parking solution in big cities where less space available for parking. This system replaced the conventional parking along the sides of streets with a multi-storey parking solution. Hence the problems like traffic jam, less security etc during parking are minimized.

FUTURE IMPLEMENTATION to this system is to enhance its security as when a car is stolen from parking area how it can be tracked and how it can be prevented from parking area to get steal by thefts.

REFRENCES

1. Microchip INC, "PIC16F87X Datasheet" www.microchip.com
2. D.L.Almanza et al, "Design and implementation of a vehicular access control using RFID", MEP 2006, Guanajuato, Mexico, PP 223-225.
3. Shih-chung Tuan "Research for RFID Tag implementation in vehicle environments".
4. Abdulshkbaz" Implementation of embedded system using RFID and alcohol sensor at the toll plaza".
5. Zeydin pala "utilizing RFID for smart parking applications".