

Smart and Secure Car Parking System

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ABSTRACT:

In big residential areas parking usually causes serious problems. As the number of vehicles are increasing, the problems faced by manual parking management systems are also increasing. This problems can be eliminated to some extent by implementing a smart parking system where the RFID technology is used to get access of parking slots. This is an IOT based system which is prototype of an automated parking system targeted to ease parking mainly in residential areas where the number of cars to be parked are in 1000's of count. The concept is initially aimed at usage of parking slots where authorized/residential users can park their cars. Each user is provided an RFID card for accessing the parking lot at entrance as well as at individual slots. The main controller used is Ardiuno Uno. Users can park their car in only the reserved slot. A website is designed using THINGSPEAK which is an IOT platform where entry and exit is monitor.

Key Words: Ardiuno Uno, IOT, RFID Tags, RFID reader, THINGSPEAK .

I. INTRODUCTION:

During the era of ever growing Civilization, there is inconvenience regarding parking and safety of vehicle. Henceforth, many times user ends up with sacrificing the security of car when the parking slot is not available .To focus on the earlier issue, the proposed system, uses RFID technology to develop a smart and secure parking to each and every resident of the building and also is available with the guest parking slots. The integration of RFID and IR sensor technology has enhanced the security level in parking areas and can avoid theft. We aim to implement “**Smart and secure car parking**” that can be used to eliminate the inconvenience caused by manual operation in parking system and also to offer safe and secure parking slots within authorized areas The purpose of our system is to develop smart and secure car parking system to avoid disturbances at residential areas, that can be caused when someone else parks his/her vehicle in parking slot which is allotted only for the residents of that building.

II. BLOCK DIAGRAM:

Here the main controller is Arduino unoAtmega(328p). When the car is approaching to the main gate RFID reader attached on windshield will get detected and if user is registered then access is granted and information regarding the vehicle and owner is displayed on webpage and for guest user , he /she has to go through one time registration process . At the individual parking slot the RFID

scanner will again detect the RFID tag present and will grant access.

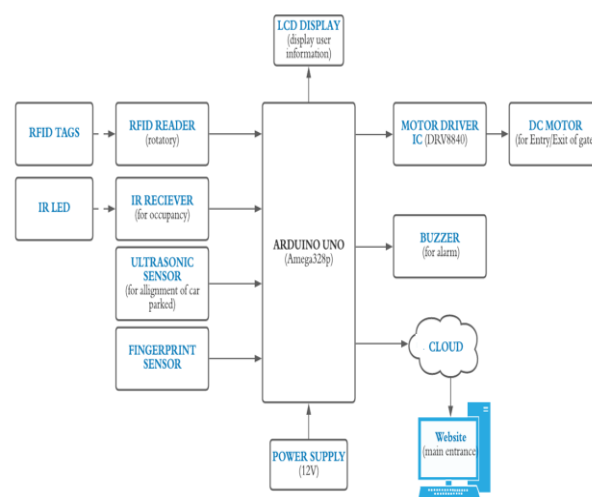


Fig:1 Block diagram the system.

Also the ultrasonic sensor present will check the proper alignment of car when parked and if not then buzzer will give alert that car is not parked properly. The infra red (IR) module is to check the availability of parking slots and to monitor the occupancy of particular slot. The fingerprint sensor will give access to exit point. All the user information will be displayed on LCD screen. All the data will be transferred to main guard room via Wi-Fi module.

III. FLOW CHART:

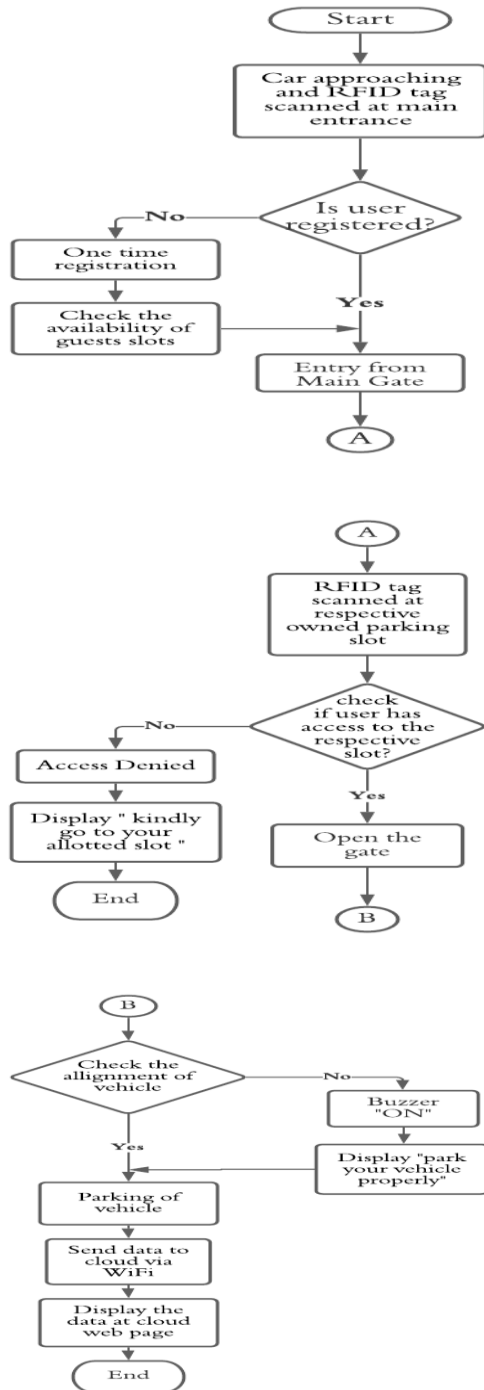


Fig: 2 Flow chart of the system

IV. ARCHITECTURAL MODEL:



Fig: 3 Architectural model.

V. CIRCUIT SIMULATION:

In this we have simulated a module of our project, where in RFID based entry and exit is monitored .

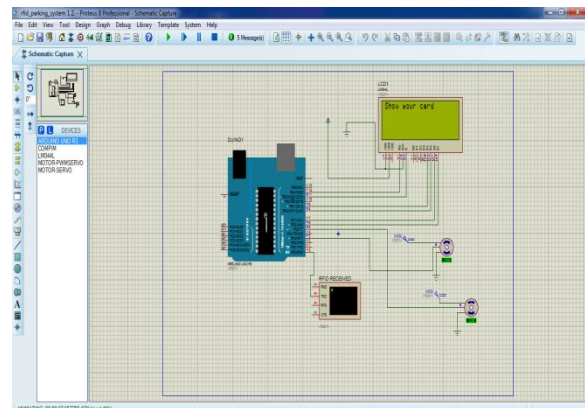


Fig: 4(a) Simulation setup.

Case I: When Car of Registered User A approaches to the gate

In this case when **user A's** car approaches, then RFID Tag attached on windshield is detected and RFID scanner scans and decodes the data and sends to controller, controller compares the data and if user is registered then access is granted.

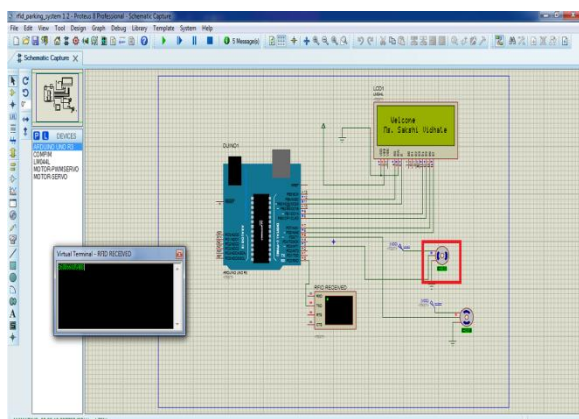


Fig: 4(b) User A approaches to gate.

Case II: When Car of Registered User B approaches to the gate

In this case when **user B's** car approaches, then RFID Tag attached on windshield is detected and RFID scanner scans and decodes the data and sends to controller, controller compares the data and if user is registered then access is granted

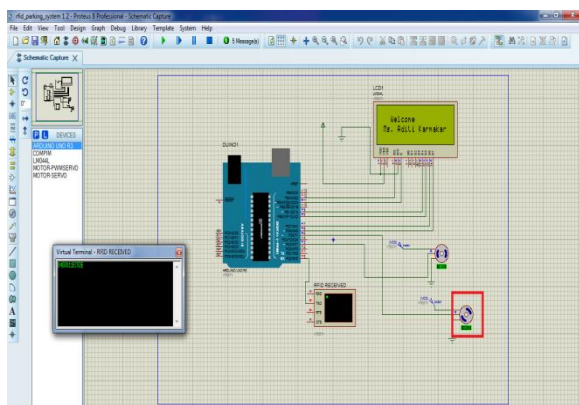


Fig: 4(c) User B approaches to the gate.

Case III: When Car of Unregistered User approaches to the gate

In this case when **user C's** car approaches, then RFID Tag attached on windshield is detected and RFID scanner scans and decodes the data and sends to controller, controller compares the data and if user is unregistered then he/she has to go through one time registration and a guest slot available is allotted, again RFID scanner scans, decodes, compares data & then access is granted. Thus, it can be concluded that an RFID-based parking system will provide an effective solution for parking facilities.

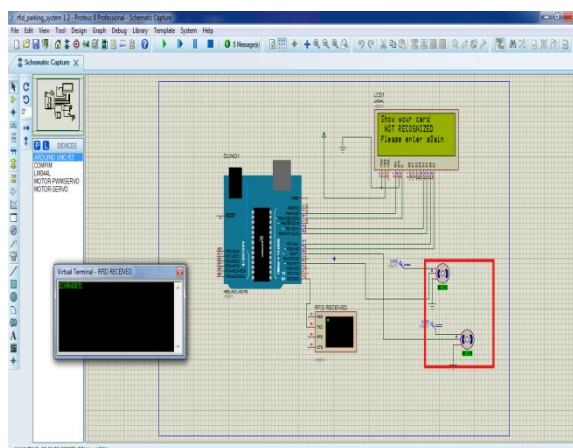


Fig: 4(d) Unregistered user approaches to gate.

VI. CONCLUSION:

The proposed system is sustainable in terms of social, economic and environmental factors. By the implementation of this system the risk factor regarding the theft of vehicle can be eliminated fully in the big cities and residential areas where flats are in 1000's of number. Other features includes real time monitoring of parking space and slots are known in advance to registered user which saves time.

This project can be enhanced for tracking the vehicle speed on the roads and Video surveillance can be implemented. Also if the user is ready to spend, then motion based camera can be implemented in the system and application can be developed to give the real time status of the vehicle parked.

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