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Smart Car Parking System

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1.Abstract

The main objective is to avoid the cramming in the car parking area by implementing an efficient car parking system along with a user-friendly application for an ease of use. Normally at public places such as multiplex theatres, market areas, hospitals, function-halls, offices and shopping malls, one experiences the discomfort in looking out for a vacant parking slot, though it's a paid facility with an attendant/ security guard. The parking management system is proposed to demonstrate hazel free parking. The proposed system consist of 4 IR Sensors , Arduino UNO , NodeMCU ESP8266 Module , RFID Reader and Tags , Buzzer. Implementation involves minimal human interaction and provides a seamless parking experience thereby reducing a lot of time wasted by the user in parking his/her vehicle.

2.Introduction

Nowadays in many public places such as malls, multiplex systems, hospitals, offices, market areas there is a crucial problem of car parking. The car-parking [1-4] area has many lanes/slots for car parking. So to park a car one has to look for all the lanes. Moreover, this involves a lot of manual labor and investment. So, there is a need to develop an automated parking system that indicates directly the availability of vacant parking slots in any lane right at the entrance.

It involves a system including IR Sensors- receiver pair in each lane .So the person desirous to park his vehicle is well informed about the status of availability of parking slot. Conventional parking systems do not have any intelligent monitoring system and the parking lots are monitored by security guards.

A lot of time is wasted in searching vacant slot for parking and many a times it creates jams. Conditions become worse when there are multiple parking lanes and each lane with multiple parking slots. Use of parking management system would reduce the human efforts and time with additional comfort. In the proposed system, the display unit displays a visual representation of the parking and it shows the empty and occupied slots which help the user to decide where to park their car. The system would not only save time but the software and hardware would also manage the Check-in and check-outs of the cars under the control of RFID readers/ tags, Entry exit data logging.

3.Problem Statement

Nowadays in many public places such as malls, multiplex systems, hospitals, offices, market areas there is a crucial problem of car parking. So to park a car one has to look for all the lanes. Moreover, this involves a lot of manual labor and investment.

4. Proposed Methodology

It proposes a prototype of Smart Car Parking System. There will be an RFID Tag with every user. As soon as the vehicle passes through the entrance the user puts RFID tag over the RFID Reader and gets the Unique ID and then gets entry inside the parking lot.The sensor used in this project is an IR sensors which determines whether the slot is occupied or unoccupied. These sensors are connected to the NodeMCU ESP8266. The output of these sensors is sent to the database through the NodeMCU ESP8266. Each second Firebase database is updated with latest values from IR Sensors. This result is displayed using the Mobile Application.

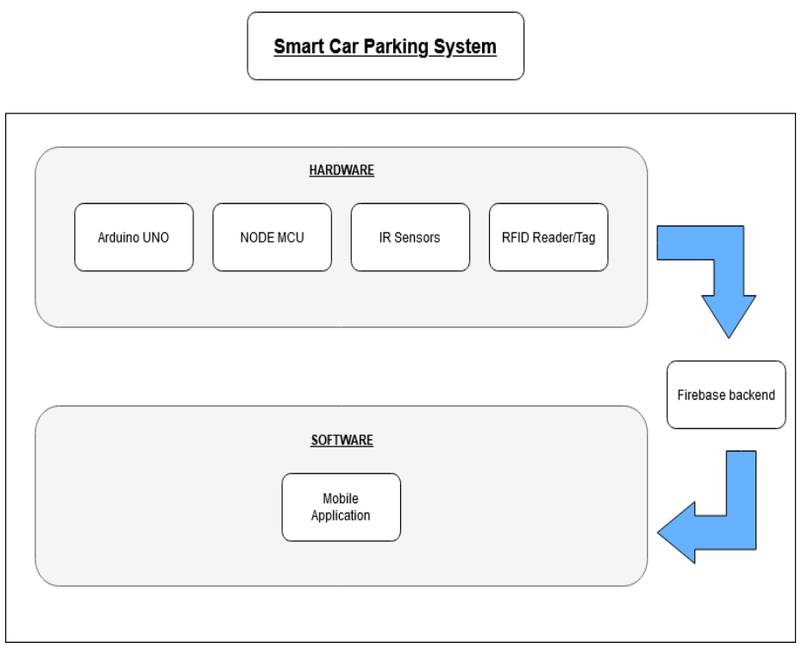

Figure.1: Block Diagram

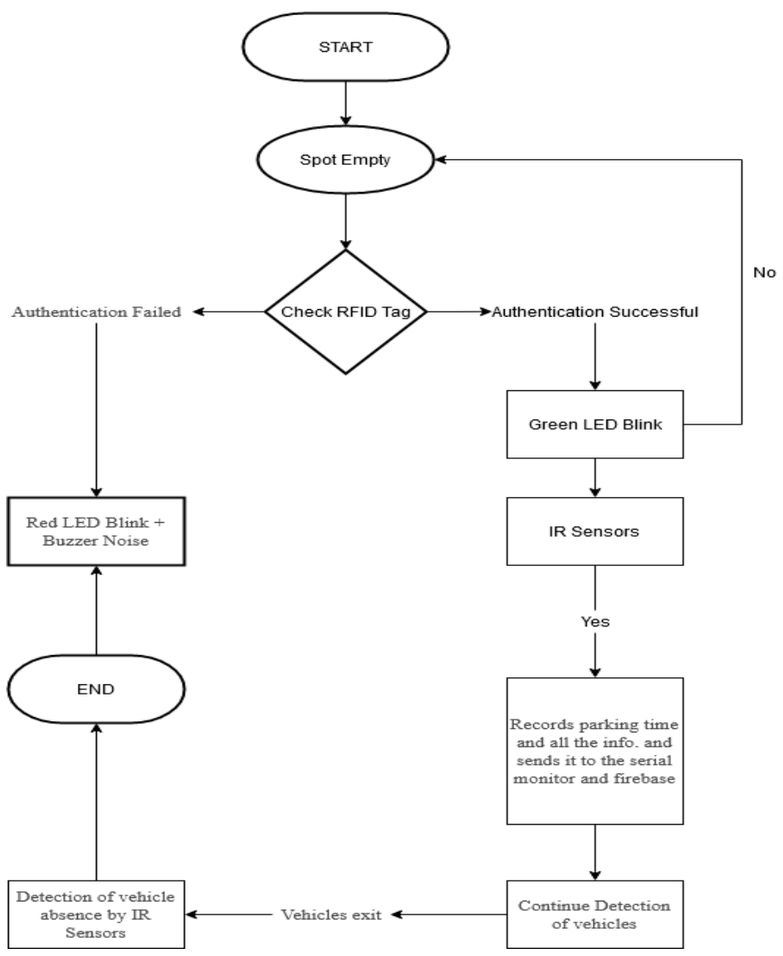

Figure.2: Flowchart

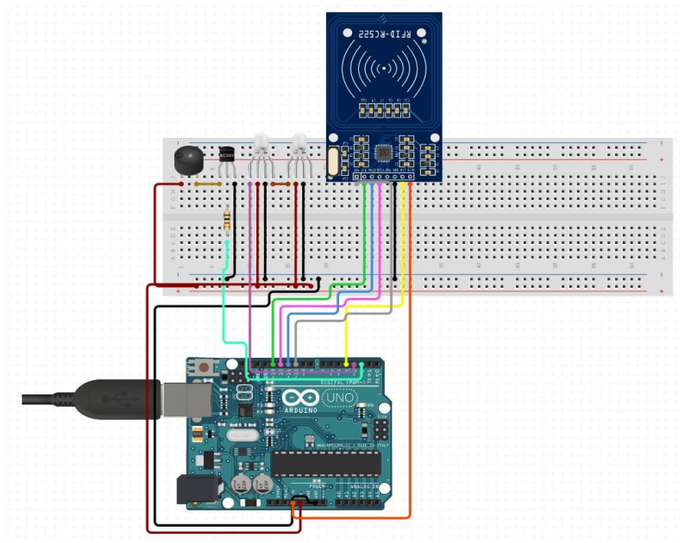

Figure.3. RFID Module

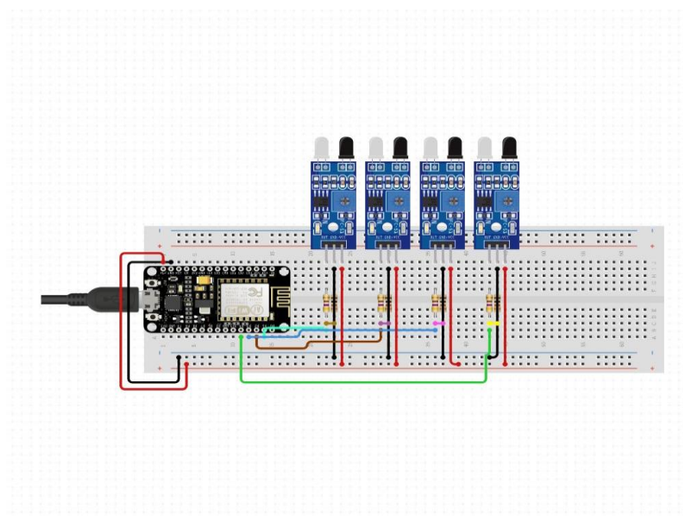

Figure.4. IR Sensor Module

5. Algorithm

1. Check RFID Card / Tag.
2. Give permission to enter on the basis of RFID authentication.
3. Check for empty parking slots.
4. Detect new vehicle entry.
5. Count the parking time.
6. Send this data to firebase.
7. Display real time data on application.

6. Conclusion

The main aim is to design an integrated system which involves two components namely Parking Allocation and Seamless Parking. The Parking Allocation component consists of sensors in front each slot and when a vehicle enters into the slot, the database is updated and the changes are reflected immediately on the Mobile Application. The seamless parking component consists of a RFID Tag with user. It will save the time of human intervention and saving an ample amount of time. The IR senses the presence of a vehicle in the parking slot and updates the database. We have made an android application.