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SAGE PARKING SYSTEM USING IOT

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Abstract - *Each and every vehicle ride/trip ends in a parking situation. Truly, when one arrives at a destination by any motor vehicle one of the worst experiences is of parking, this gives parking problems ad solution. Therefore we provide solution of parking using "SAGE PARKING SYSTEM USING IoT". In this we are using raspberry pi, sensors, Wi-Fi module, RFID detector etc. using this anyone can find parking space via message on his/her mobile.*

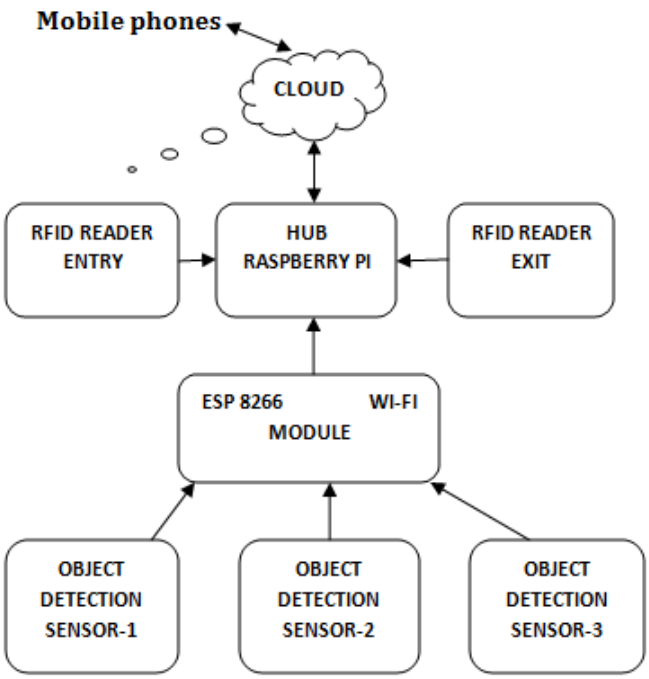
Key Words: IoT(Internet of things), Sensor, RFID detector, Raspberry pi, Wi-fi module

1. INTRODUCTION

In the development of traffic management systems, an intelligent parking system was created to reduce the cost of hiring people and for optimal use of resources for car-park owners. Currently, the common method of finding a parking space is manual where the driver usually finds a space in the street through luck and experience. This process takes time and effort and may lead to the worst case of failing to find any parking space if the driver is driving in a city with high vehicle density. The alternative is to find a predefined car park with high capacity. In recent years, research has used vehicle to vehicle and vehicle to infrastructure interaction with the support of various wireless technologies such as RFID, ZigBee, etc.

To resolve the parking problems and take the advantage of the significant development in technology, the IoT has created a revolution in many fields in life as well as in smart parking system(SPS)[1] technology. The present study proposes and develops an effective cloud-based SPS solution based on the internet of things. Our system constructs each car park as an IoT network, and the data that include the vehicle GPS location, distance between car parking areas and number of free slots in car park areas will be transferred to the data center. The SPS is based on several innovative technologies and can automatically monitor and manage car parks. Furthermore, in the proposed system, each car park can function independently as a traditional car park. This research also implements a system prototype with wireless access in an open source physical computing platform based on Arduino with RFID technology using a Smartphone that provides the communication and user interface for both the control system and the vehicles to verify the feasibility of the proposed system.

1.1 BLOCK DIAGRAM



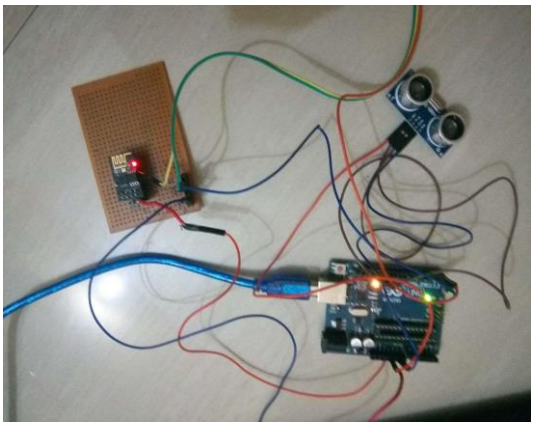
1.2 Procedure

1. User will log in the system and send request for parking via cloud[2]
2. Cloud will send the request to the hub
3. RFID sense the entry of vehicle and sent it to hub
4. It will sense the place of parking is empty or not. It will send this message to ESP8266
5. ESP8266 sends the sensor data to the hub, through which hub comes to know whether the place is empty or not.
6. Hub[3] then sends the message to the user about the area in which user has to park the vehicle
7. Whenever any vehicle exits the parking area, there is RFID sensor placed at the exit, and it will send the signal to hub that vehicle has left the parking area

2. SYSTEM METHODOLOGY

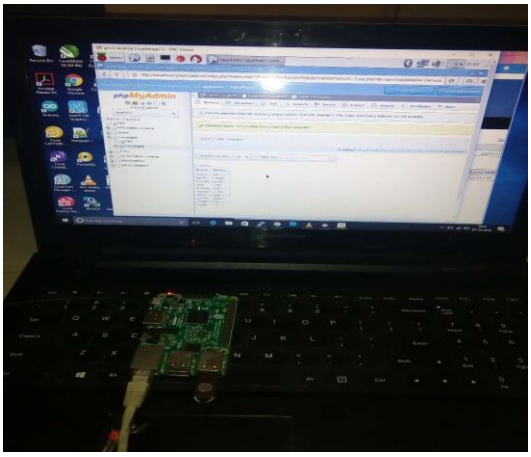
1. Interfacing of Ultrasonic sensor and Wi-fi Module to Arduino.

   - Sensor sense object and measure distance from object.
   - This data needs to be send wirelessly through arduino to wi-fi module esp8266



2. Creating Server Using Raspberry Pi

   - Using Raspberry pi, LAMP[4](linux, apache, MySql, PHP) server is created.
   - All entered data needs to be stored in server.



3. Creating Web page Using PHP.

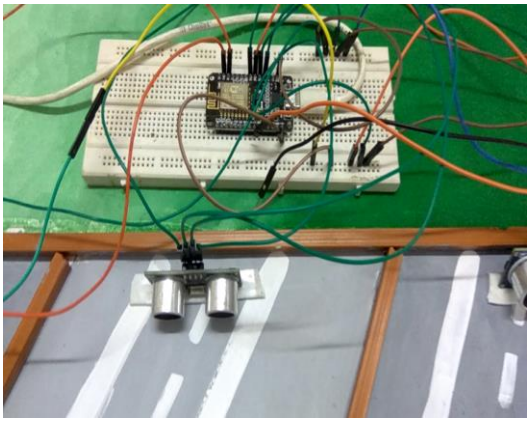
   - When car is enter in parking area at that time RFID detector detect that car and it is shown in that web page and also we can monitor the situation of parking area.

4. Interfacing of RFID with Raspberry Pi

   - When RFID tag is detected by RFID detector at that time gate is open and that data is come in raspberry pi.

5. Interfacing of Node MCU with Ultrasonic Sensor

   - Availability of space in paring is detected by Ultrasonic sensor, that data comes in raspberry pi through node mcu wifi module



3. WORKING STEPS

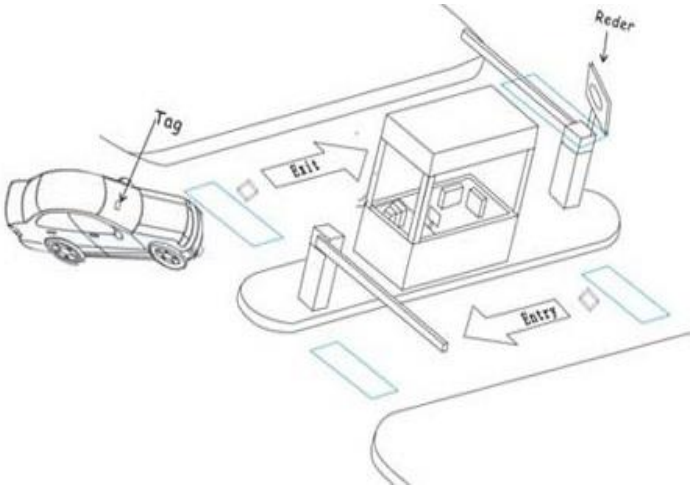
1. When user will enter into the parking area, at the entrance RFID reader will detect his/her presence by reading RFID card data. That data is stored into HUB.

2. Now in the parking lot object detection sensor will detect is there parking space available or not? And send that data to HUB using ESP8266 Wi-Fi module.

3. Now HUB which is actually Raspberry Pi analyze the data and give the response to user that at which location space is available to park vehicle via message on user's mobile using cloud.

4. At the exit another RFID reader is there, which will sense that particular user left the parking lot and sends the acknowledgment to the HUB

4. Functional Diagram according to Working:



5. Main Components Used:

5.1 ULTRASONIC SENSOR:

It is a type of proximity sensor. This sensor are designed to generate high frequency sound wave and receive the echo reflected by the target.

5.2 RFID reader:

Radio-frequency identification (RFID) uses electromagnetic fields to automatically identify and track tags attached to objects. The tags contain electronically stored information.

5.3 Raspberry Pi:

The Raspberry Pi is a mini-computer that plugs into a computer monitor or TV, and uses a standard keyboard and mouse. It is a capable little device that enables people of all ages to explore computing, and to learn how to program in languages like Scratch and Python

5.4 Esp8266:

The ESP8266 is a low-cost Wi-Fi chip or Module with full TCP/IP stack[5] and microcontroller capability

6. CONCLUSION

This concept is a single lined solution of many parking problems. The system which is the design and construction of the parking system for vehicles was designed considering some factors such as economy, availability of components, portability, etc. The operation and performance of the system is dependent on the presence of parking vehicles

7. FUTURE SCOPE:

1. If the person parks the vehicle in wrong section/area then buzzer will turn on.

2. If theft vehicle comes for parking then system will be able to detect it as system would have the information about theft vehicles.

8. REFERENCES

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