

Ingenious Car Parking System using IoT in Commercial areas.

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Abstract - With the proliferation of vehicles availability and usage nowadays, identifying a vacant space for parking is becoming more and more strenuous, causes a number of practical conflicts. This is about creating an expert system that takes over the task of identifying free slots in a parking area and reserve the slots for parking. This project reduces human effort at the parking area and makes the payment for the parking accurately when compared to payment by a security officer or any other person. The vehicle identification, free slot detection and payment calculation are the process executed in this system. Vehicle identification is done by using RFID, free slot detection is detected by IR sensor and the payment calculation is done on the basis of parking time.

Key Words: IR Sensor, RFID Sensor, Arduino, RFID Tag, Wi-Fi module.

1. INTRODUCTION

Car parking is a major cause of blocking and has been still a major problem with cramped parking spaces in urban cities. Searching for a parking space is a daily activity for many people in cities around the world. This leads to wastage of fuel every day. These complications will remain worse as the global population grows rapidly and slot identification by a human continues. Smart parking system detect the information about free slots in parking area in a commercial area. This process is real-time to place vehicles at available parking slots. It includes real-time data collection using sensors and the mobile payment process that allows people to reserve parking in advance.

2. EXISTING SYSTEM

In the existing system there is no automation or RFID used for parking slots. They are used to identify only the number of vehicles parked and the slots available using a web application.

2.1 Drawbacks

- ✓ Manpower is needed to identify the parking slot and calculate the amount for parking space.
- ✓ Time delay and fuel consumption is a drawback in manual car parking.
- ✓ Traffic congestion due to lack of accuracy in the parking area will be more complicated one.

3. PROPOSED SYSTEM

Proposed system is a user friendly where a non-technical person can use this application easily. Through this application user can search a free parking slot wherever he need. They provide well organized parking management through isolated parking spot localization. The reservation based car parking system has a limitation of space and time. Proposed smart parking system provides free slot identification efficiently and saves time and fuel that reduces atmospheric pollution and congestion in cities. IOT based Parking platform enables to connect and analyze the gathered data, and execute efficiently that makes smart parking possible. Smart Parking System is an important aspect to avoid the human effort and the congestion occurring, this system is completely based on Arduino board and sensors. whenever a person want to park their vehicle in parking area then they have to open this mobile application this will show the free parking slots available, the vehicle identification is done by RFID sensors and id is generated for that user. The RFID Tag is used to store the amount for making payment easily on the parking area. The IR sensor is used to detect the vehicle on the slot identified by the user and whenever they leave the slot the amount for that id is generated on the basis of amount of time the vehicle parked in that slot. When the user uses any slot for the next time the amount for that parking slot is updated in their id and the credit amount is reduced from the RFID tag for the payment calculated. The credit amount on their tag is valid until it has been completely used and the user have to debit the amount on their tag for making payment. When the

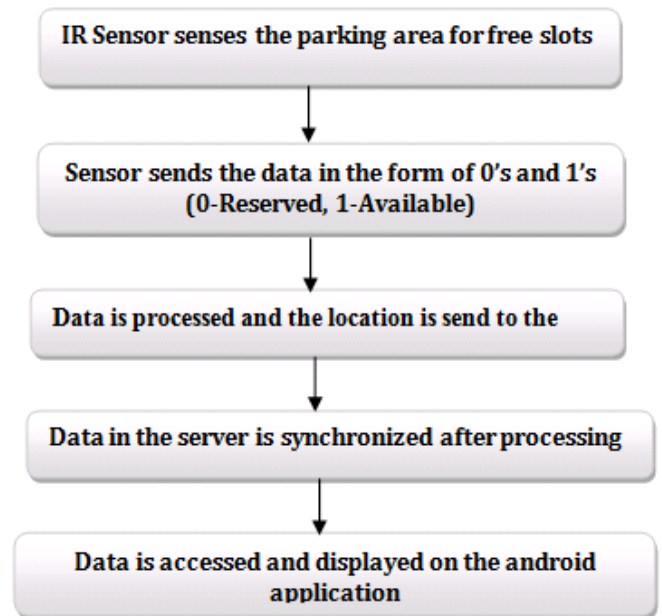
payment for the parking is not done by any user then the slots available in the parking area will not be detected.

3.1 Advantages

- ✓ The fuel consumption and time consumption is reduced.
- ✓ Automation is used to reduce the man power.
- ✓ Payment processing is very simple and effective.
- ✓ Sensing/detecting the parking slots is more accurate.
- ✓ Optimized usage of parking area.
- ✓ Helps to control the traffic in the city by leveraging IOT technology.
- ✓ Enables accurate results using data, including real time status applications and historical analytics report.
- ✓ Smart Parking act as an environment friendly system by reducing the emission of CO2 and other pollutants.
- ✓ Smart Parking enables better and real time identification and make use of available parking space.

4 . IMPLEMENTATION

The implementation contains collection of Sensed data by the sensor and processing the data gathered from the sensor. The implementation of project includes processing the data and detecting the empty slots for parking. The information is displayed on the mobile application. The following system flow is the procedure used to process the information

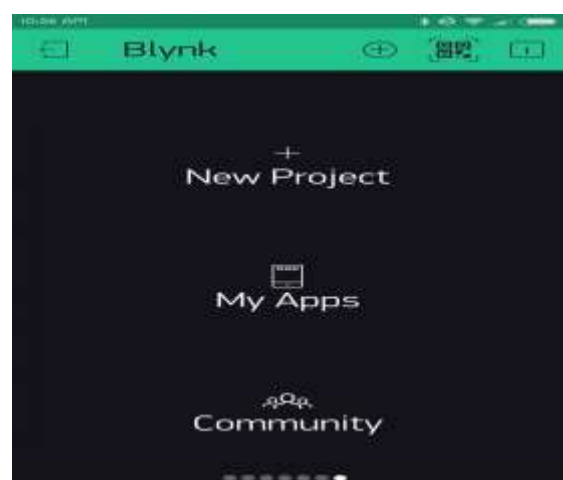


4.2 Mobile App

The mobile app used in this smart parking system is the Blynk App. It is a platform used to control the Arduino, Raspberry Pi which is used over the internet. The creation of dashboard is an easier one which includes dragging and dropping of widgets by the user. The wireframes are added to the app to monitor the activity of the Arduino. This app displays the detected result from the Arduino. The information about the slot is displayed in this app the white light represents the slot is available and the red light represents the slot is occupied. The user information and the payment calculated is also displayed on this interface.

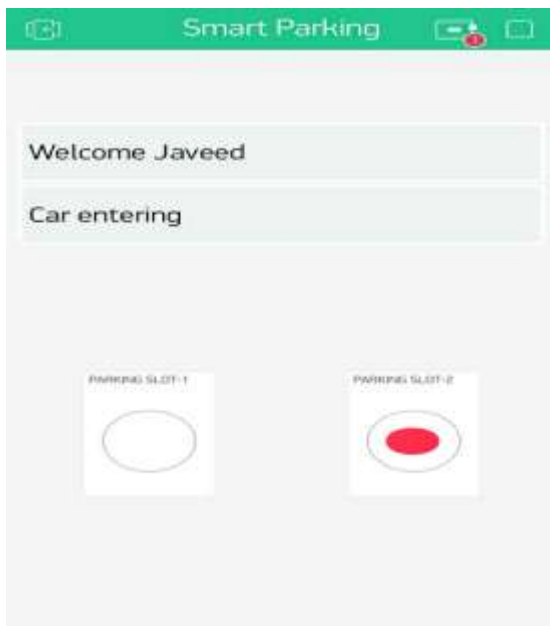
A. Creating a dashboard to display the parking information

The dashboard is created by clicking the new project and adding the wireframes to create a communication between the app and the Arduino board.



B. Displaying the slot information on the dashboard

The dashboard displays the information of slot availability and the slot number of the parking area. It navigates the user to the parking slot easily by displaying the slot number. The red light represents that the slot is unavailable and the empty circle represent the free slot. The owner information is also displayed on the dashboard with greetings.



5. MODULE DESCRIPTION

A. Free Slot Detection

The free slot is detected using the Infra-Red (IR) Sensors. The IR sensors are fixed in the parking slots to detect the free slot. They detect the object in infra-red waves that is reflected and covers a short distance. A pulse of IR light is generated by the IR Sensor and emitted by the emitter. The information detected will be send via WI-FI Module to transfer the data to the Arduino board and the results are displayed in the mobile app and in the LED Screen.

B. Vehicle Identification

It is assumed that each vehicle is built with the RFID tag and the vehicle is authenticated by RFID reader. The new user have to register to use these facilities and every user is provided with unique id which carries their information about the car and the tag holder. The authenticated vehicle will get the pass for the entry and the slot availability is displayed on their mobile. The tag contains the type and name of a car and the owners name and mobile number. The tag also carries the user bank account number and their details for making payment this information is authenticated to avoid hacking.

C. Payment calculation

The payment is calculated on the basis of vehicle parked time on the parking slot with arrival time and leaving time. The amount is generated and sent to the mobile via WI-FI module. The payment is calculated by the Arduino board by the information gathered from the sensors. The amount is reduced from the RFID tag when the vehicle leaves the parking area. This is done by using the RFID Sensor which reads the tag and process the payment for parking.

6. CONCLUSION

The problems of metro and cities, transportation mobility and environment sustainability is solved by the smart parking system. It also benefits in terms reduced cost and increases the revenues. Proposed system has developed from traditional system like toll-booth and parking attendants. It involves the use of IR sensor, Arduino, ESP8266 Wi-Fi Module and server. The IOT is used to integrate the hardware and software to make network connectivity that enables the sensing of objects and remote accessing. Such integration allows users to check the available and unavailable parking slots that lead to improved efficiency, accuracy and economic benefit. By using this application people can find the parking space easily with accuracy and avoid traffic in cities which saves the energy fules and peoples time.

7. REFERENCES

1. Hassan, Qusay; Khan, Atta; Madani, Sajjad (2018). Internet of Things: Challenges, Advances, and Applications. Boca Raton, Florida: CRC Press.
2. Reza Arkian, Hamid (2017). "MIST: Fog-based Data Analytics Scheme with Cost-Efficient Resource Provisioning for IoT Crowdsensing Applications". Journal of Network and Computer Applications.
3. Kang, Won Min; Moon, Seo Yeon; Park, Jong Hyuk (5 March 2017). "An enhanced security framework for home appliances in smart home". Human-centric Computing and Information Sciences.
4. Shannon Saunders McDonald, "Automated parking saves space in Tight Places" Achieved August 9, 2010, at the Wayback machine.
5. Wael Alsafery, B. A. (2018). Smart Car Parking System Solution for the Internet of Things in Smart Cities. IEEE, 5.
6. Rachapol Lookmuang, K. N. (2018). Smart Parking Using IOT Technology . IEEE, 6.
7. MohitPatil, R. S. (2014). Smart Parking System Based On Reservation. International Journal of Scientific Engineering and Research (IJSER), 6.

8. Vishwanath Y, A. D. (2016). Survey paper on Smart Parking System based on Internet of Things. International Journal of Recent Trends in Engineering & Research (IJRTER).

9. Dr. V.Kepuska, H. A. (2016). Smart Car Parking System. International Journal of Science and Technology, 7.

10. J.Cynthia, C. B. (2018). IOT based Smart Parking Management System. International Journal of Recent Technology and Engineering (IJRTE, 6).