

Smart Parking using Raspberry-Pi

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Abstract - As significantly grown, in the current era, as a result of the ever-rising number of vehicles geared by the rapid population growth in urban areas. wherefore, finding a vacant parking space has become quite a challenging task, especially at peak hours. Car operators have to cycle back and forth a number of times before they finally find where to park. This leads to increased fuel consumption, air pollution, and wastage of time, is not just a major problem in India but also in all over the world. This system implemented us a cost effective, scalable and robust to indicate the number of free parking slots in a given parking area. This system implemented by using infrared sensors in every bay which are then connected to a Raspberry Pi. The raspberry Pi transfers all the data to a server, which is open to users using a mobile application.

Key Words: Cloud Computing; Raspberry Pi, Mobile Application; Sensors.

1. INTRODUCTION

More than half of the world population lives in the urban areas so the cities have reached its full occupancy. As a result, number of vehicles in the cities is also increased. Car parking system would have more appreciated in placeless of higher demands such like Theatre, Shopping malls and in some crowded place. The devices could be tracked, controlled or monitored using remote computers connected through the Net. In IOT objects are connected to each other and exchange information from internet. Our cloud based smart parking organized the parking lot. It helps user to find a vacant space in parking slot. It saves user's time as well as vehicle fuel.

An infrared (IR) sensor is used at each slot in parking; it tells the space availability which can be easily seen in mobile application through internet. It may be defined as connecting things present in the physical world with sensors and then connecting them to a network through wired or wireless means.

The solution proposed in this paper utilizes the architecture of the cloud server is in a way that an unrestricted number of slots may be added without any change in the code. The associated mobile application can run on Windows, Android and iOS. Moreover, the code can be recycled for multiple boards making the proposed solution cost effective, adaptable and versatile. Followed by the developments in sensor technology, man modern cities have opted for deploying various IoT based systems in and around the cities for the purpose of monitoring

2. ARCHITECTURE

A. Sensors

The Infra-Red photoelectric reflective module, with range of 0.02 to 0.4 meters was used. It requires 5Volts and less than 2mA of current. The required powers provided by the raspberry pi board. The output goes low in the presence of an obstacle.



B. Raspberry- Pi

The Raspberry has the following collections: a power source, an Ethernet cable and to 12 sensors. A voltage divider

network is used to connect the sensors to the GPIO pins of the Raspberry Pi as they give an output of 5V but the raspberry pi accepts inputs of 3.3V. The device is registered using Web API to be recognized as a part of the network. Using the sensor, we know the presence of the vehicle, is available on parking slot or not. This is enabled by checking the distance of the object in the slot from the sensor.



C. Cloud Database

Information regarding registered applicant, status of the parking slot, and time duration of parking is maintained in server. The information regarding availability of parking slot is shared among all users who use mobile application. Database server is updated from two terminals. One is from sensors and System. Cloud computing offers cheap and

effective ways of connecting, tracking, and managing devices from anywhere over the Net. By the use of built-in applications systems could monitor and control things on a real-time basis through remote locations. The processed data from the Web jobs and Web APIs is stored on the firebase Database. The function of the Web job is to send the Queued data from the Service. Cloud provides a scalable approach.

D. Mobile Application

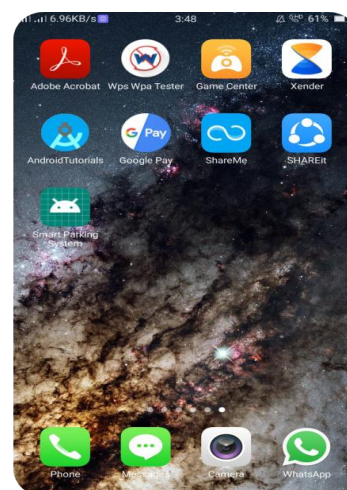
The mobile application for the users is developed using Android Studio Tools on Microsoft Visual Studio. Angular JavaScript was used so that the application may be ported across Android, Windows and IOS platforms. It reads out the number of empty parking bays in the user’s preselected preferred parking level or zone. The application has an error reporting facility which may lead to the recognition of faulty sensors. This draft facilitates user to login and registration for new user. During login user has to note preregistered username and password. For registration user has to provide name, password, E-mail ID etc. After successful login there will be a desk window at the left most corner of main window. When user selects desk window there will three options available to him which are profile, booking and checkout.

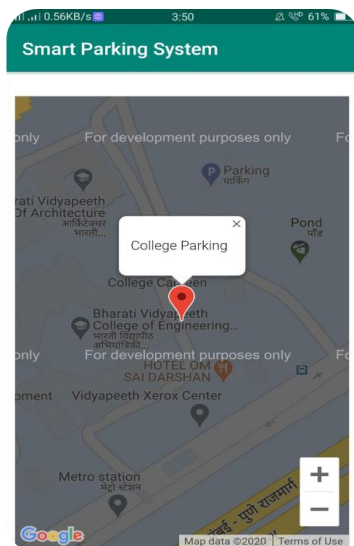
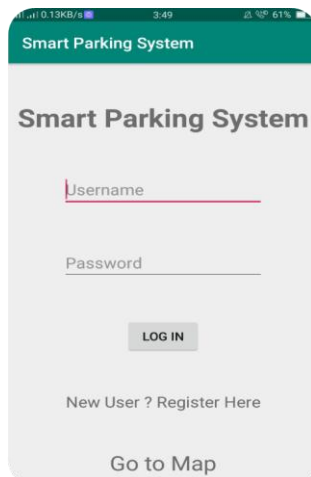
3. PROCESS

There are some steps to park a vehicle in parking slot, such as follows

1. Android app

Using this app, we get the information about the vacant parking slot; using this app know about the actual location of the parking slot. You pay your bill via through this app. New users are also registered easily.





4. CONCLUSION

Work proposed in this system addresses an issue of parking in smart cities. The system is implemented using low cost IR sensors, Raspberry pi model 3b for real time data processing, E-parking mobile application motor. The developed system contributes real time information of availability of parking slots in parking area and allows users to book parking slot from remote locations by using mobile application and also provides user authentication. The developed system is tested for different cases such as single user booking, multiple users booking, user trying to book reserved slot and user authentication.

5. REFERENCES

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2. Database/Display/payment

Using display, we got the information about the user. When user allot the slot and they ale not arrive within time, after10 minutes allocated slot will be cancelled. Payment system in metropolitan areas searching parking, slot is very critical in peak hours. In our system, user can book the parking slot in advance like theatre tickets booking online by mobile phone. We can book parking spaces by mobile apps and websites.

