

Advance Car Parking

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Abstract - The Internet of Things (IoT) is capable of connecting billions of devices and services anytime and anyplace. IoT has expanded its feathers almost in all areas of applications such as Smart Homes, Smart Farming, Smart Supply Chain, Smart Retail, Smart Health Monitoring Systems, Automobile Industry, Smart Grid Systems and Smart Cities. Recently, IoT became an emerging technology in the field of smart parking systems. The proposed work is mainly focused on providing a solution to one of the Smart City problems Vehicle Parking Management System. With IoT technology, we propose a design and development of real smart parking that can provide help for the user to locate the space where a vehicle can be parked through a webpage and book that parking slot to reduce traffic congestion at parking areas. The proposed work will reduce the time and exertion of looking for empty parking slots leading to traffic jams. Finally, detailed results were presented in this paper.

I. INTRODUCTION

Intelligent Transportation aims at providing benefits to the Social, Energy and Economic. Internet Of Things (IoT) has the potential to transceiver data through a network without involving human intervention. By using IoT the user can have easy access to affordable wireless technology and also help to update the data on the cloud. In today's scenario searching for parking spaces has become difficult. The rapid industrial growth in the world reflected in the increased number of cars on the road globally. According to the recent survey, there will be a rapid increase in the vehicle's population of over 1.6 billion around 2035. In urban areas, where the number of vehicles is high as compared to the availability of parking spaces, a lot of time being wasted in searching for parking locations. Advance Parking System is a proposed method that users can reserve their parking spaces by using a webpage and get a confirmation of booking with One

Time Password (OTP). The password will be used to enter the parking area and valid for a certain period. Initially, the data is collected from the different distributed sensors in indoor parking. Furthermore, the collected data from the sensors will be analyzed and processed accordingly by the IoT devices.

The data is also updated on the cloud web services which acts as a mediator between the user and the car parking area. The cloud web services are administered by the admin but can be also viewed by the user to check the availability.

II. LITERATURE SURVEY

A] Smart Parking Using IOT Technology
Author-Racahapol Lookmuang, Krit Nambut, Sasiporn Usanavasin.

In this paper an embedded controller Raspberry Pi is used and also an Android application is developed. Real-time informative parking space is updated immediately on a mobile application. The available or unavailable parking spaces are displayed simply such as parking slots graphic, colours and symbols on a mobile application. These processes together with sensor and update the status on each parking slot, its data is managed on the cloud.

B] Smart Car Parking System Solution for the Internet of Things in Smart Cities

Author -Wael Alsafery, Badraddin Alturki, Stephan Marganiac, Kamal Jambi.

In this paper, an android application is designed based on a Linux kernel and primarily designed for the touch screen. The application provides users with real-time readings for the availability of spaces. Here Raspberry Pi is used as a base controller for the project. But by looking at the application in this project this microcontroller is not feasible.

C] IOT based Smart Parking System

Author -Abhirup Khanna, Rishi Anand.

In this paper, an android application is designed by using the Raspberry Pi. With this application, you can search for a parking area on and around your destination. You can make a payment online and can select the time for which you will be parking your car.

D] An Anonymous Smart-parking and Payment Scheme in Vehicular Networks.

Author- L.Zhu, M. Li, Z. Zhang and Z. Qin.

In this paper, an effective technique is utilized to implement a smart parking system. An Anonymous smart parking and payment scheme (ASAP) is used and showed improved analytical results.

Several technologies and techniques have been implemented and Researchers have contributed to the development of Smart Parking system across the world.

E] Low cost- smart parking system for smart cities

Author - D. Vakula and Y. K.

In this paper, a Low- cost IOT based vehicle parking system for smart cities is proposed using a cloud computing model: Platform-as-a-Service (PaaS). The HCSR-04 based ultrasonic sensor used to detect the proximity of a car in a parking slot to detect the status of occupancy of a slot in the parking zone.

F] IOT based parking system using Google

Author -S. Shinde, A. Patil, S. Chavan, S. Deshmukh and S. Ingleshwar.

IoT also finds its application in medical, transportation etc. One of the major issues that are found in daily routine is traffic congestion and hence vehicle parking systems. As mentioned in this paper.

G] An Android Application for Smart Parking with Efficient Space Management

Author- P. M.Ebin, P. AkhilDev, P. Mishab, C. Sreejith and U. Srudhil.

They have proposed an android app based Smart Parking with efficient space management using the number plate scanning technique.

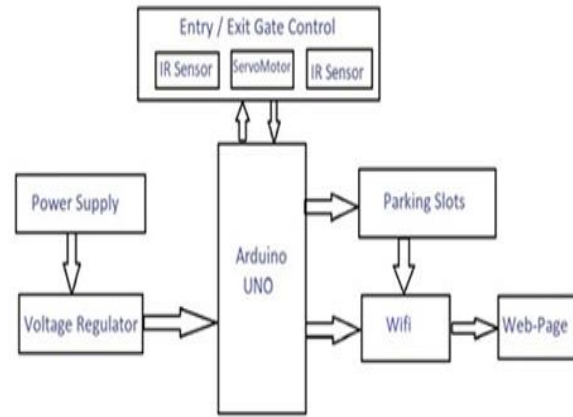


Fig 1: Block Diagram

The whole system is controlled by the Atmega328P microcontroller. We have operated on a customized Arduino board. Atmega 328P is code efficient, all the 31 registers are directly connected to the Arithmetic Logic Unit (ALU) making it 10 times faster than the conventional CISC microcontrollers. It is immediate between the sensors and the cloud.

The power supply block supplies voltage to the whole circuit. It also consists of a step-down transformer which is used to convert 230V into 12V.

The voltage regulator will constantly regulate the voltage and give us an output of 5V. At the Entry and Exit of the parking system, there is an IR sensor and servomotor placed for detecting a vehicle. If there is a vehicle present at the gate, the IR sensor sends the information to the Atmega328P microcontroller. The microcontroller accordingly controls the servomotor for opening and closing the gate.

In the parking area slots, the IR sensors are placed which detect whether an object (vehicle) is present or not. If a vehicle is present, this information would be transmitted to the cloud and it would be displayed on the web page that, the particular parking slot is occupied.

And there is no vehicle present then according to the webpage will be updated that, the particular slot is available for parking. So all this information whether the parking slot is available or not will be displayed in a user-friendly way on the webpage.

A] HARDWARE

- Atmega 328P
- IR Sensor
- WIFI ESP8266
- Transistor BC547

III. BLOCK DIAGRAM AND SYSTEM ANALYSIS

- Servomotor
- IC 7805

B] SOFTWARE

- Proteus
- PHP (Wynk)
- Apache Tomcat Server

IV. FLOWCHART

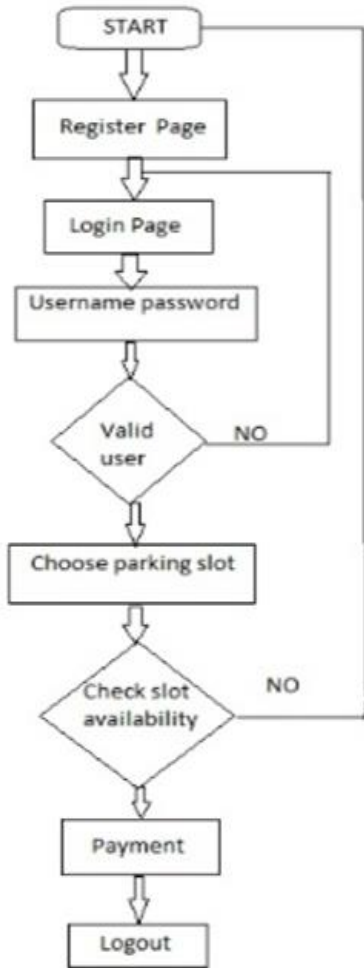


Fig 2: Flowchart (Webpage)

As soon as the user opens the webpage he can log in/register with appropriate credentials. Then in the dashboard, he can check for the available parking slots and then book a slot. Then for the payment, he can use the UPI ID, credit card or debit card. The charges will be applicable on an hourly basis. After a successful booking, you can log out of the system.

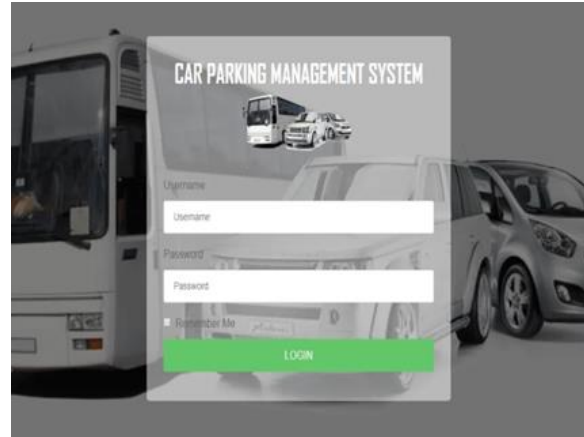


Fig 3: Login/Register page

Login /Register– This is where the user enters the correct combination of username and password for them to gain access and manage the records of the system. The user who doesn't have login credentials can register and get access to the webpage.

The interface of system login results of Testing Cross-browser testing was done by the researcher to ensure that the web application looks the same in major browsers that is Google Chrome, Mozilla Firefox, Opera and Internet explorer. The web project is consistent (looks the same) in Google Chrome, Mozilla Firefox and Opera but the looks vary slightly in internet explorer.



Fig 4: Dashboard

Dashboard – The dashboard serves as the homepage or control panel of the system. It is the form of the system that links to the other pages of the project. The image above shows the dashboard of the system. It displays the statistics such as the available slots, occupied slots and the number of vehicle entries. It also stores the number plate for data entry in the PHP server WYNK. In the dashboard, you can find available slots and get real-time data.

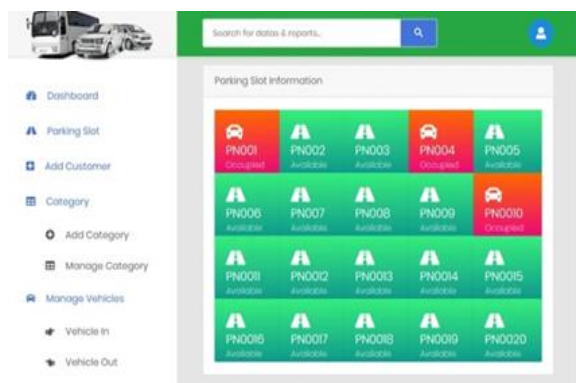


Fig 5: Payment Gateway

Payment Gateway-After selection of the available parking slot you will have to make a payment. Using a page manipulation technique now the payment has to be done according to an hourly basis. You can make a payment using a UPI ID, Credit Card or debit card. After successful payment, you will receive a confirmation SMS consisting of an OTP (One Time Password) which further needs to be communicated to the admin after you reach the parking area. The OTP will be valid for a certain time duration.

V. HARDWARE DESIGN AND IMPLEMENTATION

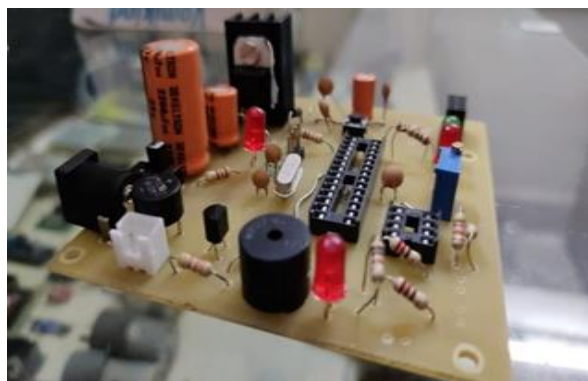


Fig 6: Customised Arduino Board

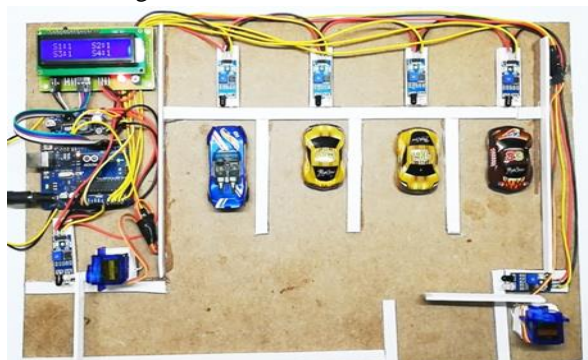


Fig 7: Final Hardware View

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VII. CONCLUSION

Online vehicle parking reservation system improves the existing system since we are in a computerized world. This new system is mandatory, it enables the user of the system (client, employee, System administrator) to reserve a parking lot online and this reduces the wasting of time of the clients looking for where to park, increase the safety of the property avoiding the traffic congestion.

We designed this Advance Parking System using hardware and software based on IoT concept, and a webpage. The driver can easily check parking information and use mobile payment to pay the parking fee. The goal of our study is to improve the parking process by reducing the time that is required to park a car.

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