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Smart Parking System using IoT

Keerthana Devi G
Electronics and Computer Engineering, SRM Institute of Science and Technology, Tamilnadu, India.

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Abstract: *Today many metropolitan areas have seen explosive growth in the number of visitors and patrons due to urban revitalization, extension of transit services into suburban areas, and the general trend toward increased mobility of our society. As a result, there are too many vehicles on the road and insufficient parking spaces. This has led to the need for an efficient parking management system. With the help of a computerized system, we can deliver a good service to citizens who want to park their vehicle into the any organization's premises using Internet of Things (IOT) based on parking management system. In this context, Internet of Things (IOT) uses sensors to connect physical parking space infrastructures with information and communication technologies, where cloud-based smart management services are provided. To implement this concept a mobile based application would be developed. This mobile application will allow an end user to check the availability of parking space and book a particular parking lot accordingly. Each parking lot would be equipped with a control system that enables monitoring of the number of free and occupied parking places and informing users about the parking lot status (open with/without free available parking spaces or closed) Additionally the application would display parking service payment according to parking time duration. Also, it will sense if a vehicle has arrived on the gate for automated gate opening. This allows users to check for available parking space online from anywhere for hassle free parking. Thus, the system solves the parking issue.*

Key Word: *Smart Parking; Intenet of Things; Application.*

I.INTRODUCTION

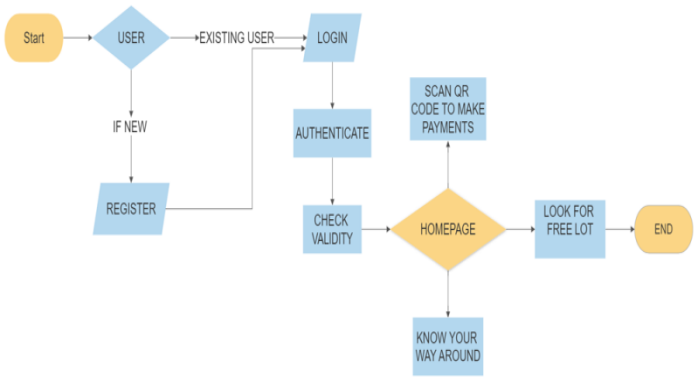
Traffic issues are inevitable as a result of the increase in the number of vehicles on the road. This is because there are too many cars on the road for the existing transportation infrastructure and car park facilities to handle. The smart parking system has been developed to address the aforementioned issues. Customers now have easy access to a vacant parking space at any car park that is convenient to them thanks to the implementation of the smart parking system. The introduction of a simple payment method makes vehicle entry and exit even more convenient. Using an Internet of Things (IoT)-based parking management system, we can provide citizens who wish to park their vehicles on the premises of any organization with a satisfactory service with the assistance of a computerized system. In this setting, the Internet of Things (IOT) connects physical parking space infrastructures with information and communication technologies through the use of sensors, enabling cloud-based smart management services. An application based on mobile devices would be developed to put this idea into action. The end user will be able to check the availability of parking spaces and book a particular parking lot using this mobile application. A control system would be installed in each parking lot, allowing for the monitoring of the number of free and occupied parking spaces as well as providing users with information about the parking lot's status (open with or without free parking spaces or closed). Additionally, the application would display parking service payments based on the length of time a parking space was used. Additionally, it will detect whether a vehicle has entered the gate, enabling automated gate opening. Users are able to find hassle-free parking by checking for available parking spaces online from anywhere. Thus, the parking issue is resolved by the system.

II.SURVEY

In most cases, smart parking systems get information about available parking spaces in a specific area and use real-time processing to place vehicles in those spaces. It involves the utilization of low-cost sensors, real-time data collection, and mobile-phone-enabled automated payment systems that make it possible for people to reserve parking in advance or very precisely predict where they will likely locate a spot. As a result, smart parking reduces car emissions in urban centres by eliminating the need for people to waste time and effort circling city blocks in search of parking. Additionally, it enables cities to carefully manage their parking supply. Smart parking addresses one of the most significant issues with urban driving: controlling illegal parking and finding empty parking spaces This suggests that convenience and rightness/safety are the goals of M2M technologies. There are three modules in the Parking Assistance System: a monitoring module, a control module, and a displaying unit. In addition to the three modules listed above, it will include a SMS gateway and a centralized supervisory system for managing a parking space database. Ultrasonic and ambient light sensors are included in the monitoring module, which uses ZigBee to send information to the control unit about available parking spaces. The sensor provides additional information in addition to identifying the vehicle, such as the length of time it has been parked and its health status. The information is processed by the control units before being sent to the central supervisory system. Through UDP, the controller transmits information about a parking space to the centralized supervisory system. After that, it sends the user's mobile phone details like the allotted slot, time parked, billing information, and directions.

The primary objective is to prevent congestion in the parking area by implementing a user-friendly application and an effective parking system. Even though parking is a paid service with an attendant or security guard, it is typically uncomfortable to look for a vacant spot in public places like multiplex theatres, market areas, hospitals, function halls, offices, and shopping malls. It is proposed that the parking management system demonstrate parking without hazel. The infrared transmitter-receiver pairs of the proposed system communicate with the raspberry pi remotely about the occupancy status of the parking space and show the empty slots on the display at the parking entrance so that the user can determine whether or not a parking space is available before entering the parking space. The implementation requires little human interaction and offers a seamless parking experience, saving the user a lot of time when parking their vehicle.

III. METHODOLOGY



IV.DESCRIPTION AND COMPONENTS REQUIRED

The system flow of our project is depicted in the preceding diagram. At the login page, if the user is authenticated, they will proceed to the dashboard, whereas if they are not, they will be redirected to the login page.

After that, the user will be able to reserve a parking space at the desired location from the dashboard, pay online with their wallet, and authenticate themselves at the parking lot using the generated QR code. Once they leave the space, the user will be able to log out of the app.

Arduino:

The ATmega328P-based Arduino UNO is a microcontroller board with 14 digital input/output pins, 6 analog inputs, a 16 MHz ceramic resonator, a USB connection, a power jack, an ICSP header, and a reset button.

Node MCU:

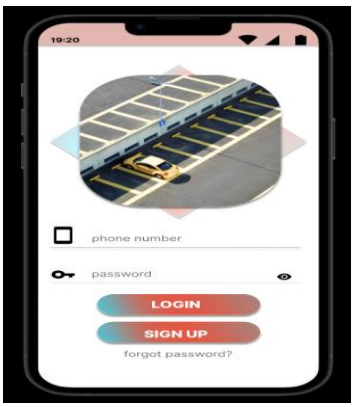
There are designs for open-source prototyping boards and an open source firmware for the Node MCU. The words "node" and "MCU" are combined in the name "Node MCU." The firmware, not the associated development kits, are the true meaning of the term "Node MCU."

IR SENSOR:

An optoelectronic component that is radiation-sensitive and has spectral sensitivity in the infrared wavelength range of 780 nm to 50 m is known as an infrared sensor (IR sensor). IR sensors are now widely used in motion detectors, which are used in building services to turn on lights and alarm systems to find guests who aren't welcome.

V.DESIGN

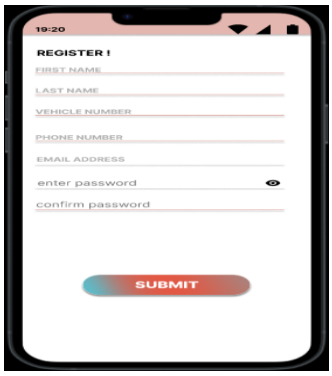
1. Login Activity



Description:

In this the user will login or sign up if account doesn’t exist yet.

2. Registration Activity



Description:

The user will have to register with his name ,phone number and other details.

3. Authentication Activity

Description:

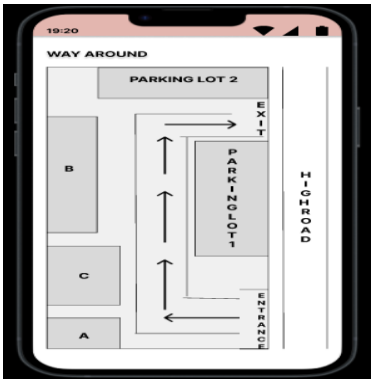
It is a process where an one time password (otp) will be sent to the registered number to check if the user is registered.

4. Home Page Activity

Description:

In this the user may find the information regarding the place, and several other services linked to it.

5. Map Activity



Description:

In this page the user will be able to find his/her way in and out.

6. Parking Lot Availability

Description:

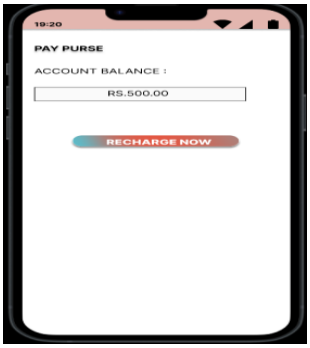
This page will let know the users which lot is available and close to them.

7. Qr Code Activity

Description:

During this activity, the parking lot watchman will examine the vehicle user's generated QR code to determine whether or not the user is authenticated.

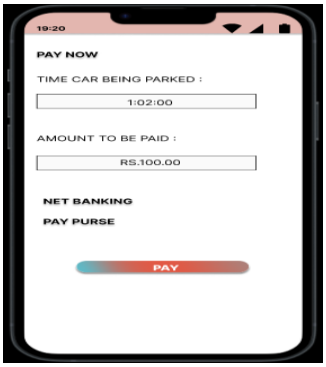
8. Pay Purse Activity



Description:

Here, the driver puts money in his or her wallet and pays the parking fees based on how long they stay there.

9. Payment Activity



Description:

In this page you will be able to make payments through net banking, credit cards or debit cards.

VI.CONCLUSION

The system's visual goal is to cut down on time and avoid traffic. You will be able to reserve a parking space using this system, which will also assist you in finding nearby parking lots in your area. Additionally, it facilitates online payment. We conclude that we will be able to cut down on time and traffic by putting in place the proposed system. This system, with its functional requirements, has been proposed by us.

References

1. *"Smart parking system happiest minds" Aditya Basu, 2014 HappiestMinds https://www.happiestminds.com/Insights/smart-parking/*
2. *"RFID based car parking system" Anusha ,September 1, 2016https://www.electronicshub.org/rfid-based-car-parking-system/*
3. *"Automated underground car parking system" Karan UpendrabhaiVyas, Adarash Kumar, Vadher Dhaval Hareshkumar, December,2014http://library.atmiya.net:8080/dspace/bitstream/handle/123456789/2593/AUTOMATIC%20UNDERGROUND%20CAR%20PARKING%20SYSTEM.pdf?sequence=1&isAllowe d=y*
4. *"Smart parking car ystem"Ali Abd Al-Zahra Jawad, Murtada FalahHassan, Zain Hussam Muhsen, Mohammed AzherTherib(28/7/19)https://www.researchgate.net/publication/320356747_Design_and_Implementation_of_Smart_Car_Parking_Syst*
5. *"Smart Parking System based on IOT"Hardik Tanti, Pratik Kasodariya, Shikha Patel, Dhaval H. Rangrej,Assistant Professor Laxmi, May-2020.*