Smart Parking System

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Abstract: In recent times the concept of smart cities has gained unconfined popularity. Parking in the urban area has been a major problem these days. Traditional Parking System is not only expensive but moreover time-consuming process. An efficient way to manage the parking system would be by using the concept of the Internet of Things (IoT). Consistent efforts are stuff made in the field of IoT in order to maximize the productivity and reliability of urban infrastructure. Problems such as traffic congestion, limited car parking facilities, and road safety are stuff reduced by IoT. The proposed Smart Parking system consists of an on-site deployment of an IoT module that is used to monitor and signalize the state of availability of each single parking space. A mobile application is provided that allows an end user to check the availability of parking space and book a parking slot accordingly. If there is no parking slot available, the user can go into 'waiting' state similar to that of railway ticket booking system. According to the number of hours the vehicle is parked, the user will do the online payment. Availability of parking slots will be updated in real time.

Index Terms - **Internet of Things (IOT), Smart Parking System, Smart City, Cloud Computing**

I. INTRODUCTION

As it is being seen that traffic congestion caused by the vehicle is growing day by day. Car parking is a major issue in urban cities. Searching for a parking space is a frustrating activity for many people in cities around the world. In searching parking space about one million barrels of the world's oil is burned every day. As the global population continues to urbanize, without a well-planned, the problem caused due to the car will worsen.

Smart parking system obtains the information about the parking spaces in particular area and processes it in real time. This system uses sensors which are low in cost. It also involves the collection of data and processes it in real time. This system allows a user to find and book the empty slot through the mobile application and the payment is done through the online payment system. When deployed as a system, smart parking thus reduces the fuel consumption and also saves the time required in finding available parking slots. It also permits cities to carefully manage their parking supply Smart parking helps one of the biggest problems on driving in urban areas; finding empty parking spaces and controlling illegal parking.
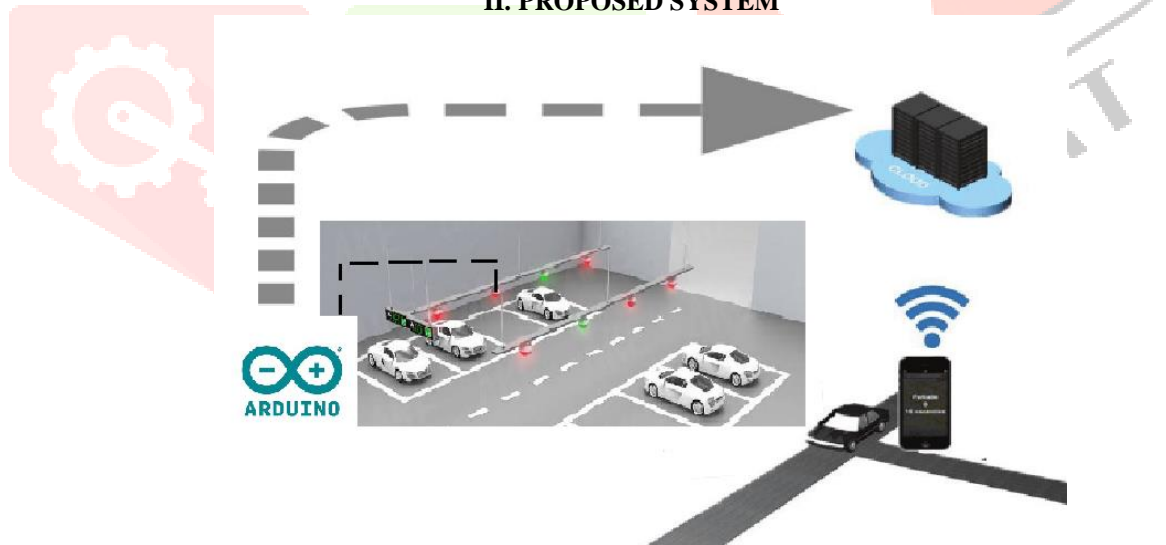
II. PROPOSED SYSTEM

Figure 1: Smart Parking System

In this system, the information of different parking spaces will be stored in the cloud database. Users can access this information through the mobile application. Information regarding availability of parking slots will be updated in real time.

Mobile Application: The mobile application acts as an interface for the end users to interact with the system. The application is developed in Visual Studio using XAML and C# as a programming language. The purpose of using Visual Studio is to create applications that can run on all three platform Android, IOS and Windows with the same source code.

The Cloud: Cloud acts as a database to store the real-time information regarding the parking slots. In this system, the database used is a SQL database. It keeps a track of every user information such as parking time, the time duration for which vehicle was parked, the amount paid by the user. It provides flexibility to the system to add any number of users at any time of the day.

Sensors: In this system, IR sensors are used in parking slots. These sensors provide the information regarding the state of the particular parking slot.
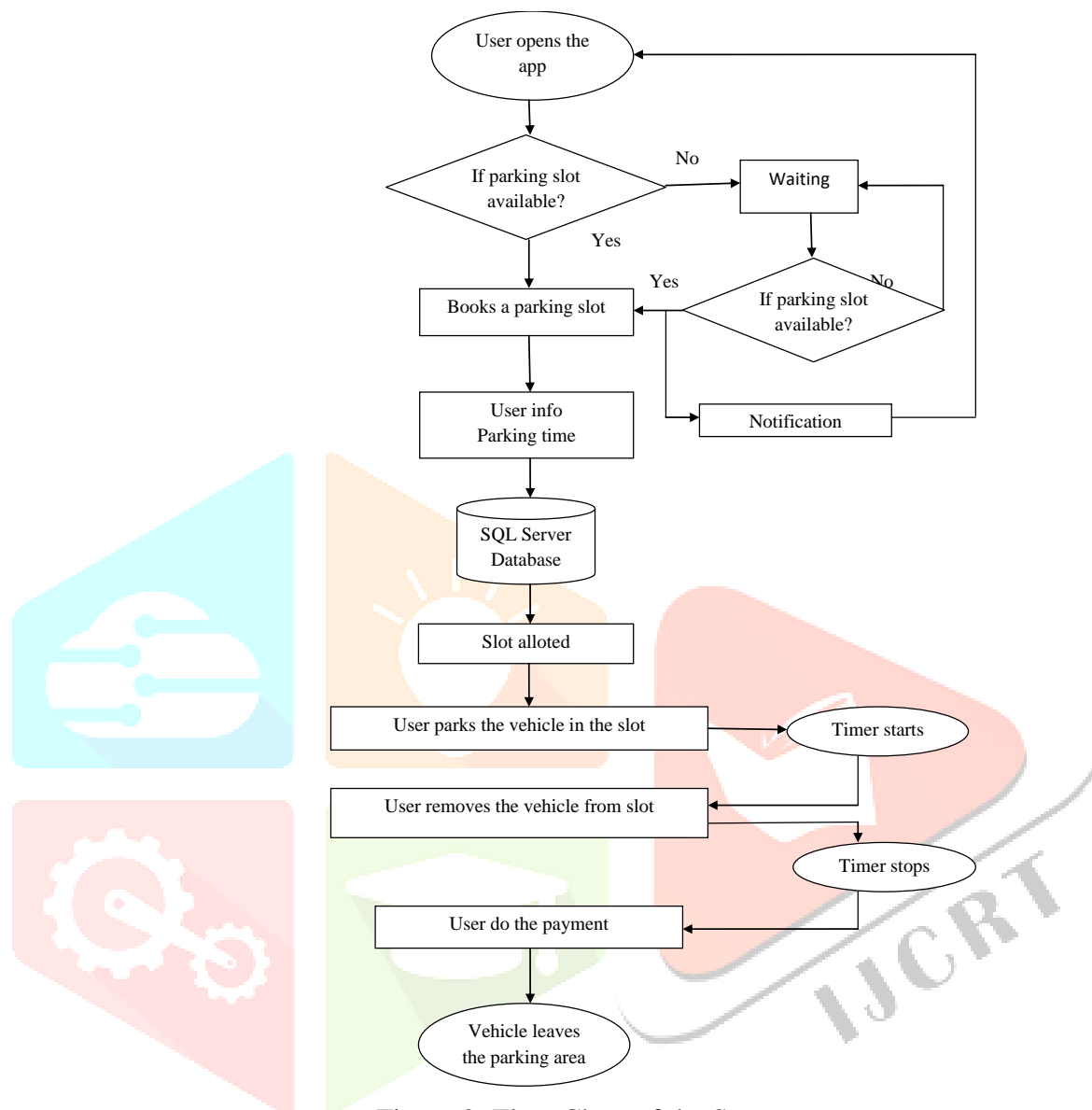
III. IMPLEMENTATION AND WORKING

Figure 2: Flow Chart of the System

Our system will provide information on the availability of the parking slots in real time. This system can be implemented in smart city area like shopping mall or cinema hall etc. Below are the steps that a user needs to follow in order to park vehicle using our parking management system.

- Step 1: Install the application on your mobile.

- Step 2: Open the application and select a type of vehicle you are going to park.

- Step 3: Check for the availability of parking slot.

- Step 4: If the parking slot is available, do the booking by filling the required details or else you can go into a state waiting for.

- Step 5: After waiting state when the parking slot becomes available you will get a notification that the parking slot is allotted.

- Step 6: We can only allow the vehicle after checking whether the vehicle is allotted a parking slot in this parking area or not.

- Step 7: When you park your vehicle in the slot the timer starts.

- Step 8: After parking, the vehicle occupancy will be confirmed.
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- Step 9: User can extend the parking time.

- Step 10: When you leave the parking slot, timer stops and time duration is calculated.

- Step 11: According to time duration do the payment through online payment systems like mobile banking, internet banking, credit card, debit card etc.

- Step 12: Vehicle payment is checked, whether it is done or not.

- Step 13: After doing the payment vehicle leaves the parking area.

Advantages of Proposed System:

1. A user can book a parking slot from anywhere in the city through the mobile application.
2. Payment is done through online payment systems like   mobile banking, internet banking, credit card, debit card etc.
3. Sensors are used to check whether the parking slot is occupied or not.
4. A user can extend his parking time if required.
5. Sensors will guide the user to the empty parking slot.
6. Unless and until payment is not done user cannot leave   the parking area.

IV. CONCLUSION

Smart City is developing with the help of Internet of Things and cloud technologies. Smart parking is one of the ways to build a smart city. In smart parking system user books the parking slot from a remote location through the mobile application. Smart parking system will avoid the unnecessary waste of time in finding an empty parking slot. This system will also avoid the traffic jam, more fuel consumption and air pollution, etc in the city. Hence smart parking system makes parking easier with greater convenience.

V. REFERENCES

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