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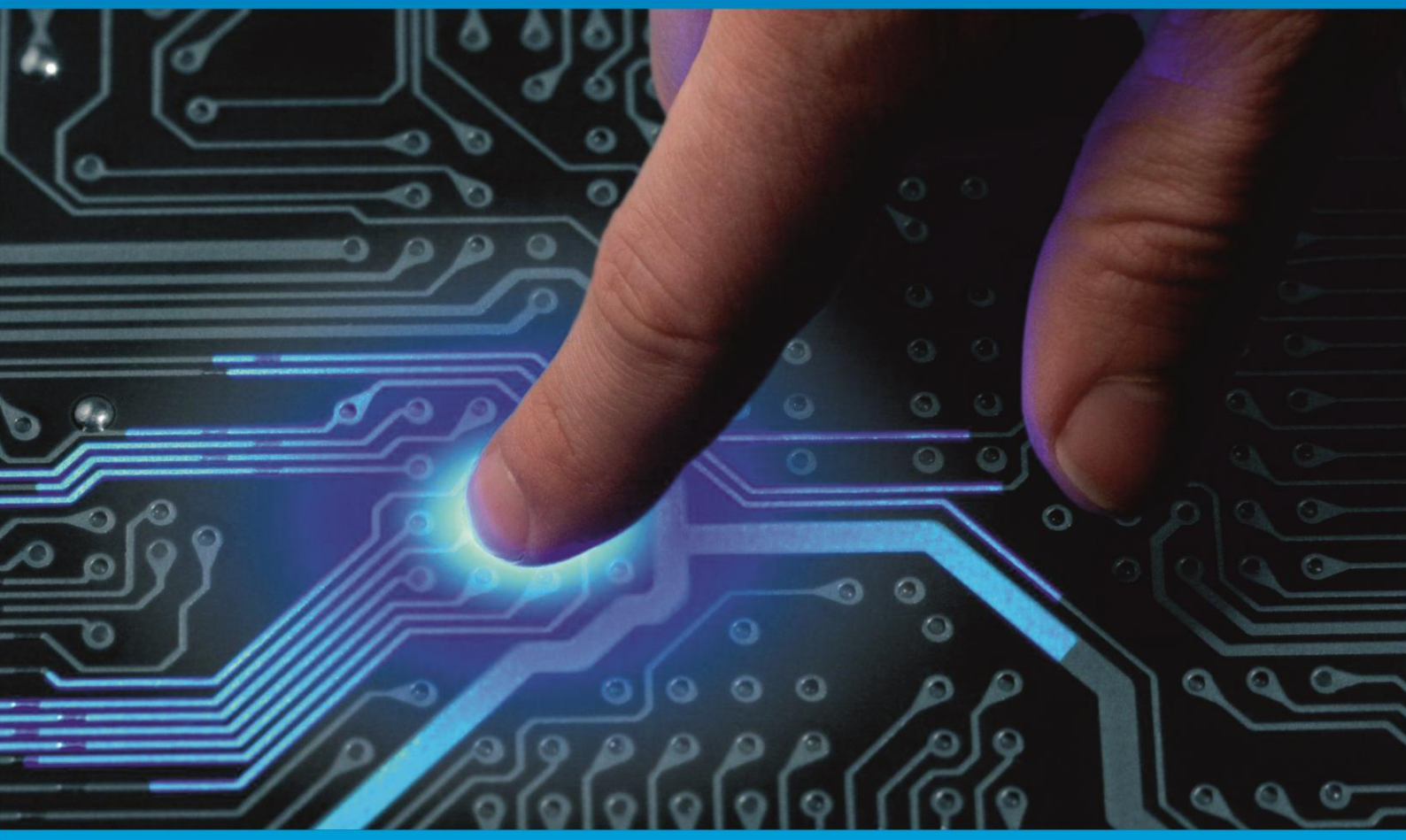

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Design of Real Time-Based Smart Parking System

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ABSTRACT: Smart parking System is the combination of the carious technologies like IOT, Android, Cloud Computing. Smart parking is an essential service that is required in the smart cities Bengaluru, Chennai, Hyderabad etc, where there are lakhs of vehicles that commute on a daily basis for various reasons. In this paper we discuss about the system that can be implemented using IOT, Cloud Computing and Android Platform to prevent the congestion of the vehicles at parking station and also provide an option to book the parking space in prior and also option to extend the parking duration they have opted for.

KEYWORDS: Cloud Computing, IOT, Android, QR code.

I. INTRODUCTION

Smart parking is the combination of technologies like IOT, Cloud Computing, Application It is found that total 8.33lakh cases for two-wheeler wrong parking and 93435 towing cases for other class of vehicles are booked in the year 2018.

As the companies or people owning the tenders of the parking stations are unable to provide the parking space availability information, finding a right parking space is a time-consuming process and in return it can have some adverse effects on the individual work like unable to reach to work on time.

This paper provides an idea for building an application, using which user can book the parking space before he even reaches the parking station and even can extend the parking duration he has opted for and pay the charges using various option like Net-Banking, UPI Payments etc. which help the user in tracking the transaction that has taken place.

II. LITERATURE SURVEY

The system helps us to find a parking space and calculation of the parking cost is done using least cost basis, the parking cost is calculated considering the factors like distance between the place and number of free places.[1]

Due to urban population growth, there is rapid increase in number of vehicles which lead to traffic congestions. Here a background of parking problems and relevant algorithms, techniques that can be used for smart parking is reviewed and discussed.[2]

There are three techniques that can be used, they are Information Collection, System Deployment, and Service Dissemination. In each technique, it explains and synthesize the main methodologies used in the existing works and summarize their common goals and visions to solve current parking difficulties.[3]

The idea of capturing the location present at place is done using the camera and based on the camera orientation the location is saved in the application.Then the application keeps on updating the information as the direction changes.[4]

A Smart Parking Energy Management solution for a structured environment such as a multi-storied office parking area. The system proposes implementation of state-of-the-art Internet of Things (IoT) technology to mould with advanced Honeywell sensors and controllers to obtain a systematic parking system for users. Here automatically controlled light illuminance helps reduce energy usage, along with lighting up the parking space to the user whilst in the parking space. [5]

In this paper, an IoT based cloud integrated smart parking system. 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.[6]

There is a significant issue with the stopping framework in pretty much every significant city across the globe. Large numbers of us get exceptionally upset when there could be no appropriate space for parking spot for our vehicles. In

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this article, we have proposed a keen leaving application, where clients will actually want to leave their cars by tracking down a vacant parking garage through Android Application or can even stop their vehicles straightforwardly through Embedded Hardware. An Intelligent Parking System is executed dependent on Slot Allotment. There are two modes utilizing which the Android client can book the stopping openings effectively like Advance and Current Booking.[7]

In this paper a smart parking system based on internet of things which not only allows the drivers to book a particular parking spot but also helps in automatic cashless billing, hacking intimation, post trip booking is proposed [8].
System enables drivers to cancel the reserved parking slot. Amount will be refunded after cancellation charges. Thus, a low-cost prototype for smart parking with reservation is proposed using sensor, Arduino and android in Cloud Platform. [9]

Android Wear (AW) is Google's foundation for creating applications for wearable gadgets. We will probably make an initial move toward an establishment for examination and testing of AW applications. We center around a center element of such applications: notices gave by a handheld gadget (e.g., a cell phone) and showed on a wearable gadget (e.g., a smartwatch). We initially characterize a proper semantics of AW warnings to catch the center highlights and conduct of the notice instrument. Then, we depict an imperative based static examination to fabricate a model of this run-time conduct. [10]

III. COMPARISONS OF EXISTING PARKING SYSTEM

There are few existing parking systems namely GCC Smart Parking and Parking Rhino. There are few flaws in the existing system which are listed in table 1.

Table 1: Comparison of Existing Parking System

Application Name	Release Date	Missing Functionalities
GCC Smart Parking	Oct 2, 2019	Functionality failed, showing the vehicle not registered under particular user
Parking Rhino	Aug, 2019	Registration of new user not working and also the inventory of the parking space available is not available.

IV. PROPOSED SYSTEM

The workflow of the proposed system is shown in the figure 1.

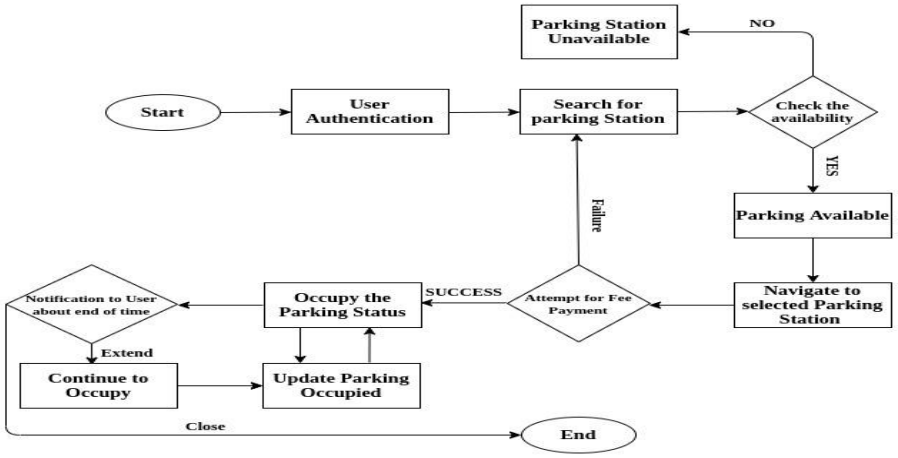

Figure 1: Workflow of Smart Parking System

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Figure 1 is the workflow of smart parking system where, the stages involved in the proposed system are highlighted. The proposed system is a development of android application, where user can use for booking the parking space. User has to register with the application by providing the required details. On Successful Registration, user can into login to the application with valid credentials.

On successful login user can search for parking station and check the availability of the parking spaces. On availability of parking space is available,user can book that parking the space and make payment in order to get the QR code which indicates the payment success. After which application will navigate user to the corresponding parking station, once reaching to the parking station user has to scan the generated QR code at the entrance and can occupy the space user has booked.

User will get notification regarding the closure of the parking duration before 15mins of the actual end time. During this notification user can either choose to extend the parking duration or end the parking duration. If user wishes to extend the parking duration, user has to pay the additional charges for that duration and another QR code will be generated which can be used to exit the parking station.

V. CONCLUSION

This paper proposes a real-time intelligent vehicle parking system-based on the cloud-computing, Iot technologies for the smart cities, here by it saves time and fuel. In order to prevent the vulnerability of the system from cyber-attacks the system uses different MAC (Media Access Control) address for different devices like wireless sensors, routers and cameras which will be utilized at different parking locations. The data will be encrypted based on the Data Encryption Standard (DES) algorithm. The aggregated data is stored on cloud for the analytics for monitoring the status of parking spaces and same will be used notify the user about the parking spaces.

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