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RESEARCH WORK ON IOT BASED SMART PARKING SYSTEM USING QR- READER

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Abstract

The concept began with identity communication tools based on the Internet of Things. The device can be tracked, controlled or monitored from a remote computer via the Internet. It is developing the current intelligent parking system and network architecture based on the Internet of Things. This proposed a system to help users automatically find a free parking space at the lowest cost based on the new performance metrics to calculate user parking costs, taking into account the distance and the total number of free spaces in each parking lot. We use this cost to offer a solution to find a free parking space at the request of the user and to offer a solution to suggest a new parking lot when the current parking lot is full. The simulation results show that the algorithm improves the probability of successful parking and minimizes the user waiting time. We have successfully implemented the proposed system in the real world as well. Recently, the concept of smart cities has become popular. Thanks to the development of the Internet of Things, the idea of a smart city seems feasible. In the field of IoT, consistent efforts are being made to maximize the productivity and reliability of urban infrastructure. The IoT addresses issues such as traffic congestion, limited parking spaces and road safety. Introducing an IoT-based intelligent parking system integrated into the cloud. We also describe a high-level view of the system architecture here. Towards the end, a full description of how the system works, demonstrating the correctness of the proposed model.

1. INTRODUCTION

The It is causing day-to-day problems in traffic management and parking arrangements due to the increasing number of vehicles. With the development of traffic management systems, an intelligent parking system has been created to reduce the cost of hiring people and making optimal use of resources for car park owners. Currently, the general method of finding a parking space is manual, where the driver usually finds a place on the street for luck and experience. This process takes time and effort and, in the worst case, can lead to not finding a parking space if the driver is driving in a dense city. The alternative is to find a pre-determined, high-capacity car park. However, this is not an optimal solution because the parking lot can usually be far from the user's destination. In recent years, research has used vehicle-to-vehicle and vehicle-infrastructure interactions with the support of various wireless networking technologies such as Radio Frequency Identification (RFID), Zigbee, Wireless Interference Network, and the Internet. The purpose of this study was to provide the driver with information about nearby parking spaces and to book a few minutes in advance using supported devices such as smartphones or tablets In addition, the services will use the ID of each vehicle when booking a parking space. However, the current intelligent parking system does not provide an overall optimal solution for finding available parking space, does not solve the problem of load balancing, does not provide economic benefits,

and does not plan a denial of service. problems and take advantage of significant advances in technology, the Internet of Things (IoT) has revolutionized many areas of life as well as intelligent parking system (SPS) technology. The present study proposes and develops an efficient cloud-based SPS solution based on the Internet of Things. Our system builds each parking lot as an IoT network, and the data, which includes the vehicle's GPS location, the distance between the parking spaces, and the number of free spaces in the parking spaces, is transferred to the data center. The data center serves as a cloud server to calculate the cost of a parking request, and these costs are frequently updated and available to vehicles on the network at any time. SPS is based on a number of innovative technologies and can automatically monitor and manage car parks. Furthermore, in the proposed system, each car park can function independently as a traditional car park. This research also implements a wireless prototype system prototype on an open source physical computing platform based on QR code reading technology and using a smartphone that provides a communication and user interface for both the control system and the vehicles to verify the proposed feasibility. system.

2. IMPLEMENTATION OF PROPOSED METHODOLOGY

When a user wants to find a parking slot, he/she must open the mobile application. Application asks for the city, and map shows the nearby parking slot and updates you to the currentposition of the free parking slot. As per choice of the parking the system will forward the vehicleto a car park. When the user arrives at the car park, hemust be authorized to enter. This authorization is achievedvia the QR ticket scanning. Thismechanism is simple but economical. If the information iscorrect, the user is allowed to park. As we previously discussed about the architecture and technical stack related to the smartparking system. In this section we talk about the implantation and working of the system in a real world scenario. The complete process of booking a parking slot, parking a car in that slot and leaving the parking area is explained with the help of the following flow chart.

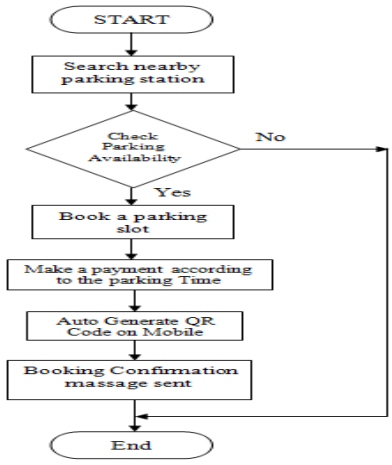

Fig 2.1 (A): Flowchart of system operations

The above flowchart of the system operation starts with search by near parking station, check the parking availability if yes the control passes over the booking of slot select the slot at random by the user. User need to book the parking it can park his/her

vehicle in any available slot. After the making of payment the QR ticket will generate and booking confirmation massage shows on device.

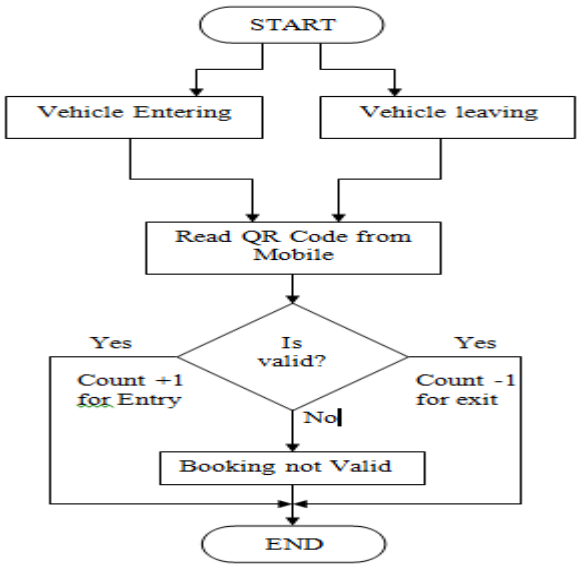

Fig 2.2): Flowchart for updating the status of the car on parking lot

Above Fig2.2 shows the flowchart for the updating the status of the car. If the car is entering into the parking station it will check the QR ticket generated on the mobile after the booking done. If the ticket is scan by the camera then opens the QR ticket and hold the mobile in front of camera, the entry is new and valid then its count the +1 for entry andpass the status vehicle is '**Parked**' or count the -1 for exit and pass the status vehicle is '**Exit**'.

3. PROPOSED WORK

We conducted an experiment in order to depict the working of our system at every stage from checking the availability of parking space to actually park a car in a vacant parking slot. This is done by implementing the smart parking system in the parking area of a shopping mall or any public/privet parking. Below are the steps that a user needs to follow in order to park its car using our parking system.

- **Step 1**: Install the smart parking application on your mobile device.

- **Step 2**: With the help of the mobile app search for a parking area on and around your destination.
- **Step 3**: Select a particular parking area.
- **Step 4**: Check the parking slots available in that parking area.
- **Step 5**: Amount of time is by default set for 4 hours which you would like to park your car for. Exceed the time limit extra charge will be applied.
- **Step 6**: Pay the parking charges either with your wallet or your credit card.
- **Step 7**: Once you have successfully parked your car in the parking slot your entry has been done and your QR ticket is ready to exit.

4. RESULTS ANALYSIS

The following screenshots which is help to understand the flow of project and uses of the application.

Fig 4.1(A) Select City

Above figure depict the presence of available parking in the city. The application shows only these cities where the parking service is available.

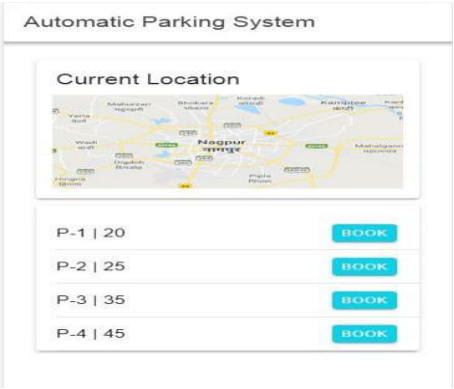

Fig. 4.2 (B) Select Parking Station

As per the current location we can select the parking lot where it's nearby your current location and next we will go for the further booking process.

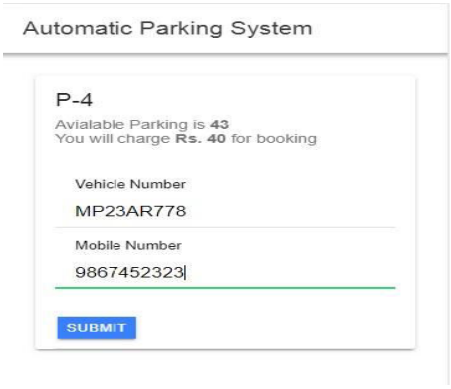

Fig 4.3 (C) Vehicle Registrations

In the fig 6.1 (C) we need to insert vehicle number and the Mobile Number for the booking.

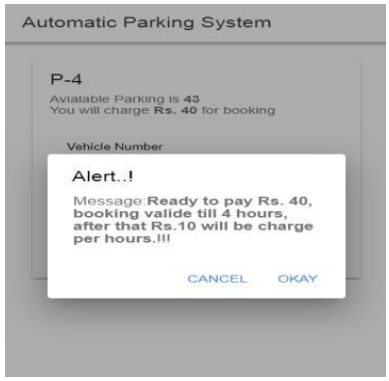

Fig 4.4 (D) Booking Confirmation

Fig 4.1(D) show the alert message before the booking confirmation click ok to next confirmation and generate QR ticket.

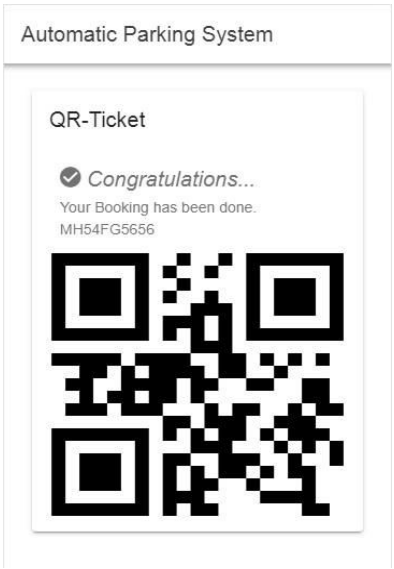

Fig 4.4 (E) QR Ticket

In the fig. 6.1(E) application shows the final result of the process and displays the confirmation message and QR ticket over the screen.

4.2 Parking Station Application

Fig 4.2 (A) Parking Station Logi

5. CONCLUSION

This study proposed a parking system that improves performance by reducing the number of users who cannot find a parking space and minimizing the cost of moving to a parking space. Our proposed architecture and system have been successfully simulated and implemented in a real situation. The results show that our algorithm significantly reduces the average parking latency of users. The simulation of our system reached the optimal solution when most vehicles successfully found a free parking space. The average waiting time for service in each car park will be minimal and the total time for all vehicles in each car park will be reduced.The concept of smart cities has always been a dream for humanity. In the last few years, great progress has been made in the implementation of smart cities. The Internet of Things and the growth of cloud-based technologies have created new opportunities for smart cities. The focus of building smart cities has always been on smart parking facilities and traffic management systems. In this article, we address the issue of parking and present an intelligent parking system integrated into an IoT-based cloud. The system we propose provides real-time information on the availability of parking spaces in a parking lot. Users from remote locations were able to reserve a parking space for them using our mobile app. The efforts made in this project aim to improve the city's parking facilities and thus the quality of life of the population.In our future study, we will consider the security aspects of our system and implement our proposed system on a large scale in the real world.

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