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Smart City Parking System

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ABSTRACT

Parking in the city has been a major problem in modern days. An efficient way to manage the parking system is using Internet Of Things (IOT). Traditional parking system commonly uses security camera, ultrasonic sensors or infrared ray sensors to manage the parking lots. However, these systems are not only expensive but time consuming. So it is necessary to have a smart parking system. So in this system we are using RFID tag to each of the car and also assigning a sensor to each parking slot. Using an android application user may able to see the available parking slot so that it will required less time than previous system. Also we will provide information to the user about nearest places ie hospitals, hotels, school etc. So to implement this idea we are using sensors and RFID

Keywords- **Smart city parking, sensors, RFID, Internet Of Things (IOT)**

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I. INTRODUCTION

Parking is limited in almost every major city in the world–leading to traffic congestion, air pollution, and driver frustration. For example, the Amanora Mall Magarpatta Central IT Industry District Pune(AMD).Yet, often parking spots are wasted. In large parking lots, a driver may exit the lot without knowing about new spots that have just become vacant. Finding an empty parking spot may also lead to driver frustration if another car takes the spot before the driver can reach it. Thus, innovative parking systems for meeting near-term parking demand are needed. With wireless communications, computer, control, and electronics technologies, intelligent service-oriented parking management car improve parking space utilization and improve driver experience while decreasing drivers' frustration. Our motivation is to fill the near-termparking demand using the Internet of Things(IOT). The contributions of our system include: 1)Reduce time 2) increasing space utilization,3) improving drivers' experience, and 4) providing intelligent management.5)Saving Fuel From the point of users' view, Smart City Parking system which is a secure and intelligent parking service. Parking information, order information, and vehicle information are collected and transported by sensor detection and the wireless network. The proposed infrastructure prevents most security/ privacy attacks. The parking navigation is convenient and efficient. Drivers can view and reserve a parking spot on the fly. The parking process can be a straightforward and non-stop process. From the point of management's view, Smart Parking The proposed system consists of IR sensor, RFID tag and e-valet, server. In this system we are providing an android application to the user. This application will give a graphical view of the available parking slots. IR sensors will do a main role in this care. Since when any car is parked at any position IR sensor will sense that and according to that the changes will be done in graphical view of the application. So IR sensors must have to sense continuously to the parking slot. The user most of the time visit that place can register to take advantages of e-valet facility.

II. RELATED WORK

A. Collecting Occupancy Information

Sensor Flap Parking System is a parking facility in which an occupancy sensor is installed in each parking space.A flap plate for settling a car is raised when a car is parked in the space. This method has an advantage in its ability to exactly sense a parked car, while deployment and maintenance cost tends to be high.

.B. Parking Route Navigation

Chinrungrueng et al. proposed a method based on wireless sensor networks. The system collects parking status information in real-time through wireless sensor networks,and informs each driver of a different parking space. However, the deployment cost of wireless sensors is not low. With the same objective, Tang et al. proposed a method which provides a parking navigation service using low cost sensors. Unfortunately, maintaining this system tends to be troublesome, and this disadvantage cancels out the benefits of the low deployment cost. Lu et al. proposed a smart parking scheme for large parking facility (SPARK) that utilizes vehicular communication technology. With this method, a central server collects the parking space status information using sensors, and locates the position of cars using infrastructure-to-vehicle (I2V) communications. Based on the collected information, the server issues each car with an electronic ticket that assigns a specific parking space to the car. Cars are not allowed to park at spaces that are not specified by the tickets. However, there are two critical problems: (1) In a crowded parking facility, it is difficult to get to the specified parking space, and (2) If drivers do not park at the specified parking space, the system will fail (which we call the *Selfish Driver Problem*).

C. Localization of Vehicle Position

Because GPS cannot be used inside buildings, we need an alternative positioning method in order to locate vehicle position in a multilevel parking facility. Many indoor localization methods have been proposed recently. Some of these are range-based positioning methods based on Received Signal Strength Indication (RSSI) using WiFi, 3G Cellular, etc. Common to these methods is their being based on trilateration: the system estimates the distance between a target object and at least three anchors, according to the RSSIs sent from anchors. The system then estimates the position of the target object by using the distance information and the anchors' positions. The typical estimation error is about 5-10 meters.

III.PROPOSED SYSTEM

Traditional parking system commonly uses security camera, ultrasonic sensors or infrared ray sensors to manage the parking lots. However, these systems are not only expensive but time consuming.

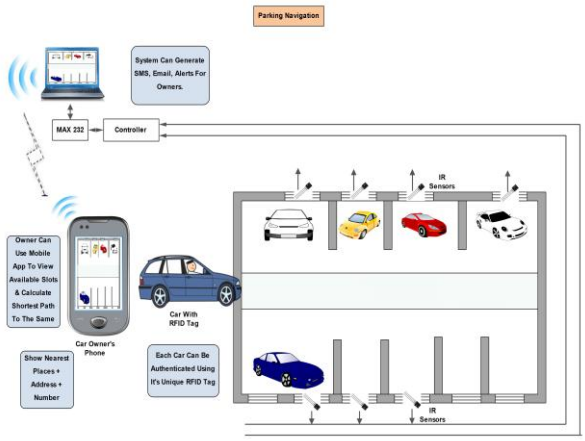
We will compare our system with previous methods listed below:

Random Parking**:** Cars randomly select a target zone. If the car cannot park because the target zone is full, then the car will select the next target randomly.

Billboard Advertising Parking**:** Cars select the most popular vacant zone shown on the billboard as a target zone. If the car cannot park because the target zone is full, then the car selects the next target randomly.

Greedy Parking**:** 50% of cars select the highest popular zone as the target. Even if the target zone is full, the driver does not give up immediately. If a vacant space cannot be found after searching 5 zones, the driver selects the 2nd best popular zone as the next target.

So it is necessary to have a smart parking system. There are two types of car parking systems: traditional and automated. In the long term, automated car parking systems are likely to be more cost effective when compared to traditional parking garages. And for smart parking system IOT is a best option. In this system we are providing an android application to the user. This application will give a graphical view of the available parking slots. IR sensors will do a main role in this care. Since when any car is parked at any position IR sensor will sense that and according to that the changes will be done in graphical view of the application. So IR sensors must have to sense continuously to the parking slot. The user most of the time visit that place can register to take advantages of e-valet facility. For that we will provide RFID tag to user. When a registered user enters the parking place the RFID tag will be sensed and the admin will check whether the user is authorized person or not. Entering time is also saved when the RFID tag is sensed at the arrival of the car. And when car laves the parking area that time is also get calculated according to that charges will be deducted from user's e-valet. For the random user did not registered can see the available parking slots. Also we will provide information to the user about nearest places such as



hospitals, hotels, school etc.

IV . SYSTEM ARCHITECTURE

The proposed method consists of the server part and the vehicle part. The server part is executed on the central server. Based on the information sent from the on-board device on the cars, the server estimates and announces the parking

occupancy information periodically. The vehicle part receives the announcement and finds the route that has the minimum expected time until the car parks.

- **Server Part**

If there is no parking occupancy information available from any external systems, the parking server use following mechanism to obtain the occupancy information.It calculates the probability for the next car entering each zone to find a vacant space in the zone. If the central server detects a car passes through a certain zone, the server assumes that there is no vacant parking space in that zone. Please note that the server cannot know the exact occupancy of the zones or behavior of all cars due to low penetration.

- **Vehicle Part**

When a car enters the parking facility, it finds its position by an existing positioning method based on the RFIDs and Sensor. It then communicate with the central server and finds the parking route. Cars periodically send its position and status (running, parked or leaving a parking space) to the server and receive the parking occupancy information.

V.CONCLUSION

After completion of this project our system will be ready to be used in smart city parking areas which will save the time as well as fuel.

ACKNOWLEDGEMENT

An acknowledgement section may be presented after the conclusion, if desired

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