Smart Vehicular Parking System

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Abstract - *This research paper presents Internet of Things (IoT) oriented smart vehicular parking system with Raspberry pi. The proposed system uses ultrasonic sensor, light emitting diodes(LED) integrated with IoT environment. This technique can overcome the problems of traffic congestion, car parking problems, depending on the availability for smart cities environment system. The availability of parking space is stored and if the parking space is free and unoccupied it can be used by the user through the mobile application and make use of the system effectively and efficiently. This proposed system is efficient and effective for smart cities environment and can be used for various applications for future developments.*

Key Words: *IoT, Parking, ultrasonic sensor, Raspberry pi*

1.INTRODUCTION

Vehicular parking systems in smart cities [1] have undergone great changes with evolution of various technologies considering the fact low cost, complexity of the electronic components and easier usage of the systems by making smart parking[2] more viable for human life. By using context information smart parking can be done where vehicle can be parked with fast search and parking resources[3] and booking of the parking space slots can be made possible[4]. Further Internet of Things (IoT) technology which evolved smart internetworking of devices such as sensors, intelligent devices as that of Arduino, Raspberry Pi can be incorporated and with that smart parking vehicular system with IoT [5]can be effective and efficient system. Incorporation of sensors[6] such as infrared sensors, ultrasonic sensors can also provide a very good efficient system for smart vehicular parking concepts.

Usage of microwave based sensors can also be significant in helping development of smart vehicular parking system where microwave[7] and [8] components operating in frequency ranges of GHz. Microwave signals are transmitted and received with operating ranges which are normally in the frequency ranges for vehicle to vehicle and end user communications on par with ultrasonic sensors which can interconnect various wireless sensors which can be in the form of wireless sensor networks [9], or as that in cognitive radio systems, wireless systems [10] and smart robots[11] for future applications where smart robots [12] are significant. This research paper has sections given by the

proposed system in section II, section III presents the results and discussions followed by the conclusion.

2. PROPOSED SYSTEM

Smart vehicular parking system is suggested in many of research works from [1]-[6]. Systems with ultrasonic sensors are used light emitting diodes(LED) where the red LED will glow and if the green light glows then it indicates the presence of available parking slot which is used.
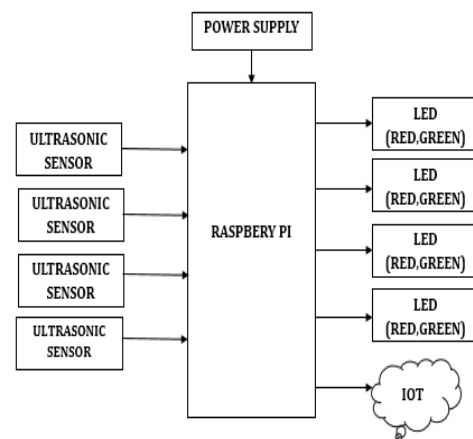

Fig.1 Proposed System Smart Vehicular Parking System

In the proposed system in Fig.1 which is intended to be implemented to be used for smart vehicular parking we have a Raspberry Pi incorporated with IoT like arrangement. The presence of ultrasonic sensors and the LEDs indicate the absence of free parking slot and green light indicate the presence of free parking slot for the users and it will be made known to the Internet of Things(IoT)platform with the available time at which it is free and also the corresponding cost for the parking slot information.

3. RESULTS AND DISCUSSIONS

The results which are obtained for smart vehicular parking for the arrangement considered here is given here. Fig.2 shows the availability of various parking slots and the

corresponding slots which can be edited or it can be entered by the system

Fig.2 Parking Slot availability with Raspberry Pi

With the availability of parking slot registration can be done with the user id which can be email id information and password information can be viewed to view its status as shown in the Fig.3.

Fig.3 Smart Parking Login Information details

Further, the booking information for a intended user parking slot can be done as shown in the following Fig. 4, with details of information such as date from the required time till the end time and it has to be submitted.

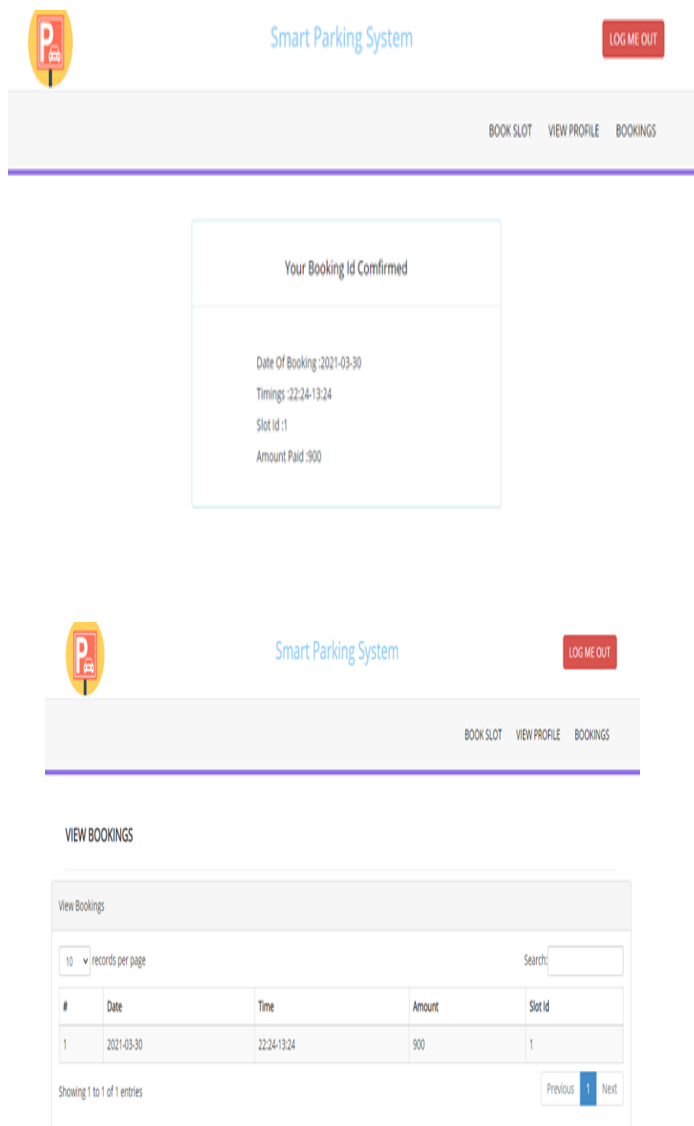Fig.4 Booking Details information of Smart Vehicular Parking

Fig. 5 Payment Details, Confirmation and View Booking details for Smart Vehicular Parking System.

Fig.5 shows the Payment details for Smart Vehicular Parking where payment processing is done by using payment process and confirmation of parking slot along with the amount can also be viewed by the user so that making the entire system more efficient and effective which can be compatible for smart vehicular parking .

CONCLUSION

Vehicle parking system is very significant as it is essential for commercial, domestic and personal transportation for human life. Though ample provisions are available for parking vehicles in cities, smart vehicular parking is essential with low cost and needs to be effectively done as per the proposed system arrangement of ultrasonic sensors incorporated with LEDs and Raspberry pi. Based on this system future applications can be used for smart vehicular parking systems.

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