Management & Control of Parking Space In Smart Cities

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Abstract-*In large busy cities, finding an empty parking slot is a time taking task. We are also unaware of the existing parking slots in the necessary area. Therefore in this paper, we have proposed a Smart parking system, in which we will maintain a central server, where information about the registered parking slot is stored. This system proposes a safe and efficient parking system which will work on sensor communication and secured wireless network. The central server will also maintain the count of the empty slots in the parking facility and will show it to the user.*

We are using GSM module in this system, which will continuously provide the real time data to web link. Link consists of information of the nearby parking zone. User has to feed data in link after which they'll be receiving their allotment code which is to be shown to the admin at the time of parking. Therefore the time of user is saved along with the less fuel consumption and increased authenticity.

Keywords-Weblink, IR Sensors ,GSM Modem, Microcontroller.

I. INTRODUCTION

In major cities, there are inadequate parking areas which consequences in traffic blocking, air pollution and also irritation of driver. Also in huge parking area, a driver may way out lacking the Information of the new existing parking that has just become free. But if a new car gets parked before the driver reaches, which eventually leads to driver dissatisfaction. The driver does not have awareness about the existing available space before entering the parking facility. Also if the car gets trapped in the traffic blockage, it will take extra time to come out of that area.

In this system, we suggest a system that can find available space for parking with ease. We propose a central server that preserve database about the registered parking areas. It also retains the count of free space in the parking facility and shows it to the user. So the user can simply take judgment based on the nearby parking vacant. To overcome these problems we had designed smart parking system for smart cities by using web link. These systems provide quick response to every user and also the parking area information quickly updated. For on-spot registration there is some vacant space and the web page is specially designed for our smart parking system area.

II. IMPLEMENTATION

In first step, user has to select their parking slot in a webpage. In second step user has to feed data in the page. In third step user has to book the slot for parking of their vehicle. After booking user will gate an acknowledgement from the server consist of user name parking slot number and confirmation code. At the time of parking, user has to show that code to the admin, then he will update the information on the weblink, then the vehicle is allowed for parking. When vehicle is parked, the IR Sensor send an information to the microcontroller and microcontroller console the message and send real time data to main server along with the led at the parking slot will blown which is an acknowledgement for user, that your vehicle is parked.

A.HARDWARE COMPONENTS:

1. Micocontroller PIC16F876A: 8 bit microcontroller. It has 8-bit bidirectional ports that are A,B,C.It has inbuilt UART for serial communication.

2. GSM Modem: GSM gives secured and long distance wireless communication. It will update the real time data over main server. Advantage of using this modem will be that you can use its RS232 port to communicate and develop embedded applications. Applications like SMS Control, data transfer, remote control and logging can be developed easily.

3. Sensors: We use Infrared Sensors for car detection in the parking zones. Each of the sensor nodes determines the occupancy status of a parking space without regard to the types of sensors involved. The sensor nodes should read sensor data at a relatively high sampling rate to tell whether a car is entering or leaving a parking space. As soon as vehicle is parked, the sensors sense data and send it to microcontroller which will send the data through the GSM modem to the server.

4. PC: It will be available on server side for maintaining the database of the registered parking slot and also the count of the vacant available spaces.

5. Mobile: Mobile number is required for the confirmation message consist of booked parking slot number, user name and confirmation code, which is used to show at the time of parking. If confirmation code match with the database operator will allow the user to park his vehicle.

B.SOFTWARE COMPONENTS:

1. MPLAB IDE V8.56: The MPLAB IDE software brings an ease of software development previously unseen in the 8/16-bit microcontroller market. The MPLAB IDE is a Windows based application and is used to dump the program to programmer kit using pickit2.

2. Terminal Software V1.9b: this software is used to connect programmed microcontroller to GSM modem via transmitter and receiver pin. Using AT commands we can transmit and receive data.

C.OBJECTIVES:

1. Install the parking application on the client side.

The user needs to install the parking application on his/her Android phone.

1. Register to system for parking.

There is necessary to register by feeding required data on the link.

2. System generates the information and update database of register user and after booking confirmation message is received by the user

3. User can check the availability of parking slots.

The system maintains the availability of the vacant parking slots in the parking zones.

4. Maintains the status of the car.

The system maintains the status of the car entering the parking zones, whether the car is entering or exiting the parking.

IV.SYSTEM ARCHITECTURE

1. First step, user has to select their car parked slot in a webpage. Hence every user has to make this only by an internet access.
2. Second step, user has to enter his name, vehicle type, vehicle number, mobile number and parking time in the webpage.
3. Third step, user will get a confirmation message consists of user name, parking slot number and confirmation code.
4. Fourth step, user has to show that confirmation code to the operator along with billing, this will reduce the wastage of paper.
5. When user leaves the parking slot, the operator updates the weblink by selecting unpark option. In this way the safe parking is done which reduces consumption of petrol , wastage of paper and less timing to park vehicle.

V. WORKING

1. Server Part:

The system contain the hardware part GSM Modem, IR sensors, microcontroller. There are parking slots in which the IR sensors are to be placed in every slots. The time in which the user want to parked the car he will easily find the available parking slots in zone by using the parking user window. He canuse this link on PC as well as on mobile with internet access.

2. User part:

User can easily view the available parking slots on their mobile or PC. Yellow slot indicates the slot is booked, red slot indicates the slot is full and green slot indicates the slot is empty.In second window, user have to add required data. Then user will receive confirmation message with code. The code is required at the time of parking. The message is shown below:

Fig 1. Available parking slot

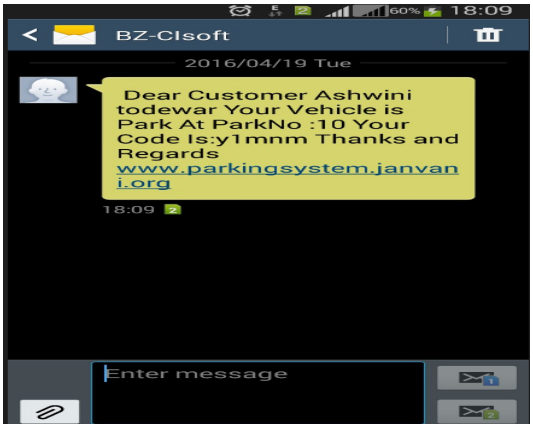

Fig 2: confirmation message with code

VI. STRENGTH

1. In this system, we solve the problem of traffic congestion.
2. We propose a system that can easily find vacant space for parking.
3. We design a central server that maintains information about the registered parking zones.
4. It also maintains the count of vacant space in the parking facility and broadcast it to the user. So the user can easily take decision based on the nearest parking available.
5. Hence we have reduced the time required for parking efficiently.

VII. FUTURE SCOPE

The future scope to adopt this automatic Smart Parking System (SPS) so that availability of spaces could be displayed on a smart phone Application or even to satellite navigation device so that drivers will always aware of whether there are free spaces are not. And also enhance to send some notifications to users smart phone when vehicle enters to particular shopping places and some streets in a city etc.

VIII. CONCLUSION

We have proposed a smart car parking system to make easy and efficient use of car parking area. This system efficiently detects the empty parking slot and updates the information on the web page specially designed for respected parking area. In this project with this smart parking system, vehicles can fast enter the parking slot without manually scanning the parking permit. This parking system will also help users view the availability of the parking space in mobile. Therefore, this system helped user reduce the wasting time of search parking slot and also improve the parking slot utilization.

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