



International Journal of Innovative Research in Computer and Communication Engineering

(An ISO 3297: 2007 Certified Organization)

Website: www.ijircce.com

Vol. 5, Issue 4, April 2017

Energetic Android Based Parking Management System

B.Charanya^{#1}, C.Ranjani^{#2}

PG Scholar, CSE, Sri Ramakrishna Engineering College, Coimbatore, India^{#1}

Assistant Professor, CSE, Sri Ramakrishna Engineering College, Coimbatore, India^{#2}

ABSTRACT: Parking inconvenient is the major problem in most of the cities. Parkers cannot find the parking place as easily as they would like. To overcome these problems drivers need the advantage of new technology that solves the inconvenient in parking. Using those technologies they can easily parked the vehicles smoothly, paid easily. The traffic congestion is occurring due to the number of vehicles is greater than the available street capacity. The proposed system decreases the traffic congestion in main cities using the most recent developing and user friendly android application. Smart parking reduces the car emission in urban areas by reducing the need for people to needlessly circle city blocks searching for free space. It is implemented by using hardware and android application. So the user can lock the parking area easily using their mobile. Thus the performance of the proposed system shows that the detection of the vacant space for parking is accurate and more efficient.

KEYWORDS: Parking inconvenient, android application, smart parking.

I. INTRODUCTION

The Internet of Things is the internetworking of various physical devices, vehicles, buildings and other items-embedded with software, sensors, electronics, actuators, and network connectivity that enable these objects to collect data and also exchange data. Now a days the main problems in cities are traffic congestion due to unavailability of free spaces to park vehicles. Most of the traffic congestion is caused by people cruising for parking, mainly in major cities drivers spend between 3.5 to 14 minutes searching to find for a space each time they park. It is an impact of transport development. The unavailability of free space in urban areas has increased the Demand for parking space especially in Metropolitan cities. This leads to a great Economical impact. The proposed work introduces a concept of new parking reservation system and to reduce the traffic congestion. The android as well as web application is used to increase the efficiency of reserving the parking lot

In major cities the traffic congestion occurs due to insufficient free space to park the vehicles. In [13] it introduces Parking management system based on Wireless Sensor Network. In this paper they are using Infrared sensor nodes (IR Sensor) used to sense the status of the free space and transfer the status to the AVR controller. AVR sensor senses the parking status and display the status in the LED screen; it helps the driver to find the vacant space so it reduces the traffic jam. In this paper they are using Wireless Sensor Network for a parking system without entering into the parking lot area. This system helps the driver to reduce the roaming time for searching the free space to park the vehicle. A wireless sensor network is a collection of various nodes that are organized into a cooperative network. Each node in the network consists of processing capability and also contains multiple types of memory, RF transceiver, power source and various actuators and sensors. Wireless sensor network is the fast growing technology that are widely used in various applications such as medical applications, transportation, military uses, smart environment applications, entertainment.

The advantage of using this method is the customer can determine the space availability and free spot to park the vehicle, and also reduce the traffic congestion.

The method [12] is implemented using wireless sensor network. In [9] they are using the combination of two sensors that are ultrasonic sensor and magnetic sensor. These sensors provide an accurate detection of vehicles in the



International Journal of Innovative Research in Computer and Communication Engineering

(An ISO 3297: 2007 Certified Organization)

Website: www.ijircce.com

Vol. 5, Issue 4, April 2017

parking lot and also reliable. They are introducing a modified version of min-max algorithm to detect the vehicles using magnetometers. Ultrasonic sensor with magnetometers provides an accurate result of vehicle detection.

The advantage of this method is to provide analysis of various sensor characteristics and produces an accurate result of parking availability. The limitation of this method is the energy consumed by the sensor node is high.

In method [11] the SMS (Short Message Service) to solve the parking problem and reduce the time to chase the free space to park the vehicle. In SMS based parking system they are using micro-RTU (Remote Terminal Unit). Micro-RTU is a wireless communication instrumentation device used to send the SMS. It will send the confirmation of booking details of reservation by providing password and parking lot number. This system is fully automated by using Peripheral Interface Controller (PIC). This will help to storing information of free parking spaces; provide passwords to lock the place. The Micro-RTU will generate the request and replay SMS to the user. The SMS system data transmission was carried out using GSM (Global System for Mobile Communication) antenna.

The advantage of this system is the customer can reserve the parking lot before entering in to the parking area using short message service (SMS). This method is fully automatic and more secure.

In method [4] they are implemented using Raspberry pi it is based on the parking sensor. Parking sensor contains pi-camera used to detect the free parking space and the information is stored in the data server. The pi camera is placed on the street light posts or ceiling of the parks. Camera is helpful to check whether the parking lot is free or not. The advantage of this system is helpful to reduce the traffic congestion in the metropolitan cities.

In method [9] they are implemented using wireless sensor network, parking space consists of sensor node. Sensor node equipped with 3-axis Anisotropic Magneto Resistive (AMR) installed in the center of the parking space. The sensor node is powered by batteries. The AMR sensor values are measures periodically using the sensor nodes. When the sensor values are varied abruptly the values are transmitted wirelessly. The data from various nodes are received by server through sink node and a gateway. A server can analyze whether the parking space is occupied or free and maintained the values in the server.

The advantage of this method is the sensor nodes do not need to perform computations for determining whether or not corresponding parking spaces are occupied. The limitation of this method is it is more sensitive to interfering magnetic fields.

II. PROPOSED SYSTEM

Identifying and parking the vehicles in the free space is more difficult now a day. It is happened due to increasing the number of vehicle in the urban areas. People cannot find the free space to park their vehicle without any interruption. To avoid this kind of inconvenient the proposed system is implemented using android application and arduino board. The parkers can register their details and park their vehicles easily without getting any inconvenient. It will avoid the parker's time to circle the city to find the vacant space for parking. It will be implemented and explained below. The components used in the implementation phase are ULTRASONIC SENSOR, LCD DISPLAY, ARDUINO BOARD, and BLUETOOTH.

The proposed system consists of three modules

- Registration of Vehicles
- Vehicle Detection
- View and Reserve Parking Details

The architecture diagram is given in Fig.1.

International Journal of Innovative Research in Computer and Communication Engineering

(An ISO 3297: 2007 Certified Organization)

Website: www.ijircce.com

Vol. 5, Issue 4, April 2017

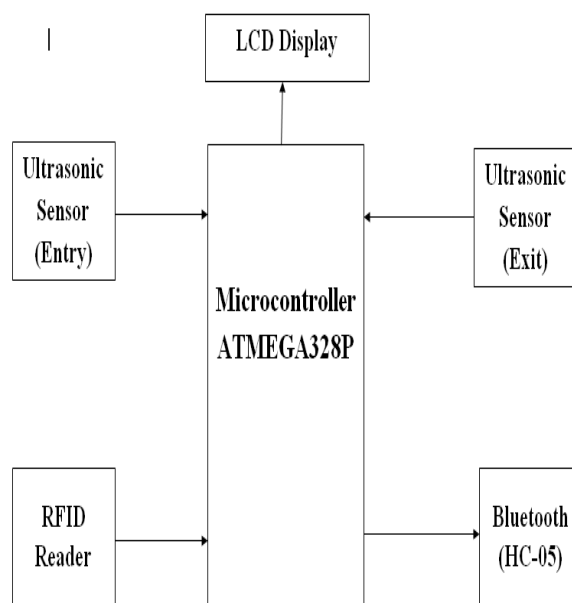


Fig.1. Parking System architecture

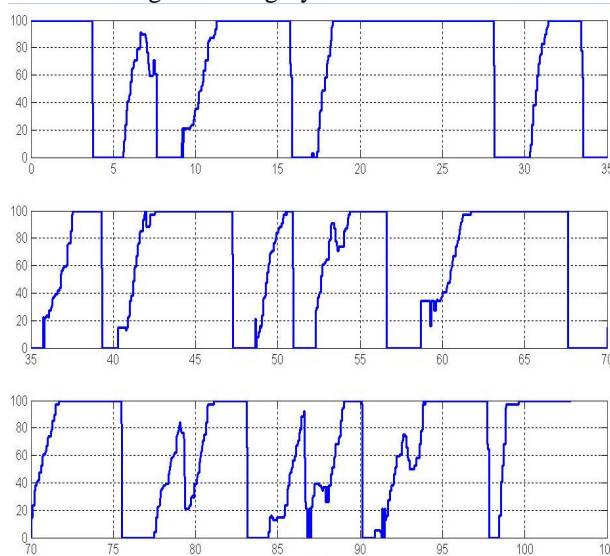


Fig.1 (a). Parking Summary for 3 Days Cost Vs Time

I. Registration of Vehicles

Parkers before entering into the parking area, they can register their details and their vehicle number using Bluetooth. Here using a HC-05 Bluetooth module is an easy to use Bluetooth Serial Port Protocol (SPP) module. It is designed for transparent Wireless serial connection setup. Using Bluetooth module the connection is established between the parker's mobile devices and the hardware devices.

International Journal of Innovative Research in Computer and Communication Engineering

(An ISO 3297: 2007 Certified Organization)

Website: www.ijirccce.com

Vol. 5, Issue 4, April 2017

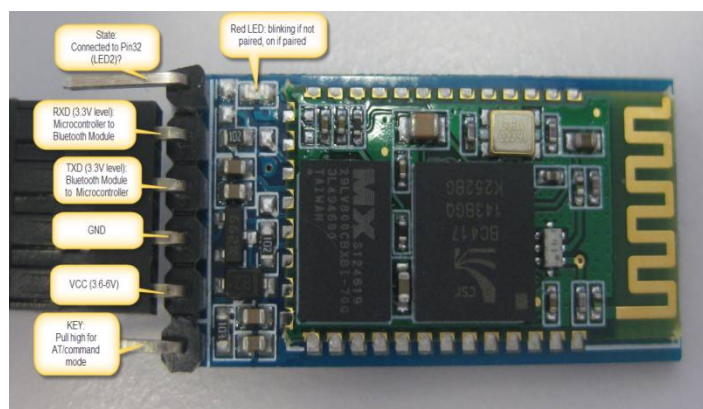


Fig.2. HC-05 Bluetooth

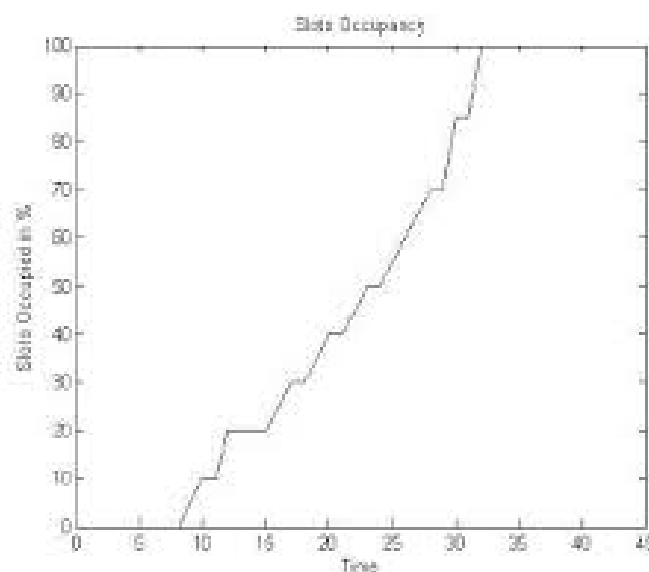


Fig.2(a) Lane/Slot Occupation Status

II. Vehicle Detection

Parking area is having two ultrasonic sensors. One sensor is fitted in the entrance of the parking area. Another sensor is fitted in the exit area. If the vehicle entered into the parking area it will be sensed by the ultrasonic sensor. The sound wave emitted by the sensor is used to identify the vehicle entered into the parking area. Parkers can register their vehicle details in the registration page using their android mobile. The registration details are saved in the server if the vehicle entered into the parking area it will be sensed by the ultrasonic sensor and the register slot will be filled. Then the other parkers cannot be used the same lane to park their vehicle.

International Journal of Innovative Research in Computer and Communication Engineering

(An ISO 3297: 2007 Certified Organization)

Website: www.ijircce.com

Vol. 5, Issue 4, April 2017

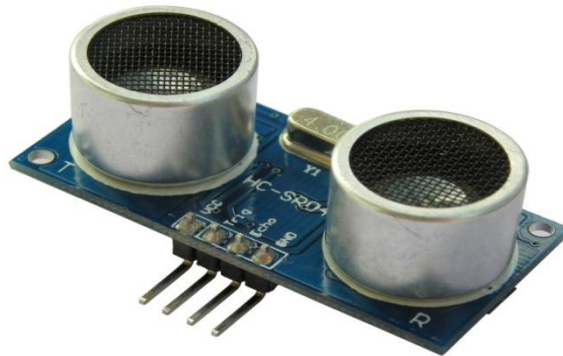


Fig.3. Ultrasonic Sensor

III. View and Reserve Parking Details.

Parkers can view their parking details using their mobile. Parkers can register their number and their details such as name, address, city, mobile number and their email address along with their vehicle number these details are saved in the server. In parking page the parkers can select their lane and their respective position. The LCD display is placed at the parking area if the vehicle is entered into the parking slot it will display the status that is car in and out status.



Fig.4. LCD Display

III. RESULTS AND DISCUSSION

The prototype of the proposed system is given in the following figures. Fig. 5 depicts the overall design of the parking management system.

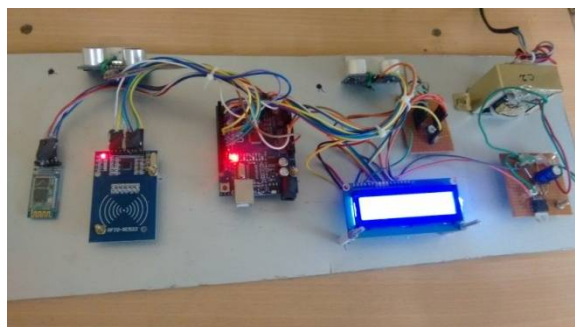


Fig. 5 Parking Management Prototype

The android application is developed to lock their parking area using their mobile itself. The design of the application is given in the fig. 6.



International Journal of Innovative Research in Computer and Communication Engineering

(An ISO 3297: 2007 Certified Organization)

Website: www.ijircce.com

Vol. 5, Issue 4, April 2017

The parkers can connect their Bluetooth device with HC-05 Bluetooth device to register their details. The connectivity page can be depicted in fig. 7

The registration page consists of the RFID no, name, address, mobile number, mail id, and vehicle number. Fig. 8 describes the registration page.

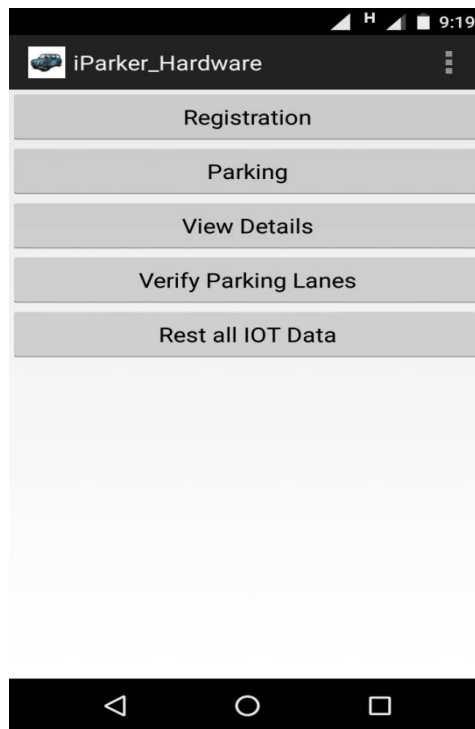


Fig. 6 Design of android application

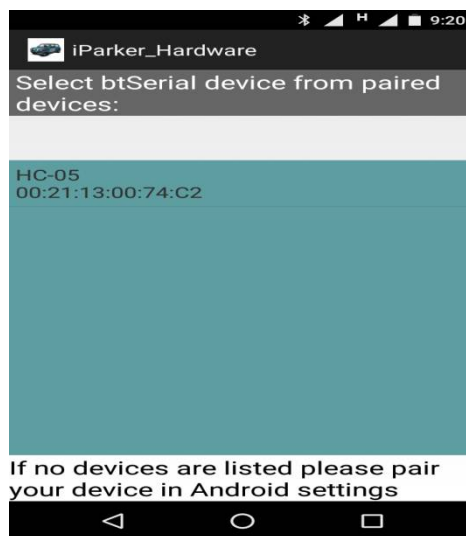


Fig. 7 Bluetooth connectivity



International Journal of Innovative Research in Computer and Communication Engineering

(An ISO 3297: 2007 Certified Organization)

Website: www.ijircce.com

Vol. 5, Issue 4, April 2017

RFID No

Name

Address

City

Mobile

Mail

Vehicle Number

Save

If no devices are listed please pair your device in Android settings

Fig. 8 Registration page

Verify Lane Status

LANE-1

Total Cars Parked in Lane
2

Current Position
3

Back

Fig. 9 Verify Lane status

Fig. 9 describes the lane status.



International Journal of Innovative Research in Computer and Communication Engineering

(An ISO 3297: 2007 Certified Organization)

Website: www.ijircce.com

Vol. 5, Issue 4, April 2017

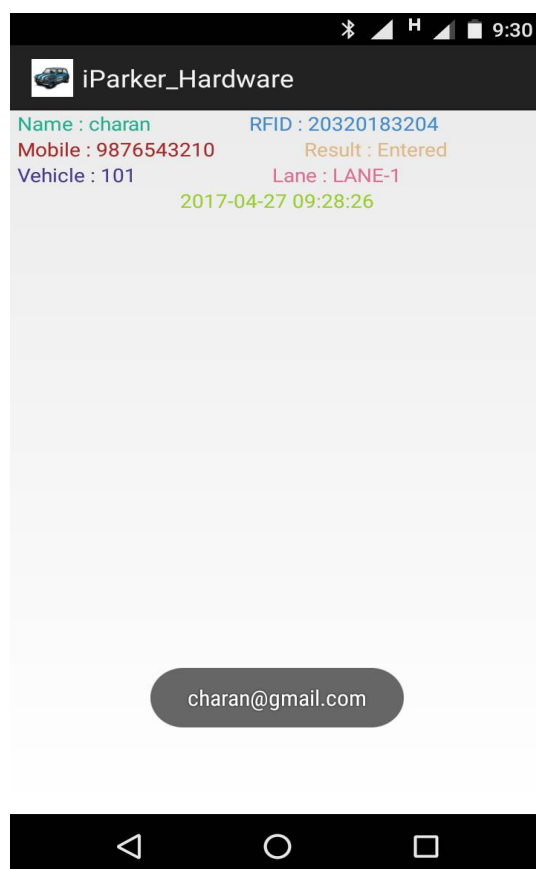


Fig.10 View lane status

Fig. 10 describes the lane status, when the vehicle is parked and the status of the vehicle whether it is entered state or exited state. It also displays the date and time.

IV. CONCLUSION

It can be inferred from the above results that the proposed system is accurate and more efficient in detecting the free space to park the vehicle. The proposed system is economically low cost, easy to use and the maintenance cost is less. The android based parking management system is easy to use and reduce the parker's time to park the vehicle. The vacancy could be updated in the server based on the occupancy. This method reduces the pollution, traffic congestion and helps the drivers to save their time.

REFERENCES

- [1] Albert Domingo, Boris Bellalta, Manuel Palacin, Miquel Oliver and Esteve Almirall, "Public Open Sensor Data: Revolutionizing Smart Cities", IEEE Technology And Society Association, Vo.32, no.4, pp.50 – 56,S 2013.
- [2] Antoine Bagula, Lorenzo Castelli and Marco Zennaro, "On the Design of Smart Parking Networks in the Smart Cities: An Optimal Sensor Placement Model", Vol. 15, no.7, 2015 doi: 10.3390/s150715443. Online source:www.mdpi.com/journal/sensors edition, 1 July 2015.
- [3] Arshdeep Bahga and Vijay Madiseti, "Introduction to IoT" in "Interest of Things A Hands-on Approach", Orient Blackswan Private Ltd, First
- [4] Basavaraju S R, "Automatic smart parking system using Internet of Things (IoT)", International journal of scientific and research publications, Volume 5, Issue 12, December 2015, 2250-3153.
- [5] Civitas.in, "Parking Law in India", 13 Mar 2012[online].Available:http://www.civitas.in/legal_solutions/articles/16/parking_Law_in_India [Accessed: 20-02-2016]



ISSN(Online): 2320-9801
ISSN (Print): 2320-9798

International Journal of Innovative Research in Computer and Communication Engineering

(An ISO 3297: 2007 Certified Organization)

Website: www.ijircce.com

Vol. 5, Issue 4, April 2017

- [6] Digi.com, "XCTU:Next Generation Configuration Platform for XBee/RF Solutions"[Online]Available:http://www.digi.com/products/xbee-rfsolutions/xctu_software/xctu[Accessed: 2-03-2016]
- [7] Jae Kyu Suhr, Ho Gi Jung, "Sensor-Fusion based vacant parking slot detection and tracking", IEEE transactions on intelligent transportation systems, vol. 15, no. 1,pp.21 – 36, 2014.
- [8] Jun Xing, Qi Zeng, "A Model Based Vehicle Detection and Classification Using Magnetic Sensor Data", M.S Thesis, Department of Signals and systems, Chalmers University of Technology, Goteberg, Sweden, Repor EX075/2007.
- [9] Jung-Ho Moon, Tae Kwon Ha, "A car parking monitoring system using wireless sensor networks", International journal of electrical, computer, energetic, electronic and communication engineering, Vol:7, No:10, 2013.
- [10] Mala Aggarwal, Simmi Aggarwal, R.S.Uppal, "Comparative implementation of Automatic Car Parking System with least distance parking space in wireless sensor network", International Journal of Scientific and Research Publications, Vol.2, no.10, pp. 2250-2254, 2012.
- [11] Noor Hazrin Hany Mohamad Hanif, Mohd Hafiz Badiozaman, Hanita Daud, "Smart parking reservation system using Short Message Services (SMS)".
- [12] Sangwon Lee, Dukhee yoon, Amitabha Ghosh (2009), "Intelligent parking lot application using wireless sensor networks".
- [13] Satish V. Reve ,SonalChowdri (2012), "Management of car parking system using sensors", International journal of Emerging Technology and Advance Engineering volume 2, Issue 7.
- [14] Zusheng Zhang, Ming Tao, Huaqiang Yuan, "A Parking occupancy detection algorithm using AMR sensors", IEEE SENSORS JOURNAL, Vol. 15, no. 2,pp.1261 – 1269, 2015