Android Application Development for Parking System

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Abstract— Android Application Development for Parking System is an Android App which will be helpful for vehicle owners to park their vehicles. In the current system, activities are performed by Admin at the Server side and Mobile app at the client side or by the user. The system provides secure parking with the help of registration and login for the system through Android App and with the RFID Tag or RFID Card. It also provides the parking view for users on Mobile App through which user can register a particular parking slot which is available. Once the registration is done, the user can use its RFID Tag/Card at various parking places due to its unique identification where the system is available. This system reduces the traffic congestion at parking places through Slot Allocation Method.

Key words: RFID - Radio Frequency Identification

I. INTRODUCTION

Now a days, as the population increased in the metropolitan cities, the usage of vehicles increased at highest level. It causes problem of parking which leads to traffic congestion, driver frustration, and air pollution. When we visit the various public places like Shopping malls, multiplex cinema hall & hotels during the festival time or weekends we face more parking problem. In the recent research found that a driver takes nearly 8 minutes to park his vehicle because he spent more time in searching the parking slot. This searching leads to upto 50% of traffic congestion. In this project, we are going to reduce traffic congestion problem. Also to do secure parking using the smart parking under Slot Allocation method with the help of an Android application. RFID application is used to deduct the amount for parking charges with the help of the RFID tag which will calculate the IN & OUT Time of the specific Parked Vehicle. The main contribution of our proposed systems is to find out status of the parking area and provide secured parking slot to user.

II. LITERATURE SURVEY

A. Prof. R. S. Sandhya Devi, Dr. V. R. Vijay Kumar, S. Sridevi."Application Development for Reservation Based Parking Slot Allotment and Management System Android. App"

To increase the standard of living and for better transportation means, people own vehicles. Increase in vehicles increases the complexity of traffic and parking. Parking of vehicles is becoming a major problem in day to day life. This paper presents a design and implementation method of a smart car parking technique for less time consuming car parking using mobile application. The system is designed to identify the empty slot automatically by a proximity sensor and to park the car at the corresponding slot for a particular time period by using RFID, GSM.

B. Luca Mainetti, Luigi Patrono, Maria Stefanizzi, Roberto Vergallo. "A Smart Parking System on the basis of IoT Protocols and Emerging the Enabling Technologies."

This paper presents a novel Smart Parking System based on the jointly use of different technologies, such as RFID, WSN, NFC, Cloud and mobile. It is able to collect the environmental parameters and information about the occupancy state of parking spaces and to direct drivers to the nearest vacant parking slot by using a customized software application. This last one leverages a NFC-based e-wallet system to allow users to pay for parking fees. Furthermore, a customized software application, installed on a cloud platform, is able to manage alert events e.g.Theimproper use of a reserved space of the purchased time. In such cases, it informs the traffic cops through an Android application, which has been designed adhoc for the considered scenario.

C. Rosarieo Salpetro, Luca Bedogni, Marco Di Felice, Luciano Bononie."Park Here! A Smart Parking System on the basis of Smartphones, Embedded Sensors and Short Range Communication Technologies."

The paper provides the presence of vacant parking slots in real-time of Advanced smart parking systems by describing Park Here!, a novel mobile application that aims at mitigating the overhead caused by parking slots seeking operations in urban areas. It targets the common city environments, where no per slots sensors are available and there is no remote service allowing the reservation in advance of a parking slot. For this scenario, a novel algorithm for the automatic detection of parking actions performed by the users through the analysis of the smart phone embedded sensors and of Bluetooth connectivity. Once a parking event has been detected, an adaptive strategy allows disseminating the information over the target scenario, using a combination of Internet connection to connections over Wi-Fi Direct links.

III. SYSTEM ARCHITECTURE

In this System, the Admin operates at the Server Side, User at Android Mobile Application. Admin adds the Functionalities according to Parking Area and Parking Slots.

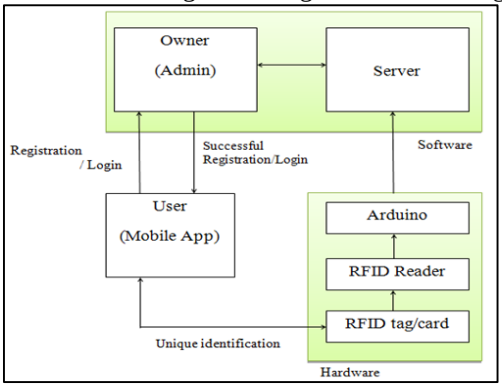

Fig.1: System Architecture

Admin can add functionalities as city, number of slots, two wheeler parking, and four wheeler parking. The continuous interaction should be done with vehicle owner therefore, Admin manages the Database and Update database. System operates on Eclipse which supports the Tomcat version 8.5. MySQL supports to update database and saving it too. User Registers to the System through the Android Mobile app, and then further Login. The parking area and parking slots are viewed on the app through which user can select the slot for parking vehicle. User taps the RFID tag or RFID Card on RFID Reader and at the server side admin updates database. RFID Reader when tapped at out time then server calculates the IN &OUT time and deduct the parking charges. User receives the message of deducting charges. The Bill is generated according to specific time of parking.

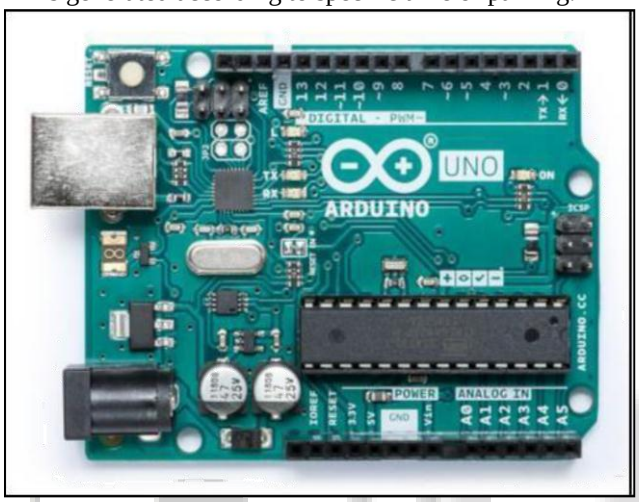

Fig. 2: Arduino UNO

Arduino Uno is a microcontroller board mostly used because of following advantages. It has 14 digital input/output pins (of which 6 can be used as outputs), 6 analog inputs, a 16 MHz quartz crystal, a USB connection, a power jack, and a reset button. It contains everything needed to support the microcontroller, simply connect it to a computer with a USB cable or else power it with an AC-to-DC adapter or battery to get started. You can work with your UNO without worrying too much about doing something wrong, worst case scenario you can replace the chip for a few rupees and start over again.

Fig. 3: RFID Tag

Radio Frequency Identification (RFID) is of radio waves to read and capture information stored on a tag attached to an object. A tag reads from several feet away and does not need to be within direct line-of-sight of the reader to be tracked.

RFID tags are made up of two main parts. First one is an antenna, which receives radio frequency (RF) waves. Second is an integrated circuit (IC). This is used for processing and storing data also modulating and demodulating the radio waves received from or sent by the antenna.

A Radio Frequency Identification tag is also known as a RFID chip respectively. The RFID tag or RFID card consist of a unique identification code. The RFID tag interacts with the RFID reader. RFID reader burns the code when RFID tag is tapped. The server and RFID reader interacts with each other and recognizes the user's identification.

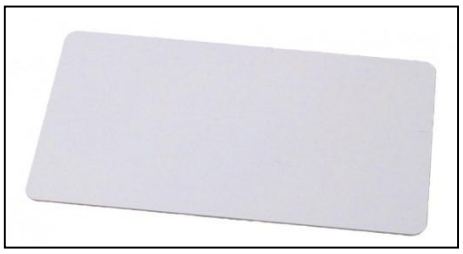

Fig.4: RFID card

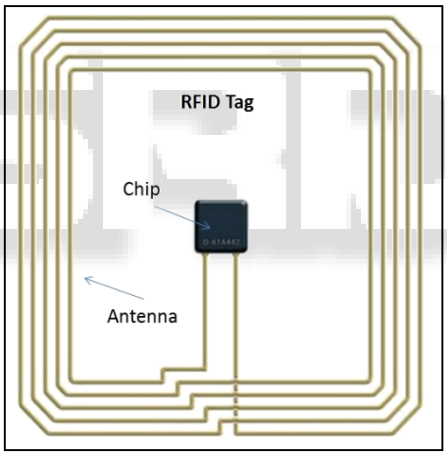

Fig.5: Internal Structure of RFID card

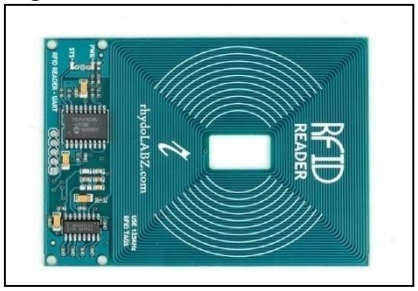

Fig.6: RFID Reader

A radio frequency identification reader which is known as (RFID reader) is a device used to gather information from an RFID tag. It is used to track individual objects. Radio waves are transfers the data from the tag to a reader.

The RFID reader transmits the radio frequency signals continuously on or upon powering. When an RFID tag is placed inside the range area of a reader then it energizes the

tag through electromagnetic induction and it thoroughly collects the information from RFID reader respectively.

IV. IMPLEMENTATION DETAILS

A. Server:

- Admin Login or sign in - At the server side admin operates the whole functionalities regarding to the System. Admin adds the functionalities such as city, place name, Two Wheeler place Four Wheeler Place, number of parking slots are updated by admin as per the area of parking. On filling up the functionalities admin updates the database as per the changes and logout.
- The system operates on Eclipse which relatively includes Tomcat 8.5 version and supports at run-time.
- MySQL supports for saving the database and updating the same.
- HTML is the Hyper Text Markup Language which is used as the front-end language. It is used for generating Web-Pages. Web-Pages are text files. The Key to the particular Hypertext is the use of hyperlinks. It is used to present the information in LAN /WAN.
- CSS is the Cascading Style Sheet is a style sheet language used to describe the presentation of a document written in a language. The most common application of CSS is to style the web pages written in the HTML.
- The RFID tag or RFID card consist of a unique identification code. The RFID tag interacts with the RFID reader. RFID reader burns the code when RFID tag/card is tapped.
- The server and RFID reader interacts with each other and recognizes the user's identification.

B. User App:

- Registration Of user.
- Login Details.
- Selection of parking area and slots.
- IN time and Date.

V. RESULT AND DECISION

Slot allocation is implemented using web application for the parking system.

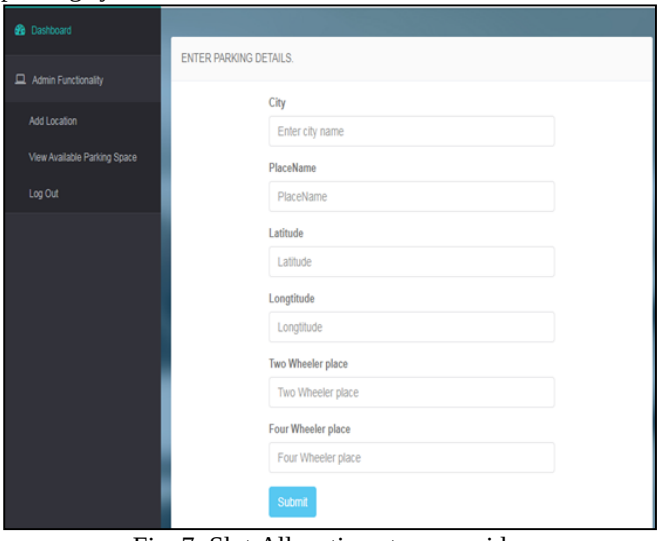

Fig. 7: Slot Allocation at server side

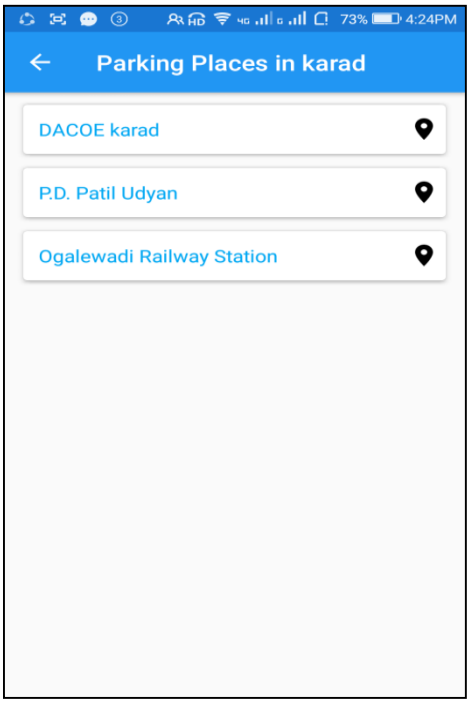

Fig. 8: Select Place

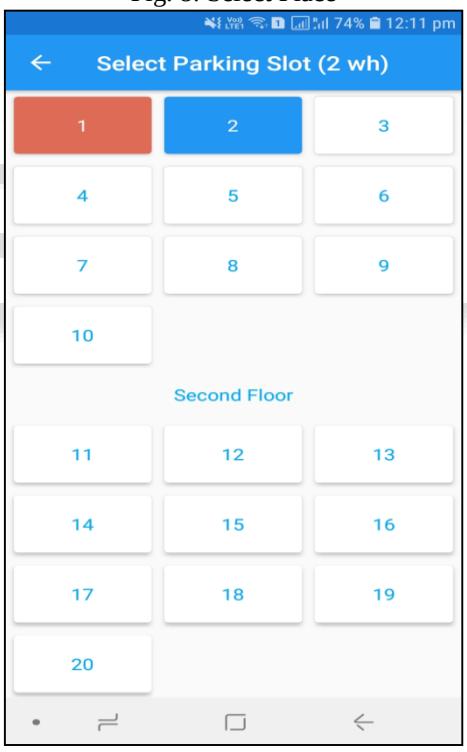

Fig. 9: Select Slot

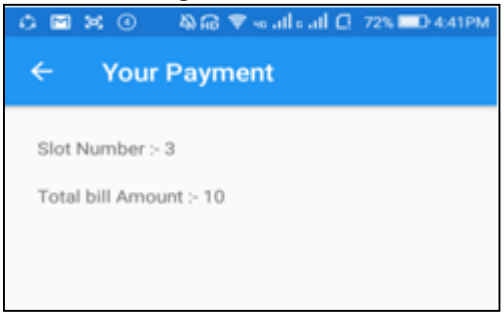

Fig. 10: Show Bill

VI. FUTURE SCOPE

For the Future work, the Google Wallet can also provide the fastest, efficient and more secure payment. Our System can be used at the present parking systems at malls, at railway stations, near the airports, at the thetres etc. as an efficient means to park. In future our application can be implemented on the existing system like iOS, Windows. etc.

VII. CONCLUSION

An efficient way to park vehicles using recent technology. This app allows to user to take control of the parking decision unlike tradition method by trying several parking spaces physically. Even if a user is in new place this app is user friendly so that people of all age groups can use it easily.

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