ABSTRACT
Smart Parking Allotment system is an Android Application which allows you to book a parking slot in the desired area in advance. Parking is limited in almost every metro city and number of vehicles is increasing day by day. With our system parking allotment can improve parking space utilization and reduce driver’s frustration. This application uses Google maps and GPS to find the nearby parking area and also know its vacancy. Our system reduces average time to find a parking space whereas overall parking capacity is more efficiently utilized.

Keywords— Parking slots, Google maps, Booking, Unique code, Android Application, GPS, Fare.

I. INTRODUCTION
In today’s world, with increase in the number of cars, finding a vacant place in a congested area or a large parking lot, specially, in peak hours, is always time consuming and frustration to the drivers. The goal of the project is to fill the near term parking demand using GPS network and Android application. This project will help to provide real time parking allotment service to drivers, friendly parking information dissemination service to the drivers means the drivers can easily and quickly get their preferred parking lots close to their destination. Thus, parking navigation is convenient and efficient, and increases the space utilization in the parking area. Our system provides the parking vacancy to user who requests for the parking information proximate to his destination.

II. EXISTING SYSTEMS
2D Range Data for Detection of Parking Spots:
Jifu Zhou, Navarro-Serment, L.E., “Detection of parking spots using 2D range data”[1] addresses the problem of reliably detecting parking spots in semi filled parking lots using onboard laser line scanners. They have proposed an algorithm that can detect vehicles form laser range scans of vehicle bumpers. AdaBoost is used to detect vehicle bumpers. AdaBoost train a classifier based on relevant geometric features of data segments that corresponds to car bumpers. The detected bumpers are considered as landmarks for vehicle hypothesis and algorithm constructs a topological graph representing the structure of the parking space. Spatial analysis is then performed to find the vacant places.

a. Using RFID Technology for detecting vacant parking slots
K. Ganesan, V. Vignesh, “Automated parking slot allocation using RFID technology Signal Processing and Its Applications”[2] uses RFID Readers connected with the computer that reads RFID tags fitted on the vehicle. This system requires a passive RFID tags and two RFID readers operating at high frequencies whose sensing range is about 10 meters at the entry and exit point of the parking slots. The RFID tags stores an Electronic Product Code. The slots availability details are connected using an RFID system and an updated periodically into a web server via internet for a registered user.

b. New “Smart Parking ” System based on Resource Allocation and Reservation
Yanfeng Geng, Cassandras, “New Smart Parking System Based on Resource Allocation and Reservations”[3] is an IEEE paper for urban environment that assigns and reserves an optimal parking space based on drivers cost function that combines proximity destination and parking cost. This proposed system takes a basic structure of PGI has one component. This approach solves a mixed-integer linear programming at each decision point defined in the time driven sequence. Based on stimulation results, compared with uncontrolled parking processes, this system reduces average time to find a parking space and parking cost.

III. DRAWBACKS OF EXISTING SYSTEMS
Till today, many parking allotment systems have been proposed. For example, RFID systems are most common that are used for parking allotment system. RFID tags are the main backbone of this type of parking allotment systems. There exists a RFID reader at the entry point which reads the RFID tags present in the key of vehicle and detects the availability of the parking.
Similarly 2D data spots are also a proposed system wherein vehicle detection is done by identifying vehicle bumpers using laser range scans. Though these systems are almost automated, they involve lot of hardware which are too expensive, involve maintenance cost for maintain and also are affected due to environmental conditions.

ABBREVIATIONS AND ACRONYMS

<table>
<thead>
<tr>
<th>Abbreviation</th>
<th>Description</th>
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<tbody>
<tr>
<td>GPRS</td>
<td>General Packet Radio Service</td>
</tr>
<tr>
<td>GPS</td>
<td>Global Positioning System</td>
</tr>
<tr>
<td>JDK</td>
<td>Java Development Kit</td>
</tr>
<tr>
<td>SDK</td>
<td>Software Development Kit</td>
</tr>
<tr>
<td>GUI</td>
<td>Graphical User Interface</td>
</tr>
<tr>
<td>RFID</td>
<td>Radio Frequency Identification</td>
</tr>
<tr>
<td>HTTP</td>
<td>Hyper Text Transfer Protocol</td>
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<tr>
<td>UML</td>
<td>Unified Modeling Language</td>
</tr>
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IV. PROJECT OBJECTIVE

With a rapid increase in population, the number of vehicles has also increased. If the availability of a parking slot is known in advance, one can save precious time as well as fuel. The purpose of our system is to eliminate the hardware part of existing systems. Today, Android phones have become a part of our life. So booking a parking slot using android app is much easier than any other existing methods. Moreover, as it is software based it does not require maintenance and due to its easy interface it makes the user comfortable.

V. DESIGN AND IMPLEMENTATION CONSTRAINTS

1. This application is implemented using Android SDK therefore client must have android phone.
2. On the other side the parking guard must also have an android handset to verify and validate the code allotted by the server.
3. The memory required for server is restricted to 50GB.
4. Speed of internet should also be considerably high because the time complexity is completely dependent on the speed of the internet. If the internet speed is less, more time will be required to complete the process.

VI. SMART PARKING ALLOTMENT SYSTEM

Finding a vacant space in a congested area or a large parking lot, specially, in peak hours, is always time consuming and frustrating to drivers. Our system is an android application where in the drivers can find the nearest parking place to the destination. Our system uses GPS network and Google Maps for finding the available space.

The user will have the application through which he can send request to the main application. After that he can see the available spaces for parking his vehicles. If the user wants any space he can select that space and reserve it for limited time. If he cannot reach there in that time, then that space will be available to others. If he again requests for the same place by sending a message, then time will be extended. Our system uses GPS network and Google maps for finding the available space. The invaluable time of many commuters in big cities is wasted while waiting for appropriate parking slot and searching for the availability of free slots at various parking stations.

This application will recommend a simple, and an efficient technology to reduce this waiting time. Using Our method, an end user can know about the availability of free parking slot through his mobile device, as well as save lot of fuel. If necessary, he can also reserve a slot using his mobile device in order to save precious time. Through GPRS connectivity the relevant parking slot details are disseminated to the end user’s mobile device as a service. Thus a registered user will be informed about parking slot availability.

VII. HYPOTHESIS

1. Connection with the server:
   a. The connection between the system application and the server is required. This can be established using the IP address of the server.
   b. Google maps:
      To book a parking slot, you need Google maps for checking the nearby parking areas. Google maps should be displayed on the application with registered parking locations on it.
   c. Available parking:
Before proceeding for booking a parking slot we need to check if there is any available slot in the desired parking area. Hence the number of available parking slots should be shown to the user.

d. Booking:
The application should allow user to book the parking slot. Hence there should be booking provision.

e. Unique code
The user receives a unique code on successful booking of a parking slot. This unique code is further used for verification.

f. Verification:
On verification of the user’s unique code, guard allows the user to check in.

g. Record:
System should have record of time and date of parking.

2. Fare calculation:
On check out of a user appropriate fare should be calculated which should be calculated on per hour basis.

### COMPARATIVE STUDY OF EXISTING AND OUR SYSTEM

<table>
<thead>
<tr>
<th>Parameters</th>
<th>RFID</th>
<th>2D</th>
<th>Smart Parking</th>
<th>Our System</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sensors</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>No (advantage)</td>
</tr>
<tr>
<td>Alerts message</td>
<td>No</td>
<td>No</td>
<td>No</td>
<td>Yes</td>
</tr>
<tr>
<td>Access via</td>
<td>Web site</td>
<td>Web site</td>
<td>Web site</td>
<td>Android Application</td>
</tr>
<tr>
<td>On spot Registration</td>
<td>Yes</td>
<td>No</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Pre-registration</td>
<td>No</td>
<td>No</td>
<td>No</td>
<td>Yes</td>
</tr>
<tr>
<td>Maps and Navigation</td>
<td>No</td>
<td>No</td>
<td>No</td>
<td>Yes</td>
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</tbody>
</table>

### VIII. IMPLEMENTATION

1. Database
Smart Parking Allotment system uses MySQL with Heidi SQL to store the data. Heidi SQL is useful and reliable with MySQL for performing various database operations. We have used Heidi SQL 3.2 and MySQL 5 for our system.

2. Server
At the server side there is a provision for parking registration. The admin is authorized to validate and to delete parking slots. Also any change in the parking details can be done via admin. User account can also be created here. We used Apache Tomcat v7 server in this system.

3. User side
This application provides user registration and if you are a registered user, directly proceed further. On the Google maps you can view all the nearby registered parking areas and select the desired. Only if there is an available parking slot, booking process can be done else, next nearby parking area needs to be selected. On booking, a unique code will be generated which will be used for the verification at the guard side.

4. Guard side
The user is allowed to check in only after the verification of the unique code from the guard. When the user check out, the duration for which he parked the vehicle is considered and fare calculation is done on the same basis.

### IX. RESULTS

![Fig 2: User Login](image)

![Fig 3: Show Parking](image)
X. ACKNOWLEDGMENT

The Authors would like to acknowledge to the Department of Computer Science and to Prof. S.C Suryavanshi for their continuous guidance and support.

XI. CONCLUSION

This paper throws a light on the various existing and our systems for parking allotment. Our Smart Parking Allotment System is an aid to drivers which helps them to book a parking place in advance. This application system makes use of Google Map and GPS network and is developed for Android Platform. Our system eliminates the drawbacks of the existing systems since this system is totally software based.

REFERENCES

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