

## Novel Approach to Smart Parking System By Using RFID

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**Abstract** -Rapid growth of automobile industry has provided us with a faster and cheaper transportation experience than ever. However, this rapid growth has resulted his heavy traffic and parking problems. Everyday hundreds of cars are towed by traffic police due to illegal parking. This problem is more prominent in metropolitan cities where crowd increases exponentially during peak hours. We are providing solution to this parking problem using mobile app. The mobile app will inform users about pre-occupied parking space to save time. The Mobile App can help to simplify the process of vehicle parking in busy streets. The vehicle parking system will use GPS system to provide the user with the nearest parking space to ensure an efficient parking of the vehicle. At the entrance the gates will be installed with RFID readers to provide a human-free interaction which will provide a faster and error-free parking, all of this while providing a safe and reliable parking where the user can park his vehicle without doubting about its safety.

**Keywords**- Smart Parking system, RFID Technology and Android.

### I. INTRODUCTION

In recent research in metropolitan cities along with increase in population there is high vehicle density on roads. Hence this leads to annoying issue for the drivers to park their vehicles as it is very difficult to find a parking slot. The drivers usually waste time and effort and end up parking their vehicles finding a space on streets through luck. In worst case, people fail to find any parking space specially during peak hours and festive seasons.

However, in current parking systems a better solution is being provided, the app-user opts the place for which he wants to purchase his parking slot. After the space he been selected, he is asked to select a date for the parking slot followed by the different areas in which parking slots are located. After the user has selected the particular area, he is asked to enter the time for which he wants to book the parking slot. The app then asks for the user information like email and phone number to send the booking confirmation. This not only helps in providing a hassle-free booking experience where the user has to login everytime he uses a different mobile.

The user books the parking slot using the android application by specifying the parking area, slot as well as the time, which is updated to the cloud. The cloud finds the shortest path which is the distance between the car park and the vehicle and allocates the parking space and this information is sent to the user. When the user starts from his place to destination, the GPS location is updated to cloud server periodically.

It eliminates the problem of looking for a free parking space on a busy street, he can just use our app to find free parking spaces near him. The app also provides the distance of the user from the nearest parking slot.

Also, the user has the peace of mind that his vehicle is parking in a safe place.

This paper presents an invention that could be applied to help drivers find free parking spaces according to their location and the timing for which they require the slot.

| Current e-parking system | Proposed e-parking application  | Advantage   | Disadvantage  | Rating    |
|--------------------------|---|---|---|-----------|
| ParkWhiz                 | It provides facility for drivers to locate and purchase passes if they frequent to a particular parking slot. There are daily, monthly, and event parking through | <ul style="list-style-type: none"> <li>• Event Parking</li> <li>• Monthly and daily pass</li> <li>• Compare prices</li> </ul> | <ul style="list-style-type: none"> <li>• Car should be registered in database to use the facility.</li> <li>• Smartphone is a must have to use this service.</li> </ul> | Excellent |

|              | applications  |  |  |         |
|--------------|---|--|--|---------|
| ParkingPanda | ParkingPanda provides user the facility to book parking slots in advance.   | <ul style="list-style-type: none"> <li>• Event Parking</li> <li>• Inventory Management</li> </ul>                                | <ul style="list-style-type: none"> <li>• This parking system is efficient for urban environment only.</li> </ul> | Average |
| SpotHero     | It is a parking reservation service to book and pay for parking spaces in advance. They provide with parking lots, parking garages as well as parking valet services. | <ul style="list-style-type: none"> <li>• It uses an effective database.</li> <li>• It is simple and based on android.</li> </ul> | <ul style="list-style-type: none"> <li>• The system choices are more expensive.</li> </ul>                       | Good    |
| ParkingRhino | It is a geo-navigation map-based app to find parking space nearby.  | <ul style="list-style-type: none"> <li>• Realtime availability</li> <li>• Hyperlocal offers from merchants.</li> </ul>           | <ul style="list-style-type: none"> <li>• Vehicle must be registered in database to use the facility.</li> </ul>  | Good    |

## II. LITERATURE SURVEY

In this survey paper, we define a new aspect in the car parking arena. We provide the users with app-based vehicle parking, whether be it for work or for a coffee shop, with security and at cheap prices. A user using this app can get the distance of the parking space from his current location and the available slots in that area. The user can pre-book the parking space for the time slot that suits him and make the payment all with just the use of smartphone.

ShindeSmita et al[1], proposed a method which provides information about the process through which vehicles will be parked. It also provides effectiveness and usability of a parking facility. This paper provides information about on-street as well as off-street parking. There are other apps which serve the same purpose but are unavailable in Indian Market. For example, ParkWhiz, spothero, ParkingPanda, etc.

MohitPatil et al[2] used android application and it provides all types of queries, question and answers and frequently asked question (FAQ's). The VISA payment option is provided with the required alerts on his smartphone.

Leydenet al[3], proposed a new parking system. This parking system provides and reserves a parking space for a driver which is based on distance from parking area. The parking cost also based on the parking strength which is already used.

Ashwini Gavaliet al[4], For every parking system there is a solution which gives an exact place which is based on user's information and it also supports events such as new user requests and parking space. The exact place is updated at the next fixed point which tells that there is no slot reservation left. No user is ever booked that place in higher amount with current price. With this increased rate of

economy and city development level, traffic rule and parking have become major issue due to the increased vehicle length.

With the use of the internet, the parking information is provided to the application to make it more benefit for the people who is looking for the parking position with the help of internet services. The system consists of mobile client and server-side parking. The client requests is given to the server for parking information through internet service interface[5].

Most useful star parking algorithm is been implemented to trace multiple users at same time, while taking into account next nearest distance to the parking area in their fixed routes[6].

Some parking system provides the location of the available parking spaces based on the driver's current location in all area or to the final destination. By the use of mobile Global Positioning System (GPS) the driver's route to the parking destination, after the parking space is reserved[7,8].

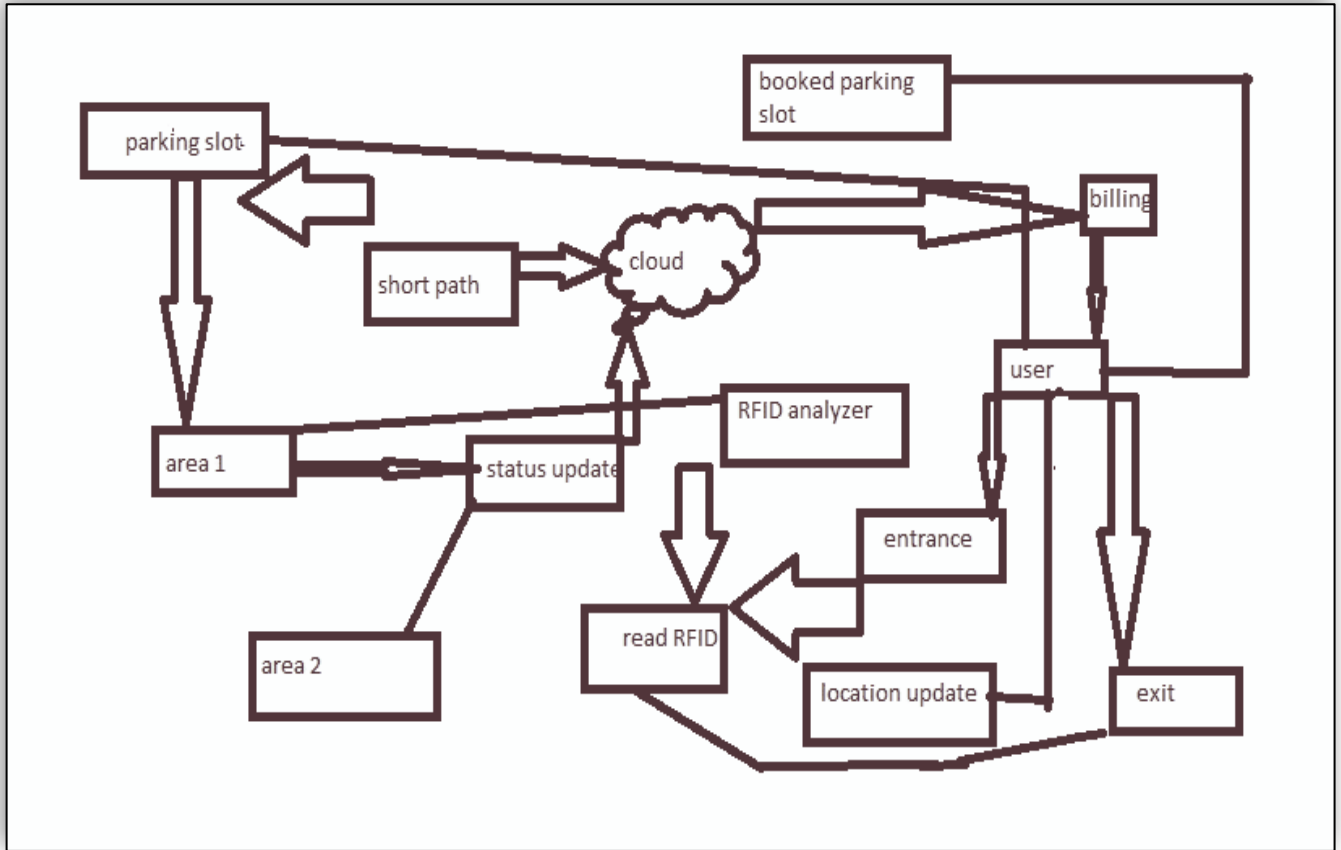
## III. PROPOSED WORK

This app is designed in such a way so as to provide an elegant parking experience. The user selects the location, date and the time slot for which he wants to book his vehicle. After that the user just has to enter his contact information to which the confirmation message will be sent. This eliminates the requirement of remembering your login credentials.

The parking spaces also designed to provide a safe and reliable parking experience for the user. When the user makes a booking, user application will send the booking information to the server. The server will then contact the specified parking slot system and make an entry about the

parking. When the car arrives, the inbuilt RFID of the car will be scanned, if the RFID data matches with the data present in the database, the entry gates will be opened for the

car to pass. This system provides a fast and error-free transition of vehicles while also providing a safe-guard to prevent unauthorized entry.



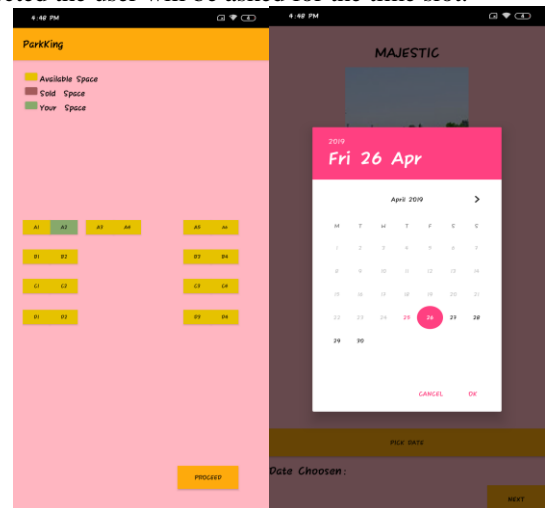
**IV.RESULTS**

The project is done with Android application. The user has to select the location, date and time slot. The following views are present in the advanced parking system app:

1. **Location View:** The users can select the location for which he wants to make booking for. The view provides a detailed description of the place and the slot of the particular location.

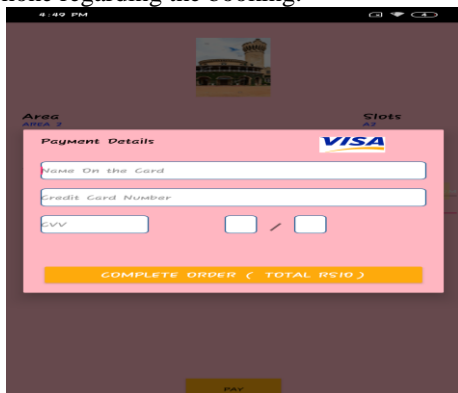


2. **Date and time selection View:** After the location has been selected the user will be asked the date for which he wants to make the booking. After the date has been selected the user will be asked for the time slot.



3. **Payment View:** The user will be provided with a VISA payment platform to make the payment for the parking slot.

After which the user will be sent a text message on his registered phone number as well as a reminder will be set on his phone regarding the booking.



Our application has been designed and tested over different locations and circumstances and is able to flawlessly provide the following features to the user:

- Get nearest parking slot which is secure.
- Parking slot time has been tested for different locations.
- Pay options are also tested and work perfectly.

## V.CONCLUSION

The app helps to get a high efficiency car parking option. Any user can use the app and park their vehicles as required. The user can select place at nearest, he goes, using GPS he can find the closest place for parking his vehicle. The user gets a peace of mind that his vehicle is safe. The app helps in a secure and reliable parking experience for drivers.

The vehicle that reaches the parking space is authenticated by the RFID reader after which the user is allowed to use the parking space. This information is updated to the cloud and to the neighbor car park. When the user exits the car park the RFID tag is read again by the RFID reader which is further updated to the cloud. Then billing process will take place in the cloud server and this information is sent to the user.

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