

Android based M-application for car parking using QR code

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Abstract - Car parking has become a city problem recently which must be taken seriously. In today's advancing technology we must come up for a solution for parking problems. Although, there are many traditional parking guidance system but we still need a better solution. The objective of this project is a real time android application that will allow the users to book a parking in advance due to which searching time for parking is reduced. We have built an application in android in which the user books a parking and a QR code is generated. This QR code will be scanned by the parking authority to authenticate the user and to keep the track of time of user's parking. QR stands for quick response. Since all the android devices can easily scan QR code. QR codes are generated dynamically. This system resolves the parking related issues moreover the time and fuel wastage is reduced because there is no need to roam here and there when the user have this android mobile application on their phone. This system will be performing the tasks of authorization, spot selection and billing.

Key Words: Car parking, android application, QR code, Parking system

1. INTRODUCTION

With rapid increase in number of vehicles, diminishing parking space this have led to parking problem all across the globe. Finding parking is time consuming and it may lead to waste of fuel. The driver may get frustrated and angry. To avoid this problem we have come up with a real time application as a solution. In this application we allow the user to book the parking in advance. This way we are saving time and fuel of the user. As there is advancement in technology requirement of automation task without human support is required. In this paper we try to resolve the parking problem faced by the user. We actually built a system to minimize human efforts and consumed time by proposing a QR code based parking system which will be fit for offices and residential societies. The developed application will be performing the following task such as authorization, selection of parking slot and billing. The

parking lot admin will scan the QR code of the car that will be entering to authorize. The following step will allow the vehicle to park. After the vehicle is registered it can search for the empty slots. We have incorporated google maps due to which the user does not have to take a round around parking lot to find its space, map will direct the user towards the parking slot. Based on hourly charges the bill generated. We have provided a e-wallet to provide easy payment options. There is timer set within which the allotted user must come and park otherwise the slot will dynamically be emptied.

2. LITERATURE REVIEW

There are different parking guidance strategies for traffic searching. Over the past decade many parking guidance systems have been developed. Here we discuss several existing parking system and their limitations. Further we discuss management strategies under realistic parking and traffic condition. In [1], the author proposes the idea of QR based Attendance system. The student needs to scan the QR code so as to mark their presence in the lecture. The output is displayed for the student at the beginning of each lecture thereby avoiding any discrepancy in the attendance system. In [2], the paper shows an Android-based system for identification of objects based on reading of QR codes. The system is developed to facilitate identification of various items that exist in already created inventory. The designed system is composed of a database, Web service for intermediary access to the database via Web, and the client Android application, that can be run on mobile phones or tablet computers. In [3], the system brings forward the idea of smart bus tracking system that any passenger with a smart phone or mobile device with the QR (Quick Response) code reader can scan QR codes placed at bus stops to view estimated bus arrival times, buses' current locations, and bus routes on a map. Anyone can access these maps and have the option to sign up to receive free alerts about expected bus arrival times for the interested buses and related routes via SMS and e-mails

Blind search is nothing but when driver is simply moving around the parking lot for searching a empty slot. When an empty slot is not found then the area of search has to be extended and moved to next neighborhood. This method is very tedious and also is a clear waste of time. Then we have

parking information sharing in which the availability of parking slots of certain area is mentioned to the driver. If it is a busy hour then again many cars will be competing for parking space, this phenomenon is known as “multiple-car-chasing-singlespace” which will cause a severe congestion. There is sensor based parking which is also used but the drawback of this system is that it only senses car in motion and not at steady position due to which it is very difficult to keep the count of available slots. Given the challenges of the existing system there are many modules we need to cover in smart parking system .Some of the modules can be to report fake request, user identification, delay and timer. In fake request sometime a mischievous user can send fake request just for the sake of attacking which must be tracked. Further the user must be identified uniquely and if any delay is there in reaching the parking must be notified by the user. There must be a timer to track time for further calculating the amount that the user is payable for using the parking. The timer is very important factor as the timer set in which the driver must reach after booking a slot.

3. DESIGN

3.1 System Architecture

In our proposed system the user is identified by the Reservation authority by the unique QR code that was generated by the management at the time of reserving the car parking space. After the reservation is confirmed with the respective authority then the availability of spaces is updated and a space is hold for the user that has recently reserved a space. Based on the state of parking lots, the system (1) analyzes their occupancy status and congestion level, (2) determines the parking prices according to their pricing scheme, (3) broadcasts the prices to all users periodically, and (4) stores the parking information, QR code and prices for further analysis. In this planned economy system acts as the final decision making body. Depending on the users demand and current economy the price of the parking is decided by the management. This system is a closed-loop system to dynamically adjust parking price, balance the benefits between users, and service providers and reduce traffic searching for parking. Each user is identified at the gate by the reservation authority through unique QR- code. Host demands for the QR code and verify the details by scanning the QR code. Since user does not need to communicate with his desired parking lot host to make his reservation, rather he directly scan the QR code by host QR code scanner and verify the details just like a centralized system. Because of this communication the chances of

overhead requests are reduced. Since the reservation is managed by the each parking lot the synchronization with user and related information is done easily.

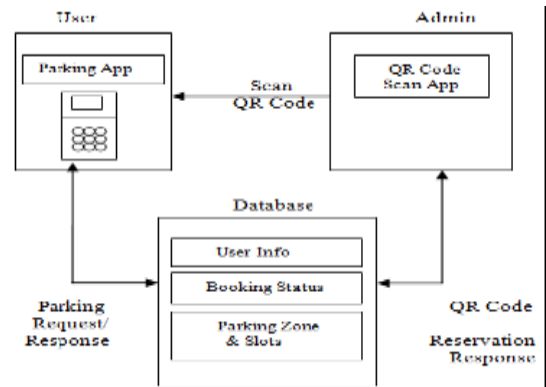


Fig- 1: System Architecture

3.2 Workflow

The below figure shows the sequence diagram of admin and all the services that are provided to the admin.

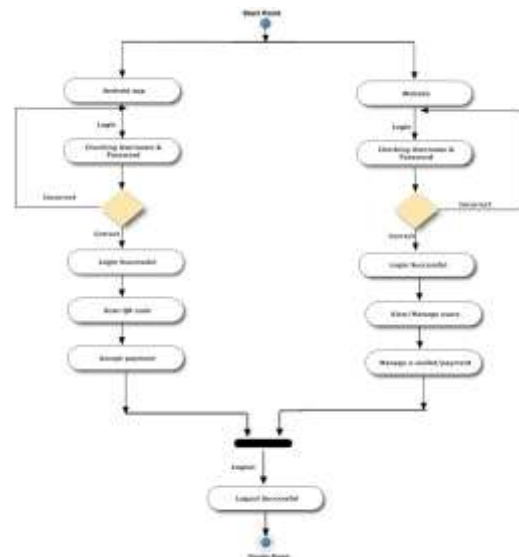


Fig-2: Admin Activity

The following diagram will show the activities of the user.

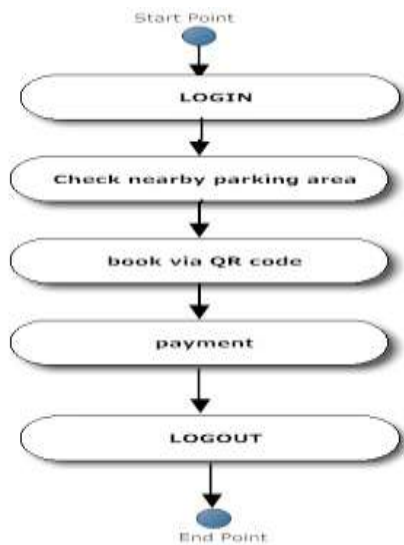


Fig-3: User Activity

4. METHODOLOGY

We have divided this project into three parts

- The first user will admin:

Here in this section the admin will be managing the parking lot .He is responsible for adding the new parking lot and verifying that the data provided by the parking lot management is right. Once the data is verified the parking lot management is given their unique credentials of logging in.



Fig-4: Admin dashboard

- The second user is parking lot management

In this section they have access to the website for updating the slot information and the android application which will authenticate the users on arrival
 Website
 The following allows you to add your parking lot information.



Fig-5: Lobby dashboard

Android Application:

The following figure shows the application for scanning the qr code of the vehicle on arrival.

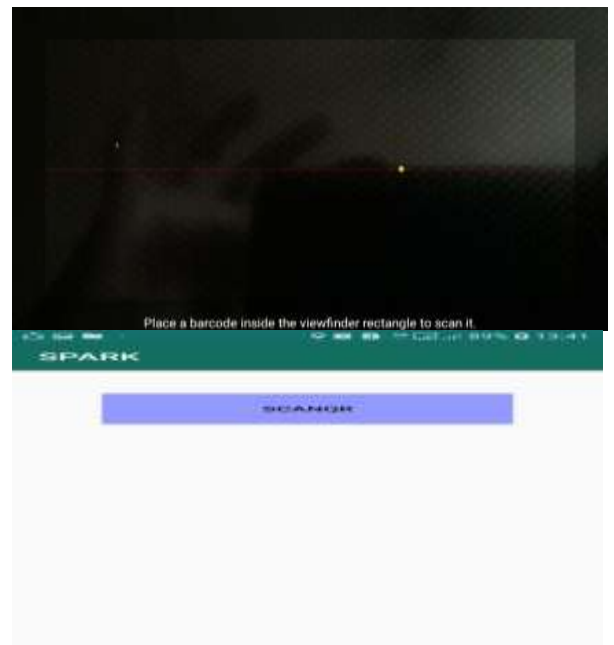


Fig-6: interface for scanning the qr code

- The third user is or car owners

They will have access to only android application in which they have to first register and then log in. Once they have logged in into their accounts they can choose the parking and a slot for themselves and a QR code will be generated.



Fig-7: User login interface

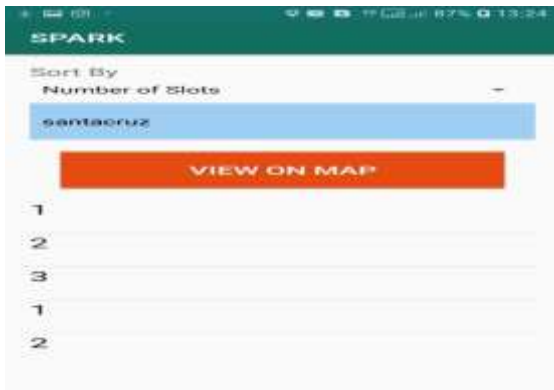


Fig-8: Interface for booking slot

From the following image we can see that after booking the slot a qr code is generated.



Fig-9: QR code generation

3. CONCLUSIONS

In this paper, we have introduced our new application using QR-code to optimize our traditional parking management. In this application, we implemented parking reservation policy to balance the benefit of service provider and requirements from the users. Moreover we have implemented the detailed idea of design. Based on the obtained results from our simulation study, we conclude that the proposed reservation-based smart parking system can alleviate traffic congestion caused parking searching and reduce the amount of traffic volume searching for parking

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