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Vehicles: Smart Parking Application

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Abstract*: In this paper, we provide the solution on various parking problems. We made an online application for parking. This application is all about a miniature model of car parking that can direct and manage the number of cars that can be parked in given area at given time based on availability of parking slots after doing the registration by user using android application on ones smart phone. This provide user to book parking spaces online in advance for given location and then park the vehicle with minimum fees. This app is concentrated on some current application and it shows that the current systems are not totally automated and require a certain level of human interference. The difference between this application and existing other applications is that this application is intended to be less human dependent by automating whole parking area.
***Keywords*: Android application, smart parking system, Location based.**

I. INTRODUCTION

The smart parking vehicle system is one of the best methods to control the traffic that prevails. In most cities of India the traffic occurs due to less space for parking. Due to lack of adequate parking space in shopping areas, malls, theatres etc. congestion occurs. Cars are parked along road sides and vehicle in search of parking areas creates heavy traffic. Thus this leads to traffic congestion and insufficient parking space.

One of the main reasons for the traffic problem is that the current transportation infrastructure and car park facility developed are unable to cope with the influx of vehicles on the road. To take this problem under consideration here an android application car parking system has been developed and designed. Car parking system helps to minimize the car parking area. In the modern world, where parking-space has become a very big problem, it has become very important to avoid the wastage of space in modern big companies and apartments etc.

This system presents a miniature model of an online vehicles parking system. This is a automated android application for parking using less human intervention. User show a mobile application for supporting wide area parking services, from search up to occupancy start/end, taking into account also reservations. The identification of any single parking slot may rely on QR codes and/or GPS positioning, reducing the system deployment costs and speeding up the automated parking procedure, fee charging included.

Information on parking occupancy is kept in the system repository and used during the search phase. This way, crowd sourcing based solutions that have been previously proposed become unnecessary. The guidance provided by a dedicated mobile application can lead to more efficient and effective car parking, with a positive impact to the quality of urban life and a reduction of fuel consumption. Moreover, the availability of real-time data on specific parking occupancies can be fruitfully exploited by other urban monitoring applications to better plan and manage trace and public city services.

Varieties of occasions turn up when user visit various public places like Shopping malls, 5-star and 7-star hotels, multiplex cinema hlls, etc. The difficulty user encounter at these places is finding the availability of parking space. Most of the times user needs to traverse through multiple parking slots find a free space for parking. The problem becomes more tedious if the parking is multi-storeyed. Thus the problem is time-consuming. This situation calls for the need for an online parking system that not only regulates parking in a given area but also keeps the manual intervention to a minimum. User proposed system presents an online car parking that regulates the number of vehicles that can be parked in a given space at any given time based on the parking space availability.

II. LITERATURE SURVEY

A. Background History

Over the years, parking systems and the accompanying technologies have increased and diversified. Smart parking systems have been around almost since the time cars were invented. In any area where there is a significant amount of traffic, there are car parking systems. Car Parking systems were developed in the early 20th century in response to the need for storage space for vehicles.

In the 1920s, forerunners of automated parking systems appeared in U.S. cities like Los Angeles, Chicago, New York City and Cincinnati. Some of these multi-storey structures are still standing, and have been adapted for new uses. One of the Kent Automatic Garages in New York (now known as the Sofia Apartments) is an Art Deco landmark that was converted into offices and luxury condominiums in 1983[1]. A system that is now found all over Japan the “ferris-wheel,” or paternoster system was created by the

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Westinghouse Corporation in 1923 and subsequently built in 1932 on Chicago's Monroe Street. The Nash Motor Company created the first glass-enclosed version of this system for the Chicago Century of Progress Exhibition in 1933, and it was the precursor to a more recent version, the Smart Car Towers in European [2].

III.PROPOSED WORK

In this paper, we developed an vehicle smart parking system which is commanded by android application and thus provides an efficient parking system.

A. System Architecture

In our system, initially parking spaces are registered on the web map server with their longitude and latitude in the college campus. To make the system more dynamic each parking space is uniquely identified by QR Code by using internet. The QR code is generated using fields like space id, latitude and longitude of the space. The QR Code is printed and affixed at the corresponding parking spaces. A database that shows all the mapped parking spaces with their attributes is created. A web server Application Programming Interface, API is established and published over the internet. The user can then access the API using the application.

The user willing to use the application must be connected to the internet via his phone. The users have to download the application and install the application on his android Smartphone .They have to register himself to the system by giving details like name, password, email id, phone number. They can log in to the system whenever he needs to reserve a parking space or use the available space.

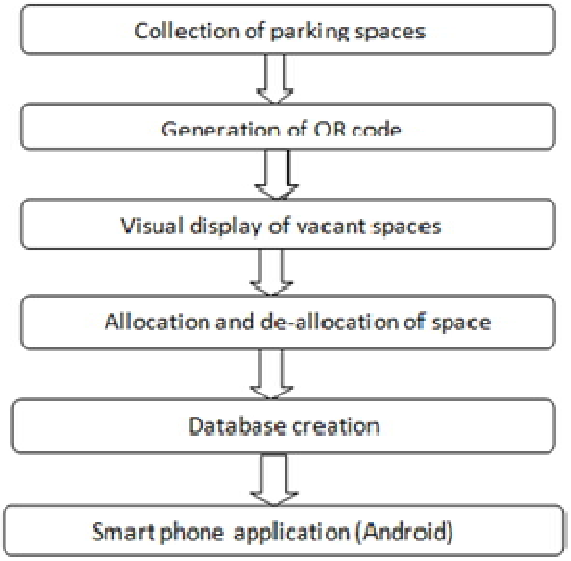


Fig. 1 Process Chart

B. QR Code

In [9] QR Code (Quick Response Code) is developed by Denso Corporation in 1994. There are 40 versions in QR Code, four levels of error correction, and the maximum symbol size (the highest version) can encoding 7089 numeric data or 4296 alphanumeric data the highest level of error correction allows recovery of 30% of the symbol code words. The QR code is a Quick Response code. It is 2-D barcode which encode numeric and alpha numeric value. QR code encodes binary information into a square matrix of black and white pixels. QR code scanner application is able to decode information encrypted in QR code. QR code is used for allocation and de-allocation of the space.

1) In addition to, qr code has many advanced features:

a) High capacity encoding of data QR Code has high capacity encoding of data, its maximum symbol can encode 7089 characters; while PDF417 only encode 2710 characters.

b) High-speed reading Adapted with CCD reading, it can Recognize more QR Code symbol per second than PDF417 Symbol for encoding same data capacity

c) Readable from any direction from 360 degree QR Code is

d) matrix two-dimensional barcode; it can be readable from any direction from 360 degree. But the stack two dimensional barcode, for example PDF417, is very difficult to realize the readable from 360 degree.

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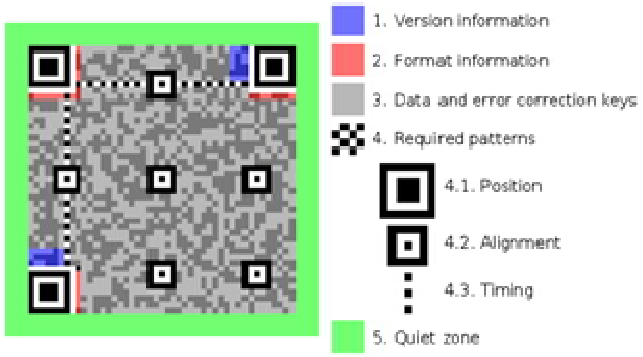


Fig. 2 Structure of a QR code, highlighting functional elements

IV. METHODOLOGY

In this system, first step is the user have to start the application. Then, the login window will open through which he/she have to login. Further, after login a new window will open on which the list of parking area is provided to the user. The user has to select parking area and check the availability of the parking space in that area. If the space is vacant in that area then he/she has to select a particular slot and book it. After booking, confirmation message will displayed user has to confirm booking. Then, in the second step for verification one QR code is given to user. After this process, user will check time, that the slot is available at particular time in which user has to park the vehicle. Then user finishes the process. If same user want to book the parking again at any time. The users only have to login the application. The system will check its QR code if it is valid, it gives confirmation to continue the process and then finish. If it is not valid then it will go to start check QR code of another user.

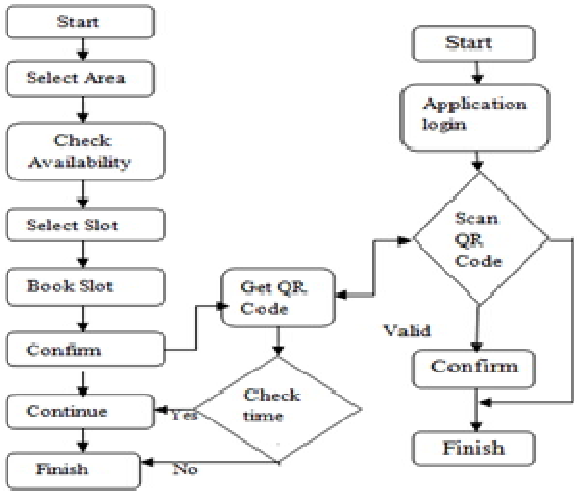


Fig. 3 Flow chart

A. Algorithm

1) At user side

Step 1: Start the application.
Step 2: Login application.
Step 3: Select the area.
Step 4: Check the available slots.
Step 5: Select particular slot.
Step 6: Book the slot.
Step 7: Confirm booking.
Step 8: Generating QR code.
Step 9: Finish.

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B. At administrator side

Step 1: Start the application.
Step 2: Login application.
Step 3: Scanning QR code.
Step 4: Confirm booking.
Step 5: Finish.

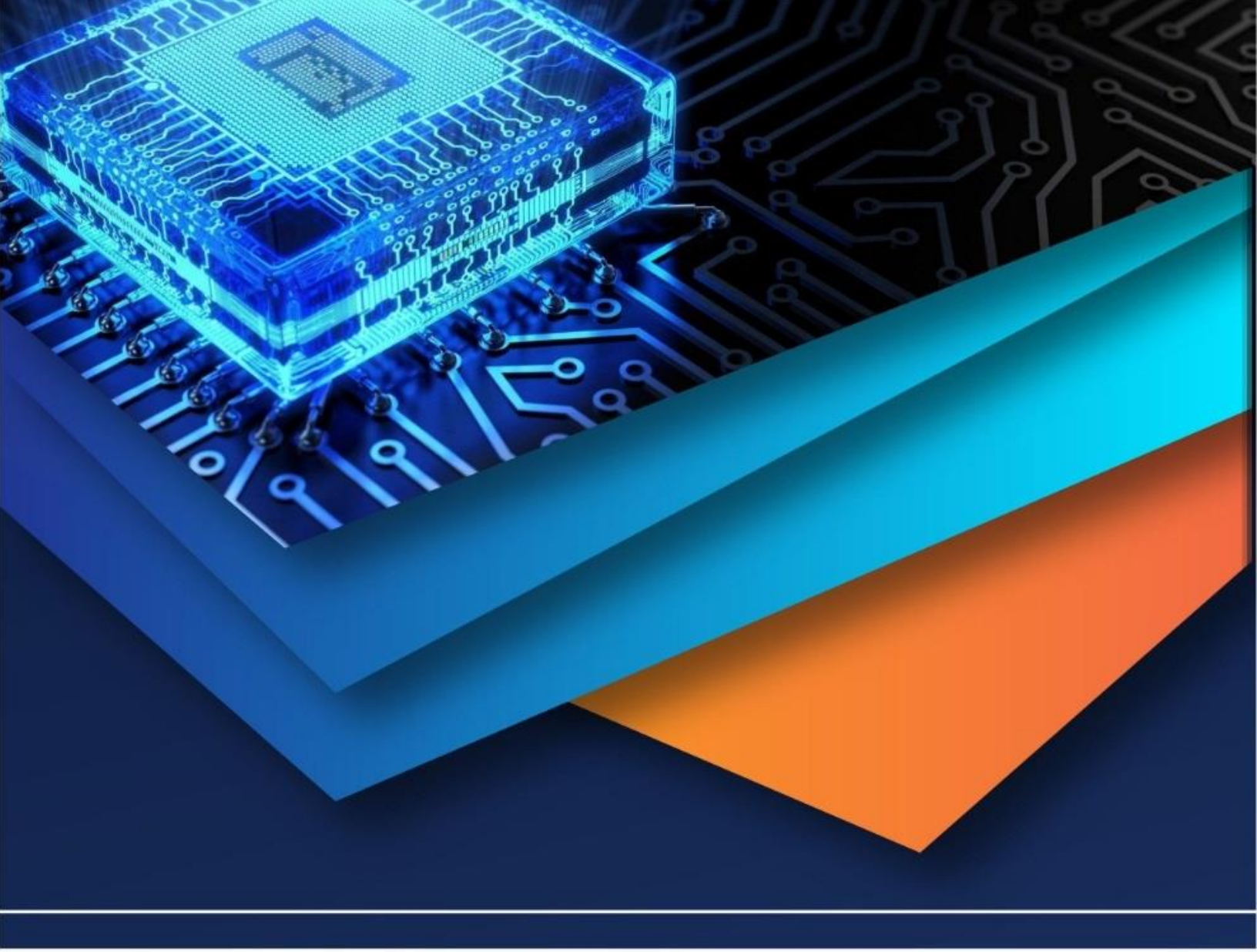
V. CONCLUSIONS

Thus we proposed and implemented an app based parking reservation system which facilitates the user to book a parking slot. It also searches for the nearest parking slot and includes features like QR code scanning in order to ensure consistency. At last the online payment option eliminates the need for human intervention and making the system automated in real sense. Also the proposed system is very economical and easy to implement as it does not involve any expensive hardware or devices.

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