

Modern E-Parking System for Smart Cities

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Abstract:- The number of vehicles are increasing day by day which is proportional to increasing population that leads to various parking issues as well as increased traffic congestion in urban areas, thus it is highly required to develop smart parking reservation system that would help the driver to find out some suitable parking space for his/her vehicle with minimal efforts. The proposed "Modern E-Parking System for Smart Cities" is based on IoT and android application to address the above mentioned issues as well as to provide secure parking using Quick Response (QR) Code.

Key Words: IOT, QR Code

1. INTRODUCTION

Modern E-Parking System for Smart Cities is an attempt towards solving the modern day issues regarding parking of vehicles in order to provide congestion free and hectic free travel experience. In large cities, finding a vacant parking space is becoming a major problem, it has been observed that a considerable amount of time is wasted in search of finding vacant space or parking and if no parking slots are found then the driver ends up parking the vehicle at road side, thus causing traffic congestion. In this scenario, we will address this issue and present our systematic solution to this challenging obstacle by introducing a mobile-based parking reservation system. The proposed system provides navigation to the user towards the reserved parking slot on successful reservation of parking slot. The navigation system uses Dijkstra's shortest path algorithm for this purpose. The proposed system uses an appropriate price monitoring system to determine nominal charges for the service provided by the modern E-Parking system.

2. LITERATURE SURVEY

A. An IoT-based E-Parking System for Smart Cities:

The huge proliferation in the number of vehicles on the road along with mismanagement of the available parking space has created parking related problems as well as increased the traffic congestion in urban areas. Automated smart parking management system that would not only help a driver to locate a suitable parking space for his/her vehicle, but also it would reduce fuel consumption as well as air pollution.

- **Local Parking Management System (LPMS):** This module deployed onto the local parking management server available within each parking facility area. [1].
- **Central Parking Management System (CPMS):** CPMS is deployed on central parking management server which is a high-end server to make CPMS available on Internet. In short CPMS manages LPMS [1].

B. IOT Based Vehicle Parking Manager:

The focus of this study is the use of IOT to overcome problem of parking issues that exist in public places such as mall, multiplex etc. Where an android application is created for the customer, whose details are updated constantly by hardware/server at the location also reduces man power [2].

C. Smart Parking: A Secure and Intelligent Parking System

- It uses an image-based detection technology by utilizing CCTV images and applying image processing techniques on the image stream to identify the parking spot occupancy status[3].
- The pictures are digitized and transferred via a sequence of computer algorithms that recognize changes in the image background on a pixel-by-pixel basis [3].
- Using CCTV could be a good choice for outdoor parking because very few number of cameras can cover a whole parking lot[3].

D. Smart Parking Guidance Monitoring and Reservations:

- **PRICE MONITORING:**

The model utilizes the real time information of parking demand and parking availability to update the pricing of parking spaces accordingly. This is achieved by varying the prices as follows: when the parking demand is increased, the prices are raised, and when the parking demand is decreased the prices are reduced [4].

• **TRAFFIC CONGESTION:**

This type of parking reservations systems basically assumes deterministic arrivals the driver's arrival

time to the parking lot has to be known a priori and there are sufficient parking resources to serve all the incoming vehicles arrival in one time interval, for this FCFS concept is used [4].

3. System Architecture.

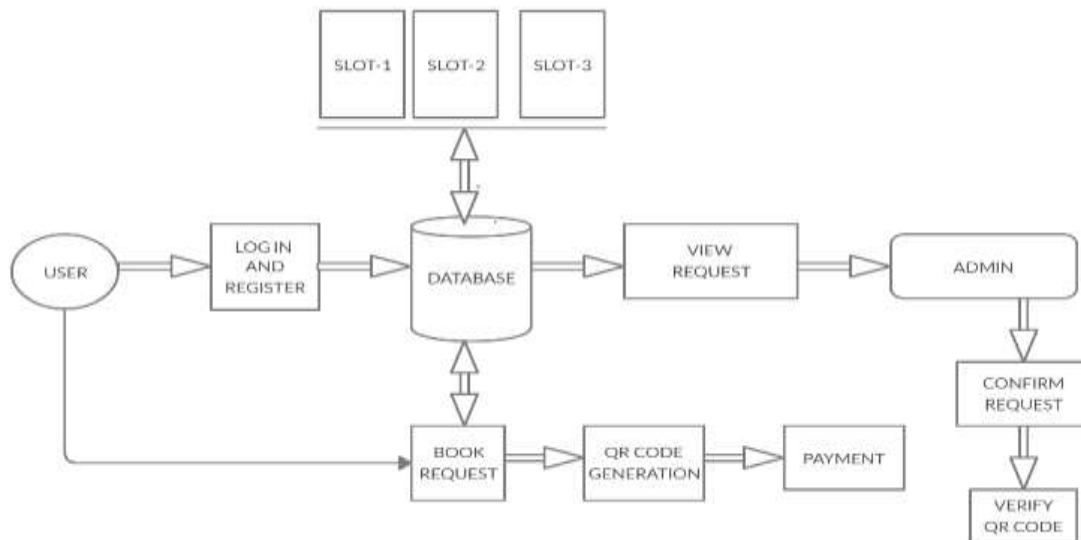


Fig -1: System Architecture

4. PROPOSED SYSTEM

1] The user searches for an available parking slot. User can search the parking slot by using the current location or any desired location.

2] After finalizing the parking slot user will be provided with various payment methods to confirm the reservation process.

3] Once the user confirms the reservation of a parking slot, the user will be provided with a navigation system/route towards the reserved parking slot with an interactive GUI.

4] After the reservation of parking slot, QR code will be generated uniquely for each user which should be used at the entry and exit of the parking. This will assure security to the parking management system.

QR codes are capable of encoding the same amount of data in approximately one tenth of the space used by traditional barcodes. It encodes data both horizontally and vertically, therefore it requires much less space as compared to barcodes. Data can be restored even if the symbol is partially dirty or damaged. Maximum of 30% code words can be restored.



Fig -2: QR code

5. CONCLUSION

The need for a parking space in busy cities is becoming a major problem. It is a very challenging task for drivers, who often need to make loops just to find a place to park their vehicles. This time wasting process may result in road accidents and have other environmental impacts. Drivers never know ahead of time what the price or the location is going to be, and they have to take this risk every time whenever they want to park their vehicles. For these reasons, in this proposed system, we introduced a reservation system that works in real-time to capture information and transmit this information regarding free parking spaces to the users. We believe that this system would always suggest the best parking to the user, so that he/she would not have to worry about the parking security or the directions. In addition, from a design prospective, the reservation process offers a unique approach that requires the least amount of taps, therefore making the reservation faster and very user friendly.

6. FUTURE SCOPE

- This can be expanded in the sense of security. Using metal detectors and CCTV cameras security of the parking areas can be enhanced.
- In future this system or technique will be the one which is used in every industries and even in household apartments.
- In future RFID tags can be used for security purpose of vehicles.
- Parking space can be utilized efficiently in case of Automated Vehicles(AVs).

7. REFERENCES

1. Research Article - Pampa Sadhukhan School of Mobile Computing Communication adavpur University Kolkata, India - 700032. <https://ieeexplore.ieee.org/abstract/document/8125982>
2. IoT based vehicle parking manager: <https://ieeexplore.ieee.org/document/7943153>
3. Smart Parking :A secure and Intelligent Parking System <https://ieeexplore.ieee.org/document/5746481>
4. Smart Parking Guidance Monitoring and Reservations <https://ieeexplore.ieee.org/document/7904775>
5. Research Article - A DISSERTATION ON Generation and Recognition of Covert Quick Response (QR) Codes BY Apurva Bhargava. <https://www.researchgate.net/publication/301891307>