

# Smart Parking System using Internet of Things

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## ABSTRACT

This paper proposes a Smart Parking system which provides an optimal solution for parking problem in metropolitan cities. Due to fast increase in vehicle density particularly throughout the height or operating hours of the day, it's terribly tough task for the drivers to search out a parking lot to park their vehicles in there neighborhood or specific space. The aim of the paper is to resolve the above mentioned issue which provides the Smart Parking system. IoT is a fast and quick growing area. It allows us to connect different dumb objects or system using different tools or kits. This system uses cloud computing and Internet of Things (IOT) technology. Using different Iot technology we can automate our product by using hardware components to communicate. In this system a suitable or a particular shortest path algorithm is used to find the minimum distance between the car or user and each car parking system in the area. Thus, the waiting time of the user is minimized. RFID technology is mainly used to track items in the near range. The radio communications uses readers and tags to exchange informations. Our product is based on the idea of Internet of Things (IOT), which mainly aims at solving the major problem, confusion, traffic and long queues in parking area of public building like malls or business park areas.

By means of this paper we are trying to present use cases related to provide smart parking solutions for drivers.

## Keywords

IoT-Internet of Things, Radio Frequency Identifier(RFID) ,  
Short message service(SMS), Microcontroller.

## 1. INTRODUCTION

In the recent research in the major cities along with the increase in population there is a very high vehicle density on road majorly during the peak hours[2]. Therefore this leads to many problems for the drivers and also for the people on the streets who prefer walking or use public transportations. For the drivers to park their vehicles it is very difficult to find the parking slot in a particular area. Even in malls, trade centres and business parks, parking of the vehicle had become an issue for the drivers[1]. We have all gone through the chaos and time consuming queues to find appropriate parking space in such places. In worst case, drivers fail to find any parking spaces during working hours and festive seasons.

In smart card based parking system, when car arrives at parking lot it automatically allot a parking space. It also provide parking type options and also with security by using cameras. A user or drivers can select there particular preferences or if not selected default preferences is selected for that user[4]. In this system, all the physical objects like, microcontroller, cloud based servers and all the user and cars parks are connected to network architecture and it uses, Radio Frequency Identifier(RFID) technology. RFID systems are used in toll collection and transport payment systems and here we are using this technology to increase the safety, security and comfort of drivers using public parking.

## 2. RELATED WORKS

Various ways are planned for development of autonomous parking systems. Reference [1] may be a smart parking system that allots users nearest parking slot. It considers solely minimum driving distance as allocation criterion. Another planned model based mostly on IoT uses Raspberry-pi and pi camera to constantly capture pictures of the parking slot to search out empty ones. Another system has been planned by creating use of android application. during this system the car traces the trail to the gate of the parking mistreatment the application[3]. On the gate, the microcontrollers of the parking unit and therefore the car communicate and accessibility of free parking slot is checked for. If a free slot is found, it's allotted and therefore the automotive traces the trail to the slot and gets set. this method fails to search out the simplest out there parking slot for the car. In another paper that tells concerning RFID based mostly parking arrival and checkout is RFID based mostly however it's no provision to automatically deduct parking charges[4]. Also, user cannot opt for a parking slot supported his preference. Another RFID based mostly work controls opening and shutting of doors, and buzzer just in case someone is drunk. Another work based mostly RFID takes care of allowing vehicles within the parking zone once any parking slot is available. available parking slots area unit automatically incremented or reduced once a car leaves or enters. each these

models don't contemplate automatic fee deduction or allocating best parking.

## 3. PROPOSED WORK

The proposed system wirelessly transfers information or data. It doesn't allow user entry, as only users or drivers with positive balance can enter the parking slot. It also allows pre-booking. The system also allows the users to pick his parking preferences. The also check if the parking slot is available and will find best parking spot according to the user preferences. It calculate the parking charges and automatically deduct the charges from the card[6]. It also deallocate the parking spot as the users leaves from the parking area. System shows all the entry and exit details of the users on a LCD screen. The major components of the system used in this architecture are Arduino Uno board, GSM module, RFID card reader, RFID tags and the other components are simcard and LCD screen[4]. The Arduino board is used as microcontroller, the RFID card stores car's number, car owner's name, mobile number and amount balance in the card. LCD is used to display messages to the user, and GSM is used to send sms to the user

## 4. EXPERIMENT

The RFID card is formed to store data just like the car's number, automobile owner's name. an internet info is maintained containing car's number, automobile owner details (name, phone, parking preference, username and password for web site, available balance), time of entry and exit. The user is allowed to decide on a parking slot based on his preference of least walking distance from the elevator or from stair case, nearest parking slot

(least driving distance), or security (total coverage or partial coverage of the slot by CCTV cameras).

#### 4.1 Entry in the Parking Lot

As the car enters the parking area for parking, the Radio Frequency Identifier(RFID) card which is installed in the car is scanned through the RFID card reader at the parking area entry gate. The RFID card reader will extract all the information about the user like automobile owner details\ car registration number. The system then checks if user has choosen any specific parking preference. The the best parkinging space available is allocated to the car and the same is displayed of the LCD screen and then a sms is sent to the owners registered number using GSM. Time of the entry for car is recorded in the system.[1]

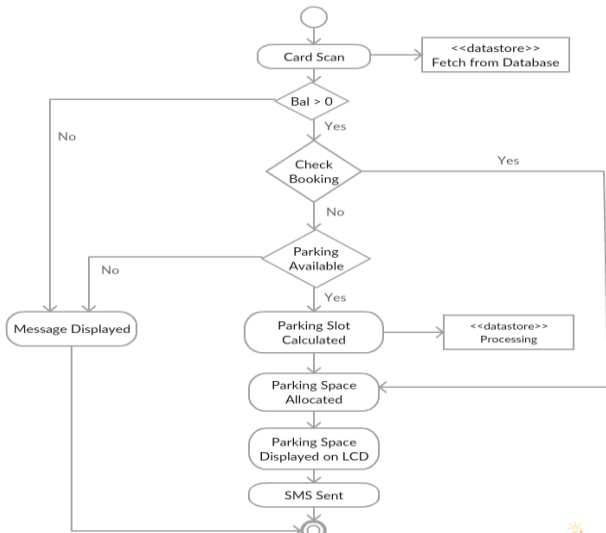


Fig. 1 Entry in the Parking Lot

#### 4.2 Exit from Parking Lot

During the exit, as the car leaves the parking area, RFID card is scanned again using RFID card reader. Exit time of the car is recorded by the system and parking charges are calculated based on duration of parking. Also the parking charges are displayed on the LCD system. Then the cost is deducted from the owner's balance and the database is updated accordingly and the amount is deducted from the owner's card and the sms will be sent to the user about the deduction about the money and the remaining balance in the card. System then de-allocate the parking space given to that car.[1]

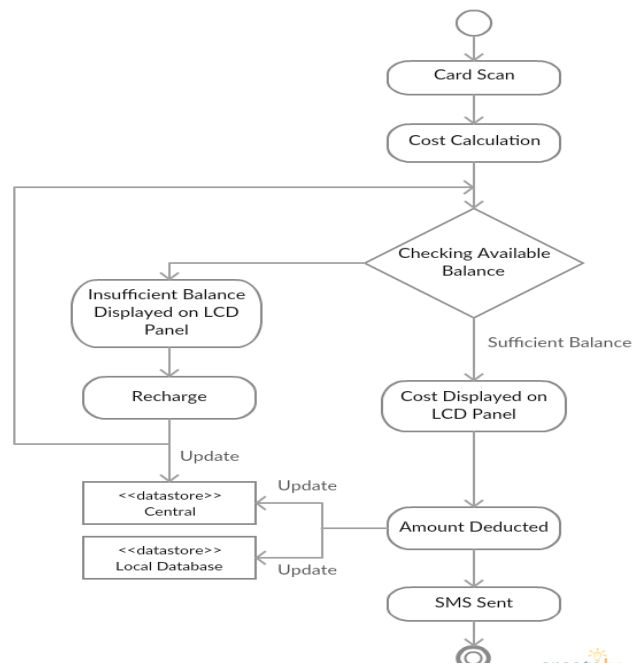


Fig. 2 Exit from Parking Lot

### 5. CONCLUSION AND FUTURE SCOPE

A successful implementation of this project would end in less traffic and chaos in crowded parking areas like malls and business buildings wherever many of us share a car parking area. The automated parking fee system would enable individuals to travel without money. It provides drivers with additionally, because it would cut back the waiting time, long queues, tension, stress and increase the efficiency of the parking system. because the smart car Parking System requires minimal work force, there are minimum possibilities for human errors, enhanced security additionally to a swift and friendly car parking experience for drivers.

### 6. REFERENCES

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