**INTRODUCTION**

* 1. **Parking And Car Park**

Parking is the act of stopping and disengaging a vehicle and leaving it unoccupied. Parking on one or both sides of a road is often permitted, though sometimes with restrictions. Parking facilities are constructed in combination with some buildings to facilitate the coming and going of the buildings' users.

A car park, also known as car lot, is a cleared area that is intended for parking vehicles. Usually, the term refers to a dedicated area that has been provided with a durable or semi-durable surface. In most countries where cars are the dominant mode of transportation, parking lots are a feature of every city and suburban area. Shopping malls, sports stadiums, mega churches and similar venues often feature car parks of immense area.

Parking facilities include indoor and outdoor private property belonging to a house, the side of the road where metered or laid out for such use, a parking lot or car park, indoor and outdoor multi-level structures, shared underground parking facilities, and facilities for particular modes of vehicle such as dedicated structures for cycle parking.

A car parking system is a mechanical device that multiplies parking capacity inside a parking lot. Parking systems are generally powered by electric motors or hydraulic pumps that move vehicles into a storage position.

There are two types of car parking systems: traditional and automated. In the long term, automated car parking systems are likely to be more cost effective when compared to traditional parking garages. Automatic multi-storey automated car park systems are less expensive per parking slot, since they tend to require less building volume and less ground area than a conventional facility with the same capacity.

Parking facilities are a major expense to society and parking conflicts are among the most common problems facing infrastructure planners. These problems can be most often described either in terms of supply or in terms of management. Parking management describes the process of optimizing the use of parking policies while making use of policies and programs that are applicable to parking. A well-thought out parking strategy often helps reduce the number of parking spots required in a particular situation and provides a variety of socio-economic and environmental benefits. When all factors are taken into consideration, improved management is often the best solution to parking problems.

In metropolitan areas, parking management inﬂuences drivers search time and cost for parking spaces, parking revenue, and traffic congestion. The wide deployment of wireless parking meters with sensing and communications capabilities allows the parking authority to monitor the state of each parking space in real time and optimize the parking management.

Modern parking lots utilize a variety of technologies to help motorists find unoccupied parking spaces, car location when returning and improve their experience. This includes adaptive lighting, sensors, indoor positioning system (IPS) and mobile payment options. In outdoor parkings, GPS can be used to remember where you park (some apps saves location automatically when turning off the carwhen a smartphone breaks communication with a vehicle’s Bluetooth connection) and guide back to your car easily. In indoor parkings, you can record your location via a Wi-Fi signature (signal strengths observed for several detectable access points).

Online booking technology service providers have been created to helped drivers find long-term parking in an automated manner, while also providing significant savings for those who book parking spaces ahead of time. They use real-time inventory management checking technology to display parking lots with availability, sorted by price and distance from the airport.

* 1. **Multi-Storey Car Park**

To understand, what is Multi-Storey Car Park? A multi-storey car-park (also called as a parking garage, parking structure, parking ramp, parkade, parking building or parking deck) is a building designed for car parking and where there are a number of floors or levels on which parking takes place. It is essentially a stacked car park.

 

**Figure 1.1: Exterior Car Park Figure 1.2: Interior Car Park**

As we can see, Figure 1 shows how a Multistorey car park looks from outside and Figure 2 shows an interior view of these kind of buildings. There are multiple levels called storey meant for parking of vehicles (cars) of various shapes and sizes. The cars are kept in a way that resembles a stack.

Movement of vehicles between floors can be effected by:

* interior ramps - the most common type
* exterior ramps - which may take the form of a circular ramp (colloquially known as a 'whirley-gig' in America)
* vehicle lifts - the least common
* automated robot systems - combination of ramp and elevator

In India, the most common way of loading the vehicles is ‘Vehicle lifts’ as seen in figure 3. In this kind, the cars are taken to the desired level or floor by a lift meant for cars. The functioning is same as that of the lifts meant for carrying persons.



**Figure 1.3: Vehicle Lifts**

In this thesis, we study state-of-the-art parking policies in smart parking systems, and show that the smart parking system needs to be “smarter”. Our design goals of the smart parking systems include:

(1) simplify the operations of parking systems

(2) improve drivers’ satisfaction

(3) increase parking revenue

(4) alleviate trafﬁc congestion.

Through analysis and simulations, we ﬁrst show that the proposed reservation-based parking policy has the potential to achieve the above goals. We then model the behavior of both service providers and drivers in smart parking systems, and explore the dynamic pricing scheme to achieve the goals in smart parking system design.

Furthermore, we design and implement a prototype of Reservation-based Smart Parking System (RSPS) that allows drivers to effectively ﬁnd and reserve the vacant parking spaces.

ParkMeRight is a project meant for advance booking of parking spaces by vehicle owners so as to reduce the uncertainty of getting an available space for parking when required. This project is being made keeping in mind the Multistorey car park buildings that are recently introduced in India and that too in few metro cities like Mumbai, Chennai and Pune. It will be used for reserving spaces in these buildings. The present daily requirements by people are being considered in this project.

The user, while enquiring, has to provide information related to the car like the name or the model so that they can be told whether there is any space left for the parking for their vehicle(depending on its size) in the building or not. If available, they can book it and tell the time duration for which it would be required (The process is similar to the booking of tickets for movies). The payment can be made well in advance or at the time of leaving. All the details of booking and payment will be communicated to the user time to time.

This project will not only help the user to secure a parking space for their vehicle and make the roads less crowded but will also lead to an increase in the use of the multistorey park buildings by spreading awareness among people since it is user friendly.