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Smart Parking with EV Charging Facility

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ABSTRACT: Currently, we are facing issues related to lack of fuel. So, we are moving towards electrical vehicle. But still people are not ready to prefer electrical vehicle over present ones. It is because of price as well as lack of available charging stations. Even if there are few charging stations are available, itis necessary to spend extra time for charging the vehicle. Also, present day car parking has become a major issue in urban cities. So, by taking in views these issues we can provide a smart parking with charging availability to the most commercial buildings. This will reduce the efforts of roaming for slot of parking. Also, there is no need to invest more time for finding charging station and for charging at charging station. This paper outlines the wireless power transfer technology for EV's and charging systems .

KEYWORDS: Django, Python, Smart Parking, EV Charging.

I. INTRODUCTION

Now-a-days Electrical vehicle is a trending topic and it is also an important part of this smart world. Drawback of electricvehicles is cruisingrange is typically limited. So, it requires frequent recharging. Not only for electric vehicle but Population is increasing exponentially and the problem is due to this is, increasing traffic volume.
All we know that we have limited stock of the fuel on our earth so it is need of time that we must switch to another way and electricity is the best option for it and electric vehicle is example of it. For charging the electric vehicles, Now-a-days mostly used charging method is plug in charging, this method consists of a plug which needs to be connected to the vehicle for start charging. In wireless charging there is no need to ON-OFF the plug.
Hence there will be less human interaction; it reduces risk of electric shock due to wired connections. Plug-in EVs have limited travel range and need large and heavy batteries. The wireless charging technology has main advantages is, it increases the traveling range, reduces the battery size and waiting time for charging the vehicle will mitigate. Such advantages will increase the economic and environmental
benefits as well as the adoption rates of EVs [16]. *Electrical* vehicles require a charging station similar to current fuel car require a petrol pump and obviously charging takes some time so it is better to charge the car when it is parked.

Vehicle Parking problem is an alarming problem at a global scale and it has been growing exponentially as increasing vehicle size in the luxurious segment and confined parking spaces.
Searching for parking places are very time-consuming, as well as wastage of fuel.
So, we are going to design system which will help to minimize efforts using your mobile/laptop devices.

II. PROJECTPLAN AND REQUIREMENT ANALYSIS

PROJECTPLAN -
Our proposed "smart parking" system adopts the basic structure of PGI systems. In addition, such a system includes a Driver Request Processing Centre and a Smart Parking Allocation Centre.Based on the driver requests and parking resource states, the Smart Parking Allocation Centre makes assignment decisions and allocates and reserves parking spots for drivers.Drivers who are looking for parking spots send requests to the DRPC. A request is accompanied by two requirements: a constraint (upper bound) on parking cost and a constraint (upper bound) on the walking distance between a parking spot and the driver's actual destination. The realization of such a "smart parking" system relies on four main requirements. First, the allocation centre has to know the status of all parking spots and the location of all vehicles issuing requests. The second requirement involves effective wireless communication between vehicles and an allocation centre. Third, the centre must be able to implement a reservation that guarantees a specific parking spot to a driver. Finally, an effective parking resource allocation method needs to be implemented to ensure optimal allocations and reservations. In what follows, we will concentrate on the implementation details of these four requirements

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Requirement Analysis-

The system starts to make an allocation, it requires the location information of all cars pending for allocation. Based on this information, it estimates the travelling time to the spot to be allocated, and provides driving directions after the allocation. Current vehicle tracking devices/systems provide the solutions to this problem. Vehicle tracking systems combine GPS tracking technology with flexible, advanced mapping and reporting software.

A vehicle tracking device is installed on a vehicle which collects and transmits tracking data via a cellular or satellite network. The system receives real-time vehicle tracking updates, including location, direction, speed, idle time, start/stop and more. This technology has been widely used in bus systems. However, it requires each driver to install a tracking device, which becomes the additional cost for drivers to use the system. In our project, we have built a smartphone application, which contains a function that constantly reads the GPS data in the phone and automatically reports to the system. The smartphone application also has other functions, which will be described later.

Parking reservations are a key feature of the "smart parking" system. In order to implement this function, when a parking spot is reserved by the driver, the system must guarantee that this parking space will not be taken by other cars. For off-street parking resources, it is relatively easy to prevent drivers from taking the spots which have been reserved by others. The system can perform ID checking at the gate of a garage or a parking lot. If the driver has a reservation, the gate opens and a spot number will be provided to him. Otherwise, he may be rejected, or allowed to park if there are vacant unreserved parking spaces.For on-street parking resources, the scheme is more complicated because there is no ID checking capability for on-street parking spaces. Drivers may park in any spot if it is vacant. One method is through wireless technology interfacing a vehicle with hardware that makes a spot accessible only to the driver who has reserved it. Examples include gates, "folding barriers" and obstacles that emerge from and retract to the ground under a parking spot; these are wirelessly activated by devices on-board vehicles, similar to mechanisms for electronic toll systems. However, this method is relatively expensive, and the hardware is not easy to install and maintain. A "softer" scheme is to use a light system placed at each parking spot, where different colours indicate different parking spot "states".

III. MODELLING

UML Diagram

I. Use Case Diagram

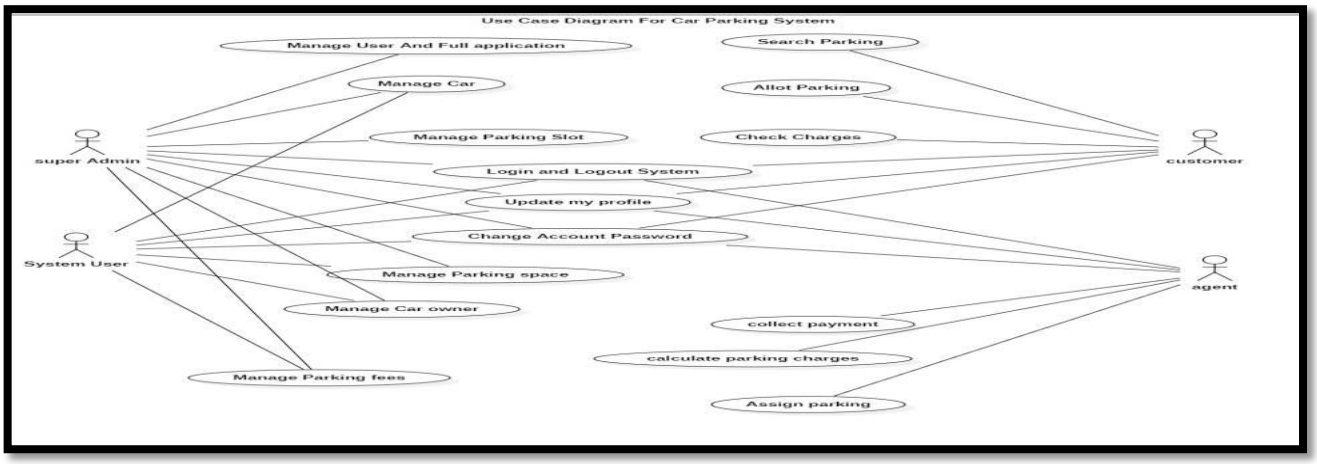

Figure1: Use Case Diagram

II. Sequence Diagram

This is the Login Sequence Diagram of Car Parking System, where admin will be able to login in their account using their credentials. After login user can manage all the operations on Car Number, Parking Fees, Parking Space, Car, Parking Slots. All the pages such as Parking Space, Car, Parking Slots are secure and user can access these pages after login. The diagram below helps demonstrate how the login page works in a Car Parking System. The various objects in the Car, Car Number, Parking Fees, Parking Space, and Parking Slots page interact over the course of the sequence, and user will not be able to access this page without verifying their identity.

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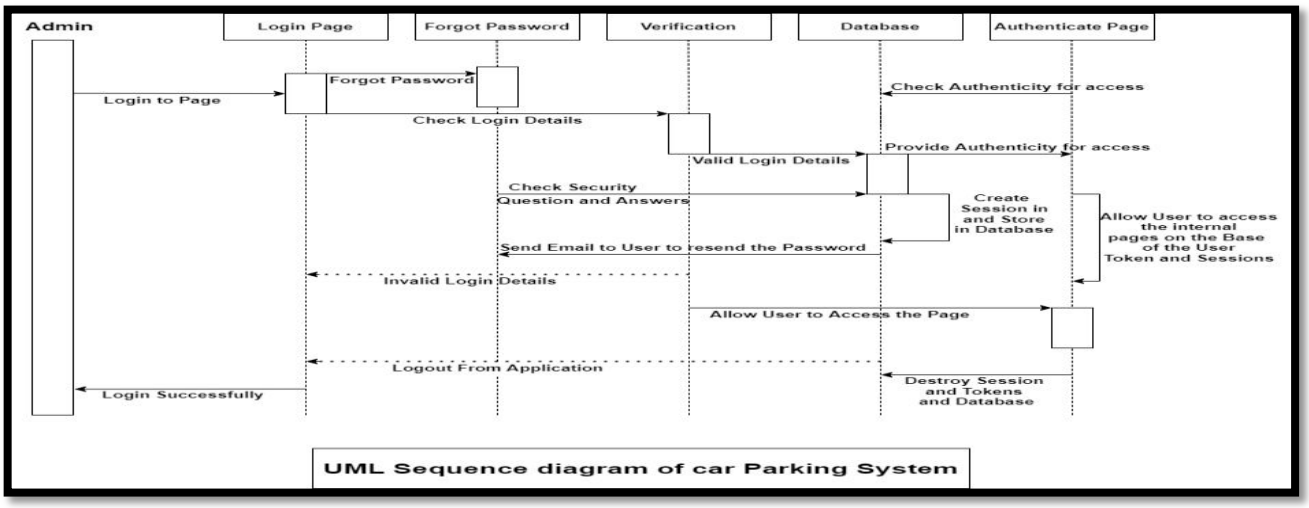

Figure2: Sequence Diagram

IV. ARCHITECTURE

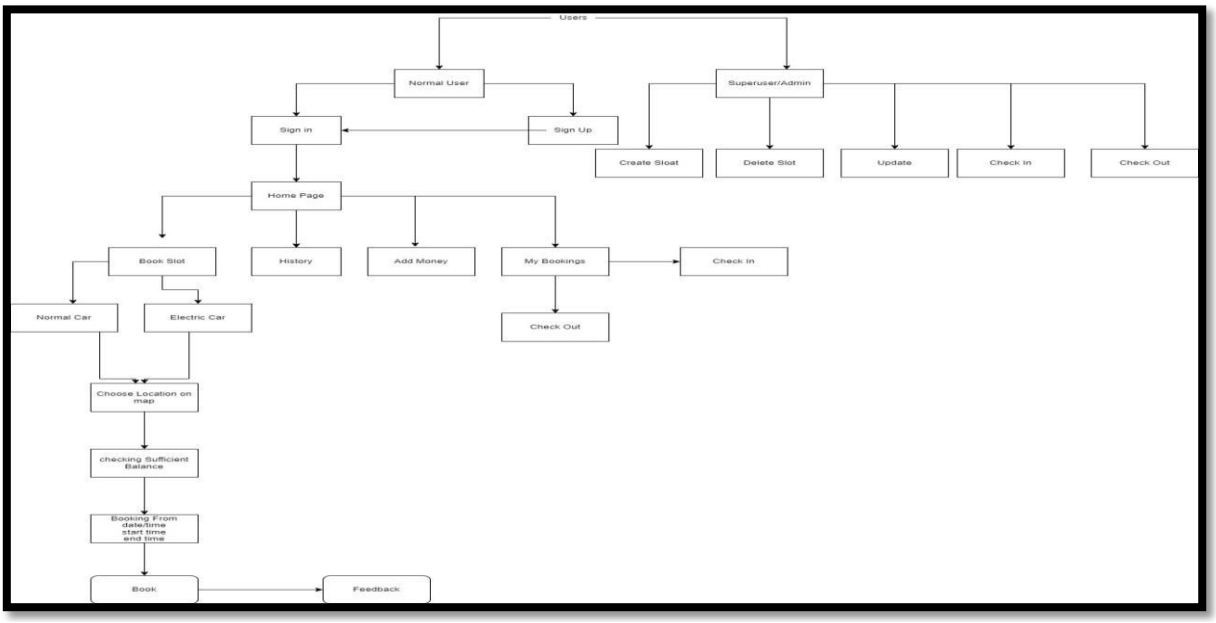

Figure3: Architecture Diagram

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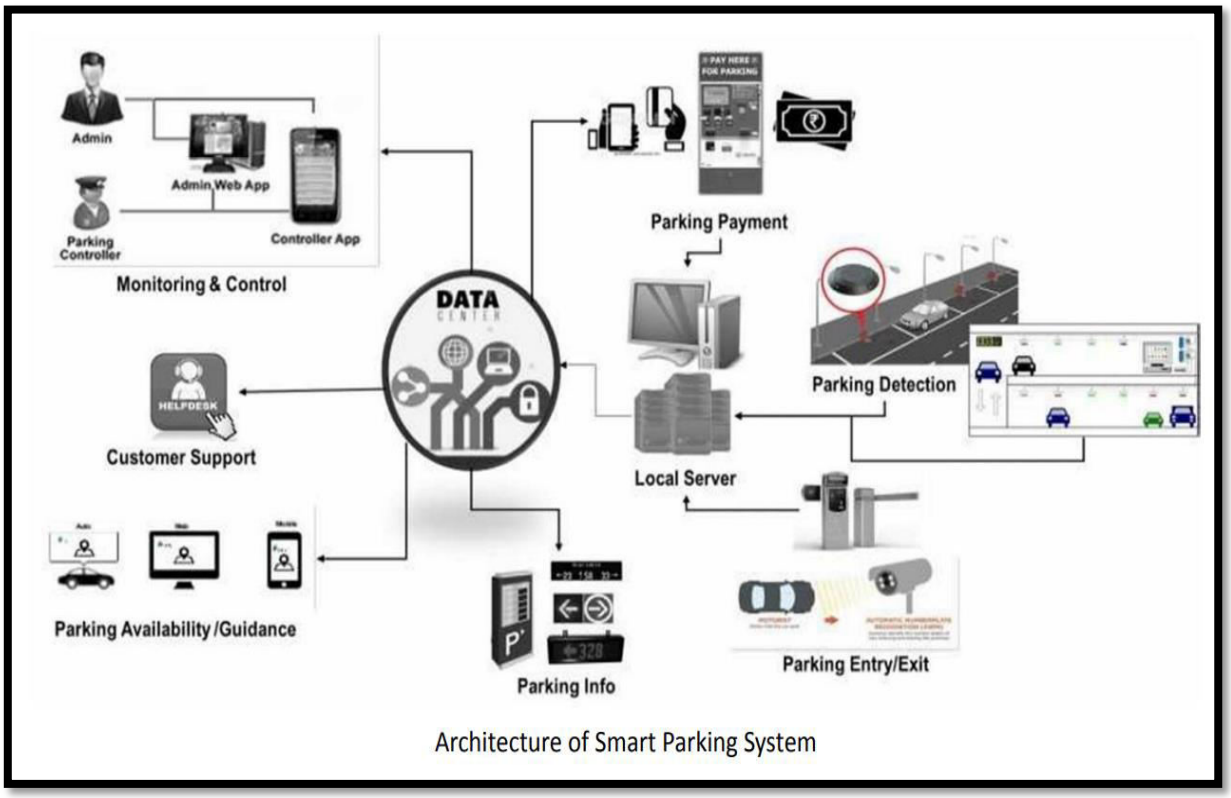

Figure4: Architecture Diagram

V.CONCLUSION

Adopting parking management system significantly reduces the amount of time consumed in seeking the parking space, renders valuable data upon the availability of the parking area, offers guidance and suggestion for proper vehicle parking with EVCharging.“Smart parking” system that exploits technologies for parking space availability detection and for driver localization and which allocates optimal parking spots to drivers instead of only supplying guidance to them. We have described the system infrastructure and basic “smart parking” procedure.we have developed a new Reservation-based Smart Parking (RSP) system to optimize parking management. We have proposed a dynamic pricing scheme for satisfying the different needs of drivers and service providers, which is based on real-time parking information

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