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Smart Parking System

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Abstract **—** Nowadays, getting a car is not seen as an extravagance. More of a requirement than a luxury, owning a vehicle. Auto-possession is rising as people's cash circumstances get better. As a consequence, parking becomes more difficult and tense. Coordination and collaboration are crucial for the smooth running of parking lots, as is effective parking administration software. Through the use of automatic parking devices, a comparable shift was also made in the parking industry. Because of powerful parking management software, the automated parking system has been demonstrated to be 100 times more effective than the conventional parking system.

1. INTRODUCTION

The traditional and typical parking systems presently in use have a number of drawbacks, which is why automated parking systems are being integrated through parking management software. In this study, we looked at how to handle the parking system more effectively. The objective is to evaluate present technology and do our part to advance it. The user of this system can access the lowest and closest parking spot at any moment. It makes use of a reservation-based method to prevent pandemonium. Through CMOS (complementary metal oxide semiconductor) sensors, the reserved car will be identified at the parking location by its license plate. Regular users will also receive a discount redemption coupon for their subsequent parking. Because of powerful parking management software, the automated parking system has been demonstrated to be 100 times more effective than the conventional parking system. The traditional and typical parking systems presently in use have a number of drawbacks, which is why automated parking systems are being integrated through parking management software.

2. Literature Survey

The existing parking systems only collect information about vacant parking lots that are available and then update the information to direct drivers using a variety of sensor networks. The problem is that the drivers won't be directed to the proper parking places by this technology. Drivers commonly engage in "blind searching" to look for parking places when parking information is unavailable. The drivers never stop hunting for parking spots close to their destination. The drivers won't stop seeking and will keep narrowing their search area until they discover a free space.To solve the "many-vehicles-chase-single-slot" problem, the way parking spot information is distributed has been modified.

Table 1: Literature survey of the domain

S NO.	Authors	Data source	Methodology	Result
1.	Wang, H., & He, W.	A Reservation-based Smart Parking System	Reservation System	Reservation-based parking policy has the potential to simplify the operations of parking systems,as well as alleviate traffic congestion caused by parking searching.
2.	Kiliç, T., & Tuncer, T. ,	Smart city application: Android based smart parking system	Application	prevent loss of customers time and to reduce costs.
3.	Paulraj, G. J. L., Jebadurai, I. J., Khan, P. F., Sumanth, N., & Reddy, K. V.	Smart Distributed Parking System using Internet of Things	Internet of Things(IoT)	Provides parking space information on real time and improves fuel efficiency.
4.	Anwar, A., Saeed, N., & Saadati, P.	Smart Parking: Novel Framework of Secure Smart Parking Solution using 5G Technology	5G Technology	Secure parking usimg application of 5G in smart cities.
5.	Kazi, S., Khan, S., Ansari, U., & Mane, D.	Smart Parking based System for smarter cities.	------	Charges of parking can be paid digitally or through vending machines.

6.	Grodi, R., Rawat, D. B., & Rios-Gutierrez, F. (2016, March). In *SoutheastCon 2016* (pp. 1-5). IEEE.	Smart parking: Parking occupancy monitoring and visualization system for smart cities.	Rear Cameras	Economical and time costs associated with traffic jams will be reduced.
7.	GokulKrishna, S., Harsheetha, J., Akshaya, S., & Jeyabharathi, D.	An IoT based smart outdoor parking system.	Internet of Things(IoT)	Flexible, convenient and safe parking of vehicles in public using using weighbridge load sensors
8.	Kanteti, D., Srikar, D. V. S., & Ramesh, T. K.	Intelligent smart parking algorithm	CMOS sensors	Parking efficiency and cost effective with less maintenance and power consumption
9.	Anand, A., Kumar, A., Rao, A. M., Ankesh, A., & Raj, A.	Smart Parking System (S-Park)–A Novel Application to Provide Real-Time Parking Solution	Website and Android App.	Hassle free operations in and around parking location.
10.	Pham, T. N., Tsai, M. F., Nguyen, D. B., Dow, C. R., & Deng, D. J.	A cloud-based smart-parking system based on Internet-of-Things technologies.	Novel algorithm	Improve the probability of successful parking and minimizes the user waiting time.

3. Problem Formulation

In the modern society, it's simpler to locate dangerous chemicals and narcotics than parking. Finding parking spaces and slots is really challenging. People must wait in lines that go on for a while, which takes a lot of time and energy. Additionally, it contributes to conditions like congestion and high levels of concentration.

4. Designing and Workflow

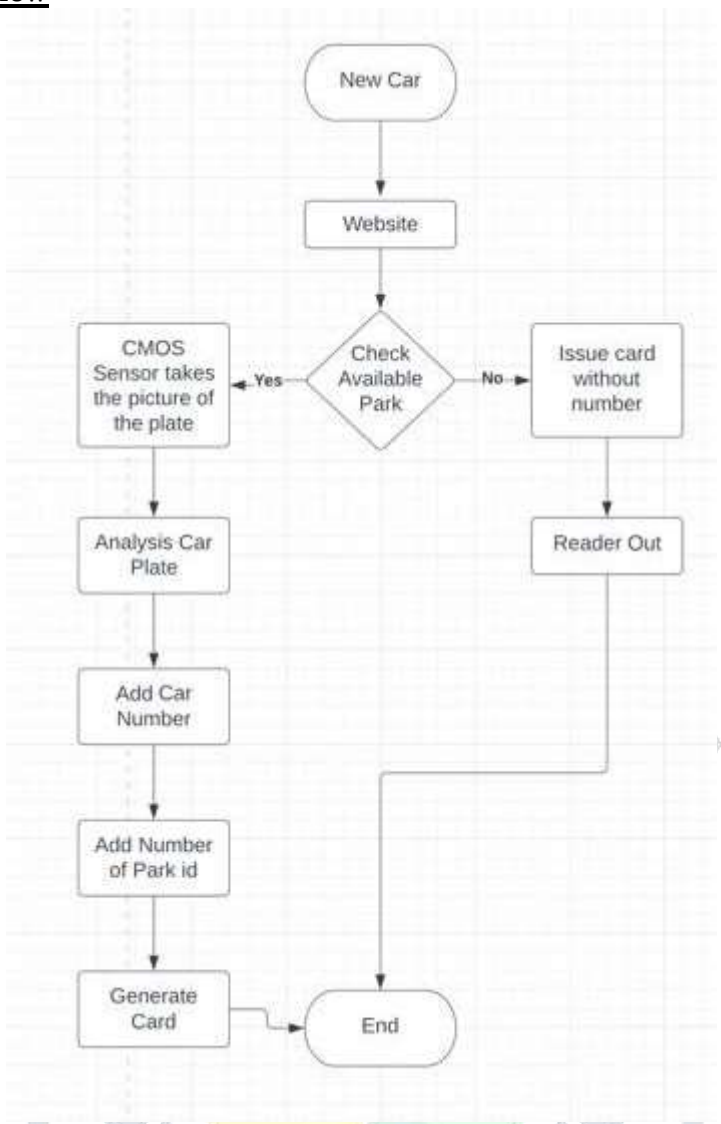


Fig.1 Parking Slot Booking

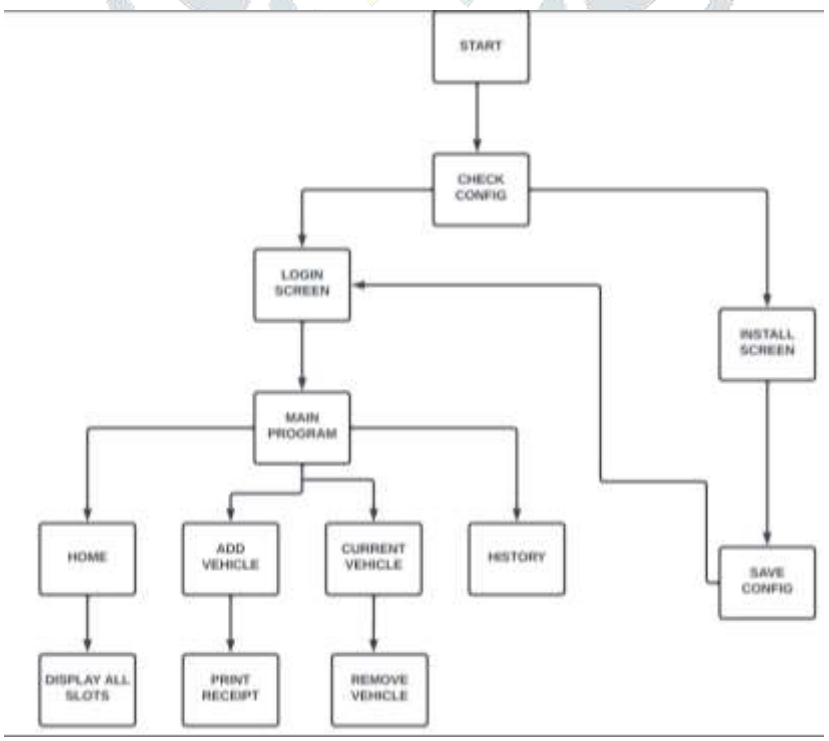
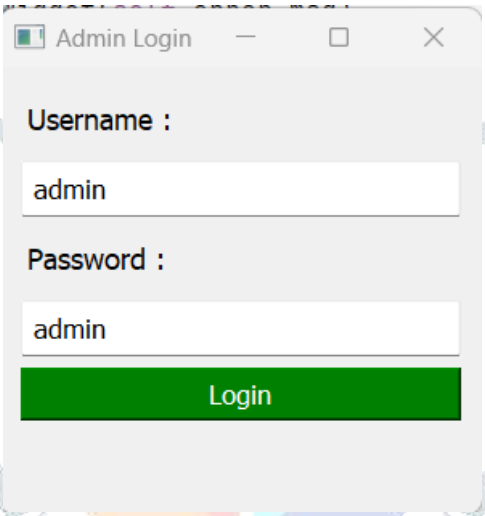


Fig.2 Flow Control and Modules

5. PROPOSED SOLUTION

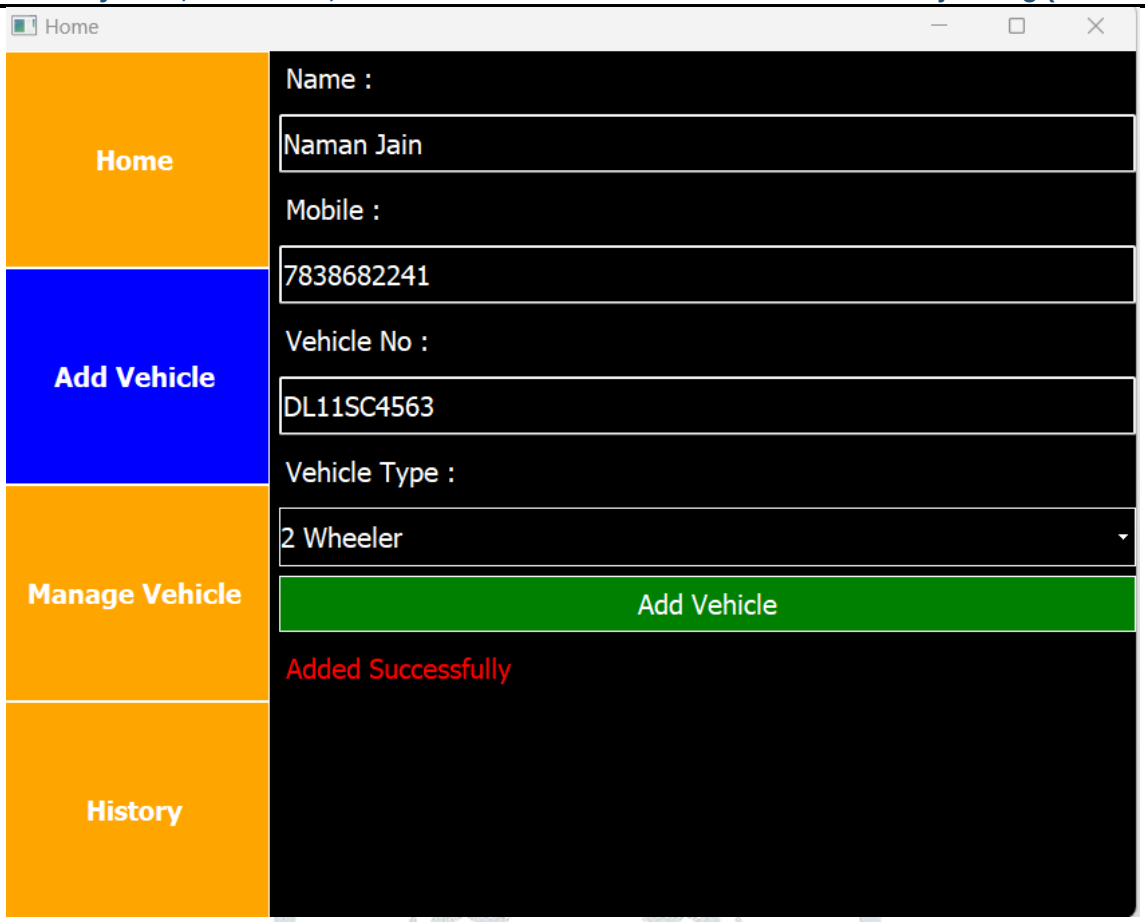
A lot of internet reservation methods that let you book reservations before you travel are equivalent to the suggested method.
1. The user enters the desired location after opening the app or website.
2. The customer then selects his expected arrival time and the length of time he wants to book the spot for.
3. After he comes and checks in at the specified location and time, the slot and money are debited from his account (online wallet) in the proper quantities.
4. As soon as he walks away, the sensor notices that the state has changed from blocked to vacant and alerts the server, who updates the database.
5. If a consumer wants to remain longer than the period given for booking, he can extend his time slot using the app by a certain amount of time.

6. IMPLEMENTATION

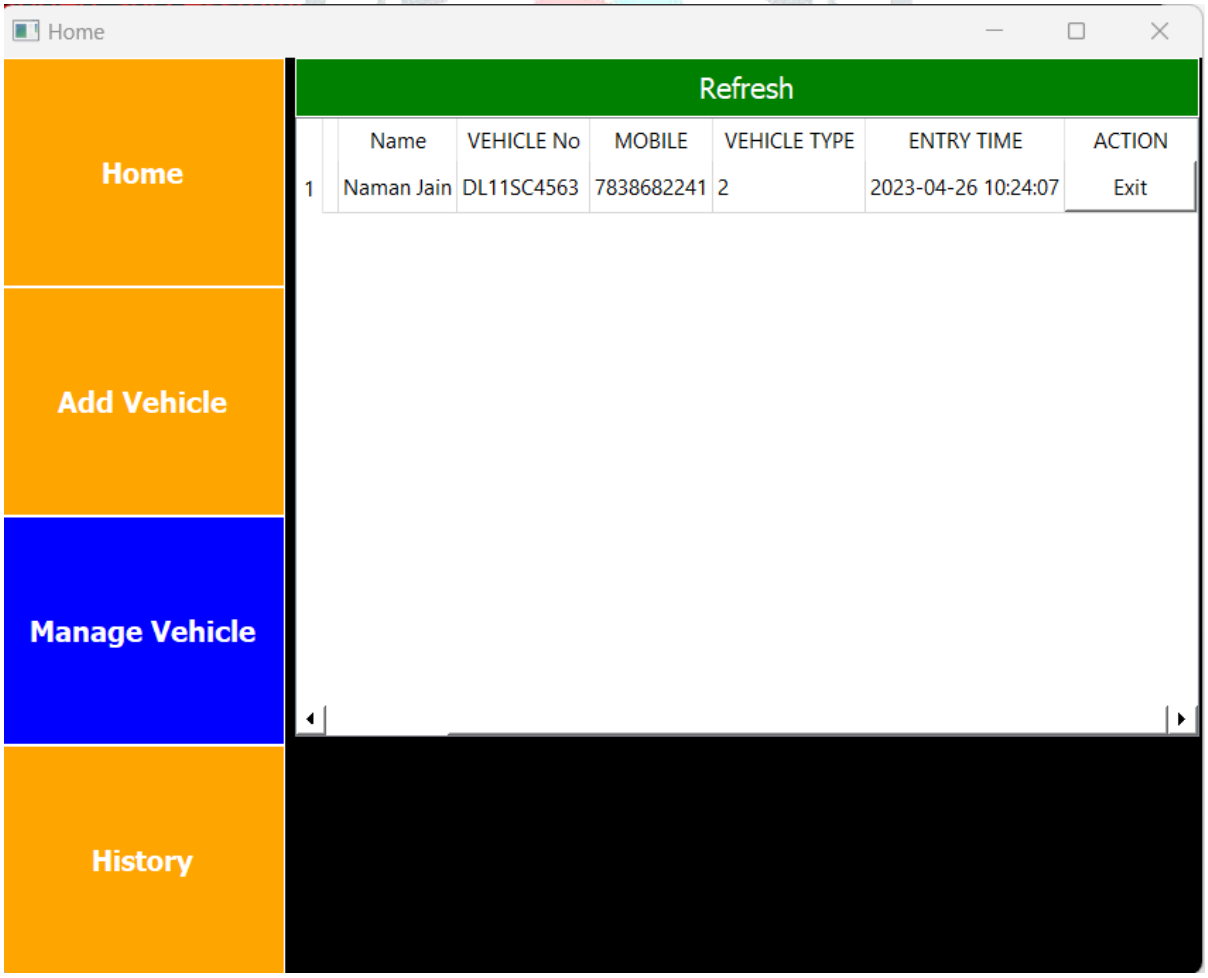


Login Window

Home Window



Adding a Vehicle



Management window

7. BENEFITS OF THIS SYSTEM

- Manages traffic effectively and without incident.
- It is possible to make efficient use of limited parking spaces.
- Directs vehicles to vacant, open parking places that are currently available.
- Effective parking spot management leads to a large increase in revenue.

8. CONCLUSIONS

With the aid of the Internet of Things, smart parking systems create new solutions. Building smart cities has traditionally been centered on the system. We discuss the parking issue in this essay. It displays a cloud-based, IOT-based smart parking system. The technology offers real-time data on the number of parking spaces that are available in a specific parking area. The user can reserve a parking space for them from a distance using this smartphone application. The goal of this article is to increase a city's parking options, which will improve the city's quality of life. The developed automated smart parking system is simple, inexpensive, and provides a useful means of reducing the carbon footprint of the atmosphere.

It is simple to view and map the availability of parking spots using a web browser from any distance. As a consequence, it lowers the problem of automobile parking in outlying cities and also minimises the wasteful movement of vehicles through occupied parking places. As a result, it saves time and is inexpensive.

9. FUTURE SCOPE

The Smart Parking system based on Slot Booking is implemented using an application. The slot allocation strategy enables us to reserve the most affordable parking spot for ourselves. In addition to lessening traffic congestion, it effectively addresses parking concerns and offers automated invoicing. This concept might be developed further into a completely automated system using tiered parking. Designing safety features like automated payment, driver facial recognition to deter theft, and tracking the vehicle's number is also an option. As we continue the testing in a real-world environment, users will be able to access the "Smart Parking" technology on their mobile devices. To make the procedure quicker and more effective, fast-tags and referral codes can be included.

10. REFERRENCE

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