RemoPark - Revolutionizing Parking System

Sushant Shelake
Department of Computer Science and Engineering, DYPCET
Kolhapur, India
sushantshelake89@gmail.com

Siddhesh Dewalekar
Department of Computer Science and Engineering, DYPCET
Kolhapur, India
siddheshcampus8@gmail.com

Tushar Kamble
Department of Computer Science and Engineering, DYPCET
Kolhapur, India
tushkamble46@gmail.com

Vaibhav Patil
Department of Computer Science and Engineering, DYPCET
Kolhapur, India
me.vaibhavpatil.mail@gmail.com

Swaroop Sutar
Department of Computer Science and Engineering, DYPCET
Kolhapur, India
swaroopsutar300@gmail.com

Assistant Prof. Pooja Patil
Department of Computer Science and Engineering, DYPCET
Kolhapur, India
poojapatil11@gmail.com

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Abstract - The system proposed in this paper aims to eliminate inefficiency in current parking systems due to limited availability of spaces and lack of real-time monitoring creates significant user dissatisfaction and economic losses for parking facilities. This research aims to develop a smart parking application designed to optimize the usage of parking spaces, enhance user convenience, and provide comprehensive real-time monitoring. By offering real-time information on available parking spots, the application helps drivers save time and reduce frustration, particularly in congested urban areas. Features such as advance reservations and electronic payments streamline the process, minimizing the need for physical cash transactions and enabling users to secure parking spaces ahead of time. The implementation of this smart parking solution is expected to alleviate traffic congestion, improve space utilization, and significantly enhance the overall parking experience for users.

Key Words: Smart Parking, Automated, Enhanced, Camera's User-friendly.

1.INTRODUCTION

In the present scenario, the limited availability of parking spaces, coupled with inefficient utilization and the absence of real-time monitoring, continues to create a frustrating experience for users. The time wasted searching for parking spots due to congestion exacerbates the issue, leading to user dissatisfaction and revenue loss for parking facilities. Addressing these challenges with an innovative and efficient smart parking solution is crucial to transforming the current state of parking systems into a seamless and user-friendly experience.

To tackle these problems, our project aims to develop a smart parking application that optimizes parking space usage, enhances user experience, and provides real-time monitoring solutions. Such a system will provide real-time information about available parking spaces, helping drivers save time and reduce frustration. By allowing users to easily find and reserve parking spaces in advance, particularly in busy urban areas, the application can significantly reduce traffic congestion. Additionally, electronic payment options and reservation features will streamline the parking process, making it more convenient for users and ensuring better space utilization for parking facilities.

2. LITERATURE REVIEW

The literature review analyzed successful implementations and shortcomings of existing smart parking solutions. Strengths, such as efficient space utilization algorithms, and weaknesses, including unreliable occupancy detection, were identified, guiding our project's design decisions.

1. ParqEx: This is a SaaS & IoT based innovative technology platform for parking management, payment processing & access control. It is designed to address parking challenges in urban areas, making it easier for people to find parking spaces. It is only available for countries like USA, Canada.

2. Parkalot: This is a website that allows users to view whether a parking space is currently in use, as well as the space's location relative to the lot. Users can visit the webpage either from home or as they enter the lot to see where there are open spots. It is only available for the customers from Poland. The feasibility study assessed technical, economic, and scheduling aspects. It ensured a realistic project scope by evaluating available resources and estimating efforts based on functionality complexity.

This approach allowed us to balance the project's requirements with available resources effectively.

3. IMPLEMENTATION

RemoPark is a project using Flutter for the front-end and PostgreSQL for the back-end. The Flutter app, designed with screens for login, registration, parking selection, booking history, and payment. The back-end, built with Django provides RESTful APIs for user authentication, parking management, and payments, with PostgreSQL handling data storage.
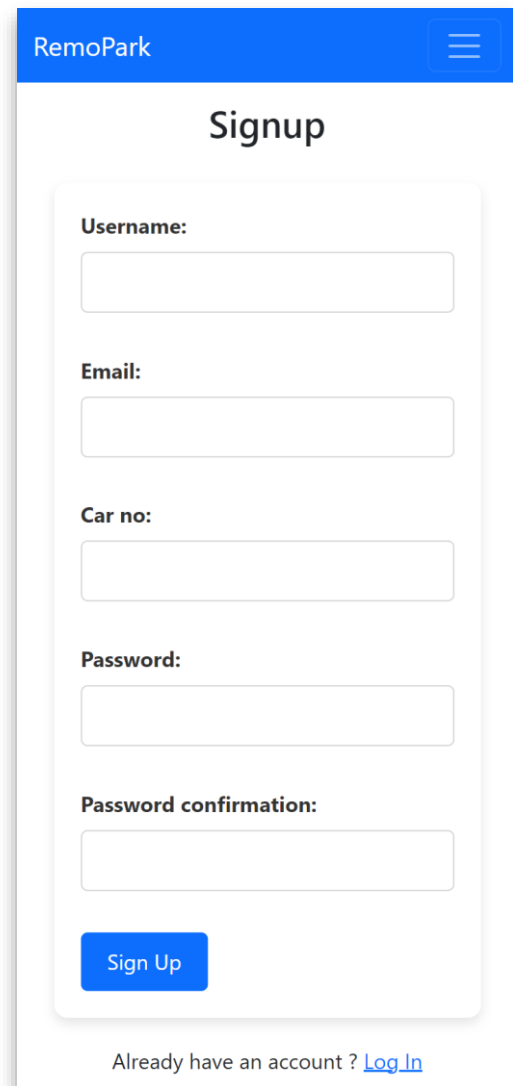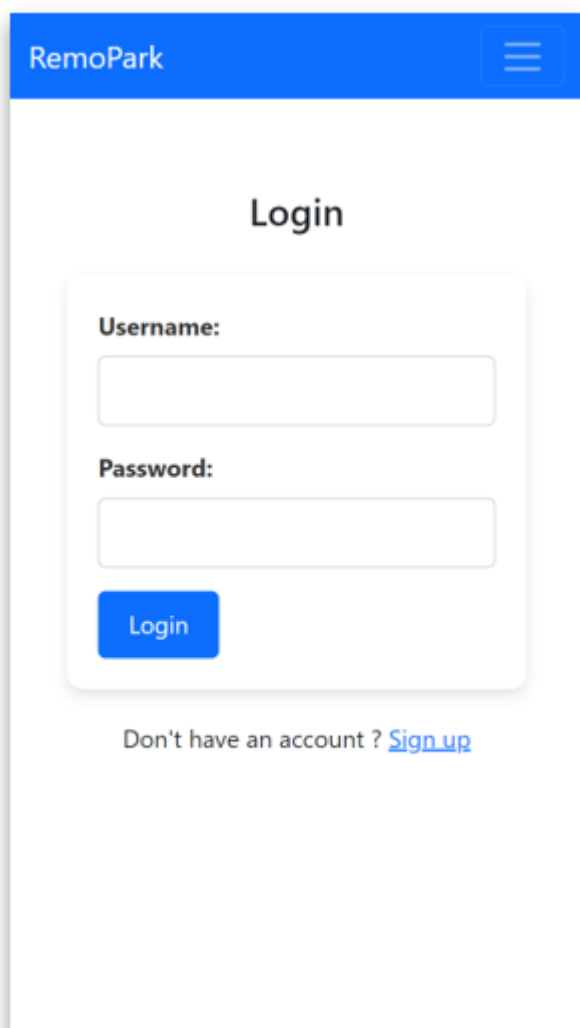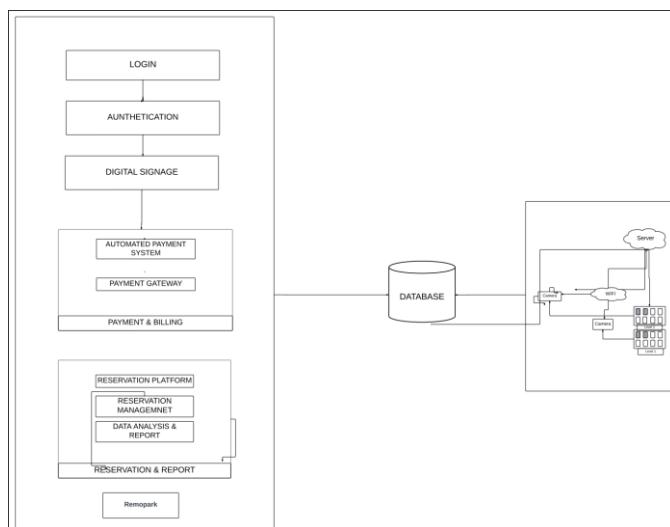

Diagram 1: System Architecture

The architecture of RemoPark, a tourist parking system, includes modules for login, authentication, and digital signage, integrated with an automated payment system and a reservation platform. The system connects to a central database that interfaces with various components, including payment gateways and reservation management tools. This comprehensive setup ensures efficient management of parking reservations, payments, and data analytics.

1. Sign Up Page:

The sign-up interface for RemoPark, part of a tourist parking system, requires users to input their username, email, car number, and password with confirmation. This design simplifies the registration process for tourists seeking parking.

2. Login Page

The login interface for RemoPark, part of a tourist parking system, requires users to enter their username and password for secure access. It includes a sign-up option for new users. This user-centric design ensures straightforward account management for tourists. Overall, it enhances the convenience and security of managing parking reservations.

3. Parking Slot Booking Page
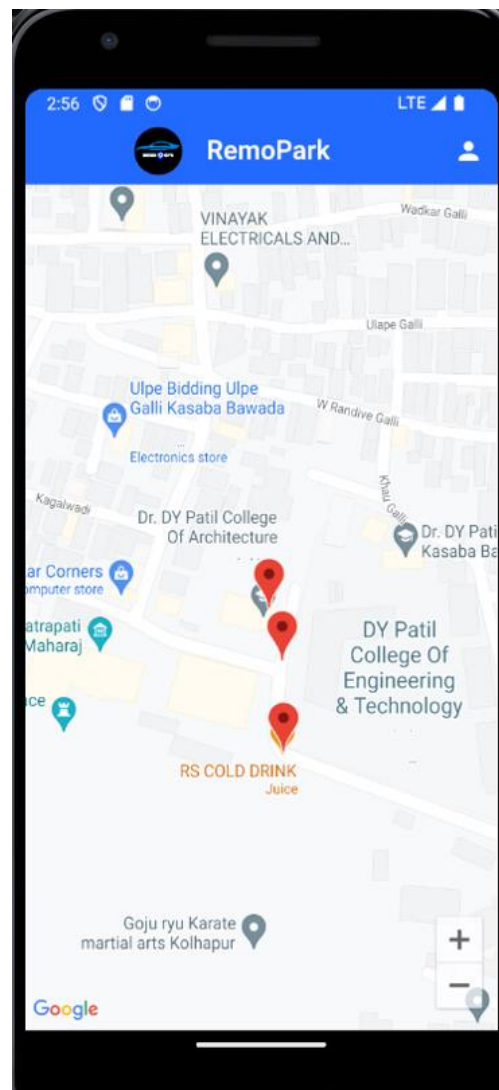
The screen shows available parking slots on the first floor, labeled from A-1 to A-8, with each slot having a "BOOK" button to reserve the spot.

4. Invoice Page
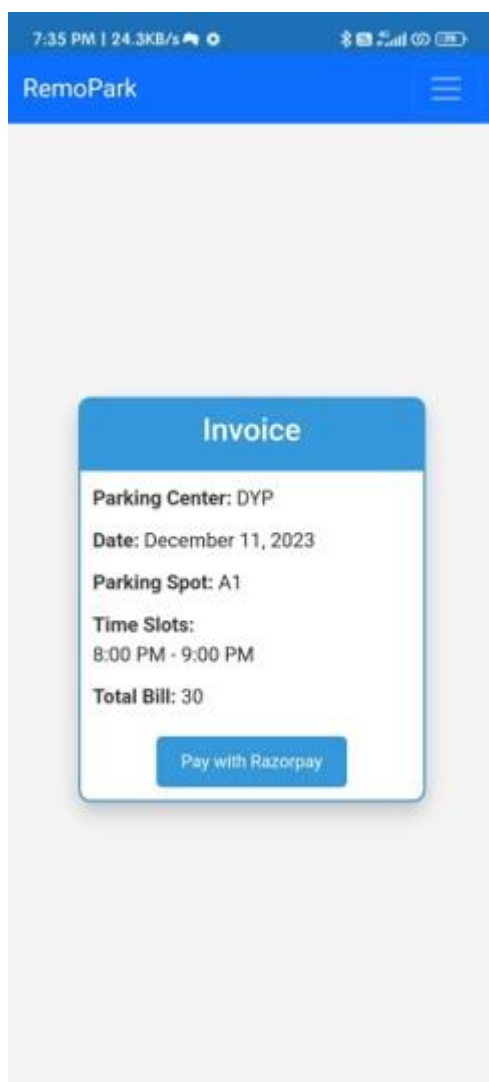
This image displays the invoice screen of the RemoPark tourist parking application. The invoice includes details such as the parking center (DYP), the date (December 11, 2023), the reserved parking spot (A1), and the time slots. It also shows a total bill amount of 30Rs and provides a button for payment through Razorpay. The interface is clean and straightforward, making it easy for users to review and complete their parking reservations.

5. Database
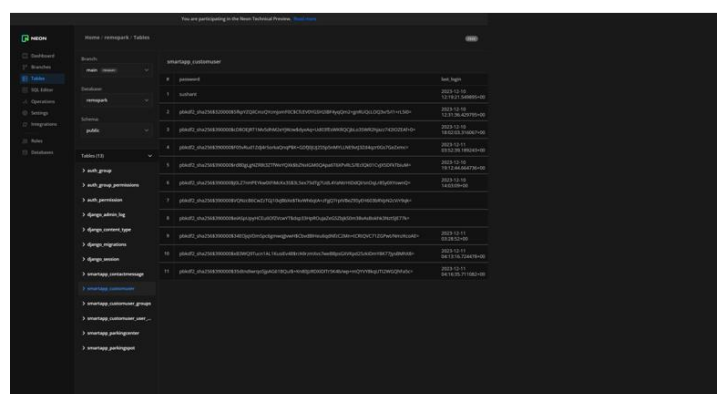
This interface depicts background work-flow in PostGre SQL. Here, it stores details of customer, parking slot information and updates on payment.

4. CONCLUSIONS

In conclusion, a smart parking application offers a wide range of assists and helps to the traditional parking experience. By using advanced technologies such as mobile apps, and smart parking applications can enhance convenience, efficiency, and sustainability in urban environments. Here are some key takeaways:

1) Improved Efficiency: Smart parking applications reduce the time and effort required to find a parking spot. Drivers can easily locate available spaces in real-time, leading to quicker

parking and reduced traffic congestion.

2) Enhanced Convenience: Users can reserve parking spots in advance, pay for parking through their smartphones, and receive navigation guidance to the chosen parking location. This added convenience simplifies the overall parking experience.

3) Reduced Environmental Impact: Smart parking systems help reduce carbon emissions and fuel consumption by minimizing the time spent searching for parking.

5. REFERENCES

[I] H. Ibrahim – "Car Parking Problem in Urban Areas, Causes and Solutions" - 24
Apr 2018 - SSRN:3163473

[II] Tejash Kumar, Uttambhai Patel,Jayshiv Thakkar, Tejash Pandya - A Review on
"Parking Issues and Challenges in CBD Area" - 01 July 2022 - IJMTST0807036

[III] Mathias Gabriel Diaz Ogas,Ramon Fabregat,Silvana Aciar – "Survey of Smart
Parking Systems" - 2 June 2020 - SSRN:10113872

[IV] Peiyuan Jiang,Daji Ergu,Fangyao Liu, Ying Cai,Bo Ma – "A Review of Yolo
Algorithm Developments" - 3 February 2022 - SSRN:10.1016