H.U.B. Rental Web App

Polytechnic University of Puerto Rico
Electrical & Computer Engineering and Computer Science Department
Capstone Design Project FA-24
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Introduction

In partnership with Toyota, our clients Radulf Basmeson and Valeria Droz are pioneering the Human Urban Bicycle (H.U.B.) project, an eco-friendly transportation solution for urban areas. This initiative leverages motorized bicycles and charging stations to reduce CO2 emissions. Our project focuses on developing the accompanying web app, enabling university students to rent bikes and scooters easily. The app aims to create a greener campus at Polytechnic University, the project's first station by providing convenient, sustainable transportation options.

Problem

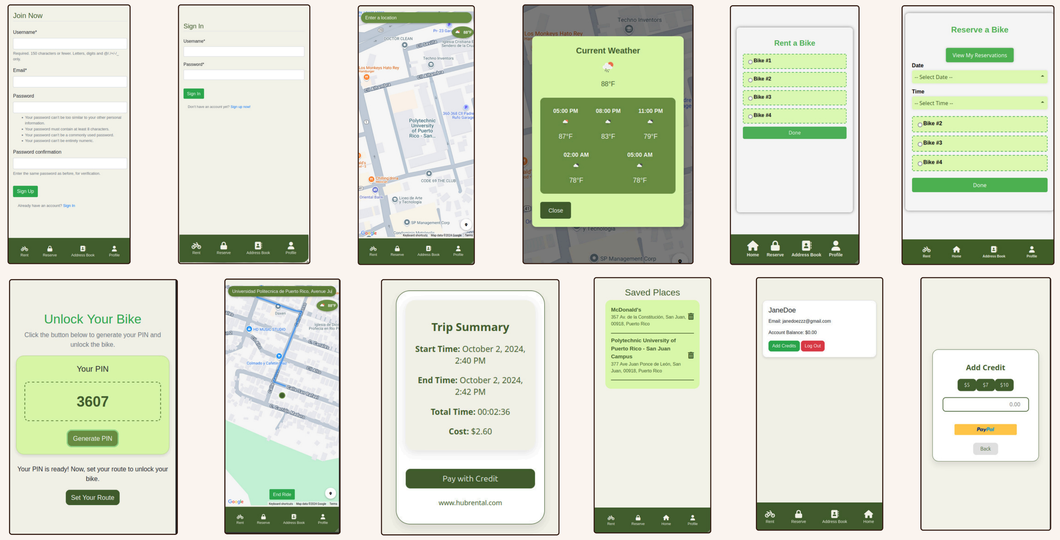
The H.U.B. project recognizes the challenges many university students face with transportation on campus. Traditional options like cars and public transit often prove inconvenient, contribute to pollution and congestion, and may have limited accessibility. The project further identifies the absence of readily available, user-friendly alternatives promoting sustainability. This lack of easy access to eco-friendly transportation directly impacts students' ability to navigate campus efficiently while minimizing their environmental footprint.

Software & Tools

Figure 1: Software Languages, Tools and APIs utilized for H.U.B. Rental Web App

The H.U.B. Rental web app leverages a robust technology stack to deliver its features and functionality. Python, combined with the Django web framework, forms the backbone of the application, enabling efficient backend development and seamless data management. The front end is built using HTML and CSS, ensuring a visually appealing and user-friendly interface. MySQL is the database for storing and managing user information, bike inventory, and rental records. The app integrates with the Google Maps API for navigation and location services, the PayPal API for secure payment processing, and the OpenWeatherMap API for real-time weather updates.

User Interfaces



The H.U.B. Rental Web App features a clean and intuitive user interface for effortless navigation and a seamless rental experience. The interface includes key sections for renting bikes, making reservations, managing addresses, and viewing user profiles. It also displays a dynamic map, a user-friendly search function, and a weather widget for real-time updates. The app's design prioritizes clarity and efficiency, empowering users to access sustainable transportation options easily.

Diagrams

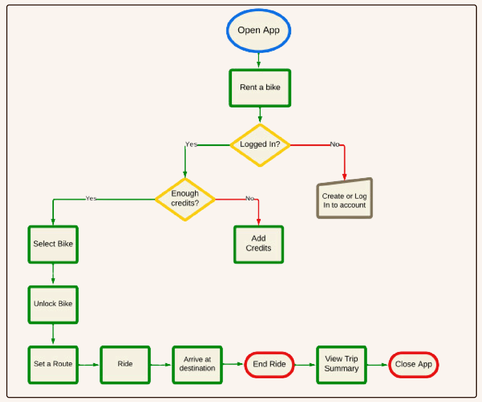


Figure 2: User App Interaction Flowchart

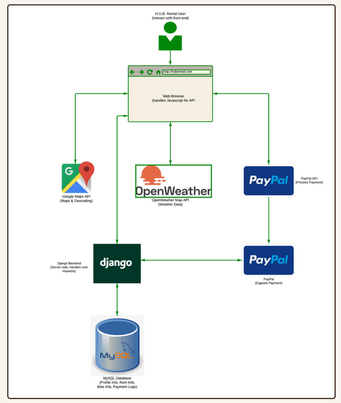


Figure 3: System Architecture

Future Work

- Loyalty program to reward frequent users
- Real-time bike tracking for security and management
- Dedicated mobile app for iOS and Android
- Implementation of innovating locking systems for enhanced security and convenience
- Ensure ongoing compliance with relevant data privacy regulations and transportation laws.
- Incorporate a feedback mechanism within the app to gather user input and drive continuous improvement.
- Implement database sharding to enhance performance and scalability by distributing data across multiple servers as the user base and data volume grow.

Conclusion

The H.U.B. Rental web app stands as a testament to the potential of technology to address pressing environmental and logistical challenges. Providing a user-friendly platform for sustainable transportation empowers university students to make eco-conscious choices, reduce their carbon footprint, and contribute to a greener campus. The app's integration of cutting-edge features, such as real-time GPS navigation and weather updates, coupled with its focus on user experience and convenience, positions it as a valuable tool for enhancing campus mobility. As the project continues to evolve, incorporating future enhancements and expanding its reach, it is poised to become an integral part of the university experience, fostering a more sustainable and connected community.

Acknowledgement

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