IBM Hack Challenge – 2023

Report on

Project Topic: Plug & Power: Revolutionizing the Road

Project Domain: Cognitive Artificial Intelligence

Team Name: BlackOuts

Team Members:

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1 INTRODUCTION

1.1 Overview

1.1.1 In the rapidly evolving landscape of transportation, electric vehicles (EVs) are gaining traction as a sustainable and efficient mode of travel. However, the lack of easily accessible and accurate information about charging stations has been a significant challenge for EV owners.

1.1.2 This project addresses this issue by creating a solution that empowers EV owners with real-time information about charging stations.

1.2 Objective

1.2.1 The primary goal of this project is to develop a platform that offers accurate and up-to-date information to electric vehicle owners, allowing them to make informed decisions about their charging needs.

1.2.2 By providing details such as charging station names, to book a slot for charging spot, available charging types, estimated charging times, and the ability to assess if the current battery charge is sufficient to reach a specific station, we aim to enhance the convenience and ease of electric vehicle usage.

2 LITERATURE SURVEY

2.1 Existing problem: Limited Access to Real-time Charging Station Information.

2.1.1 rapid growth of electric vehicles (EVs) is reshaping the automotive landscape, with benefits ranging from reduced emissions to lower operational costs. However, a significant challenge that EV owners face is the lack of convenient access to accurate, up-to-date information about charging station availability.

2.1.2 As more individuals consider making the switch to electric mobility, the absence of real-time insights into charging station locations, charging types, billing details, and estimated charging times becomes a prominent roadblock. This "range anxiety" undermines the confidence of potential EV owners, impeding the widespread adoption of electric vehicles and the realization of their environmental advantages.

2.2 Proposed Solution: Empowering EV Owners with Real-time Charging Station Information.

2.2.1 To bridge this critical gap, our project proposes the development of an innovative platform that provides electric vehicle owners with comprehensive and accurate real-time information about charging stations. This solution aims to transform the EV ownership experience by offering the following key features.

2.2.2 Real-time Data Integration: Our platform will aggregate data from various sources, ensuring that users have access to the most up-to-date information about charging station availability, location, and amenities.

2.2.3 Charging Station Details: Users will be able to view detailed information about charging stations, including their names, addresses, contact information, and ratings from other users.

2.2.4 Billing Transparency: Clear and transparent billing details will be presented for each charging session, helping users estimate the cost associated with different stations.

2.2.5 Charging Compatibility: The platform will indicate the types of charging offered at each station, ensuring that users can identify stations compatible with their EVs' charging requirements.

2.2.6 Slot Booking Facility: The EV vehicle takes minimum half-an-hour to fill the battery that based on capacity, It’s a option to book a slot, that confirms the slot for charging vehicles.

2.2.7 Estimated Charging Times: Users will receive real-time estimates of the duration required to charge their vehicles at specific stations, aiding in trip planning and scheduling.

2.2.8 Range Assessment: The platform will analyze the user's current battery charge and calculate whether it's sufficient to reach the selected charging station, addressing range anxiety.

3 THEORETICAL ANALYSIS

3.1 Hardware / Software designing:

Hardware requirements of the project :

- I3 or ryzen 3 processor
- 4 Gb ram
- 2gb graphics card
- Windows or Mac or Linux

Software requirements of the project:

- **FRONT END** - HTML, CSS, JavaScript, Flask
- **BACKEND** - Flask, python
- **DATABASE** – IBM Cloud DB

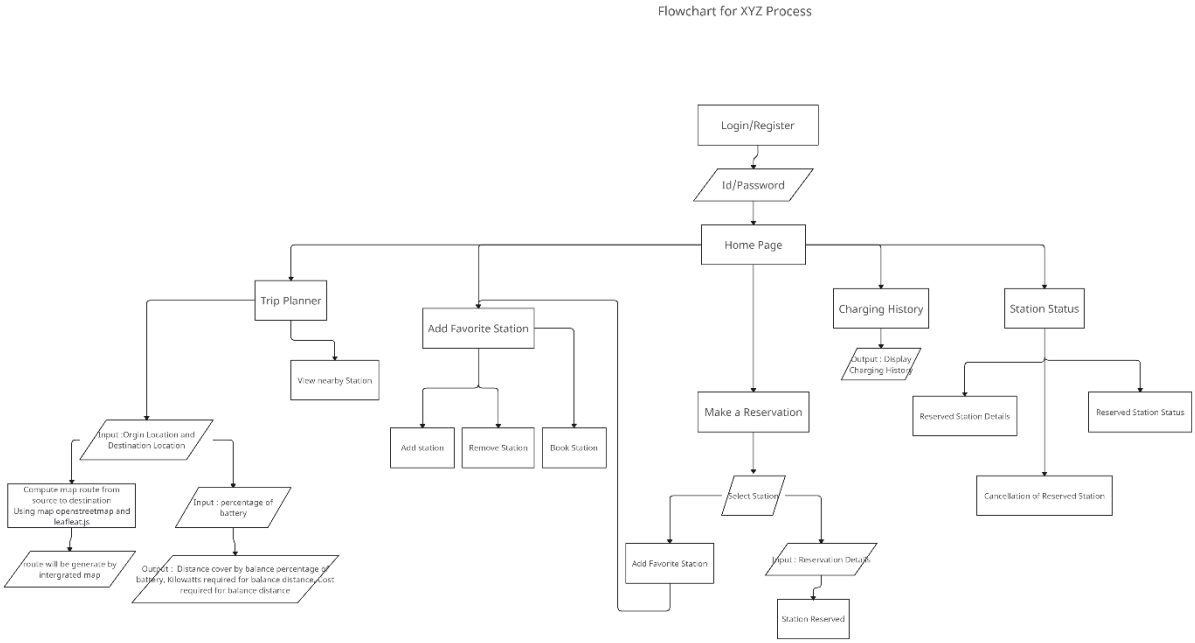
4 EXPERIMENTAL INVESTIGATIONS

Analysis or the investigation made while working on the solution.

- So, while shaping an idea about how to create a website for the proposed project, we visited a lot of websites for referrals to study about any pre existing solutions and how to make a more advanced and useful model other than the existing one.
- To check the working of the website we created random stations in certain areas for our own predictions as per the normal petrol stations interval.
- To collect all the detail about customers normal day planning and battery consumption details on each travel in a particular day, in the database, for future reference, getting a proper referral site was a bit challenging.

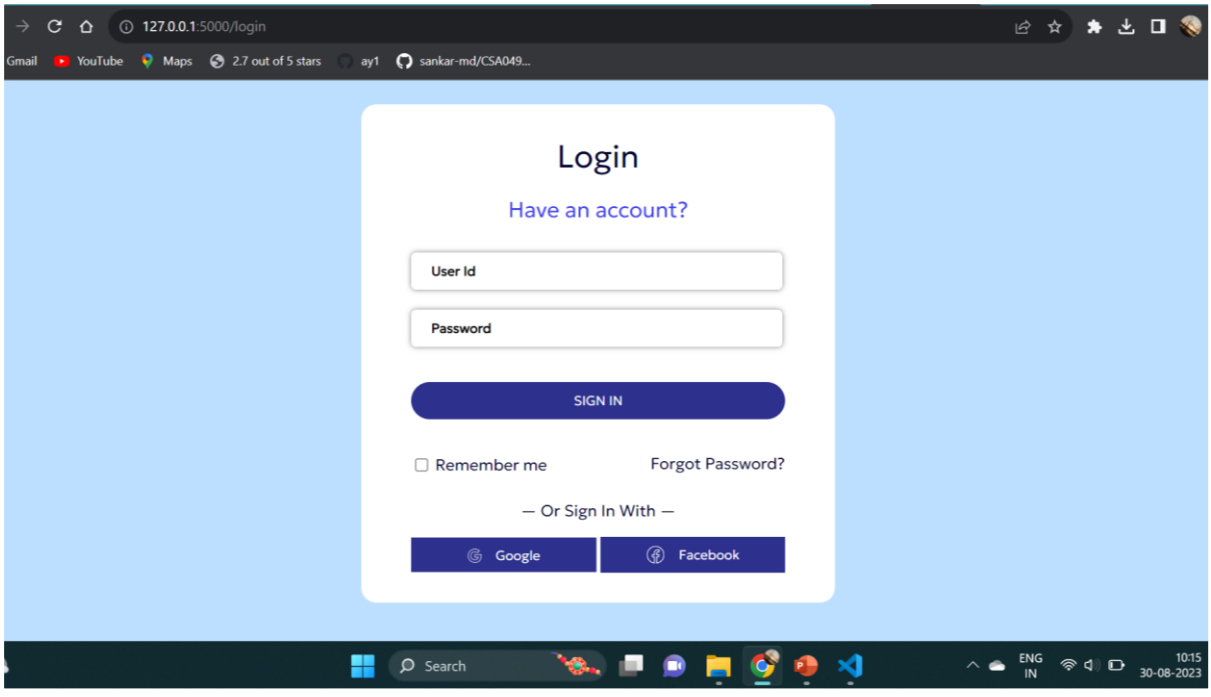
5 FLOWCHART

Diagram showing the control flow of the solution

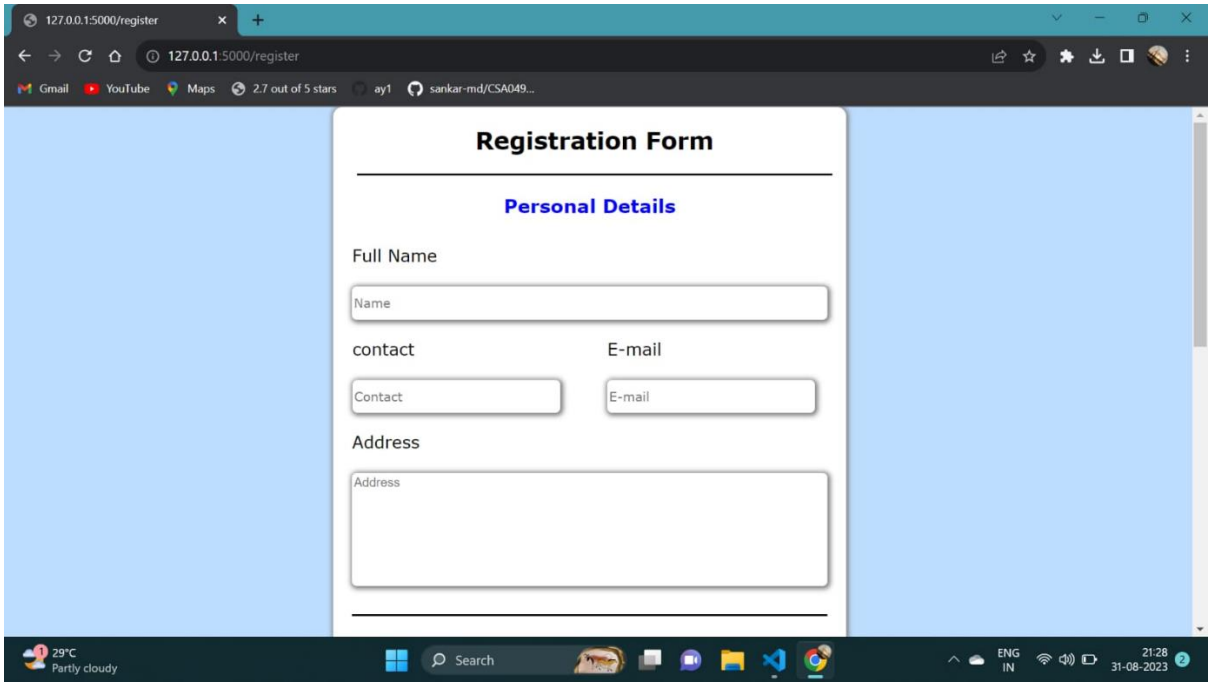


6 RESULT

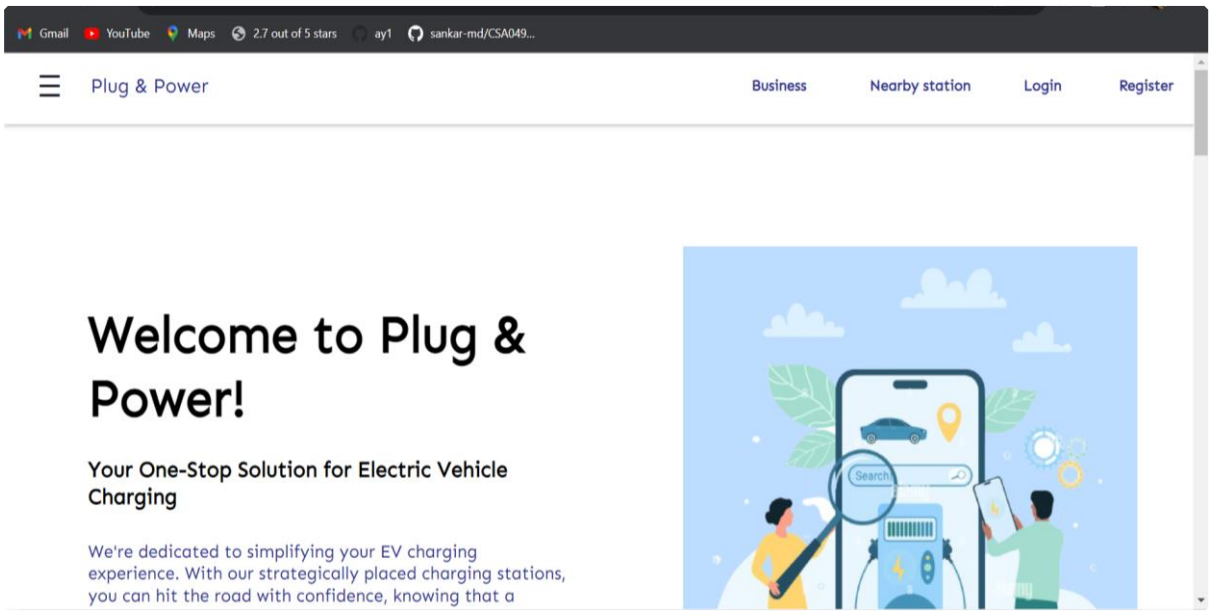
Login Page



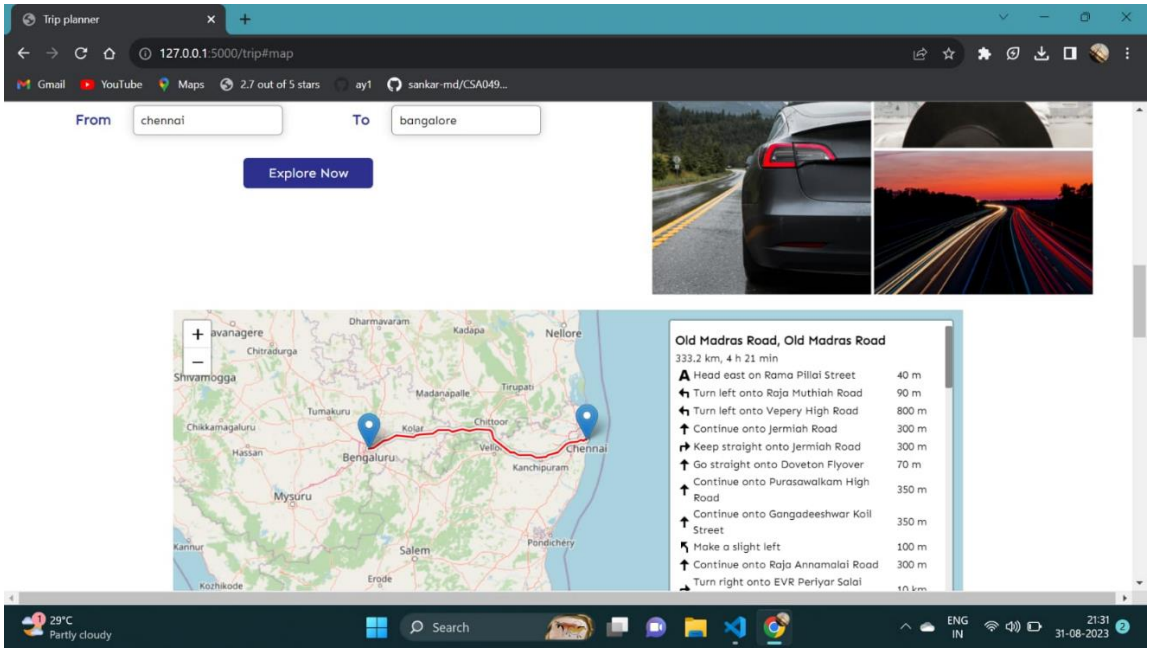
Registration Form

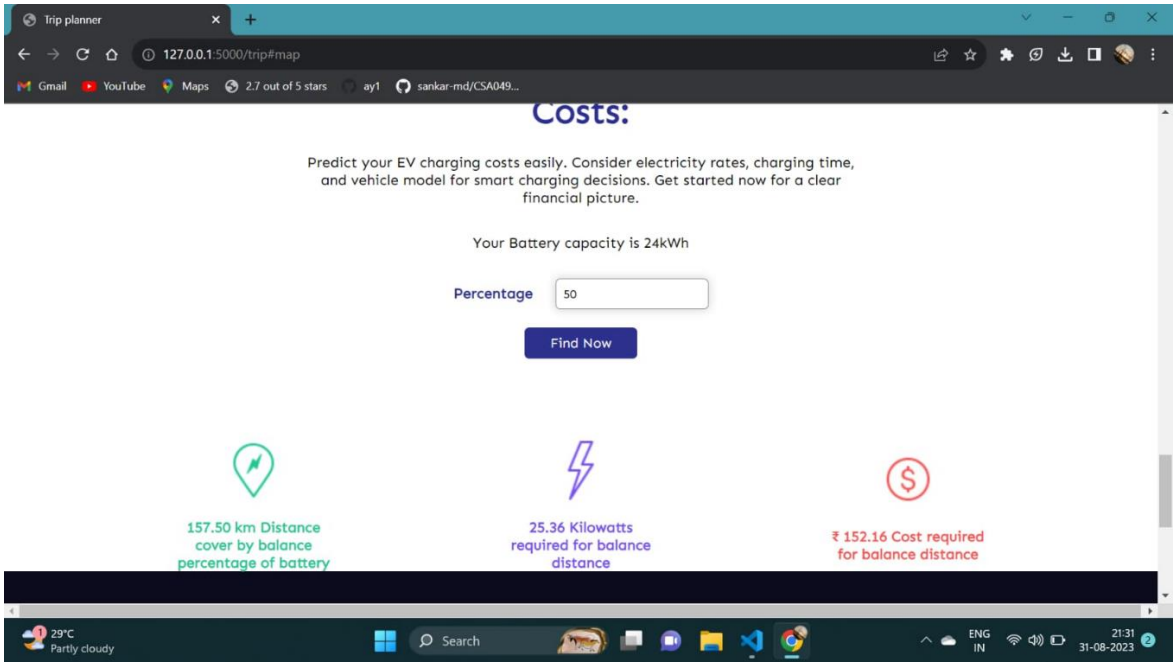


Home

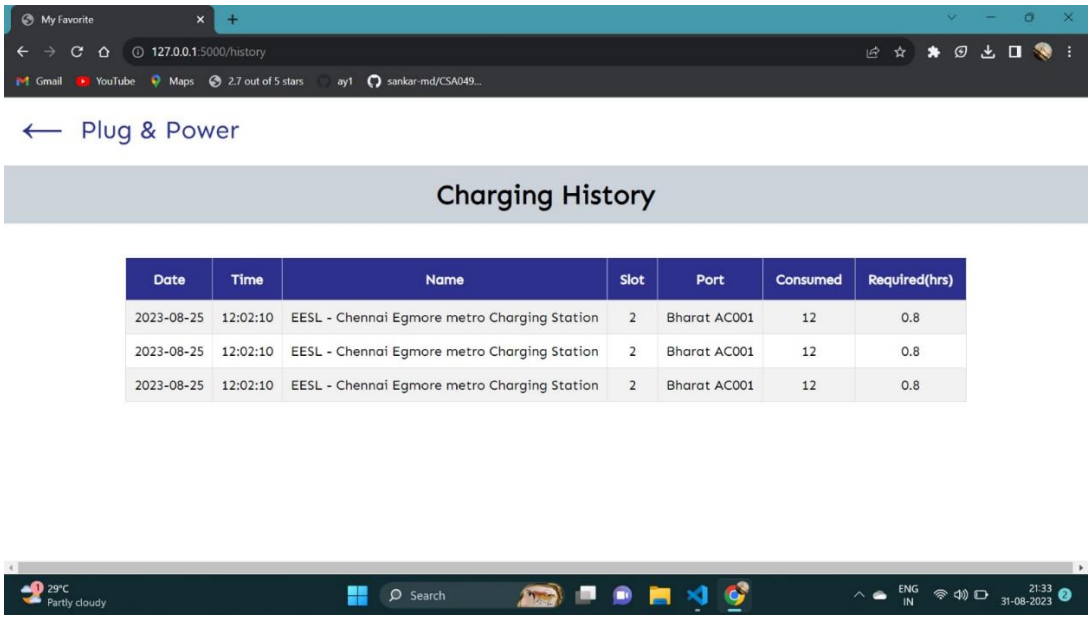


Tripping Planner

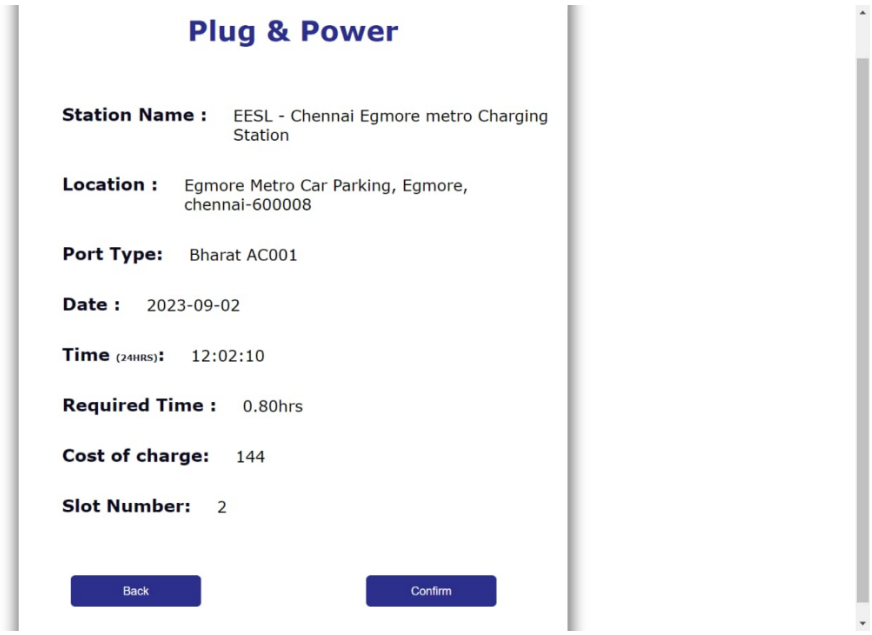




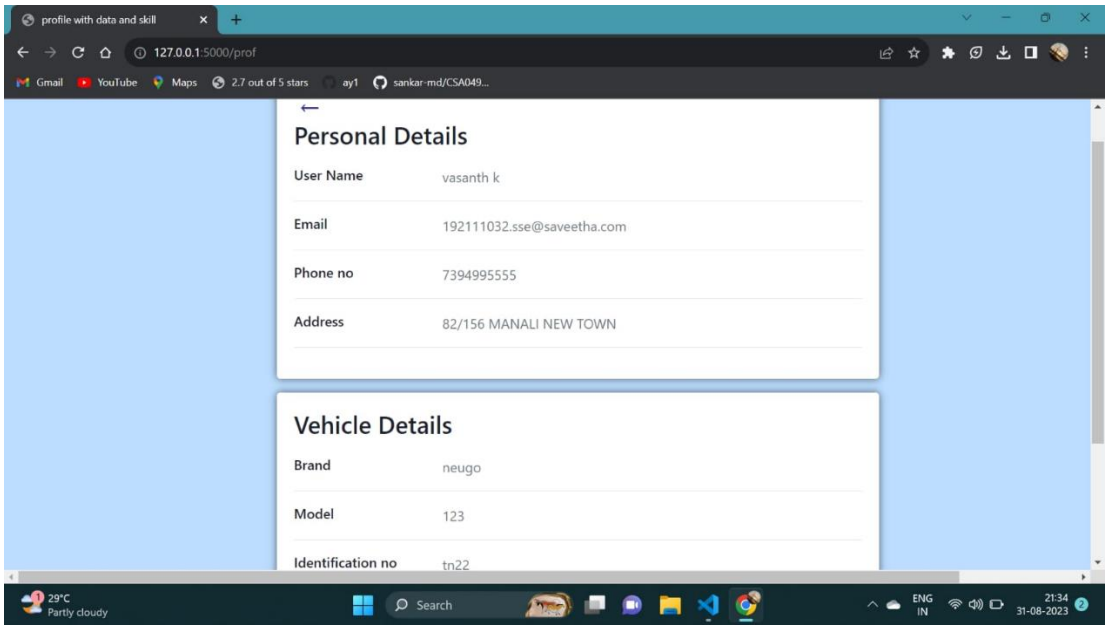
Charging history page



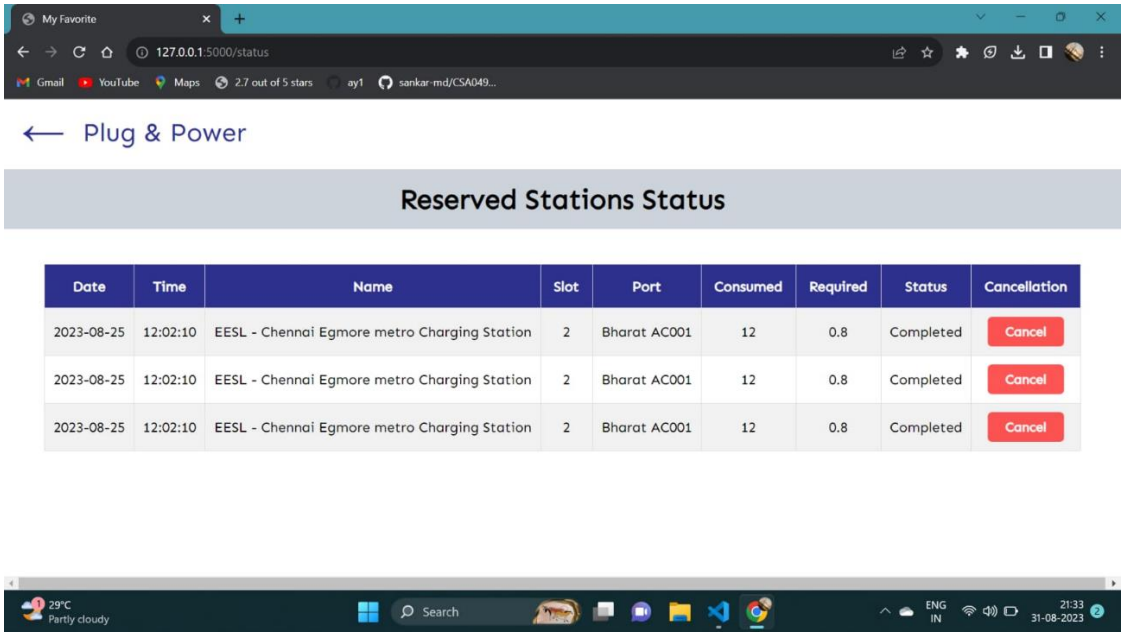
Booking Slot confirmation page



User profile Page

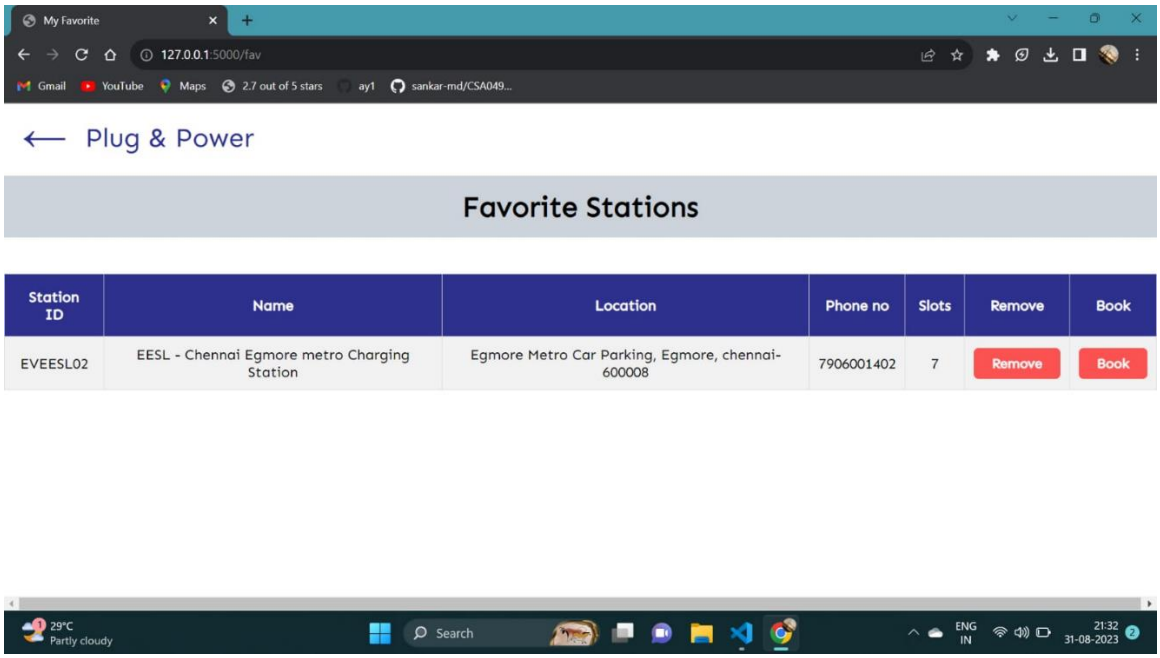


Reserved Station Page



Date	Time	Name	Slot	Port	Consumed	Required	Status	Cancellation
2023-08-25	12:02:10	EESL - Chennai Egmore metro Charging Station	2	Bharat AC001	12	0.8	Completed	Cancel
2023-08-25	12:02:10	EESL - Chennai Egmore metro Charging Station	2	Bharat AC001	12	0.8	Completed	Cancel
2023-08-25	12:02:10	EESL - Chennai Egmore metro Charging Station	2	Bharat AC001	12	0.8	Completed	Cancel

Favourite Station



7 ADVANTAGES & DISADVANTAGES

Advantages:

- Enhanced Convenience and Confidence: Electric vehicle (EV) owners will benefit from real-time access to accurate information about charging stations. This convenience will significantly reduce range anxiety, empowering them to plan their trips confidently.

- Optimized Trip Planning: By offering estimated charging times and assessing whether the current battery charge is sufficient to reach a station, users can optimize their travel plans and make informed decisions.

- Cost Transparency: Providing billing details for each charging session ensures that EV owners can factor in charging costs when planning their journeys, promoting transparency and budget management.
- Promotion of Electric Mobility: The solution encourages the adoption of electric vehicles by mitigating barriers to entry, thereby contributing to the reduction of greenhouse gas emissions and environmental impact.
- Real-time Updates: Integration with real-time data sources ensures that users receive the most current information about charging station availability, reducing the risk of relying on outdated data.
- User Reviews and Ratings: Including user reviews and ratings for charging stations enables EV owners to make informed decisions based on the experiences of others.

Disadvantages:

- The accuracy and reliability of the platform heavily rely on the quality of the data sources integrated. Inaccurate or outdated data could lead to misinformation for users.
- Developing and maintaining a robust platform that integrates with various data sources and updates in real-time can pose technical challenges, requiring continuous monitoring and updates.

8 Future Scope

- As the transportation sector explores various sustainable energy sources, the platform could expand to provide information about alternative fuel

stations, such as hydrogen refueling stations, catering to a broader range of environmentally-conscious vehicle owners.

- While the initial focus might be on specific regions, there's potential to expand the platform's coverage to a global scale, catering to the growing international demand for reliable charging infrastructure.

9 Bibliography

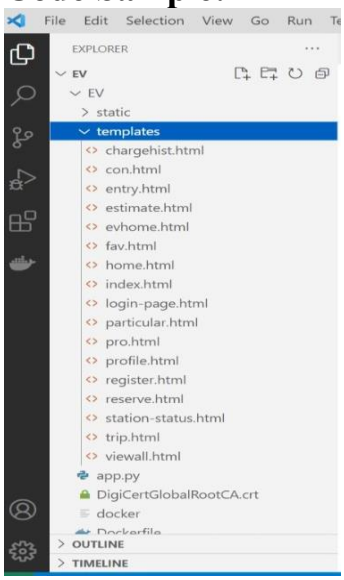
Smith, J. (2022). "The Rise of Electric Vehicles: Trends and Market Analysis." Electric Vehicle Research Report, Cleantech Analytics.

Green, A. (2021). "Charging Infrastructure and Its Role in Electric Vehicle Adoption." International Journal of Sustainable Transportation, 15(5), 301-318.

Electric Vehicle Charging Association. (2020). "EV Charging Station Installation Guidelines." EVCA Publications.

10 Appendix

Code Sample:



11 Conclusion

In the dynamic landscape of electric mobility, the proposed solution stands as a beacon of innovation, addressing a crucial gap in the transition to electric vehicles. By empowering EV owners with accurate and real-time information about charging station availability, estimated charging times, and billing details, the solution alleviates range anxiety and fosters a more seamless and confident electric driving experience. As we move toward a sustainable future, the integration of technology and data-driven insights not only propels the electric vehicle industry forward but also contributes to reducing environmental impact. Through this project, we envision a world where electric mobility is accessible, convenient, and embraced by individuals and communities alike.

Source Code Link:

https://github.com/smartinternz02/SBSPS-Challenge-10616-1692034876

Demonstration Link:

https://youtube.com/watch?v=962jg0jvj8I&feature=shared