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Green Drive: Electric Vehicle Charging Point Finder and Booking App

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Abstract: The transition to a sustainable future has led to the growing popularity of electric vehicles (EVs). However, EV owners encounter significant challenges in locating and accessing charging stations. Current systems for finding charging points are often outdated, unreliable, and lack comprehensive information on station locations and availability. This results in long waiting times and uncertainty, contributing to range anxiety and diminishing the convenience of EV ownership. To address these issues, we propose the development of an advanced EV charging point finder and booking app. This app aims to provide real-time information on charging station locations, availability, and the ability to book charging slots, thereby improving the overall user experience for EV owners.

Keywords: Electric Vehicles, Charging Stations, Real-Time Information, Range Anxiety.

I. INTRODUCTION

Android users who own electric cars should use the Green Drive app, specifically designed for their needs. It is important to have charging stations that are easy to access and dependable for the growing number of people who are considering buying electric vehicles. Programmers of this software aimed to address this issue by creating a user-friendly system for finding and reserving charging stations for electric cars. This Android app is designed to make it easier to use electric vehicles by offering a user-friendly interface. Electric car owners can easily plan charging sites. Individuals have apprehension about the depletion of electrical energy, So, the application makes it easy to find and book charging stations nearby.

This program is very important for all electric vehicle drivers because it makes many tasks for EV owners much easier and more efficient. The platform enhances customers' accessibility to the necessary charging infrastructure by simplifying the process of locating and reserving charging locations. Given the growing population of electric vehicle drivers, our software is essential in enhancing the accessibility and convenience of charging infrastructure for EV owners.

II. LITERATURE SURVEY

Electric vehicles (EVs) are often seen as a leading candidate when it comes to the development of ecologically sustainable transportation networks. However, there are other factors associated with electric vehicle (EV) transportation that pose challenges for wider adoption. A significant number of individuals hesitate to buy electric vehicles due to the extended duration required for charging them. One issue encountered when operating an electric vehicle is the lack of sufficient and precise data on the locations of charging facilities. The low level of user acceptance may be mostly ascribed to these limitations. Addressing these concerns necessitates prioritizing assistance to electric car users. ICT-based methods can do this.

This article examines the use of an Android application by the European Union's Internet of Energy (IoE) effort. The primary objective of this application is to enhance the demand for transportation services that are dependent on electric cars (EVs). The app provides comprehensive assistance to drivers of electric cars (EVs).

The application has features such as locating electric car charging outlets throughout the journey, forecasting the fluctuating capacity of the battery, and overseeing the lifespan of the battery. Moreover, it aligns with the semantic framework of the Internet of Everything (IoE). This provides electric vehicle (EV) users with the freedom to choose a charging slot that is most suitable for their requirements and preferences, considering the accessibility of EV charging stations (EVSSs). We evaluated the app's user-friendliness by administering a questionnaire.

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III. PROBLEM STATEMENT

The general acceptance of electric vehicles hinges on the presence of a reliable charging infrastructure, which is seeing fast proliferation. Although there has been a rise in the quantity of charging stations, users of electric vehicles (EVs) still face difficulties when trying to locate one. Owners of electric vehicles (EVs) may use this application to locate charging outlets in their vicinity and prearrange their charging sessions. The goal is to make it easier and more convenient for users to charge their vehicles. This initiative is designed to encourage people to use electric vehicles (EVs) by making it easier to find and reserve charging stations that are specifically made for EVs.

IV. OBJECTIVE

- Develop a comprehensive mobile application that enables EV owners to easily locate charging stations in their vicinity.
- Integrate real-time data on charging station locations, availability, and operational status to reduce uncertainty and waiting times for users.
- Introduce a feature allowing users to book charging slots in advance, ensuring that they have guaranteed access to charging points when needed.
- Design an intuitive and user-friendly interface that offers detailed information on each charging station, including pricing, connector types, and charging speeds.
- Address range anxiety by providing reliable and up-to-date information on the availability of charging infrastructure, thereby increasing user confidence in the practicality of EVs.
- Promote the adoption of electric vehicles by making the process of finding and using charging stations more efficient and convenient.
- Implement mechanisms for users to report issues and provide feedback on charging stations, ensuring continuous improvement and reliability of the information provided.
- Perform extensive usability testing with EV owners to refine the app based on their needs and preferences, ensuring a high level of user satisfaction.

V. METHODOLOGY

Designed to produce information systems via a comprehensive and multi-stage process, the System Development Life Cycle (SDLC) is a disciplined approach. The process involves several stages, starting with preparation, followed by analysis, design, development, testing, implementation, and maintenance. During the planning stage, we determine the goals, scope, and feasibility of the project.

A key component of the analysis phase is the gathering and recording system needs. The found demands are turned into thorough requirements papers with specific system structure, data models, and user interfaces throughout the design stage. Developed and programmed during the implementation phase is the system.

Testing is thus crucial to guarantee that the system satisfies all criteria and operates as expected. Using this all-encompassing approach helps to create dependable and excellent systems.

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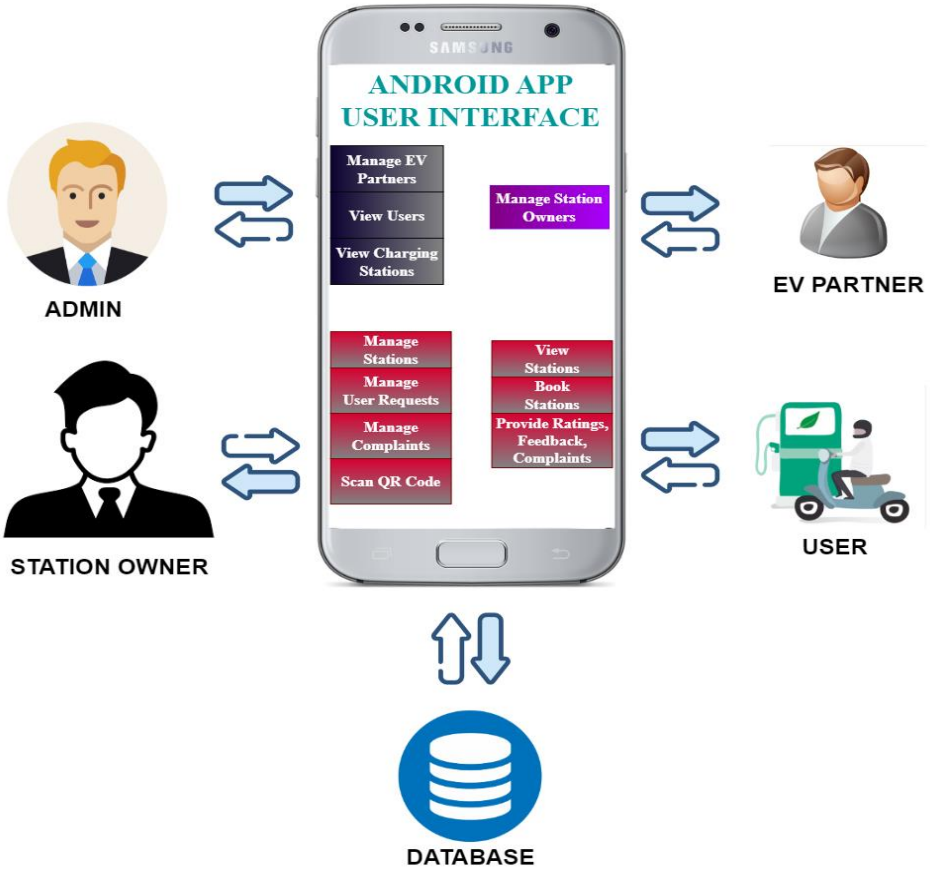

Fig 1. System Architecture

VI. PROPOSED SYSTEM

We are presenting a system that aims to assist electric vehicle (EV) owners in locating charging stations, prearranging their charging sessions, and effectively managing their charging activities. Electric car owners may use the application to promptly locate charging stations in their vicinity. Additional information on the charging station will also be supplied via the application. This program is designed to assist electric vehicle drivers in efficiently managing their trips and charging schedules.

Furthermore, the app will allow electric car drivers to make prior reservations for charging stations. Thanks to this feature, they will be relieved from the inconvenience of queuing at charging stations. In addition, the new system will help resolve other difficulties that were present in the previous system. Having information about the locations of charging stations is advantageous for those who drive electric cars. To mitigate the risk of range anxiety and reduce the need of visiting multiple charging stations, individuals should enhance their trips and charging schedules via improved organization. Furthermore, by allowing users to pre-book charging locations, the application will optimize the process of charging for those who own electric vehicles. This innovation will enhance convenience and reduce consumer waiting time at charging stations.

VII. SOFTWARE IMPLEMENTATION

The idea behind the System Development Life Cycle (SDLC) is to break down a system into smaller, more manageable parts in order to create it in an iterative manner. Unlike the conventional waterfall technique that requires finishing each stage before going on to the next, the iterative paradigm lets one review and improve past phases depending on feedback and insights acquired along the process.

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Including planning, analysis, design, implementation, and testing in every iteration helps iterative development and improvement to be supported. This method is very good in controlling changes and making sure the end result satisfies customer expectations.

The Green Drive project's software development life cycle (SDLC) strategy involves the iterative development of an application specifically designed for booking and locating charging spots for electric automobiles. The four steps that constitute each cycle are planning, designing, implementing, and testing. At first, we develop a simplified application that has just the necessary features. One of these tasks is the capacity to identify charging stations and show their availability. Afterwards, the prototype undergoes rigorous testing to assess its usability and functionality.

We include all of your recommendations for improvements and novel functionalities, such as booking and user authentication, into our next version upon receiving your feedback. Each iteration introduces new functionalities, resolves software defects, and integrates user feedback to enhance the application. By using this approach, you can make sure that the program will receive regular updates to improve its functionality and make it more user-friendly. The process of reserving and locating charging sites will become more reliable and efficient for electric car owners.

UI OF THE APP

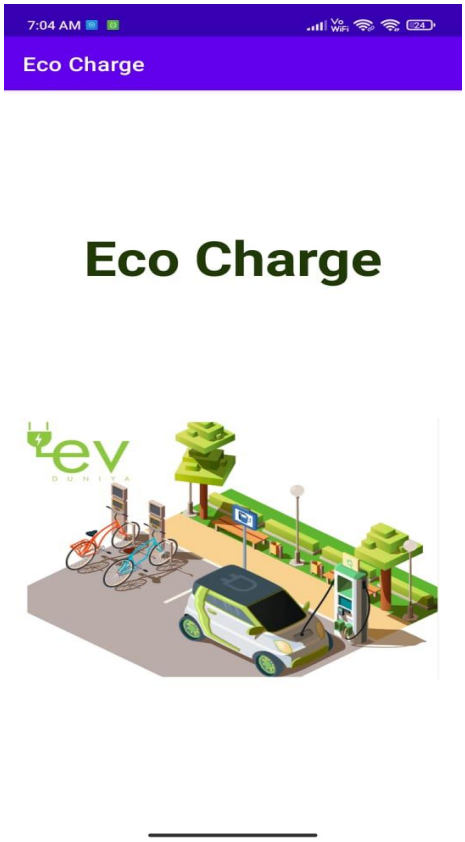

Fig 2. Loading Page

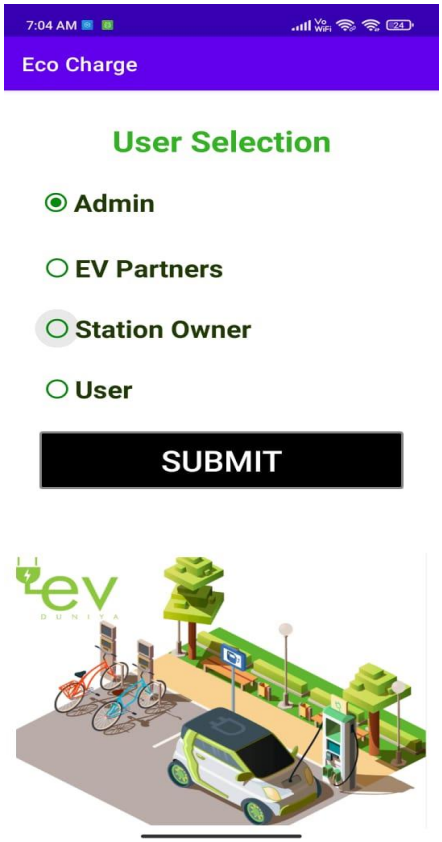

Fig 3. Home Page

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Fig 4. Admin Home Screen

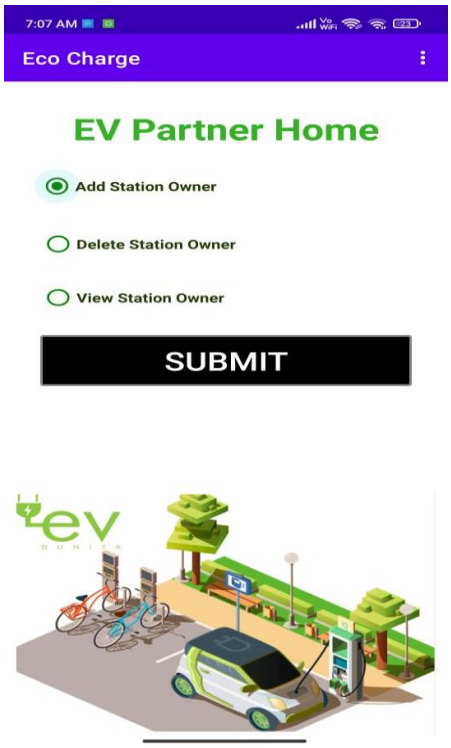

Fig 5. EV Partner Home Screen

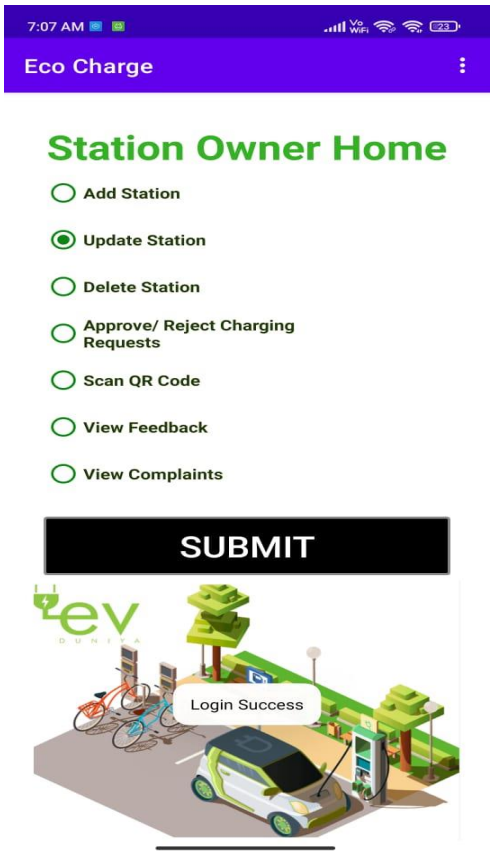

Fig 6. Station Owner Home Screen

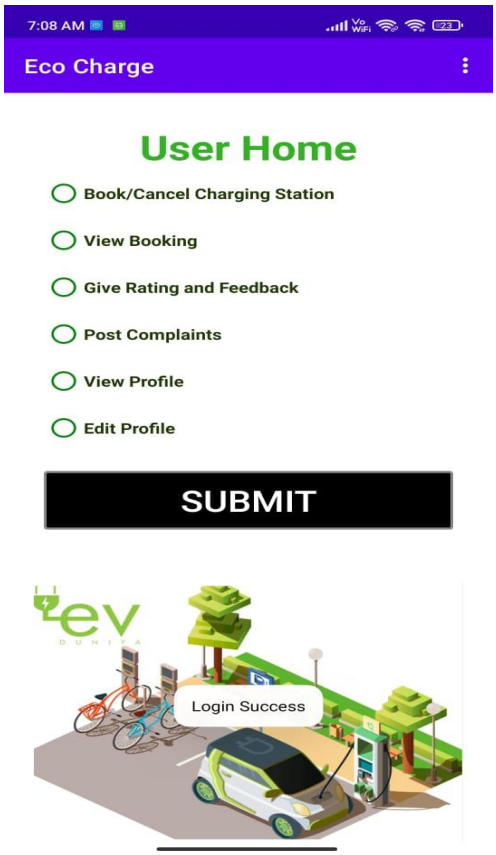

Fig 7. User Home Screen

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VIII. CONCLUSION AND FUTURE SCOPE

People who own electric vehicles will find the Electric Vehicle Charging Point Finder and Booking App to be convenient and straightforward. Finding and reserving charging spots is a breeze with its assistance. Making a reservation in advance and finding the nearest charging outlet are both made easy utilizing the search option. The app is a one-stop shop for all your charging point needs thanks to its comprehensive set of features, which includes payment choices, alerts, ratings, and reviews. The app's developers set out to solve a major problem.

This application may help users identify charging outlets that support their sustainability objectives, which is great for those who are concerned about the environment.

Customer information on charging station availability, charging status, and local charging events may be sent to them using Smart Notifications. Through the provision of pertinent data, this technology has the potential to assist clients in enhancing their charging habits.

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