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Electric Vehicle Charging Application

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ABSTRACT: EV charging application is an innovation solution designed to meet the constant growing demand of electric vehicle charging infrastructure in India. What makes our app unique is its integration of three types of charging points: Public , Private and Semi-Public. The Mobile Application utilizes the google maps API to provide users with a user-friendly way to find various charging options. The primary goal of our app is to reduce the time EV owners spend waiting to charge their vehicle and offer them more choices throughout India. User can easily locate and use publicly accessible charging stations for their journeys. The key features of our app lies in its ability to connect users with privately-owned chargers. It contributes to sustainable transportation by making charging more accessible and reliable. As India's transition to electric vehicle gains momentum. Keywords: By bringing together public, and semi-public charging options, our app significantly enhances the convience of owning an EV in India.

I. INTRODUCTION

Our project plays a crucial role in improving the user experience and advancing the country's efforts towards a cleaner and more sustainable future. EV are becoming popular day by day to their low emissions, energy efficiency, and reduced our dependence on the fossil fuels. But, the lack of charging infrastructure remains a big challenge for easy EV adoption. EV charging management system that can provide real-time information about all the available charging stations and helps users to book slots in advance. The Ev charging management system is important because the existing charging infrastructure in India is underwhelming, and this is a great problem for EV adoption. The lack of charging infrastructure leads to range anxiety and restricts the use of EV's.

II. OVERVIEW

which seeks to make electric vehicle (EV) charging infrastructure more accessible by connecting EV owners with the most suitable charging resources. This innovative business model establishes a collaboration between private charger owners and EV owners. Its primary goal is to address the issue of under-utilized privately-owned chargers and provide accurate real-time information about public charging station availability during peak hours to EV owners. The paper introduces an innovative algorithm for matching charging resources based on consumer preferences and practical limitations. This algorithm ensures that the most appropriate charging resource is provided. Factors such as charger type, socket compatibility, charging mode, distance to the station, and wait time are all taken into consideration. Additionally, the algorithm aims to maximize the utility of electric vehicle owners by prioritizing their needs.

III. PROBLEM STATEMENT

The EV's charging system addresses a big issue growing from the evolving adaptation of electric vehicle adoption in India. As EV's increase in popularity , need for accessible and useable charging infrastructure has become increasingly important. India's charging infrastructure is in a early stage of development, and there is a increasing need to provide users with more options to charge their EVs efficiently. There are two problems: first there's a lack of accessible and diverse charging points options for Ev owners. And second, the charging infrastructure align with environment goals. Our project seeks to close this gap by providing a user-friendly platform that connects public, private and semi-public charging points, while taking into account the imperative to transition to cleaner energy sources for a greener planet. The challenge lies in the fact that India's electricity generation heavily relies on fossil fuels and non green sources particularly coal.

IV. OBJECTIVE

The objective of the EV charging system focus on enhancing user options for chargers. A key goal is to optimize the user experiences through an intuitive interface providing real-time information on chargers availability and payment The ultimate aim is to ensure a seamless and convenient EV charging experiences. EV owners in locating and utilizing charging stations along routes. By minimum waiting time at charging point.

V. SCOPE

The EV Charging System project focuses on creating and implementing a mobile application that will simplify the process of charging electric vehicles (EVs) in India. The goal is to integrate different types of charging points within this project scope. The project aims to provide users with a comprehensive charging network, including public, private, and semi-public chargers. To enhance accessibility, real-time location tracking and availability information will be integrated using the Google Maps API. The project also involves user registration and authentication for EV owners and institutions to list their charging stations. However, it does not include the physical installation of charging infrastructure or address energy source management or environmental impact assessment. Initially, the project's geographical coverage is limited to specific regions but may expand in the future. It serves as a proof of concept with ongoing support and maintenance considerations.
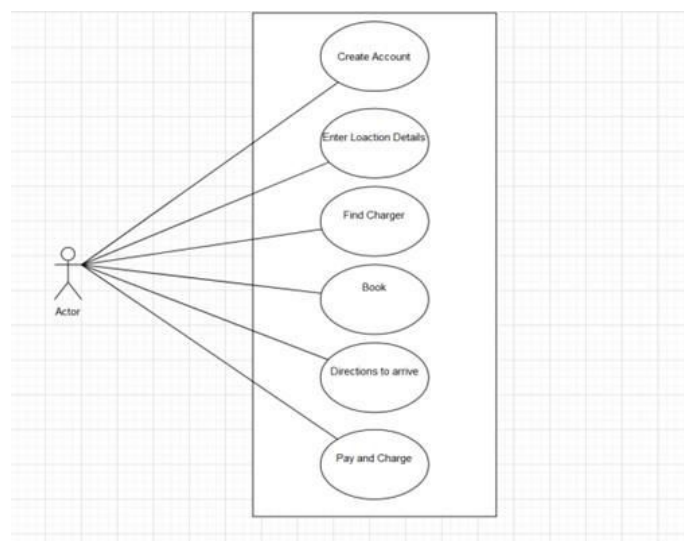

Fig. 1. Use Case Diagram

Fig. 2. Activity Diagram for user

VI. OVERVIEW OF REPORT

A. Objective
One of the challenges we encountered during this project was the inability to display public chargers on the map. This limitation arose from the unavailability of free APIs for India, leaving us with only costly options. The project also presented a budget constraint, requiring us to be mindful of resource allocation and make necessary compromises.

B. Solution
It is a Android technology to establish a robust and secure platform. Implement to track the EV hub for EV owners to there near stations.

C. Key Features
The key feature of our app lies in its ability to connect users with privately-owned chargers, including those at residences, and chargers located at places like shopping malls and universities. This feature empowers users to effectively plan their charging needs, even in areas where public charging infrastructure may be limited.

D. Overall Aim

The app shows the active hours for the charger so that the user can plan their charging accordingly. The user will be able book a slot in advance to ensure that they have a charging spot reserved whenever they need it.

E. Benefits

EV reduces air pollution around rural home and business, leading to improved health outcomes. Smart charging allows for optimized energy flow into EVs ensuing safe and efficient charging. It offers benefits such as simpler, safer, greener and cheaper charging for vehicle owners.

VII. TOOLS AND TECHNOLOGY

The implementation of the EV Charging Application is done on Android Technology with java language.
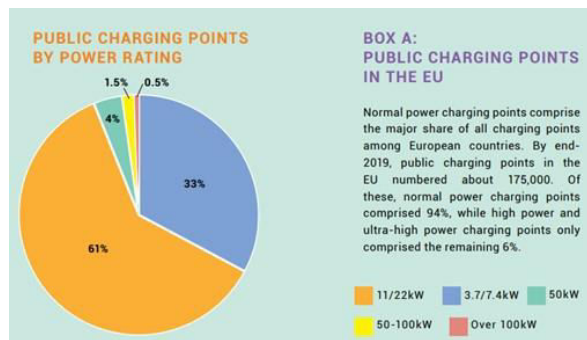

Fig. 3. Charging Points

A. Software Requirements:
- Java
- Figma (UI/UX) • Android Studio

B. Technology:
- Android
- Firebase
- Payment Gateway
- Google Map API

VIII. CLASSIFICATION OF EV CHARGING

A. Public Charging
- Usage: Open for all EV users.
- Locations: Public parking lots, on-street parking, charging plazas, petrol pumps, highways, metro stations

B. Private Charging
- Usage: Dedicated charging for personal EV or EV fleet owned by one entity
- Locations: Independent homes, dedicated parking spots in apartments / offices and any location land availability

C. Semi-Public Charging
- Usage: Shared charging for a restricted set of EV users.
- Locations: Apartment complexes, office campuses, gated communities, shopping malls
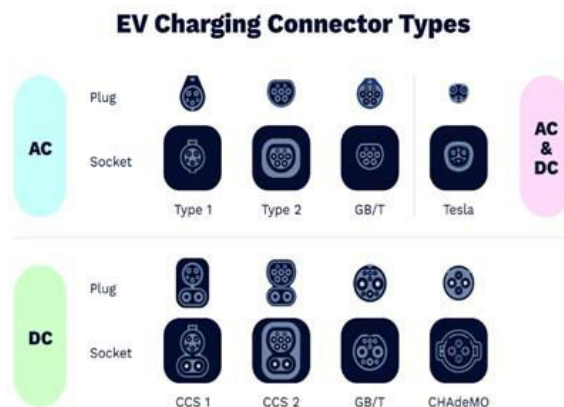
IX. TYPE OF CHARGER

Fig. 4. Type of Charging Points

X. CONCLUSION

Conclusion :- We are thrilled to introduce this app that aims to assist users in locating and booking electric vehicle chargers throughout India. We strongly believe that this app has the ability to play a crucial role in promoting the widespread adoption of electric vehicles across the country. Despite the challenges we encountered, we managed to successfully create a functioning prototype of the app. This app enables users to easily access and reserve both private and semi-public chargers. Our team is actively working to add support for public chargers and making the app more user-friendly with new features in development. We believe that this app has the potential to greatly contribute to the increased adoption of electric vehicles in India. By providing users with a userfriendly platform to locate and reserve chargers, we can alleviate charging anxiety and make electric vehicles more feasible for everyday use in India. This study offers a detailed examination of the obstacles and remedies related to electric vehicle charging infrastructure. It emphasizes the importance of implementing a hybrid renewable energy system that incorporates peer-to-peer energy sharing among EVs. Such a system presents a viable solution to the issues confronting the electric vehicle charging industry

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