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EV Stations Management System Using AI Chatbot Support

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ABSTRACT

Automotive manufacturers like TATA have launched new electric automobiles on the market along with the construction of charging stations. However, the current charging duration varies from 15 to 30 minutes, which might cause delays when the stations are completely utilized. Our idea entails linking every electric car charging station into a single network to overcome these problems. Users can quickly find and choose their chosen station, which is especially useful for long-distance driving in electric cars and ultimately saves time. When slots are available, the system allows users to reserve them; otherwise, it prompts them to choose a new time. Online booking confirmation requires a portion of the cost. Our technology also shows the quickest path to the chosen station and gives charging stations a management interface to control open and reserved slots. Our Android-based solution makes use of time-slot allocation strategies and the Google Maps API to sense direction. Through our chatbot system, provides users with personalized assistance, answers to the queries and real time guidance to the users and an online payment gateway speeds up transactions. By utilizing our technology, consumers can find and reserve suitable charging stations quickly and with a significant time savings. Real-time face detection and recognition achieved through Viola-Jones method. Software captures images, stores in database. Automated system detects person using three-phase methodology. [16]

Keywords: Smart management, charging slot, EV Cars, Map, Chatbot.

I. INTRODUCTION

The use of fossil fuels and global warming have both increased recently. global warming and the twin, serious challenges of fossil resource depletion caused by careless energy consumption. Fossil-fuel-free renewable energy systems must be installed in order to address these problems. The government's Feed-in Tariffs (Fit) program has accelerated Japan's adoption of solar power. The increased output from these systems has, however, had a negative effect on the voltage distribution and system frequency. As a result, the Fit system is currently being reviewed by the Japanese government. Additionally, photovoltaic installation costs are falling yearly, portending much cheaper PV electricity costs in the future. In this study, it is suggested that EV charging stations be used as energy aggregators, primarily for the purpose of transmitting power from PV systems in smart homes to EVs and smart homes. These charging stations need fixed batteries to exchange electricity.

In this project, we want to provide clients with a platform where they may schedule charging sessions at open charging stations in accordance with their needs. A few of the features the system offers include an AI Chatbot, mapping capabilities for direction sensing, digital payment options, as well as notifications alerts for each activity. Electric vehicles can be recharged using a variety of charging infrastructure types, each tailored to specific locations and requirements. This chapter underlines the need of taking local design and implementation for EV charging networks into consideration by highlighting technical specifics and EV charger standards.

II. LITERATURE SURVEY

"Random Forest Algorithm (RFA) is applied for finding stations that are near the vehicle location; Linear Search Algorithm (LSA) for filtering stations that satisfy the user requirements."
"A novel approach based on the dynamic forecast of charging demand has been developed to address the problem of planning EV charging stations."
"Use the enhanced Cuckoo search algorithm to optimize the deployment strategy for wireless charger nodes. The accuracy and effectiveness of the algorithm, together with the proposed model, are validated in this study."
"The optimal planning of a charging station based on discrete distribution of the demand for charging."
"The modelled charging demand of the charging station was made more realistic by taking into account EV charging behaviour, charger configurations, and charging assignment models."
"According to our study, a simulation model was proposed to forecast EV charging demand based on a number of key parameters."
"A prediction model for the demand for charging power for electric vehicles was developed by taking into account the behaviour of buses, taxis, and private vehicles."

III.PROPOSED SYSTEM

A. Problem Statement

To design and develop a web-based application to book the charging slot to the electric vehicle.

B. Block Diagram

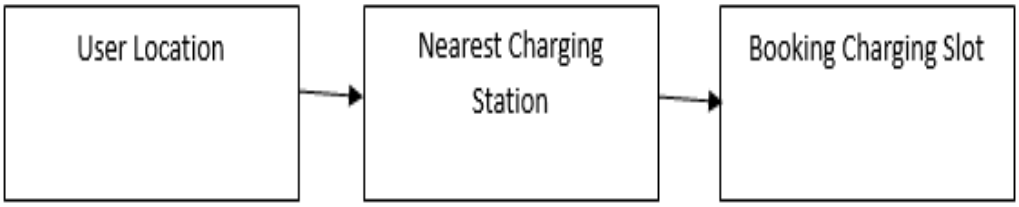

Figure 1: Proposed system

The EV charging stations management system utilizing AI chatbot support aims to streamline and enhance the user experience for electric vehicle (EV) owners. The system integrates AI technology to provide users with efficient and user-friendly support through a chatbot interface.

The EV charging stations management system leveraging AI chatbot support aims to enhance the accessibility, efficiency, and reliability of EV charging infrastructure while providing users with a seamless and intuitive experience.

C. Mathematical Model

I/P →Processing → O/P

Nearest Charging Station

Input: Finding Nearest Charging Station.

Processing: According To user Location the GMAPS shows the nearest EV stations registered by Owner.

Output: User successfully find a nearest charging station.

Slot Booking

Input: Slot Booking For Charging EV.

Processing: User required contact information, EV details (model, number), time & date.

Output: User successfully booked a slot for charging.

D. Hardware and Software Requirements

Hardware: Standard computer with having windows 8 or above.

Software: Java environment, required Apache Tomcat Server 9, HTML, CSS, JSP, Bootstrap and having Eclipse.

E. Algorithm for System

The proposed system presents a process of finding the nearest EV charging station and booking a slot. It begins with the user inputting their location, followed by a search for nearby charging stations. The available stations are then displayed to the user, who selects their preferred option. The system checks the selected station's availability, and if a slot is available, the booking is made and confirmed.

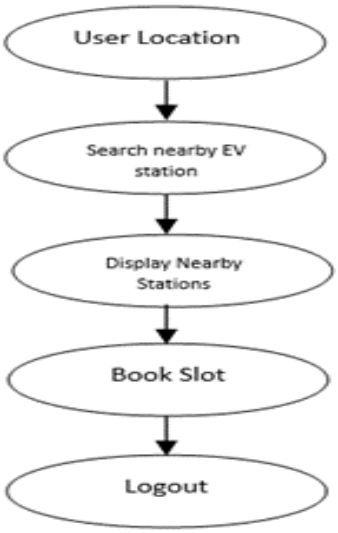

Figure 2: Workflow

IV. RESULT DISCUSSION

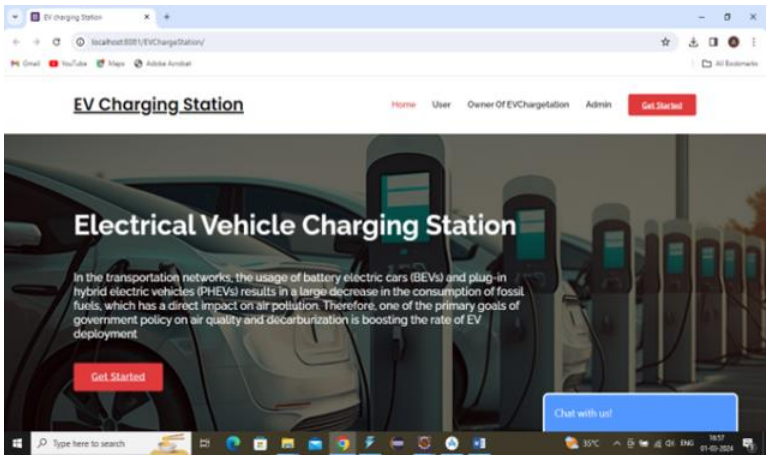

Figure 3: Home Page

Home page of EV Stations Management System platform with navigation bar which provides different options like User, Owner section, admin section with a dropdown menu with chatbot support.

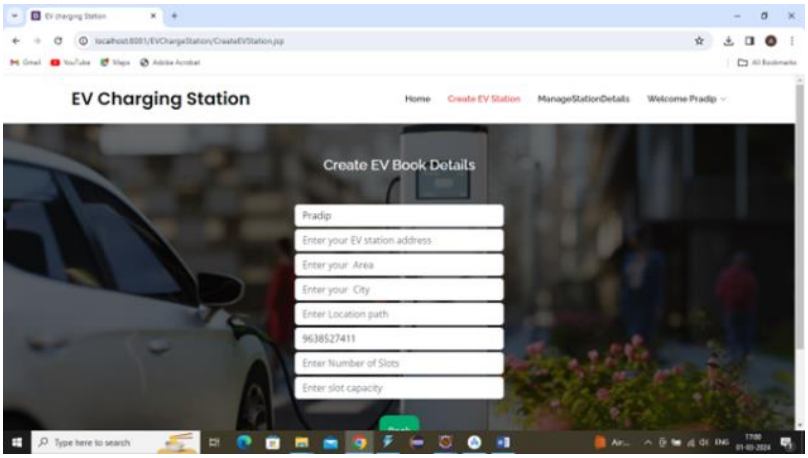

Figure 4: Create EV Sation

In this page the owner of EV charge station can create its own charging station by providing details like name, address, area, city, path, etc. so the user can easily find nearest charging station.

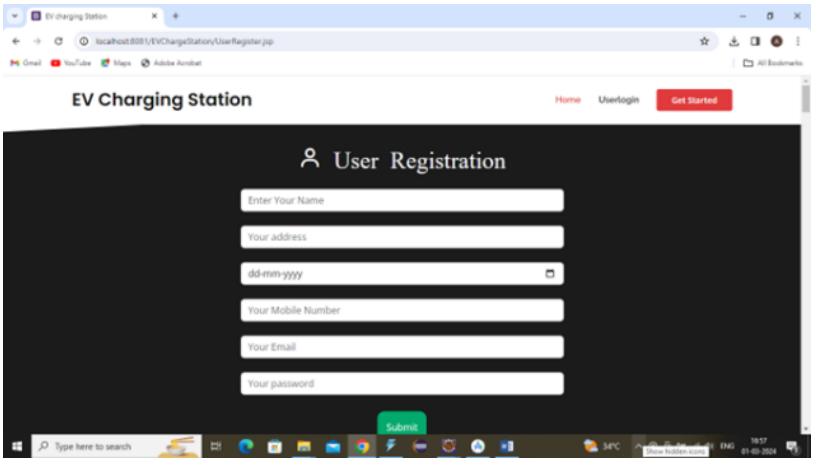

Figure 5: User Registration

In user registration a new user can register in the website by providing details like name, address, mobile number, email and password.

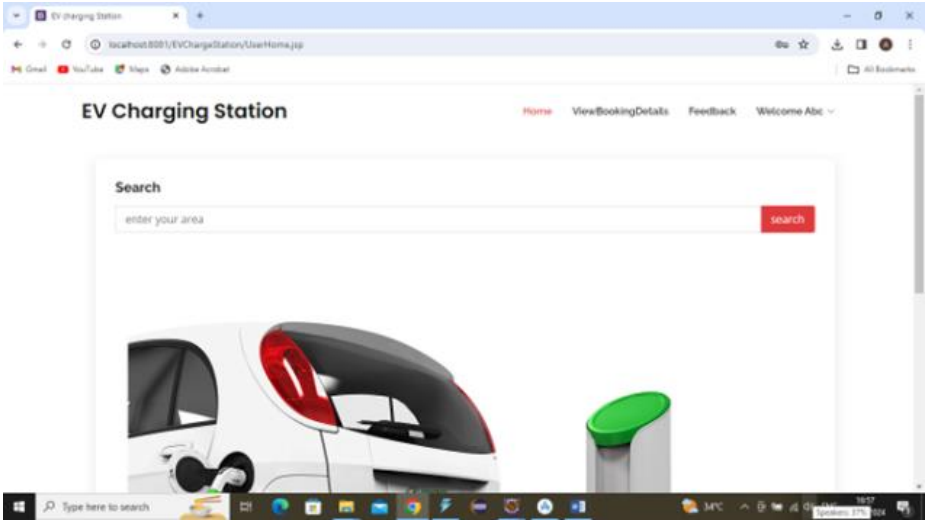

Figure 6: Nearest EV Station

In this page the user can find the nearest EV station by entering the area or the city.

V. CONCLUSION

In conclusion, the system for "Smart Management of EV Charging Stations" uses a web application methodology. It provides charging slot reservation based on charging socket types, an AI chatbot for real time question answering, and effective direction detection through the Google Maps. This complete solution makes the management of EV charging stations and enhance the user experience in general., designed to be user-friendly.

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