

# **Real Time Android-Based EV Charging Station Locator and Slot Booking**

Soham Adhav, Saurabh Ganjale, Sahil Khirid, Prathamesh Mehkakar, Prof.B.B.Waghmode

## **1. Abstract**

In the past decade, electric vehicle [EV] technology has made remarkable progress, offering enhanced power delivery and improved efficiency through innovations like regenerative braking. However, EV users still face challenges when it comes to finding charging stations, which are not as ubiquitous as traditional fueling stations. To address this need, we introduce an EV Charging Station app developed with Flutter. This app empowers EV drivers to locate nearby charging stations, reserve slots for charging, and efficiently plan their journeys by generating a roadmap with charging station waypoints based on the source and destination. This solution bridges a critical gap in the EV infrastructure, enhancing the convenience and accessibility of electric mobility.

## **2. Introduction**

One of the most significant challenges associated with electric vehicles [EVs] revolves around the charging process. The primary objective is to provide users with real-time information regarding the availability of charging slots at specific charging stations. Currently, many EV drivers are unaware of how many charging stations are along their journey route. As a result, they may find themselves in a situation where they have a low battery percentage and cannot reach their destination. This forces them to seek a charging station and inquire about slot availability. However, if drivers had prior knowledge of the charging station locations along their route, they could plan their journey more efficiently.

In our project, we aim to address this issue by developing a system that fulfills the need for real-time information about charging station availability. This system will significantly reduce the inconvenience experienced by EV users and save them valuable time. When a user plans a journey and knows in advance that there are charging stations available along the route, they can confidently travel and choose a charging station with available slots. This prevents situations where users arrive at a station only to find that there are no slots available, avoiding the need to backtrack to another station.

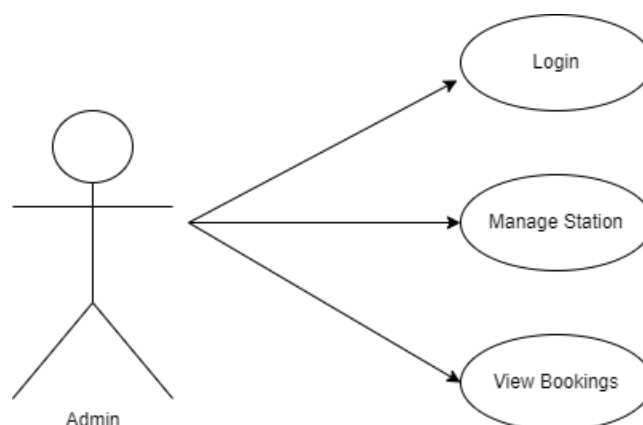
Moreover, our system goes beyond just indicating slot availability. It also provides users with information about the estimated time left for charging if a vehicle is already connected to a particular charging slot. This additional feature enhances convenience and planning for EV

### 3.Methodology

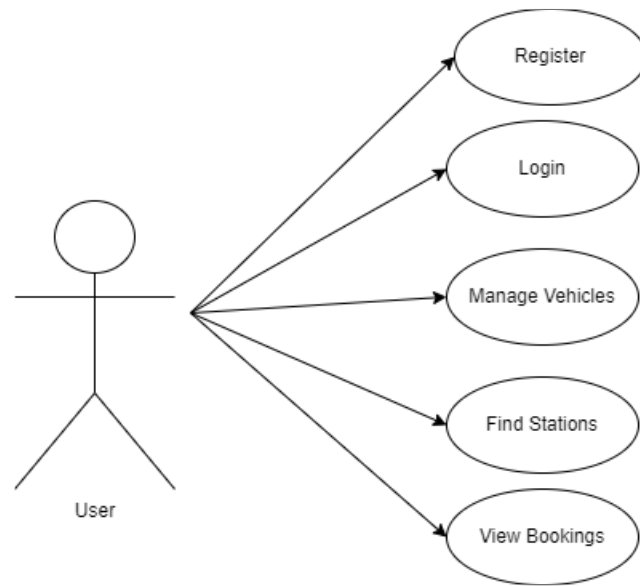
As we know from the past few years EV vehicle industry is booming so we have conceived the idea of creating an Electric Vehicle Charging Station Finder App that promises a seamless and user-friendly experience with its innovative features. This application, built using the Flutter framework, has been developed to assist EV drivers in locating nearby charging stations easily. It goes beyond mere location services by enabling users to manage all their electric vehicles within the app and even reserve charging slots in advance at the stations they choose. The primary aim of this EV Charging Station App is to empower users to find and secure available charging stations effortlessly. By providing features like vehicle management and booking options, it simplifies the EV charging process, making it more convenient and efficient for electric vehicle owners.

#### 3.1Use Case Diagram

A use case diagram is a type of behavioral UML diagram that depicts the interactions between actors and the system being developed

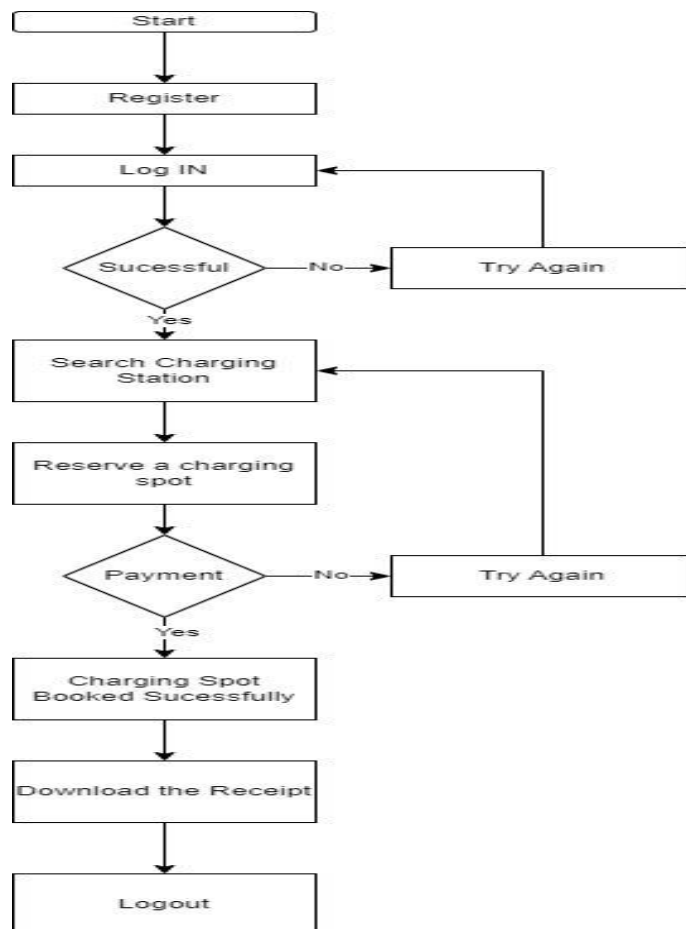


**Fig-1.Use case Diagram for Admin**



**Fig-2.Use Case Diagram for User**

### 3.2 Flow chart



#### 4. Existing System

This system focuses on determining the SOC and using the website created to locate a charging station and to book a slot at the available time slot using a database management system. The SOC of the battery pack is estimated and the data is transmitted to the dashboard through a CAN Bus Controller. When the user monitors the status of the battery on the dashboard, a decision is made whether charging is required. The current location of the EV is obtained using the GPS Module and sent to the mobile phone. The user has all the information of the available charging stations around the current live location. As the user selects the closest charging station, a link is generated for the user to book any available slots through the website. This website has a login page and a database of all the charging stations with the available slots. When a slot is selected and booked, the directions are obtained and the user proceeds to the station to charge the EV.

#### 5. Literature Review

Google Charts API offers several serviceability for including man or woman content to the Google chart and different internet chart operations may be explored primarily grounded on Google Charts API. supported cellular operation groups take over transnational positioning structures[A-GPS] as the stylish accurate positioning manner in cellular area- primarily grounded immolations. This paper proposes an answer for a cell navigation machine that realizes similar features as Google chart browse and question, machine traces seek, rapid-fire original positioning on your mobile cellphone, and so on. in this paper, we talk the system's specialized scheme and the important thing consummation technologies.[ 1] GPS monitoring has numerous uses in moment's global; the device can be used for youths tracking, asset, auto, or any device shadowing and as undercover agent device. The system lets in the localization of a transmittable tracked unit and transmitting the part to the shadowing center.[ 2] The GPS tracking machine includes a transmittable tracked device attached to a person, vehicle, or any asset and the shadowing middle wherein the transmittable tool's position must be covered. The cell tracked device receives its equals from the GPS and sends these equals as SMS through GSM modem to the monitoring center, that is unfeignedly a private pc with numerous interface operations to show the region on Google charts using a free model of Google Charts APIs[ software programming interfaces]. Flutter is a notorious UI frame for growing cell operations for Google. It has stuck traction in recent times. still, Flutter builders ought to address a state operation problem while growing their programs.[ 3] To resolve this trouble, multiple infrastructures were evolved. This paper proposes a brand new Flutter armature primarily grounded at the clean armature via

Uncle Bob. The Flutter clean structure proposed in this paper is packaged and released through a Flutter package. The armature is examined by using developing a complete mileage from scrape the use of the pack and establishing the system.[ 4] It's a good programming practice to correspond of runtime checks called assertions within the law to test hypotheticals and invariants. Assertions are said to be frequently only when they render layout choices and constraints. in this paper, we display our primary oils on rephrasing layout constraints to assertions for cell apps. design places and constraints are specific officially in the item Constraint Language[ OCL] and restated to executable assertions written in Dart, the language of the Flutter crossplatform frame. We don't forget different language and platform-particular capabilities of OCL, Dart, and Flutter.[ 5] The enhancement ofcross-platform cellular operations is a end of each customer in ultramodern- day global. masterminds are dragooned to make the equal device further than one times for different zilches working structures]. Google provides a result by means of introducing Flutter. it's long hauls an open- source SDK for enhancing inordinate overall performance and the maximum reliable mobile apps for apps like iOS, Android, Linux, internet, and home windows.[ 6] It presents a specific of well timed collecting using a pc law that consists of integration throughout the prosecution of this system in operating time in place of former practice.[ 7] Flutter affords specific fabrics and contraptions that make it clean to apply and apply law. on this studies paper, we are going to speak about flutter and its contraptions. In rearmost times, exploration and development of electric motorcars have been promoted in Indonesia as new technology. the vacuity of charging station[ CS] structure for electric powered buses [ EV] is pivotal to insure inflexibility. managing the EV Charging Station is hard due to communicating multitudinous manufacturers into the applicable machine. We effectively developed the charging station operation contrivance[ CSMS]. software enhancement is used to make a device inside the form of a CSMS software to display and manipulate CS with the call SONIK electric powered auto charging operation contrivance

## 6. Conclusion

our project endeavors to tackle the pressing challenge of electric vehicle (EV) charging station availability. The lack of real-time information on charging slot availability has been a major inconvenience for EV users, leading to unforeseen delays and disruptions. Our system aims to empower EV drivers by providing comprehensive information about charging stations along their route, enabling them to plan their journeys more efficiently and confidently.

Our primary goal is to eliminate the uncertainty associated with charging station accessibility. By offering users real-time insights into charging slot availability, we seek to enable informed decision-making, preventing situations where users arrive at a station only to find all slots occupied. This not only saves time but also contributes to a smoother and more reliable electric vehicle infrastructure.

## 7. Reference

- [1] Ev charging Station locator with slot Booking System Rahul George, Srikumar Vaidyanathan, K Deepa
- [2] ELECTRIC VEHICLE CHARGING STATION FINDER AND SLOT BOOKING MOBILE APPLICATION USING FLUTTER Vinod Kumar<sup>1</sup>, Trupti Panhale<sup>2</sup>, Pragati Kale<sup>3</sup>, Akeshrain Gedam<sup>4</sup>
- [3] Electric Vehicle Charging Station Automation U.R. Patole <sup>1</sup>, Abhishek Deshmukh <sup>2</sup>, Vaishnavi Karpe <sup>3</sup>, Prathamesh Nimbalkar
- [4] Smart Charging of Electric Vehicles According to Electricity Price Morsy Nour<sup>1,4</sup>, Sayed M. Said<sup>2,4</sup>, Abdelfatah Ali<sup>3,4</sup>, and Csaba Farkas<sup>4</sup>
- [5] IoT Enabled smart charging stations for Electric Vehicle Arunkumar P Vijith. K
- [6] IoT Based Charging Slot Locator at Charging Station Miss. Supriya T. Yadav<sup>6</sup> Miss. Sweta P. Pawar<sup>5</sup> Mr. Parag D. Kodag<sup>4</sup> Mr. Saurabh P. Jadhav<sup>3</sup> Mr. Mangesh P. Gaikwad<sup>2</sup> Miss. Jyoti M. Kharade