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## Range Anxiety in Electric Vehicles

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**Abstract**--Electric Vehicles (EVs) are on an ascent thanks to many factors, as well as the fast rise within the value of fuel also because of the climate and environmental awareness. Battery technologies, charging tactics, and new analytical difficulties and possibilities for EVs are all discussed in this article. In addition, an association study of the global market situation for electric vehicles and its prospects is administered. For an electric vehicle (EV), the battery is the most essential component, hence this article examines in depth the charging infrastructure and answer, both of which are major roadblocks in the EV industry right now. Aside from that, we're more likely to reexamine the different charging standards available for EVs due to battery energy management and power management recommendations. To wrap things off, we give our view for the near future of this discipline, including the study areas that are yet unexplored by both the commercial and educational communities.

### INTRODUCTION

EVs are the Electric Vehicles which are halfway or thoroughly operated by electric power. An electrical automobile could be steam-powered by an electrical motor instead of a traditional petrol/diesel engine. This motor is steam-powered by reversible batteries that may be charged by common unit electricity. Low operating costs and environmental friendliness are both advantages of electric cars, which have fewer moving parts and require almost no fossil fuels (petrol or diesel). Aside from lead-acid or nickel metal binary composite battery packs, metallic element particle batteries are currently considered to be best option for modern battery electric vehicles because they require longer lifespans and are excellent at retaining energy with a self-discharge rate of just five hitters per month. Electric vehicles will have a large range of charging options, making them suitable for most daily commutes. It is possible, however, that fuel cells may require recharging before you get at your destination, although regenerated brakes or will help offset this by recharging batteries. Additionally, India's dedication to pollution control and minimizing its carbon impact is growing. By 2030, the nation plans to use only electric vehicles. Voltage stability, Reactive Power Support, and Frequency Regulation are just a few services that electric vehicles may provide in the electrical market. On the globe, Range is one of the disquietude for electrical vehicles. The purpose of our project is to resolve the difficulty of varied Anxiety within which if a breakdown happens during travel, it'll indicate the chauffeur concerning it and provides the required details of close Charging Station and Repair Centres.



FIGURE . Problem of Range Anxiety



FIGURE . Charging Infrastructure

## IDEA OF APPROACH

We will conduct a literature study in order to find what previous studies have found that the government of India has taken out several steps over the past few years to increase the adoption of EV [Electric Vehicle] . Indian cities are among the most polluted in the world and it makes sense for the government to push EV as it would help decrease automobile pollution.

We will perform a Literature Review to see what major studies have been discovered about Range Anxiety in Electric Vehicles . We will also look into the Internet to get a full idea of how Studies can be benefit for modern Electric Vehicles where we will use the PlugShare Api to resolve this . Not a lot of places you go to on a daily basis will have electric fuelling stations for your vehicle, meaning that if you're on a long destination or decide to visit family in a rural or suburban area and run out of charge, it may be harder to find a charging station. Our research will show the nearby charging station and cover this limitations in order to obtain a effective approach .

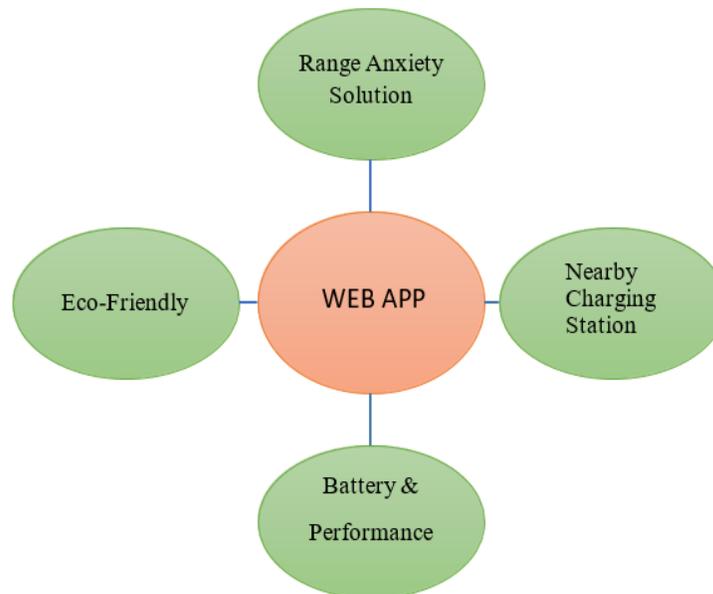


FIGURE . Approach

## RELATED WORK

It's crucial to include a section titled "Related Work" in your research paper. As a whole, the purpose is to characterize linked fields of study, and to situate our method's contributions in this perspective. We have shown the present limits need for novel method by clearly detailing prior work. Many of these earlier efforts are still relevant today:

“A Study on Adoption of electric vehicles in India: The Mediating Role of attitude, 23-24 2020 .” Anil Khurana<sup>1</sup>, V.V.Ravi Kumar<sup>2</sup>, Manish Sidhpuria. Proposed, EV adoption is not influenced by perceived economic gain, according to research. An improved outlook is one of the primary benefits. The influence of environment (EC) as well as people in it (SC). A poll was conducted to find out what people think about electric vehicles users.

“ Range Anxiety of electric vehicles in energy management of microgrids with controllable loads.” Masoud Esmailia, Hamid Shafieea, Jamshid Aghaeib. V2G contribution of electric vehicles is significantly reduced by battery wear costs, according to case study of suggested strategy. Power-sharing managements Microgrids considering V2H Service (Vehicle to Home). To enhance the stability of Microgrid Proportional-Integral of Inverter is optimized.

“Disruptor of Automotive Ecosystem” Venkataraghavan Sundaram, Natesh Muthalan M, Karthicknathan Shanmuganathan. An investigation into EV-Electric Vehicles was conducted in order to satisfy the demands of customers and offer them with useful information. You'll be able to go about with the help of future automobiles. Autonomous vehicles with zero emissions might become a reality by collaborating with Uber and ferrying people. These vehicles can collect additional information through logs in automobiles and anticipate breakdowns beforehand.

### PROPOSED SOLUTION

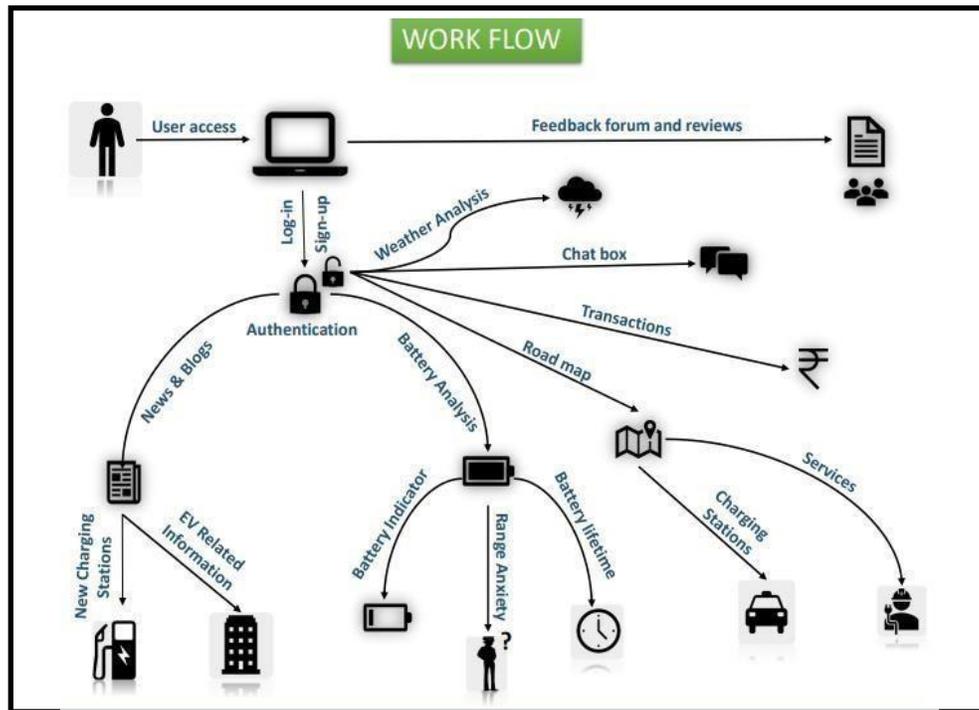


FIGURE . DFD--(Data Flow Diagram)

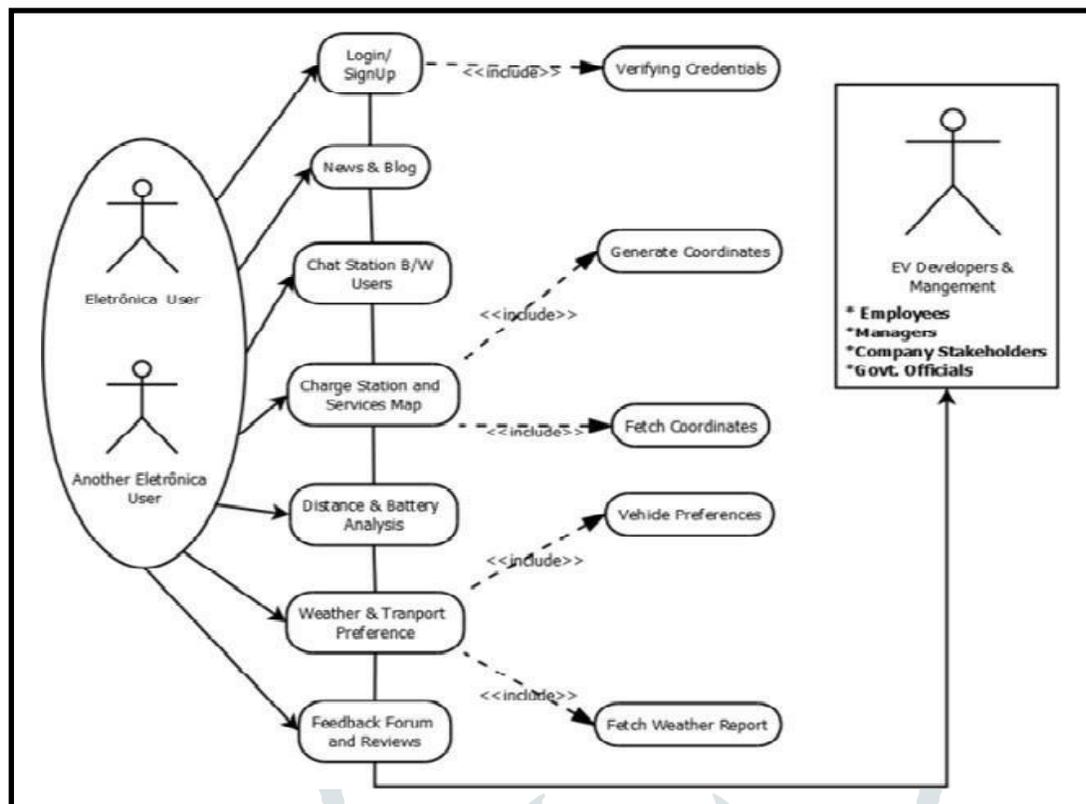


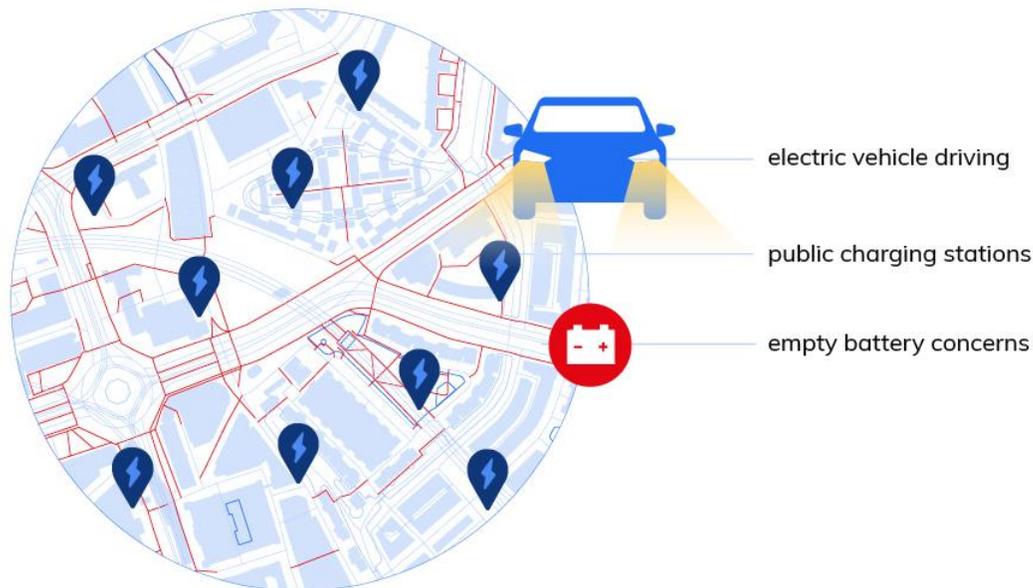
FIGURE . USE-CASE DIAGRAM

## PROPOSED METHODOLOGY

The objective is to create a web applications to peer the problem of Range Anxiety in Electric Vehicles which is the main cause for the future aspect that allows users to connect all Charging Stations & Service Stations over the map using PlugShare App. Electric vehicles (EVs) as well as its sources of power face a number of major hurdles to commercial adoption, including concerns with infrastructure, technology maturity, and consumer expectations (Price). We are connecting this application to cover Range Anxiety which will resolve the issue of the driver if any breakdown happens during Travel.

As a Growing and Populating world, India needs a better option of running vehicles for travelling from one place to the another because the price of Non-Renewable Resources are getting higher day by day as they will get extinct someday. So to avoid this, Electric Vehicles are launched which are a great option to replace Fuel Powered Vehicles. Electric vehicles (EVs) do have potential to transform automotive industry in general, not just manufacturing process. Key challenges of EV market are : Cost of Vehicles is slightly more than Fuel Powered vehicles, although they are low maintenance but the main challenge is the Driving Distance in a Charge , Charging Infrastructure and Range Anxiety.

North American and European countries are much more developed in the field of EV's they have created an ecosystem of Electric vehicles including charging stations .So our approach in this research is about Range Anxiety where if a vehicle gets Discharged or Breakdown on the way then the driver get information about Service Stations , Nearby Charging Station and Chat station between the user of the App. Features of App includes Battery status, Distance Analysis ,Breakdown Assistance. The objective of software planning is to provide a framework that enables the user to find nearest charging station, service station and can communicate with nearest driver in case of breakdown or emergency with the help of chat bot.



**FIGURE .** Electric Vehicle Ecosystem

## TECHNOLOGY USED

### A. PlugShare -

To help EV drivers find charging stations, rate them, and connect with other EV drivers, PlugShare is free software accessible on the App Store, Google Play, and web for iPhone, iPad, and Android. An extensive and accurate public charging map is provided, including stations from each significant network throughout North America and Europe, as well as much of other regions. The world's biggest EV driving community is also a part of PlugShare. Every day, vehicles add new facility location to application, assuring that its reach, strength, and accuracy are never compromised. The app allows users to check in while they're charging and share their thoughts, photos, and ideas. PlugShare allows thousands of drivers to list their own home charging points for others to use., assisting in the filling of charging infrastructure shortages.

#### Features of PlugShare :-

1. Access a database of more than 200,000 charging stations across the United States and Canada.
2. An additional 300,000+ charging stations have been added to the global network.
3. Over 4,200,000 reviews and 600,000 photographs of charging stations are available.
4. Access to directions by each and every turn to the stations you want to visit.
5. See what tens of thousands of other EV drivers have to say in the form of reviews, advice, and images.
6. PlugScore evaluation results based on user feedback will help you locate the most consistent stations.
7. Create simple smart filters which allow you to view just those stations that matter to you. As like those which work for your electric vehicle. Alternatively, you can check in to your preferred network's stations. Alternatively, particularstation categories (like level 2 stations or fast chargers).

### B. HTML –

HTML (HyperText Markup Language) is standard industry mark-up language for writings that are intended to be viewed in a web browser. CSS and computer languages such as JavaScript are utilized to implement the design of the page. Multimedia web pages are displayed by web browsers after receiving Html pages by a webpage or local storage. HTML was initially designed to provide both visual and semantic hints about the structure of a web page. HTML elements are the basic building blocks of HTML pages. HTML methods may be used to include images and other content, such as interactive forms, into a page's presentation. With HTML, you may build pages by defining structural semantics like headers, paragraphs and lists of links.

## C. CSS –

There are many different ways to describe look of an HTML page using CSS style sheet language. CSS, together with JavaScript and HTML, is a foundational element of the Internet. Through use of CSS, it is possible to separate display and content elements such as layout, colors, and fonts. Separating css from other stylesheets makes it easier for several web pages to use same stylesheet, which makes it easier for users to find and use the material they need. CSS file that helps reduce complexity and duplication of structural content. Caching of the CSS file is recommended to improve page load speed when using same CSS file with formatting across several pages.

## D. Firebase -

Google's Firebase technology enables mobile and internet apps to be created by developers. In 2011, it was a stand- alone company. Since Google purchased system in 2014, company has used it as its primary offering for app development. Firebase can be easily integrated with your team's favourite tools. The world's most popular interconnects on it. Products and solutions you can count on throughout the life of your app. Find out more today.Keep an eye on the app's performance. Using Google Firebase, developers can build mobile and online applications for iOS, Android, as well as Chrome browser. Product experimentation and marketing tools are included in Firebase's analytics monitoring and reporting. The free tier pricing plan is included in all of Firebase's products.

## D. Node.js -

There is a rapid increase in demand for the V8 engine while using Node.js, an cross-stage, open-source, back-end JavaScript runtime system that runs JavaScript code outside of a web browser. To supply dynamic page material before the page is sent to the client's browser, Node.js enables JavaScript developers to build order line instrumentation and pre-arrange running content server-side can offer dynamic web pages before page is sent. A "JavaScript all over" approach to Node.js web application development is therefore used, instead of separate server- and client-side languages for web applications.

## E. JavaScript -

In addition to CSS and HTML, JavaScript programming language is a vital component of the Internet. Over 97% of websites utilize JavaScript to power their pages, and third-party libraries are routinely included into this script. With a JavaScript engine built in, users may execute code on their devices. Often employed as a just-in-time scripting language, JavaScript is a high-level, compiled scripting language. An object-oriented programming language with dynamic typing, prototyping and first-class functions. Multi-paradigm, event-driven, functional or imperative programming approaches are all supported. In addition to the Document Object Model, it has APIs for dealing on text, dates, regular expressions, and other industry-standard data structures (DOM). JavaScript engines, which were formerly exclusive to web browsers, may now be found on a plethora of servers and applications.

## COMPARISON

Methodology	Result
A survey done on the mentality of Adopter/Users of EVs. A pre-made questionnaire was used to gather information.	Perceived economic gain was shown to be unrelated to a person's intention to use electric vehicles. A more favorable influence is shown on Attitude as a result. The influence of environment (EC) as well as people in it (SC).
Power sharing managements in Microgrids as V2H Service (Vehicle to Home). To enhance stability of Microgrid Proportional-Integral of Inverter is Optimized.	Battery wear costs have dramatic impact on EVs' contribution to V2G, as per case study examined in this paper.

Conceptual model of EV ecosystem- relevant users and identifies challenges of EV market penetration.	Using this system in a real-world network context is secure, efficient, and simple to maintain or expand, according to findings of tests.
The study's primary goal was to offer customers with information they wanted and needed about EV-Electric Vehicles.	You'll be able to go about with help of future automobiles. With the ability to collect more data from vehicle logs and anticipate breakdowns, Uber and autonomous cars may be able to work together to transport customers.
In addition to vehicle characteristics and requirements, driving cycles have significant impact on powertrain layout.	The Future Development of Electric Vehicle Technology in India should focus on aspect Develop combined Hybrid Vehicle, Optimization of control Strategy, Lower Cost.

## RESULT

After studying the previous research papers, they conclude that the issue of Range Anxiety can be solved by Battery Swapped Technology, Long Battery Capacity will be at affordable price and vast charging infrastructure. But the issue of Range Anxiety is still unsolved. Idea of how Studies can be benefit for modern Electric Vehicles where we will use the PlugShare Api to resolve this. Not a lot of places you go to on a daily basis will have electric fuelling stations for your vehicle, meaning that if you're on a long destination or decide to visit family in a rural or suburban area and run out of charge, it may be harder to find a charging station. Our research will show the nearby charging station and cover this limitations in order to obtain an effective approach using the PlugShare Api.

Therefore, After reading the research paper the following results are found that this problem statement is crucial to address the range anxiety of the electric vehicles. So our web app helps the users as we have developed a Web App that ensure User or Driver will get right prediction and status about his/her electric vehicle. Live range of battery and breakdown assistance must be on finger tips of the Driver. We are trying to provide the right judgement of Range that can be covered by the available battery in an Electric Vehicle. Range anxiety is the fear of not being able to reach one's goal with an electric vehicle. Range anxiety is likely to become more prevalent as the number of electric vehicles grows. This is especially evident in the several techniques proposed to reduce range anxiety.

Our project is only a humble venture to satisfy the need to manage the range anxiety. Several user friendly coding have also been adopted. This package shall prove to be a powerful package and satisfying all the requirement of the range anxiety. The objective of software planning is to provide a framework that enables the user to find nearest charging station, service station and can communicate with nearest driver in case of breakdown or emergency with the help of chat bot.

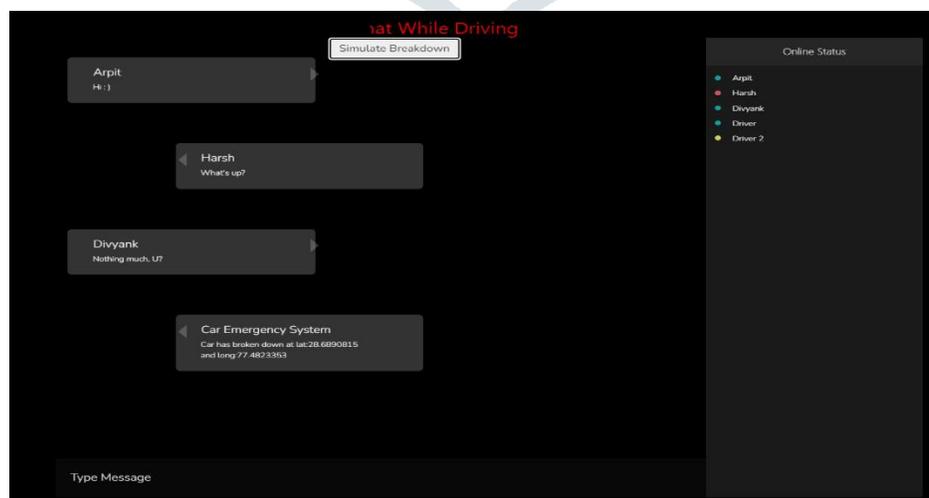


FIGURE . Breakdown Assistance

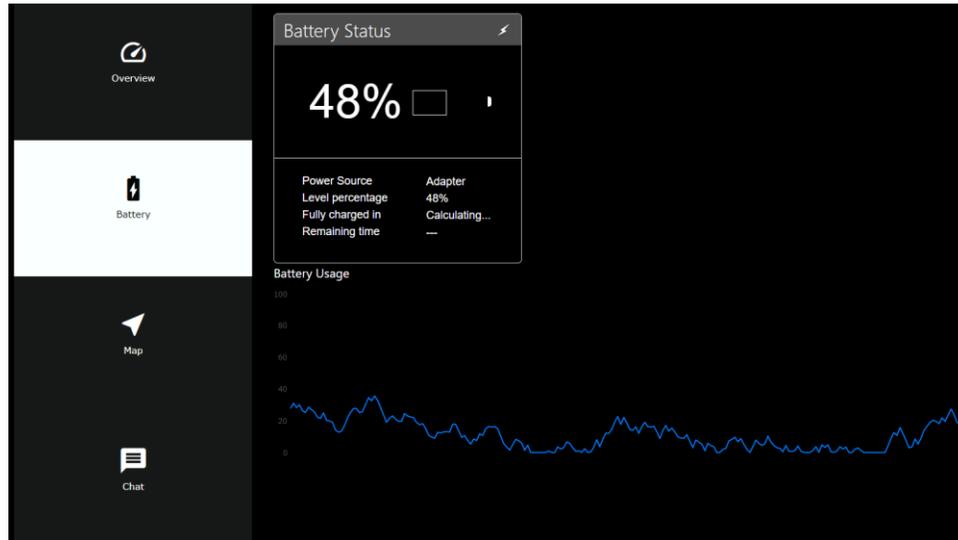


FIGURE. Battery Status



FIGURE. PlugShare Map

## CONCLUSION

Results furthermore specified that using PlugShare Application for ‘Range Anxiety in Electric Vehicles’ tells users or drivers to locate Service Stations and Charging Stations in PlugShare Map in breakdown conditions. In this application, User will be notified by a Battery Level Status , Weather Report and Nearby Charging Stations(Infrastructure) , Service Stations on the PlugShare and most importantly it provides breakdown assistance for the User/Driver in case of emergency. The objective of software planning is to provide a framework that enables the user to find nearest charging station, service station and can communicate with nearest driver in case of breakdown or emergency with the help of chat bot.

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