Introduction

1.1 Overview

Our project is a solution to the problem statement "Plug & Power: Revolutionizing The Road - A Complete Guide To Electric Vehicle Charging Station".

Electric vehicle charging stations are dedicated infrastructure facilities that provide electric vehicles with the ability to recharge their batteries. These stations supply electric power to the vehicle's battery, allowing EV owners to extend their driving range and reduce reliance on traditional gasoline-powered vehicles.
As the popularity of electric vehicles continues to grow, the availability and accessibility of charging stations are crucial for EV adoption. Governments, businesses, and organizations are investing in expanding charging infrastructure to support the increasing number of electric vehicles on the road and promote sustainable transportation.

The Plug & Power project aims to empower electric vehicle owners by providing them with accurate, real-time information about charging stations, making the transition to electric mobility smoother and more convenient. By encouraging the use of electric vehicles and facilitating access to charging infrastructure, we strive to contribute to a greener and more sustainable future on the roads. We can store the particular user data for the charge like the charging station name, billing, charging type, how much time it too to charge. We can also provide user with the information that if user want to reach to a particular charging station will the current battery be enough to take the user on that location.

1.2 Purpose

As more number of emerging technologies are rising and due to the climate changes in the recent years more number of people are switching from fuel based vehicles to electric vehicle. The zero-emission performance of an electric vehicle is great for reducing an individual's carbon footprints.
But the switch to electric vehicles has also led to increase in requirements. The major concern being the availability and convenience for charging the vehicles. Hence we need to have an application in order to solve the above problems and make this process more convenient. Our project intentions to reduce the pollution and bring about a greener planet.

LITERATURE SURVEY

2.1 Existing problem

The existing problem is that even though the technology for electric vehicles is on the rise, the number of charging stations and the information related to it is still very scarce. Due to this, some people are still reluctant to purchase electric vehicles which are necessary in order to protect the earth's climate in today's world.

The existing solutions include applications with maps that allow you to search for any nearby charging stations. But these solutions do not provide enough information to the users to make their experience convenient.

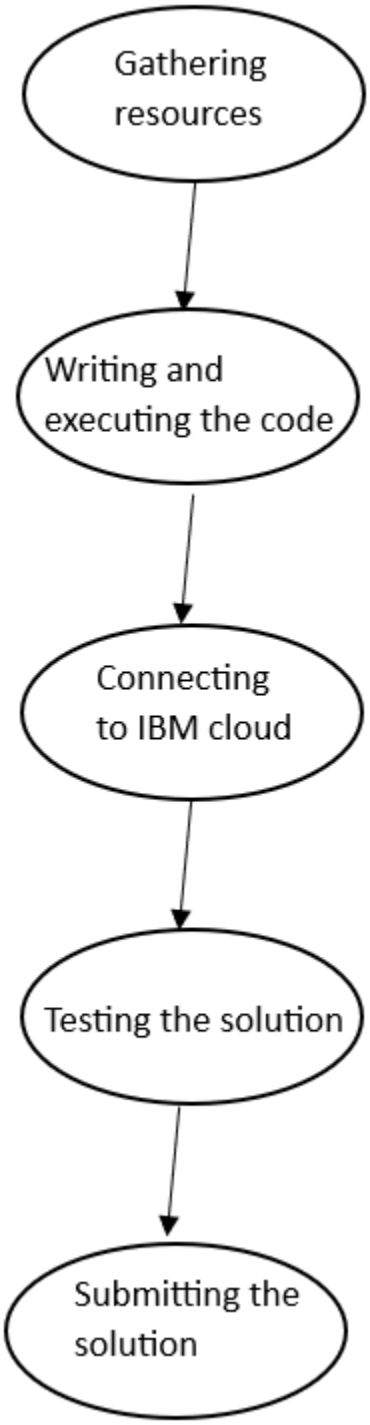
2.2 Proposed solution

Our solution to the above problem is to provide an application which includes the following features:

1) provides information about the nearest charging stations.
2) What is the estimated time to the charging station.
3) What will be the estimated waiting time at the station.
4) Information about all the charging stations in a particular locality.
5) Apart from the information about the charging stations, the application will also include information about the traffic in the nearby locations.
6) The fastest route that can be taken in order to reach the charging station.

THEORITICAL ANALYSIS

3.1 Block diagram



3.2 Hardware / Software designing

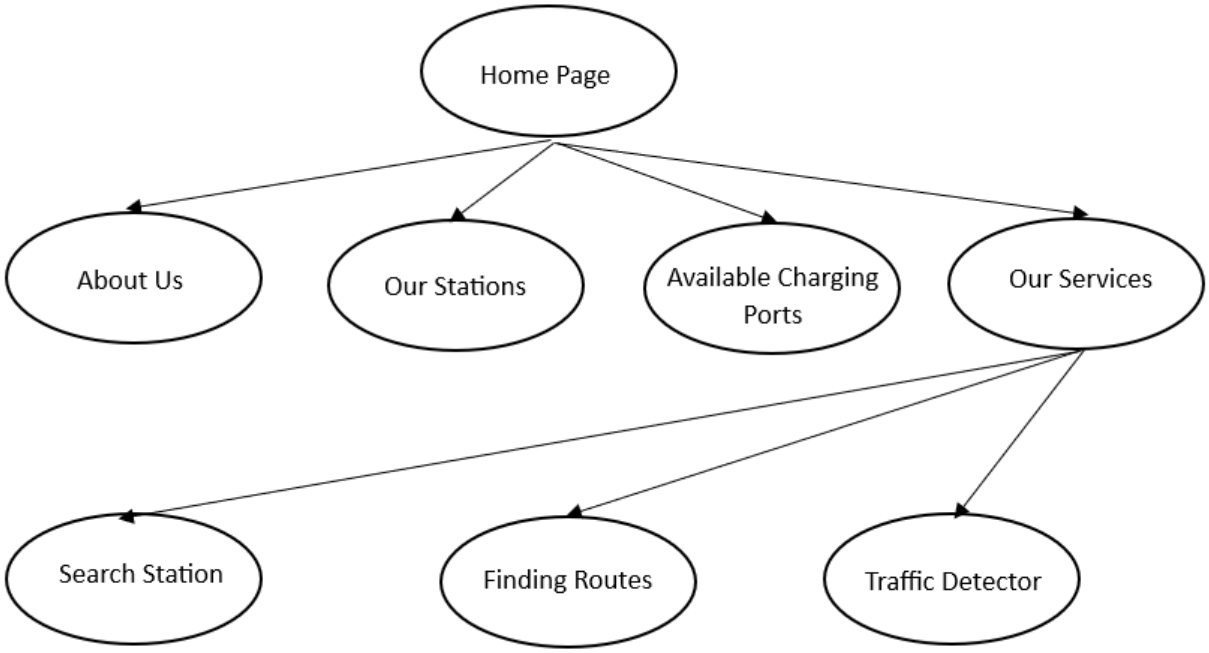
The following software is used in our project:

- Python
- IBM Cloud
- Node js
- Red Hat open shift
- IBM Cloud object storage
- Docker,
- kubernets

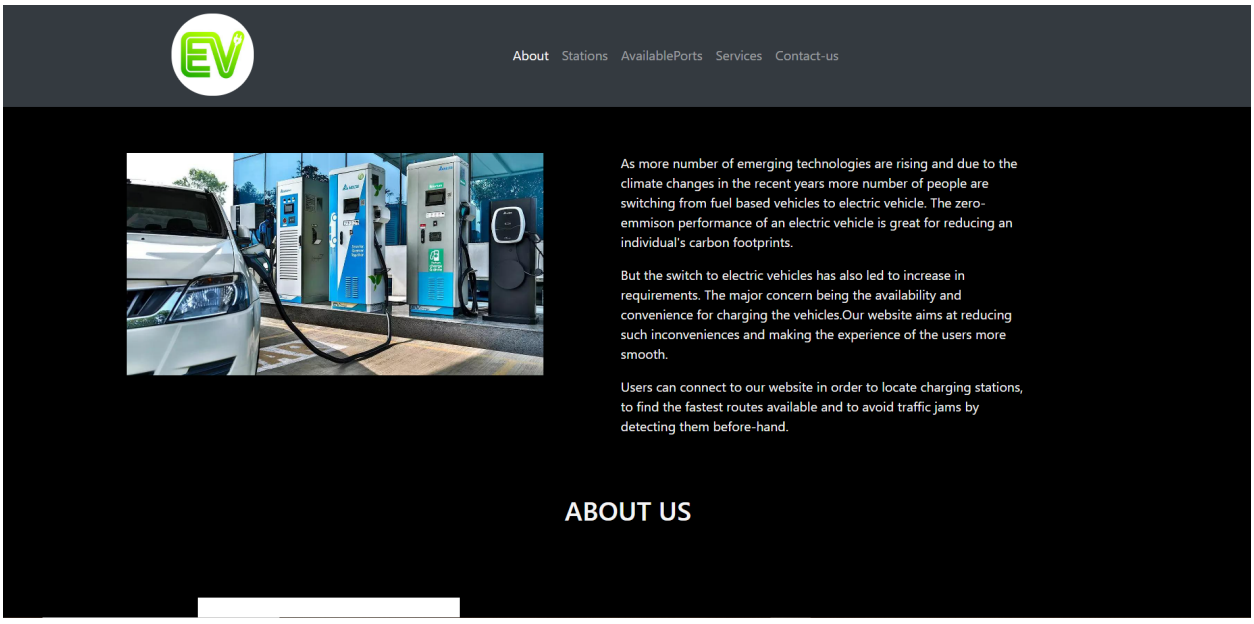
EXPERIMENTAL INVESTIGATIONS

Initially, we began by researching the current available solutions to the above problem statement. Through our research, we found out that most of the available applications just provide the locations of nearby charging stations. Furthermore, we went deeper into the problem statement and realized that the estimated time taken to charge a vehicle is much more and it would be faster if batteries of the vehicles were just swapped at the stations instead, which will take only 20 seconds. The information about the availability of charged batteries can also be included in the application.

FLOWCHART



RESULT



ABOUT US

The main concern for electric vehicle drivers is to locate a charging station nearby. As the technology is still growing, the charging stations are not present in majority.

Our website provides a charging station locator so that the users can easily locate the nearest plug-in station and that inconvenience can be striked off the list.

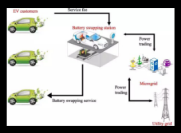
OUR STATIONS

1. Plug-in stations : The primary service provided at the stations is to charge the EVs using the plug-in ports. This allows the users to charge their vehicles the same way as that of the petrol driven vehicles.

2. Swapping out batteries : Studies have proven that swapping out batteries takes lesser time compared to charging of the vehicles using the plug in ports. It takes approximately 20 seconds to swap out drained batteries with those of already charged batteries.

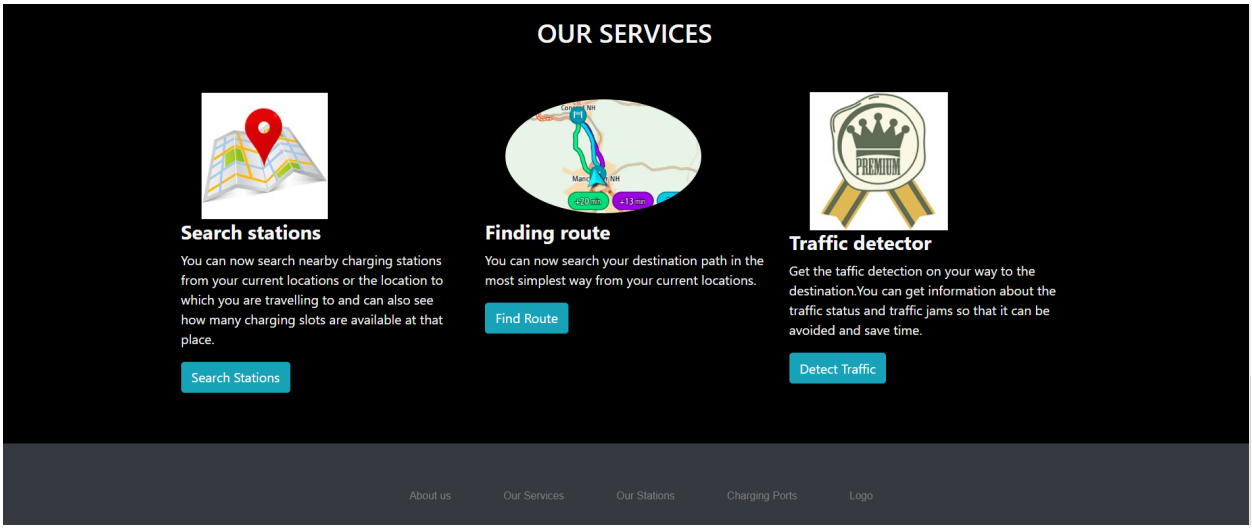
3. Maintainance : Lastly, our stations provide maintainance and servicing of the EVs which include repairing damaged parts, replacing old parts and detecing any problems in the EVs.

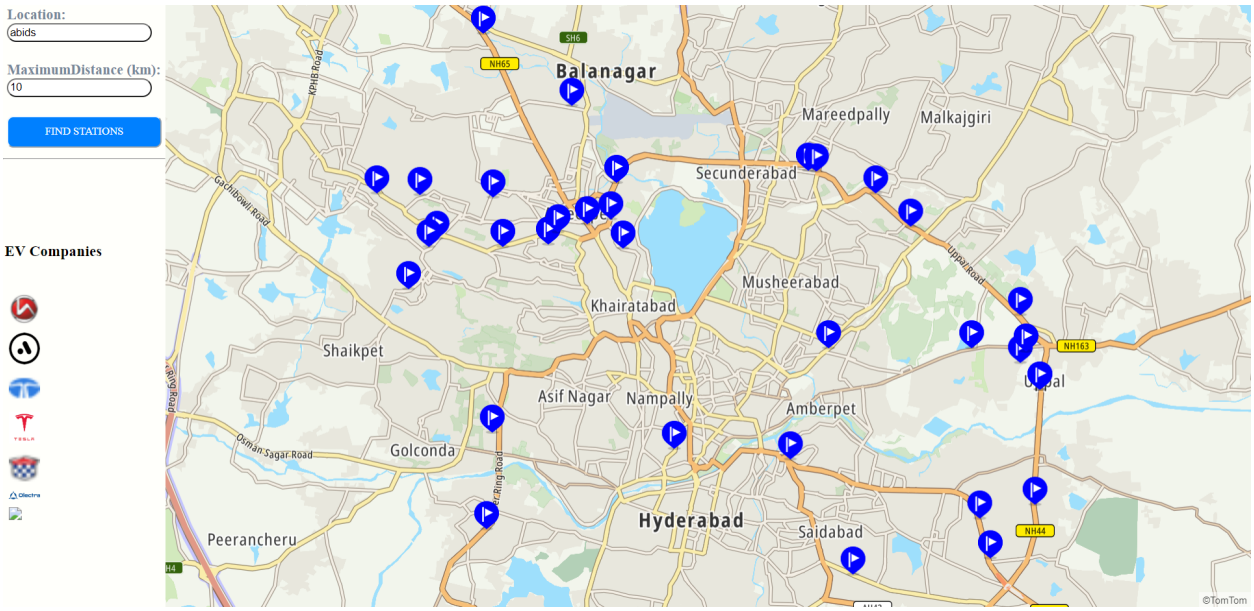
Available Charging Ports



Level 1 chargers : They are easy to find and use, inexpensive, and reliable. For a single-family home, a Level 1 charger may meet drivers' needs. Level 1 chargers charge at a rate of 4-5 miles per hour. They work best if a driver is able to plug in and let the vehicle charge overnight on a regular basis.

Since Level 1 chargers are of limited use for those who use their cars often or in apartment buildings, many consumers want a Level 2 charger, which can charge at a rate of 20-65 miles per hour. The plugs for Level 2 chargers are different from plugs for Level 1 chargers and require different cords and equipment than what comes with your new car.


OUR SERVICES
Search stations
You can now search nearby charging stations from your current locations or the location to which you are travelling to and can also see how many charging slots are available at that place.
Search Stations
Finding route
You can now search your destination path in the most simplest way from your current locations.
Find Route
Traffic detector
Get the taffic detection on your way to the destination.You can get information about the traffic status and traffic jams so that it can be avoided and save time.
Detect Traffic
About us
Our Services
Our Stations
Charging Ports
Logo


Location:
abids
MaximumDistance (km):
10
FIND STATIONS
EV Companies
Balanagar
Mareedpally
Malkajgiri
Secunderabad
Musheerabad
Khairatabad
Shaikpet
Asif Nagar
Nampally
Amberpet
Golconda
Hyderabad
Saidabad
Peerancheru
NH65
NH163
NH44
©TomTom

Starting Location:

toli chowki

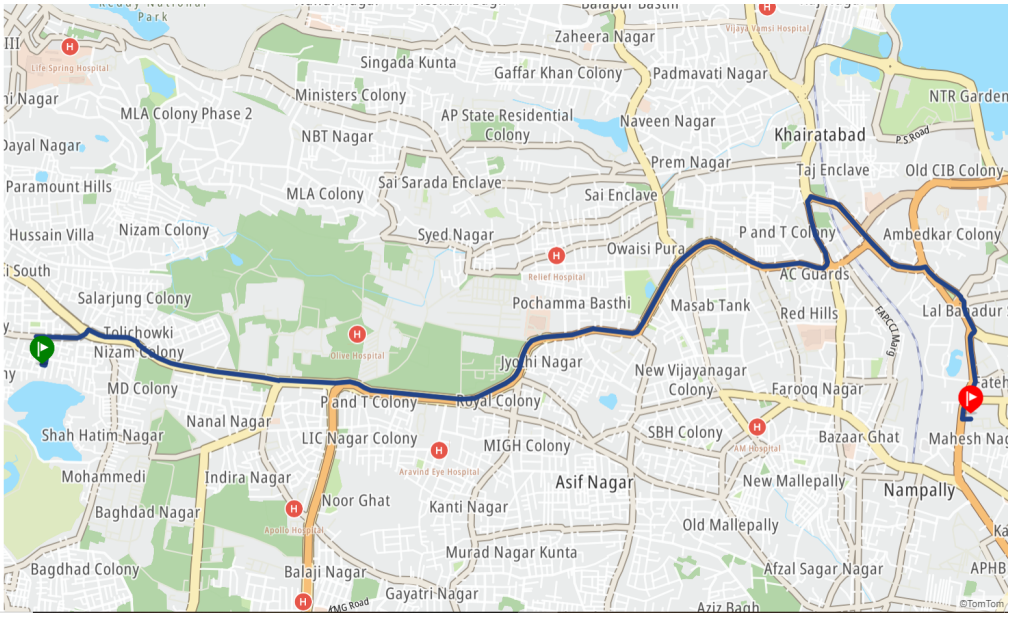
Finish Location:

abids

CALCULATE ROUTE

Route Summary

Travel Distance (km): 8.889
Travel Time: 0:23:34
Traffic Delay: 0:00:00
Battery Consumption (kWh): 2.8640
Remaining Charge (kWh): 97.1360



Choose your location

Telangana Thalli Statue, Miyapur Road, I

Show traffic layers

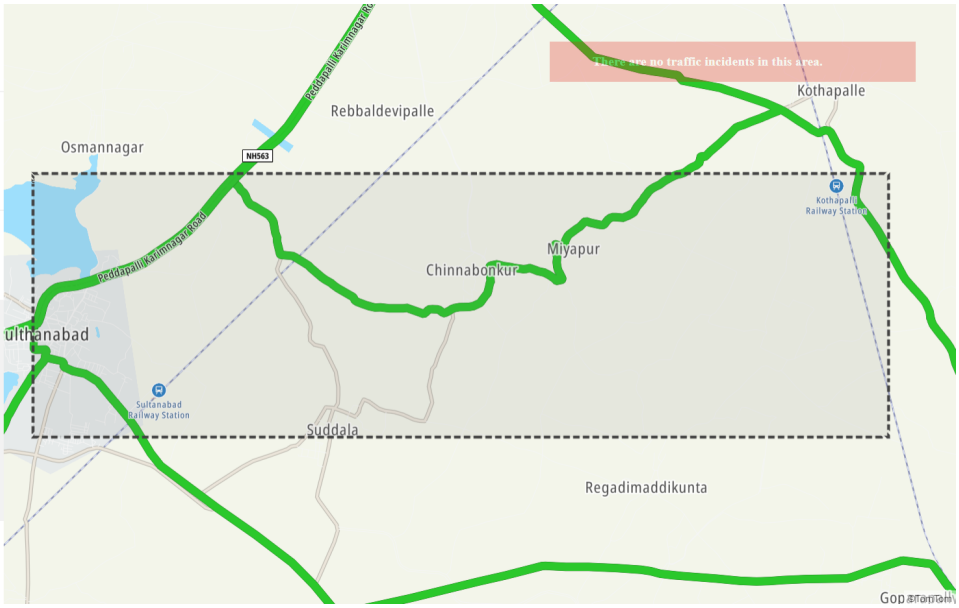
Traffic incidents

Traffic flow

Bounding box for traffic incidents

DRAW BOUNDING BOX

Conjusted — Free



ADVANTAGES & DISADVANTAGES

Advantages

The main social impacts due to our solution comprises:
- reduction on the use of fossil fuels
- reducing the percentage of air pollution.
- reduces the noise pollution
-reduces the cost of operation
- reduces the dependence on gulf countries for fuel

Disadvantages

There are not many disadvantages that arise due to our solution but some drawbacks of EVs cannot be neglected like:

- The driving range on a full charge.
- Higher Initial Purchase Cost.
- Replacing the Batteries is Expensive.

APPLICATIONS

Our solution has a wide range of applications. Some of the areas it impacts include:

- Consumer Electronics.
- Public Transportation.
- Aviation.
- Electricity Grid.
- Renewable Energy Storage.
- Military.
- Spaceflight.
- Wearable Technology.

CONCLUSION

To sum it all up, the need for expanding the industry of EVs is at its peak at the moment. The earth's climatic conditions and pollution is deteriorating day by day. It has become a necessity to take measures to control this situation at hand. Our solution is one such step towards this rising problem. Our solution will make the process of maintaining an EV more convenient which will encourage more people to switch to EVs in the coming future.

FUTURE SCOPE

Our project aims to make EV's the new vehicle purchase for everyone in the world. The project can be further enhanced in the future by adding more features and provide more information to the customers. It can include the availability of batteries at each station, it can include a chatbot for further asistance, can include previous charging history of the users and furthermore include membership for premium customers that will allow them to skip queues and service their cars at a lower rate.

BIBILOGRAPHY

- https://www.flashchargebatteries.com/applications/electric-cars/
- https://www.koehnechevy.com/electric/why-electric-vehicles-evs
- https://en.wikipedia.org/wiki/Electric_vehicle
- https://afdc.energy.gov/vehicles/how-do-all-electric-cars-work
- https://www.edfenergy.com/electric-cars/benefits
- https://timesofindia.indiatimes.com/auto/policy-and-industry/why-india-urgently-needs-an-ev-battery-swapping-policy/articleshow/100966160.cms?from=mdr

APPENDIX

A. Source Code
https://github.com/smartinternz02/SBSPS-Challenge-10699-1692292967/tree/main/EV_stations-master-main%20(1)/EV_stations-master-main