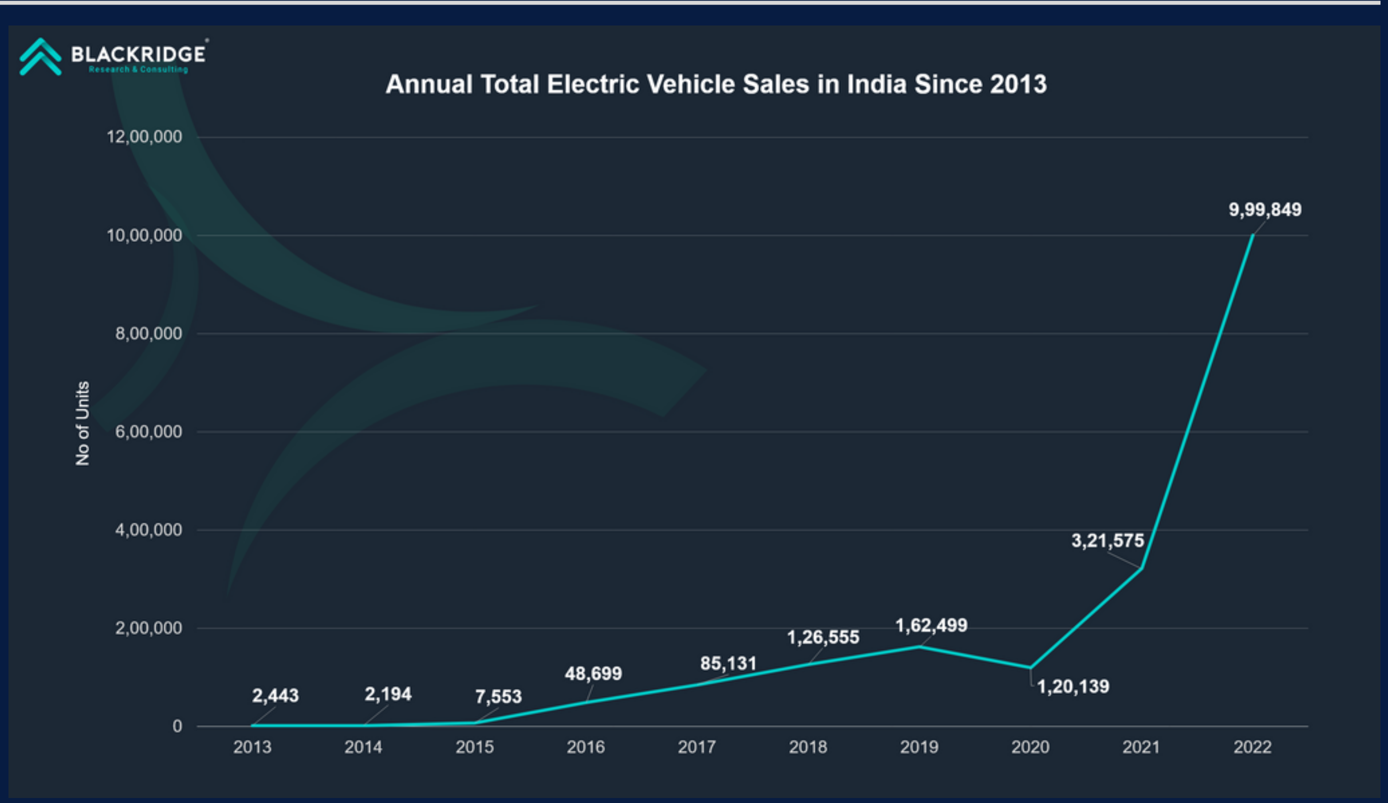
ElectriGo.

Powering Your Electric Journey

Introduction



Electrifying India's Roads: The Surge of Electric Vehicles

Electric vehicles in India have surged in the last five years, but the sector still has a long way to go before reaching parity with ICE vehicles. Though the Indian government's policies, rising fuel prices and greater awareness among the customers has given the nascent sector a much needed boost, EVs are still limited to affluent few or fleet owners.

WHY?

There are various challenges in taking EVs to masses

We want to bring confidence in using EVs in people, as their promoted use will greatly reduce the emissions by the vehicles which run on fuels, leading to a greener and more sustainable future.

Problem 3

Range anxiety, the fear of running out of electricity

Although EV ranges have been improving, there is still a perception that EVs may not offer sufficient range for long-distance travel, particularly in a country with vast distances like India.

Problem 1

Lack of sufficient charging infrastructure

The lack of a robust and widespread charging network makes it inconvenient for EV owners, especially for those living in apartments or without dedicated parking spaces.

Problem 2

Battery Technology and Supply Chain

India currently relies heavily on imports for battery manufacturing, leading to supply chain challenges. The charging time of EVs is longer than the refuelling time of conventional vehicles, which affects their convenience & usability.

What do we offer?

Locating nearest public or private EV charging station which are fetched using API's provided by the government

Rigorous monitoring & maintaining the state of charging (SOC), including battery health, replacement due date, etc. of EV using Machine Learning algorithm

One stop platform for

Battery Swap using Vehicle-2-Grid technology, powering bi-directional charging and hence EVs to manage renewable energy demand better & balance our energy system.

(in case of emergencies)

What makes Electrigo unique?

Unification of apps to provide a platform enforcing an entire Ecosystem

Offers feature to book the slot to charge EV in advance	Availability of both AC & DC batteries, hence making it ease	Use electric vehicles to manage renewable energy demand better and balance our energy system
Bilingual & Accessibility features	Integrated platform for the battery maintainace of EVs	Energy market parties can trade and optimise their balance

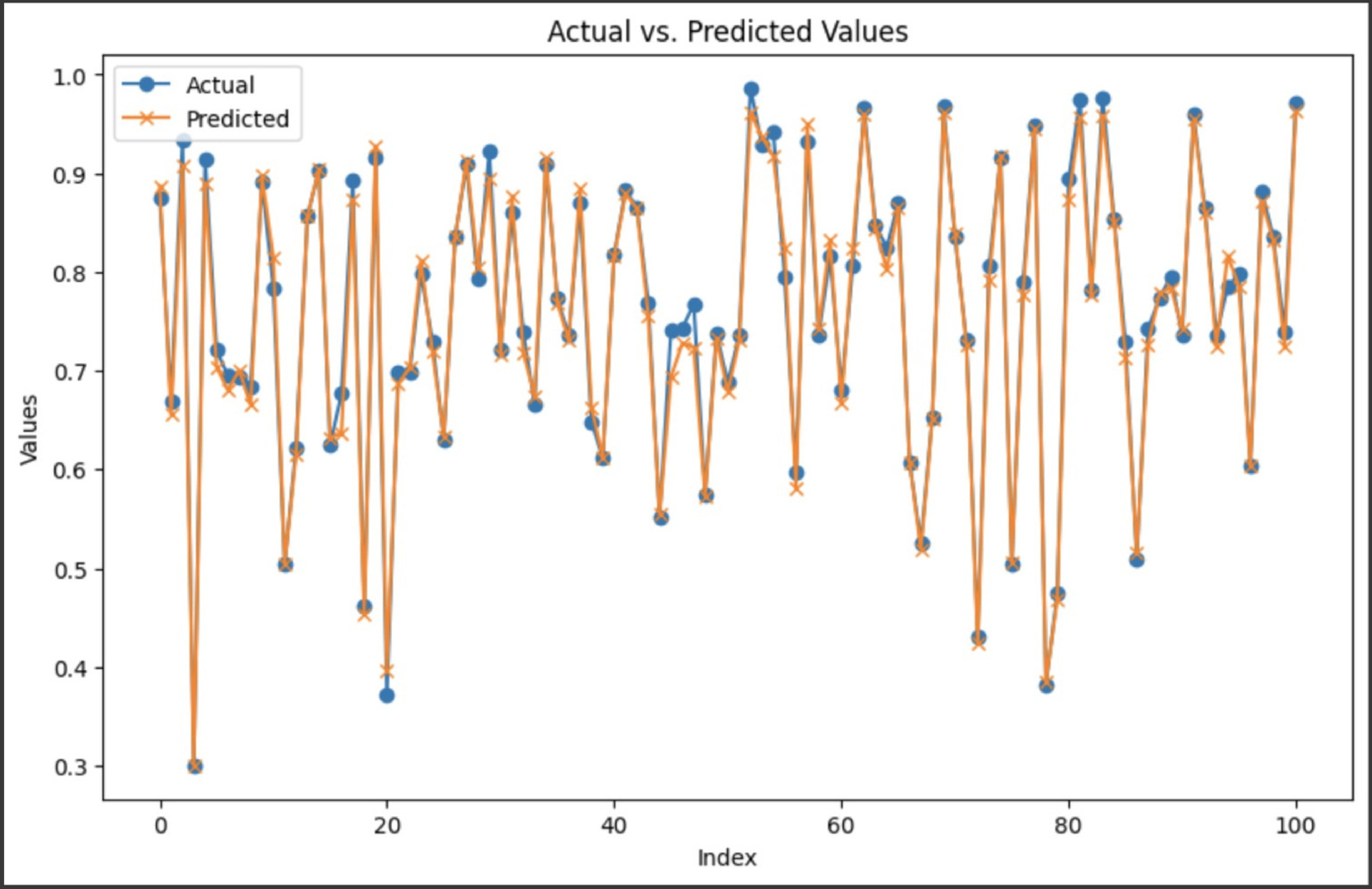
Utilizing AI in EVs for a Sustainable Future

Our Machine Learning Models

1) Linear Regression

Linear Regression

```
#@title Linear Regression

# Separate features (X) and target (Y)
X = data.drop(columns=['SoC [%]'])
Y = data[['SoC [%]']]

# Splitting the data into training and testing sets
X_train, X_test, y_train, y_test = train_test_split

# Initializing the regression model
LR = LinearRegression()

# Training the model on the training data
LR.fit(X_train, y_train)

# Making predictions on the training and testing da
train_predictions = LR.predict(X_train)
test_predictions = LR.predict(X_test)

# Calculating RMSE for both training and testing da
train_rmse = mean_squared_error(y_train, train_pred
test_rmse = mean_squared_error(y_test, test_predictions, squared=False)
```

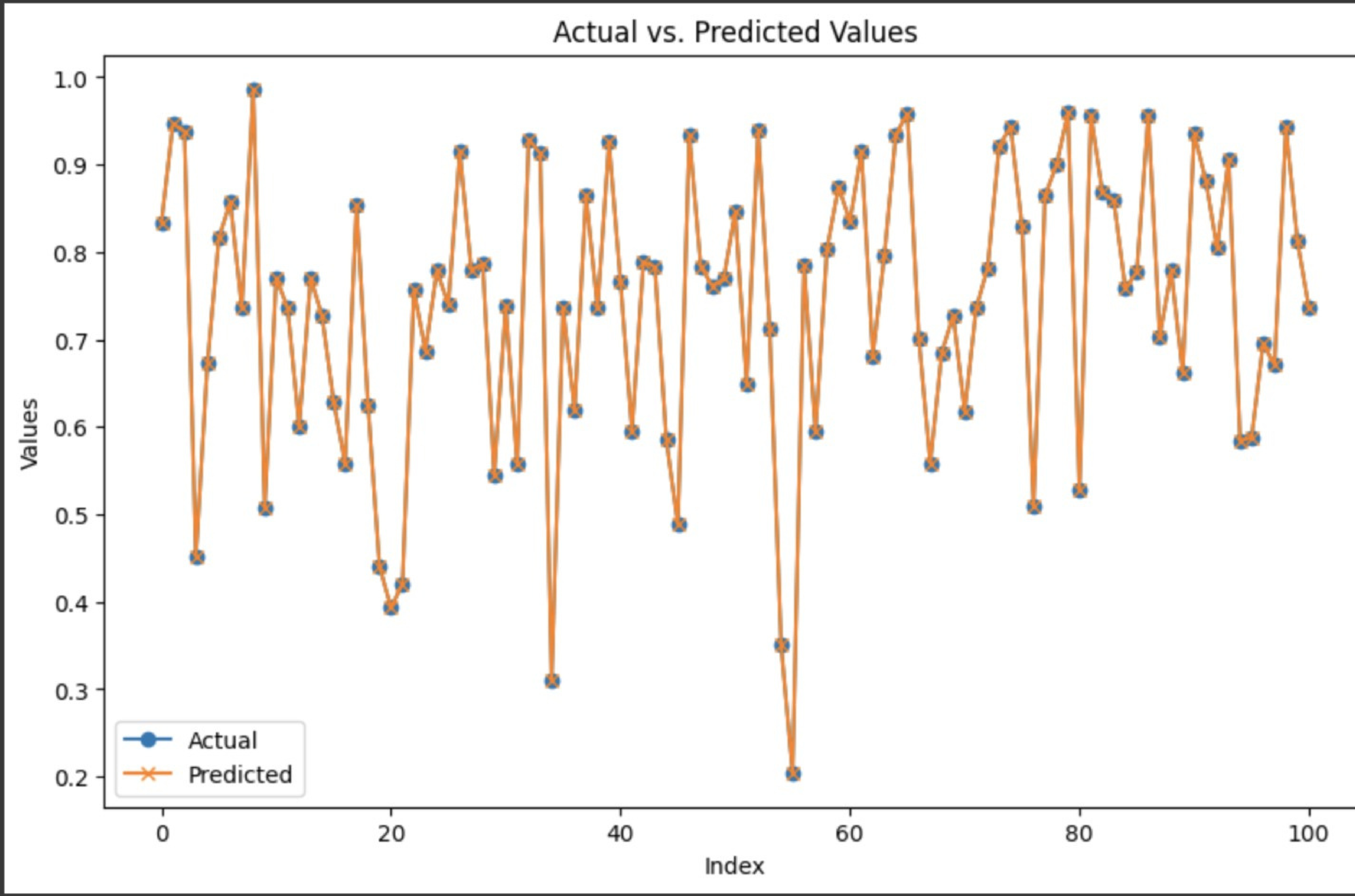


2) Random Forest

Random Forest Regressor

```
#@title Random Forest Regressor

import joblib
import numpy as np
import pandas as pd
from sklearn.model_selection import train_test_split
from sklearn.ensemble import RandomForestRegressor
from sklearn.metrics import mean_squared_error

data = pd.read_csv('/content/drive/MyDrive/Public/Hac

X = data.drop(columns=['SoC [%]'])

Y = data[['SoC [%]']]
# Split the data into training and testing sets
X_train, X_test, y_train, y_test = train_test_split(X

# Initializing the Random Forest Regressor
RF = RandomForestRegressor(n_estimators=100, random_s

y_train = y_train.values.ravel()
# Now Training the model on the training data
RF.fit(X_train, y_train)

joblib.dump(RF, "/content/drive/MyDrive/Public/HackAI

# Predicting on the test data
predictions = RF.predict(X_test)

# For performance measure calculating RMSE (Root Mean
rmse = np.sqrt(mean_squared_error(y_test, predictions
print(f'Root Mean Squared Error: {rmse:.3f}')
```

```
Root Mean Squared Error: 0.001
```



3) Train- Test - Predict

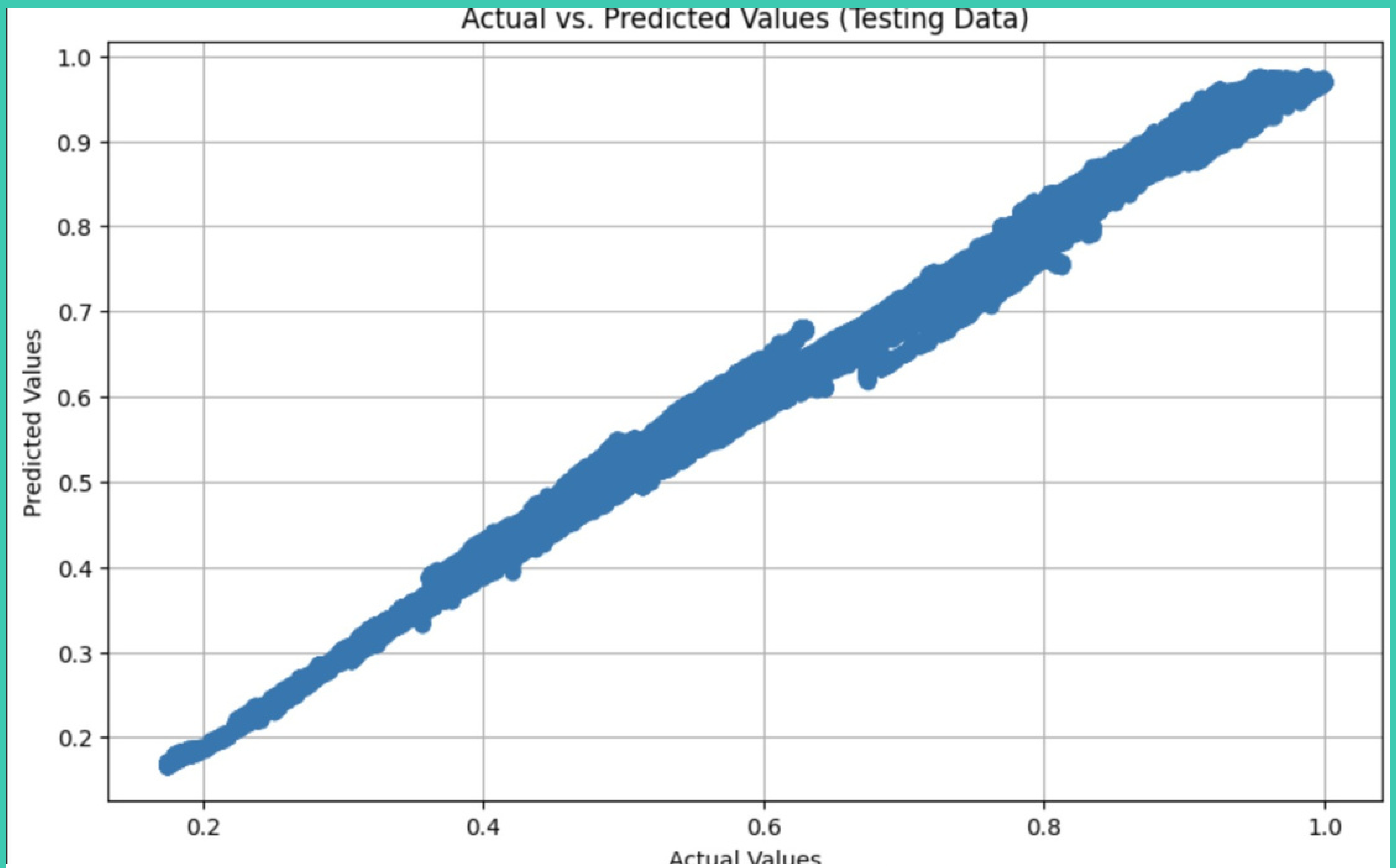
```python
# Calculating RMSE and R^2 for all three parts
train_rmse = mean_squared_error(y_train, train_predictions, squared=False)
test_rmse = mean_squared_error(y_test, test_predictions, squared=False)
pred_rmse = mean_squared_error(y_pred, pred_predictions, squared=False)

train_r2 = r2_score(y_train, train_predictions)
test_r2 = r2_score(y_test, test_predictions)
pred_r2 = r2_score(y_pred, pred_predictions)

# Print RMSE and R^2 values
print(f'Training RMSE: {train_rmse:.3f}, R^2: {train_r2:.3f}')
print(f'Testing RMSE: {test_rmse:.3f}, R^2: {test_r2:.3f}')
print(f'Prediction RMSE: {pred_rmse:.3f}, R^2: {pred_r2:.3f}')

# Plot actual vs. predicted values for testing data
plt.figure(figsize=(10, 6))
plt.plot(y_test, test_predictions, 'o')
plt.xlabel('Actual Values')
plt.ylabel('Predicted Values')
plt.title('Actual vs. Predicted Values (Testing Data)')
plt.grid(True)
plt.show()

# Plot actual vs. predicted values for prediction data
plt.figure(figsize=(10, 6))
plt.plot(y_pred, pred_predictions, 'o')
plt.xlabel('Actual Values')
plt.ylabel('Predicted Values')
plt.title('Actual vs. Predicted Values (Prediction Data)')
plt.grid(True)
plt.show()
```

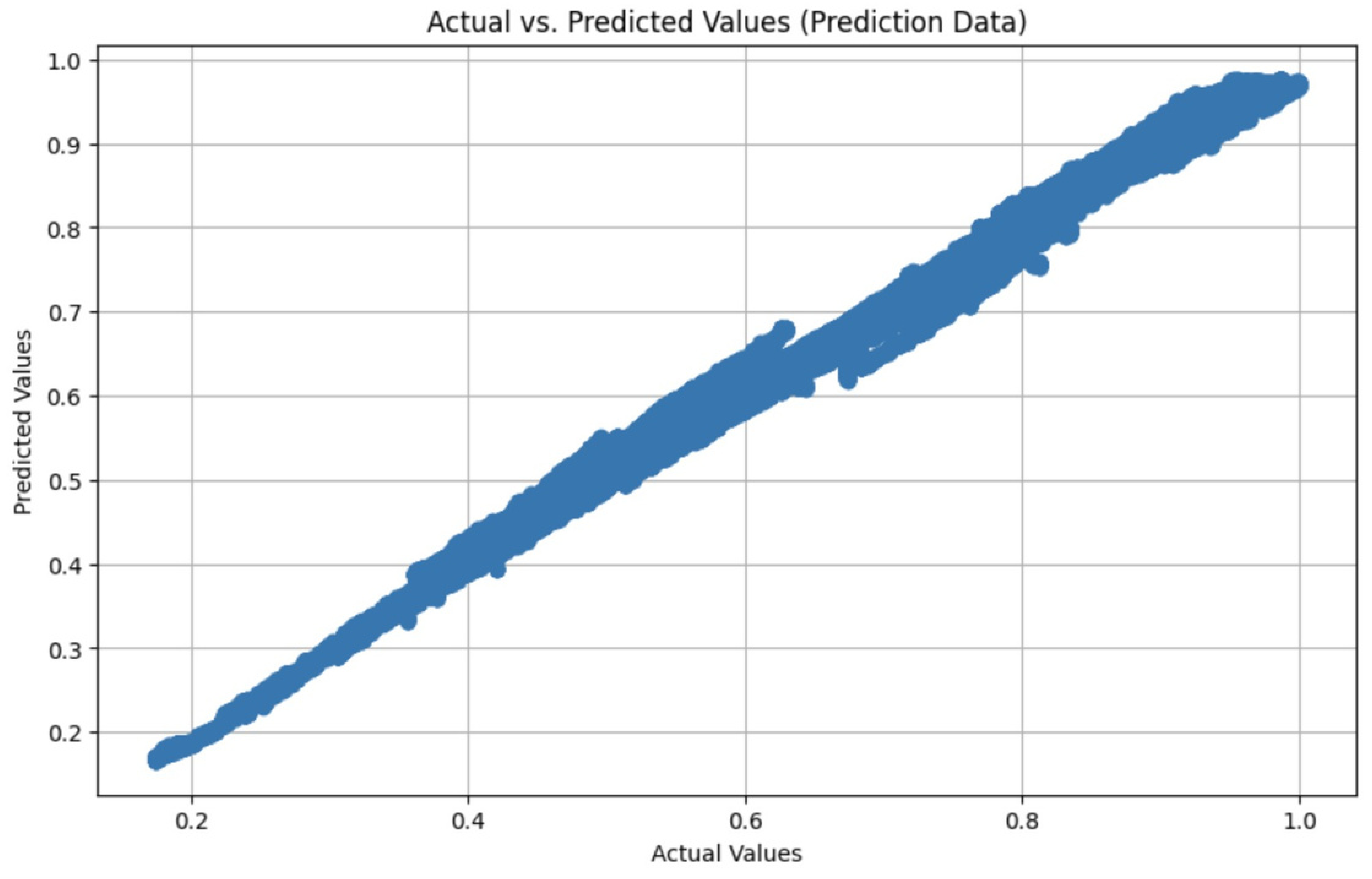
```
Training RMSE: 0.013, R^2: 0.994
Testing RMSE: 0.013, R^2: 0.994
Prediction RMSE: 0.013, R^2: 0.994
```

Training RMSE - 0.013

Testing RMSE - 0.013

Prediction RMSE - 0.013

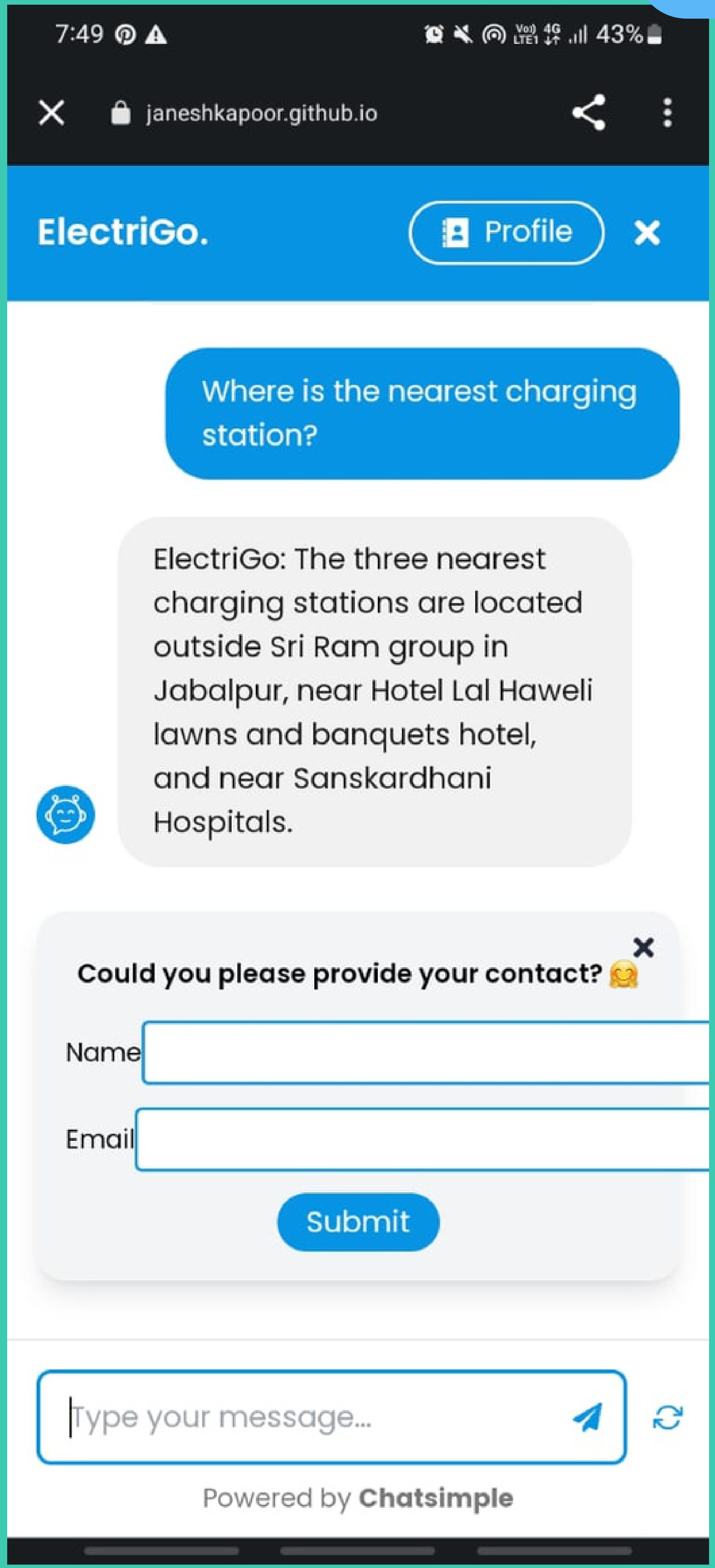


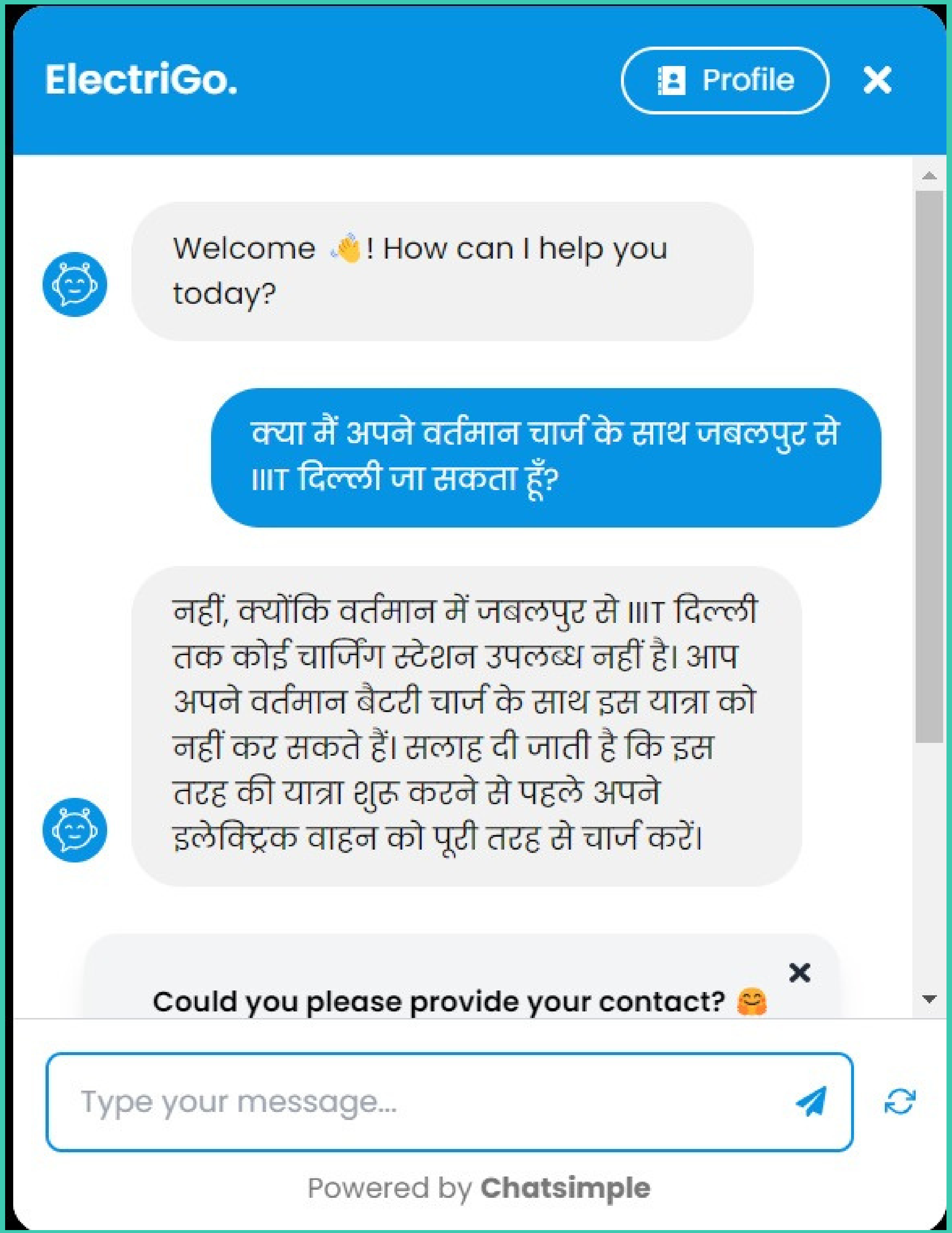


- 1.5 million+ EV rickshaw being already on the road.
- 15,000 EV rickshaw adding up every month.
- **While we were developing this solution we noticed that whenever we talk about EVs, what comes to our mind is the two or four wheelers owned by richer sections of the society. While we left the major portion of the EV industry in India and that is the EV rickshaw owners. Finally, we came up with the idea of developing a multilingual chatbot that provides information about the nearest charging stations, charging time etc to the rickshaw owners. The chatbot has a simple interface of just being used by numbers like 1 for locating the charging stations and so on, which provides better accessibility to these rickshaw owners.**

AI-based Multilingual Chatbot

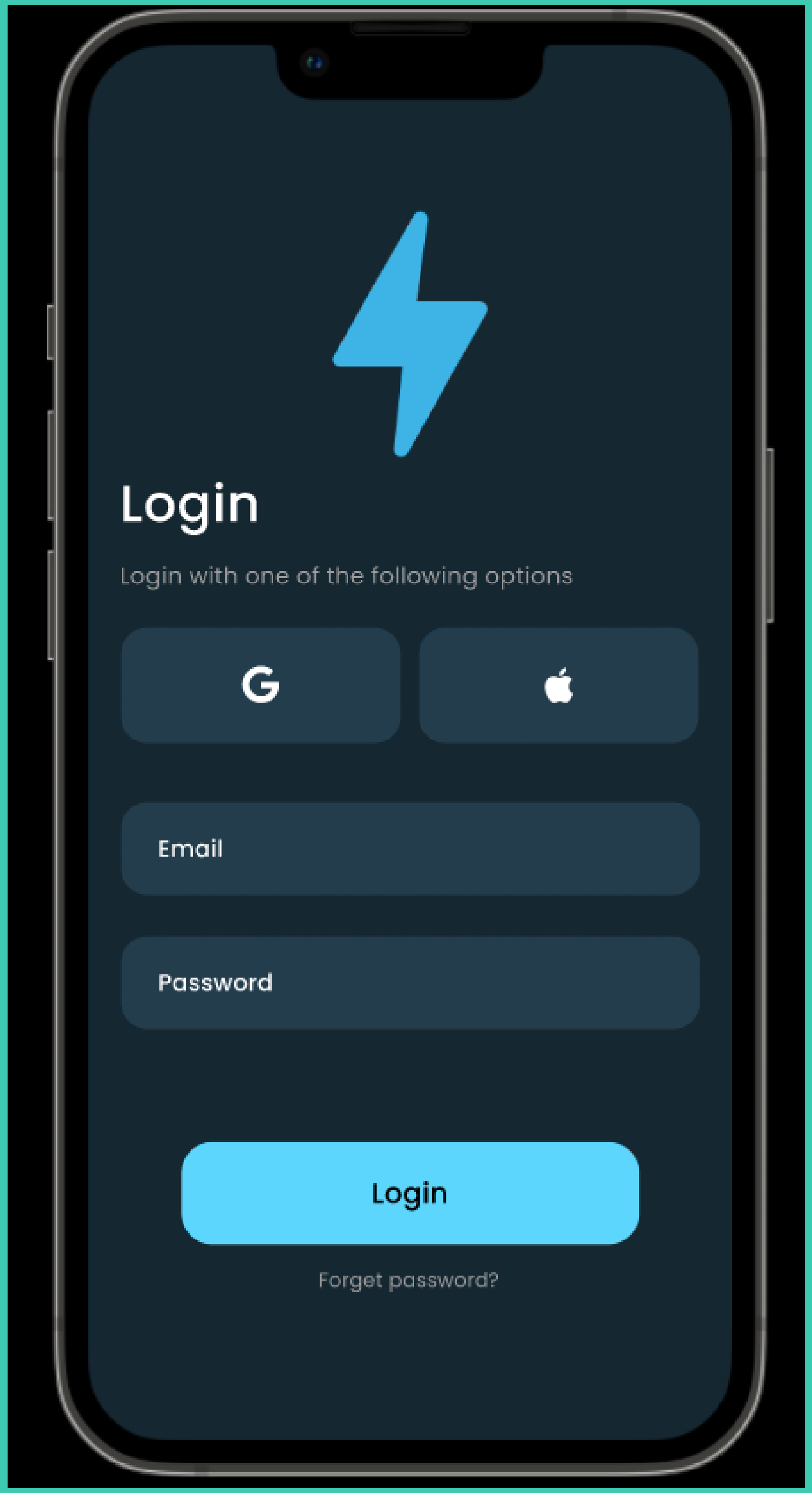


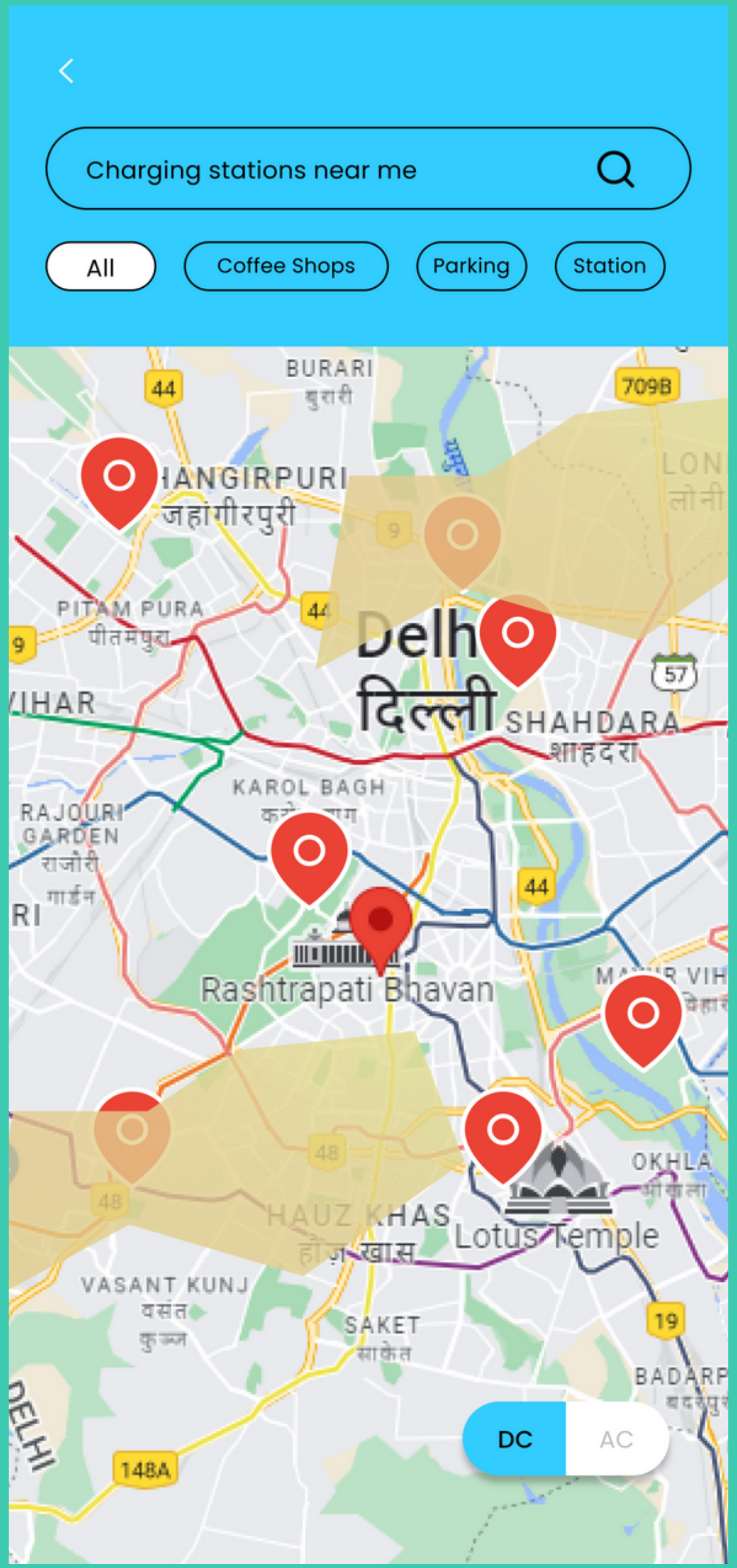


When we talk about EVs E-Rickshaws are usually ignored, but as a matter of fact, they are the biggest consumer of EVs in India.

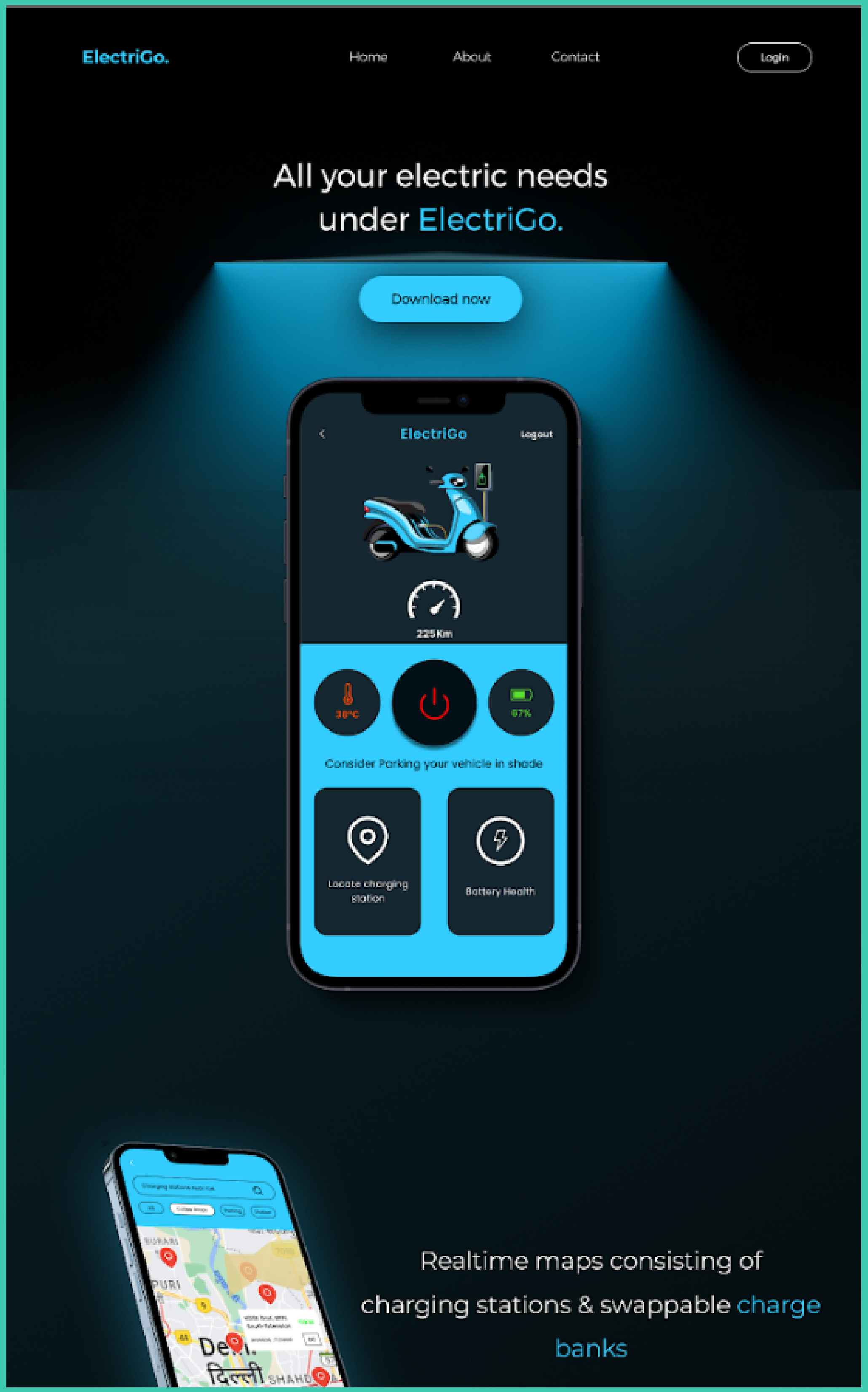
Our Chatbot makes their lives Easy :)

Application UI !!





Case Study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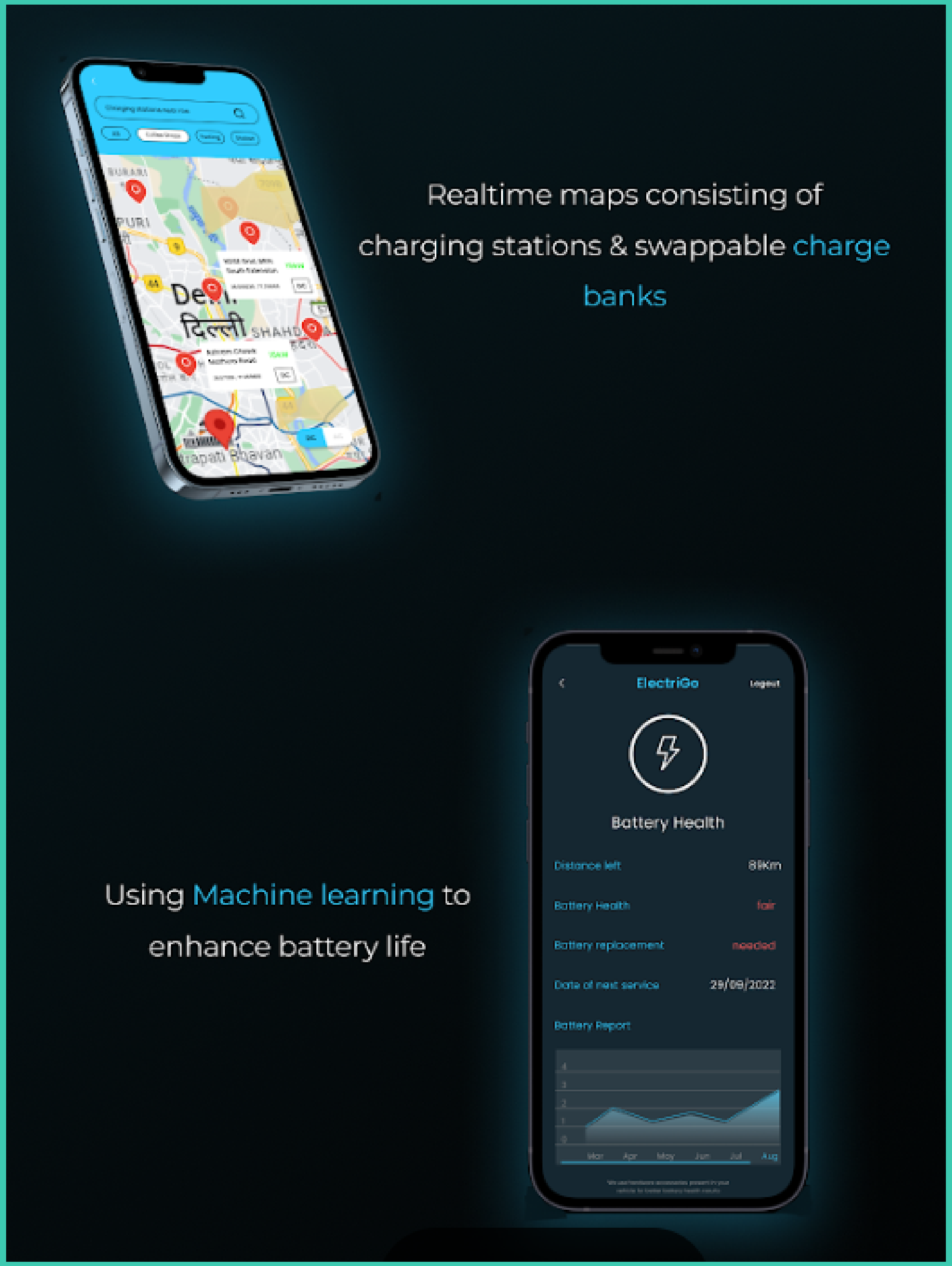
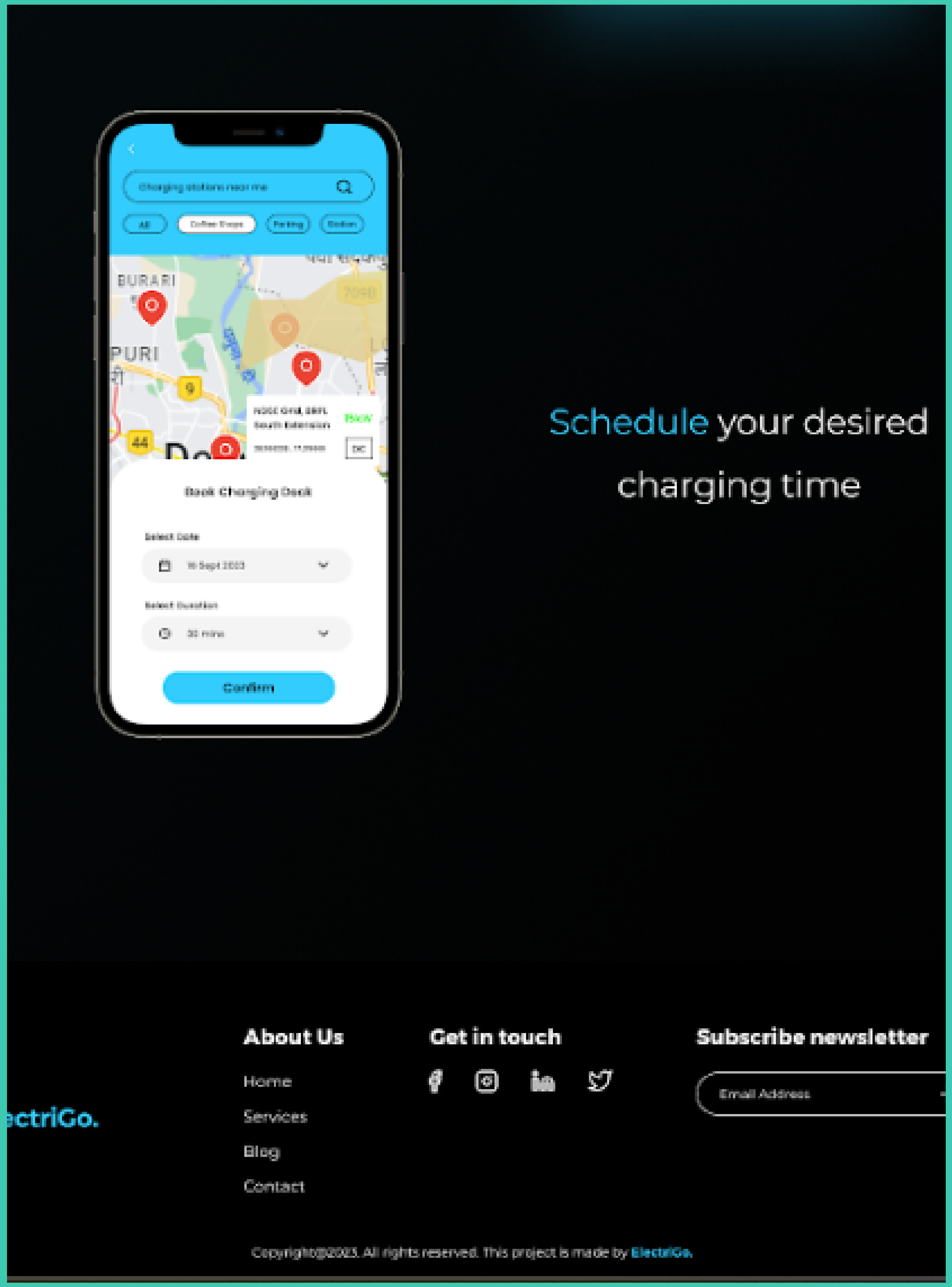
Contact
Login
All your electric needs under ElectriGo.
Download now
ElectriGo
Logout
225Km
Consider Parking your vehicle in shade
Locate charging station
Battery Health
Realtime maps consisting of charging stations & swappable charge banks


Realtime maps consisting of charging stations & swappable charge banks
Using Machine learning to enhance battery life
ElectriGo
Logout
Battery Health
Distance left
88Km
Battery Health
fair
Battery replacement
needed
Date of next service
29/09/2022
Battery Report


Schedule your desired charging time
Book Charging Dock
Select Date
Select Duration
Confirm
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Services
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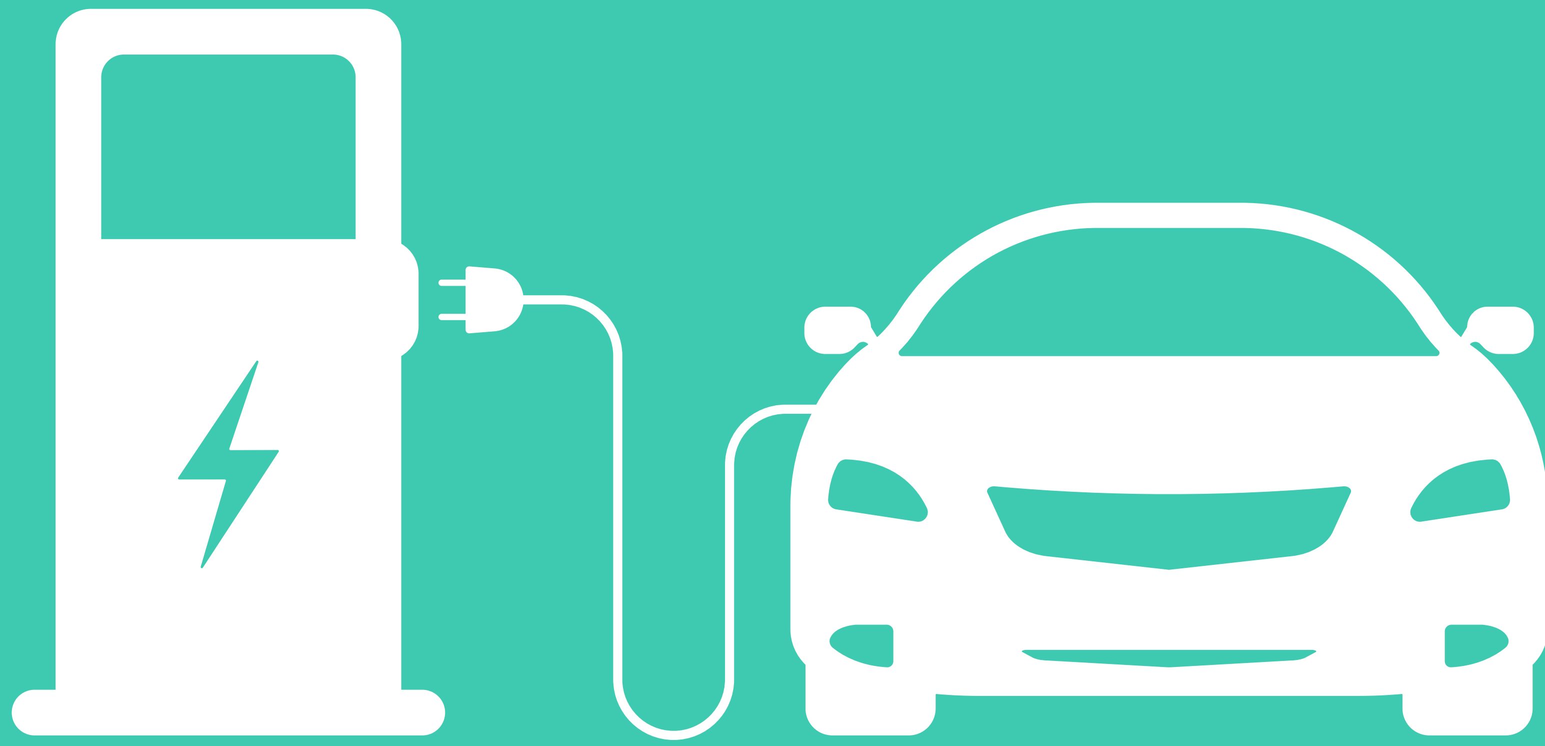
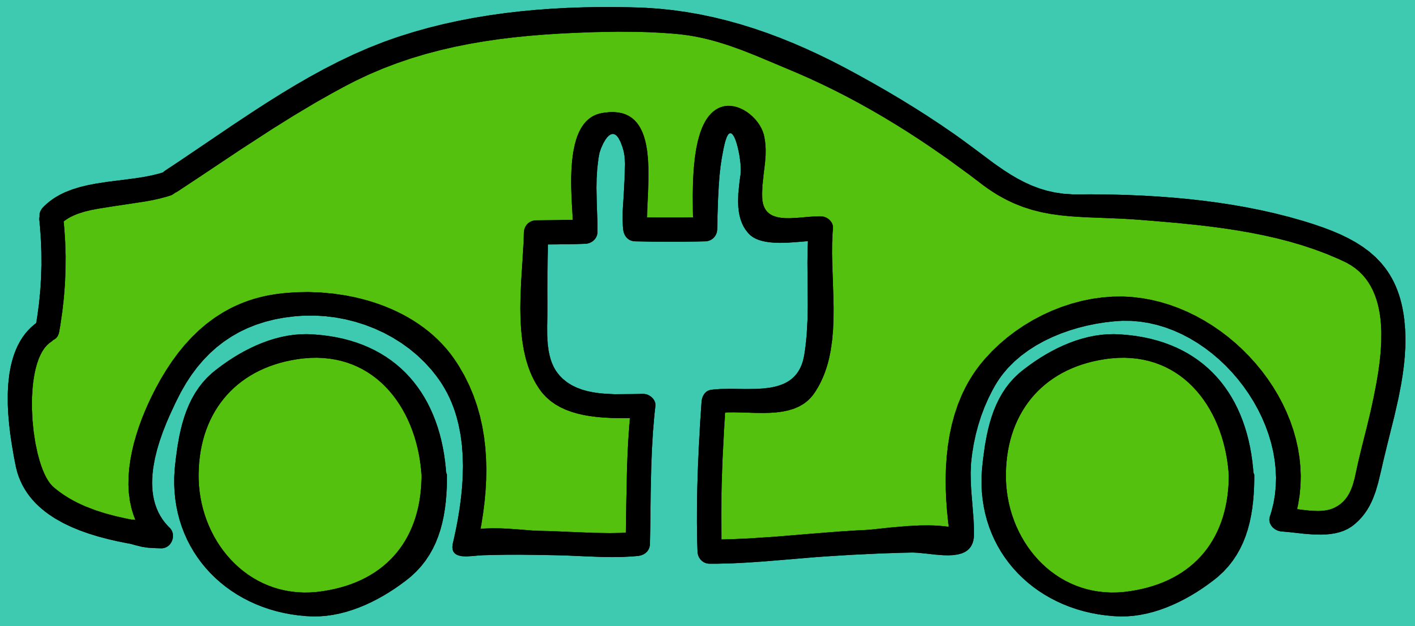
OUR GOAL!

A Greener Future

Bringing confidence in using EVs in people, as their promoted use will greatly reduce the emissions of vehicles that run on fuels, leading to a greener and more sustainable future.





REFERENCES

--> Referred Research Papers :

- https://www.mdpi.com/1996-1073/15/21/8003
- https://doi.org/10.3390/en15218003
- W. Wang et al., "Secure-Enhanced Federated Learning for AI-Empowered Electric Vehicle Energy Prediction," in IEEE Consumer Electronics Magazine, vol. 12, no. 2, pp. 27-34, 1 March 2023, doi: 10.1109/MCE.2021.3116917.
- Saxena, S., Hendricks, C., & Pecht, M. (2016). Cycle life testing and modeling of graphite/LiCoO2 cells under different state of charge ranges. Journal of Power Sources, 327, 394-400. https://doi.org/10.1016/j.jpowsour.2016.07.057.

Our Work

- Github - https://github.com/JaneshKapoor/HackAIthon_Spambots
- Canva - https://www.canva.com/design/DAFuoKgJ4yE/g_H-wiA83rkDbBvf5qpQuA/edit?utm_content=DAFuoKgJ4yE&utm_campaign=designshare&utm_medium=link2&utm_source=sharebutton
- Case Study - https://drive.google.com/file/d/1I4vtBfdbOHg59lxCpyx_ZrNqGoQoVkxk/view?usp=sharing
- Figma - https://www.figma.com/proto/RbzbDe6G7yVWpeowBaTzEQ/HackAIthon---Jabalpur?page-id=0%3A1&type=design&node-id=1-168&viewport=-3333%2C1610%2C0.73&t=ojURvAmVmmbAVxdQ-1&scaling=scale-down&starting-point-node-id=1%3A160&mode=design

THANKING YOU

Janesh Kappor
Divyam Khorwal
Tushar Chandra
Varsha Bhaskar