

## Project 3 Group 4

### EVCS App

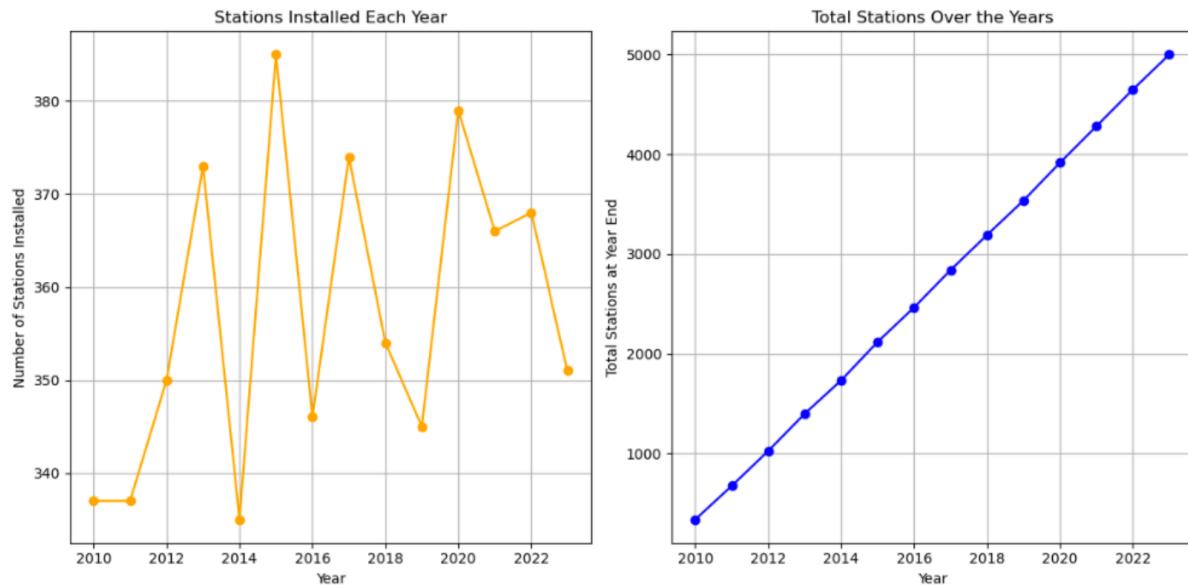
We discovered this project topic while exploring Kaggle, where we found the "Global EV Charging Stations" dataset. Given our belief that the future of transportation is electric, we aimed to create a user-friendly web application to help individuals easily locate EV charging stations. Whether on a long road trip or in need of a quick charge during daily commutes, our platform provides real time, reliable data at users' fingertips including station ratings for an enhanced experience. In addition to using this dataset, we researched how other data scientists approached similar projects. We found inspiration in the work of four different individuals who used the same dataset, particularly their effective visualizations. Their insights influenced our approach and helped shape the visual components of our project.

The web application is publicly accessible at: <https://lumamuro.pythonanywhere.com/>

## Data Cleaning & Data Analysis Visualization

We dropped an "Availability" column due to inconsistent and unclear data. We addressed missing values, standardized date formats, and performed necessary transformations. Incorrect data, including fictitious addresses such as "Random Rd" and 500 rows with incorrect location data, were identified and removed. Python scripts were implemented to automate data extraction and transformation. We conducted exploratory data analysis (EDA) using Pandas, NumPy, and Matplotlib. Statistical methods and regression analysis were employed to derive insights. Interactive visualizations using Plotly and Seaborn were created to analyze installation trends, charger types, and regional disparities.

Global EV Charging Stations Data															
Index	Station ID	Latitude	Longitude	Address	Charger Type	Cost (USD/kWh)	Distance to City (km)	Usage Stats (avg users/day)	Station Operator	Charging Capacity (kW)	Connector Types	Installation Year	Renewable Energy Source	Reviews (Rating)	Parking Spots
0	EVS00001	-33.400998	77.974972	4826 Random Rd, City 98, Country	AC Level 2	0.27	4.95	35	EVgo	350	CCS, CHAdeMO	2013	Yes	4.0	
1	EVS00002	37.861857	-122.490299	8970 San Francisco Ave, San Francisco	DC Fast Charger	0.19	4.96	83	EVgo	350	Tesla, Type 2	2010	Yes	3.9	
2	EVS00003	13.776092	100.412776	5974 Bangkok Ave, Bangkok	AC Level 2	0.48	8.54	24	ChargePoint	50	Type 2, CCS	2019	No	3.6	
3	EVS00004	43.628250	-79.468935	6995 Toronto Ave, Toronto	AC Level 1	0.41	13.28	70	Greenlots	350	Type 2	2010	Yes	4.2	
4	EVS00005	19.119865	72.913368	5704 Mumbai Ave, Mumbai	AC Level 2	0.11	9.76	19	EVgo	350	CCS	2015	Yes	3.7	

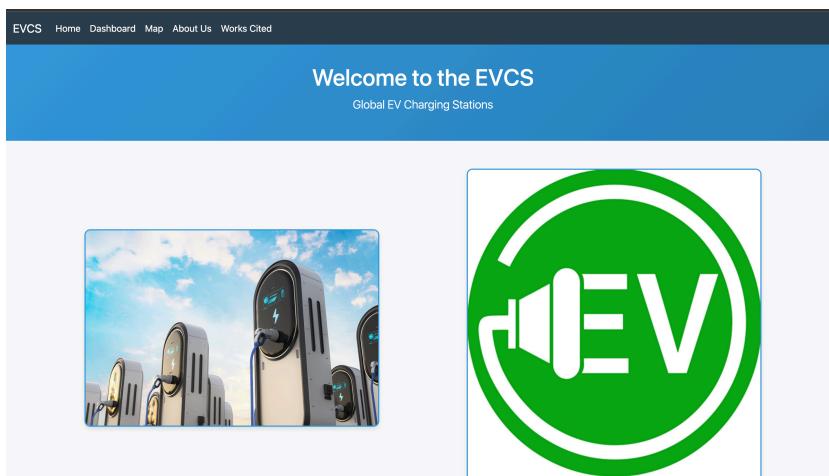


## Web Application Development

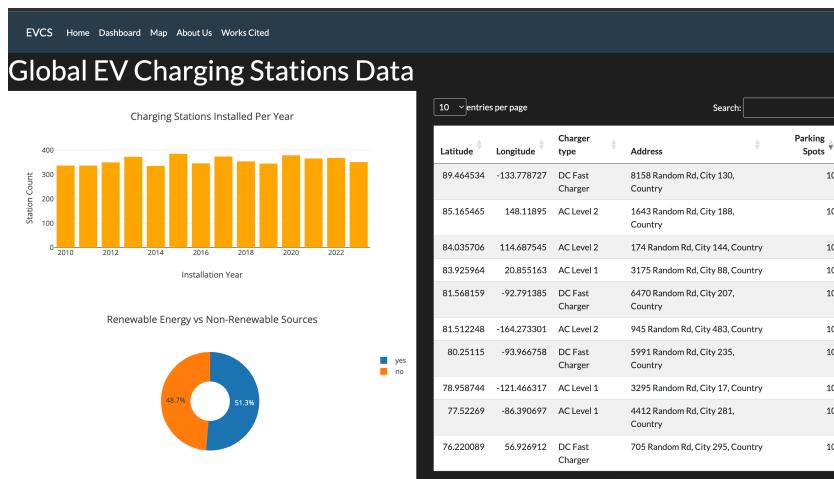
The front-end was developed using Flask, HTML, CSS, and JavaScript. Dynamic data rendering was integrated through Flask routes. A dashboard was built to provide clear insights into EV charging station trends. An interactive map feature was implemented for users to explore global EV charging station locations. The application was hosted on PythonAnywhere for public access.

## Detailed Page Breakdown

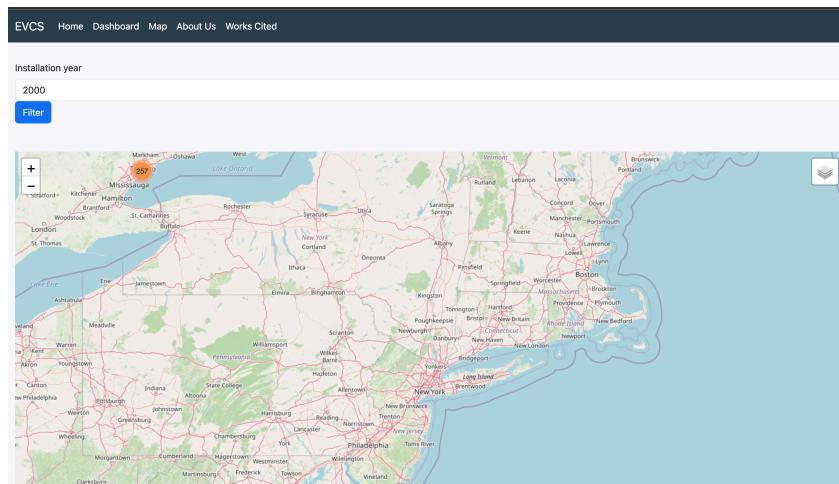
**Home Page:** Provides an overview of the project, objectives, and key functionalities. About This Project: We believe in a future powered by electric vehicles. We provide information about global EV charging stations to help you travel with confidence, wherever you are in the world.



**Dashboard Page:** Allows users to explore datasets and view statistics through interactive charts. This page presents data on EV charging stations worldwide. It includes key information such as latitude, longitude, charger type, address, and the number of parking spots available at each location.



**Map Page:** Features dynamic geographic map with the 5000 locations of the EV charging stations around the world. It also have a filter on top to separate the location by year of installation.



**About Us & Works Cited:** Introduces the team members and links to project resources. Our team of passionate data scientists is dedicated to building a reliable data app for EV charging stations. With expertise in data analytics and visualization, we deliver accurate information on EV charging stations worldwide.

The screenshot shows two pages of the EVCS application: 'About Us' and 'Works Cited'.  
**About Us Page:** The header includes 'EVCS' and navigation links: Home, Dashboard, Map, About Us (which is highlighted), and Works Cited. The main content features a section titled 'About Us' with a brief description: 'Our team of passionate data scientists is dedicated to building a reliable data app for EV charging stations. With expertise in data analytics and visualization, we deliver accurate information on EV charging stations worldwide.' Below this, there are four profiles of data scientists: Willian Ruiz, Ugur Cetin, Luisa Murillo, and Thaissa Champagne, each with their title 'Data Scientist' and social media links for LinkedIn and GitHub.  
**Works Cited Page:** The header includes 'EVCS' and navigation links: Home, Dashboard, Map, About Us, and Works Cited. The main content features a section titled 'Works Cited' with the sub-instruction 'Sources and references used in the EV Charging Stations Data App'. Below this, there is a 'References' section containing three entries: 'Global EV Charging Stations Dataset' with a link to <https://www.kaggle.com/datasets/vivekattri/global-ev-charging-stations-dataset>, 'OpenStreetMap Contributors' with a link to [www.openstreetmap.org](http://www.openstreetmap.org), and 'Bootstrap CDN. "CSS framework"' with a link to <https://www.bootstrapcdncdn.com/bootswatch/>. Both pages include a copyright notice at the bottom: '© 2025 EV Charging Stations Data App.'

## Conclusion and future work

This project provided valuable hands on experience in data analytics, and web development. Moving forward, we plan to:

- Improve data accuracy to ensure correct mapping of all 5000 stations.
- Expand data sources and improve cleaning methods.
- Enhance application performance for better speed and usability.
- Increase visual insights on charging speed and regional trends.
- Improve dashboard page with adding a better filter for each chart.