Project Design Phase-II

Technology Stack (Architecture & Stack)

Date	23 June 2025
Team ID	LTVIP2025TMID47397
Project Name	Visualization Tool for Electric Vehicle Charge and Range Analysis
Maximum Marks	4 Marks

Technical Architecture:

The Deliverable shall include the architectural diagram as below and the information as per the Table-1 & Table-2

Example: EV Charge Data Collection & Visualization Platform

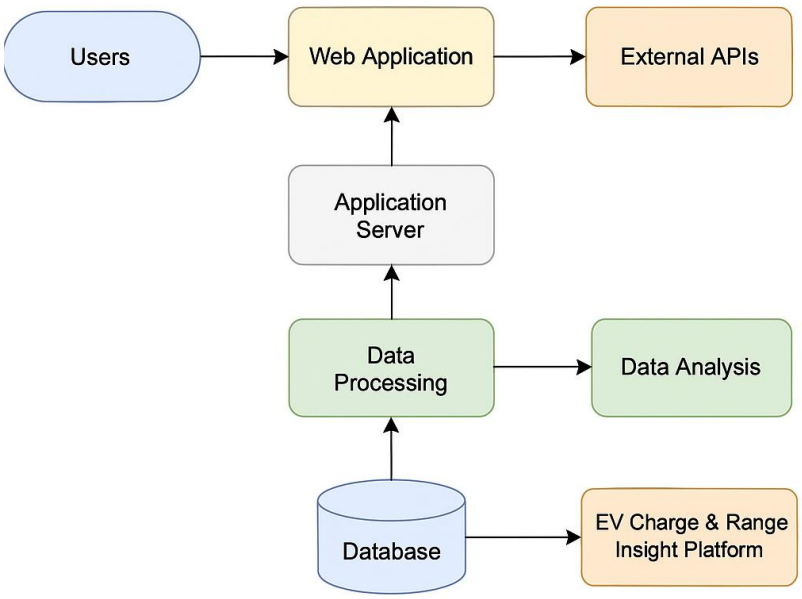

Table-1 : Components & Technologies:

S.No	Component	Description	Technology
1	User Interface	User dashboard for EV data insights via browser or mobile	React.js, TailwindCSS, HTML5
2	Application Logic-1	EV charge & range data processing	Python, FastAPI
3	Application Logic-2	User behavior analytics	Python ML libraries (scikit-learn, pandas)
4	Application Logic-3	Geolocation-based recommendations	Google Maps API, OpenRouteService
5	Database	Storing user profiles, session logs, raw EV data	PostgreSQL
6	Cloud Database	Cloud-hosted scalable data storage	AWS RDS, Amazon DynamoDB
7	File Storage	Storing data exports, visualizations	AWS S3, local FS
8	External API-1	Fetch real-time EV station data	NREL API, Open Charge Map API
9	External API-2	Weather or temperature-dependent range prediction	OpenWeatherMap API
10	Machine Learning Model	Forecast range and suggest efficiency improvements	Regression + Time Series Models
11	Infrastructure (Server / Cloud)	Deploying services	AWS EC2, Lambda, Kubernetes

Table-2 : Application Characteristics:

S.No	Characteristics	Description	Technology
1	Open-Source Frameworks	Frontend and backend using open-source tools	React.js, FastAPI, PostgreSQL
2	Security Implementations	Authentication, encryption, access control	JWT, OAuth 2.0, HTTPS, IAM Roles
3	Scalable Architecture	Microservices & cloud containers	Docker, Kubernetes, REST APIs
4	Availability	Highly available multi-zone cloud setup	AWS Load Balancer, Multi-AZ RDS
5	Performance	Optimized charts, caching, async jobs	Redis, CloudFront CDN, Async APIs

References:

https://c4model.com/

https://www.ibm.com/cloud/architecture

https://aws.amazon.com/architecture

https://medium.com/the-internal-startup/how-to-draw-useful-technical-architecture-diagrams-2d20c9fda90d

https://openchargemap.org/site/develop/api

https://openweathermap.org/api

https://developer.nrel.gov/docs/transportation/alt-fuel-stations-v1/