**Project Design Phase-II**
**Technology Stack (Architecture & Stack)**

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| Date | Feb 2026 |
| Team ID | LTVIP2026TMIDS47701 |
| Project Name | Visualization tool for electric vehicle charge and range analysis |
| Maximum Marks | 4 Marks |

**Technical Architecture:**

The EV Charge & Range Analysis System follows a three-tier architecture consisting of User Interface, Application Logic, and Database layers. The system collects EV-related data, processes it using analytical logic, and displays insights such as battery status, range prediction, and charging station availability through an interactive dashboard.

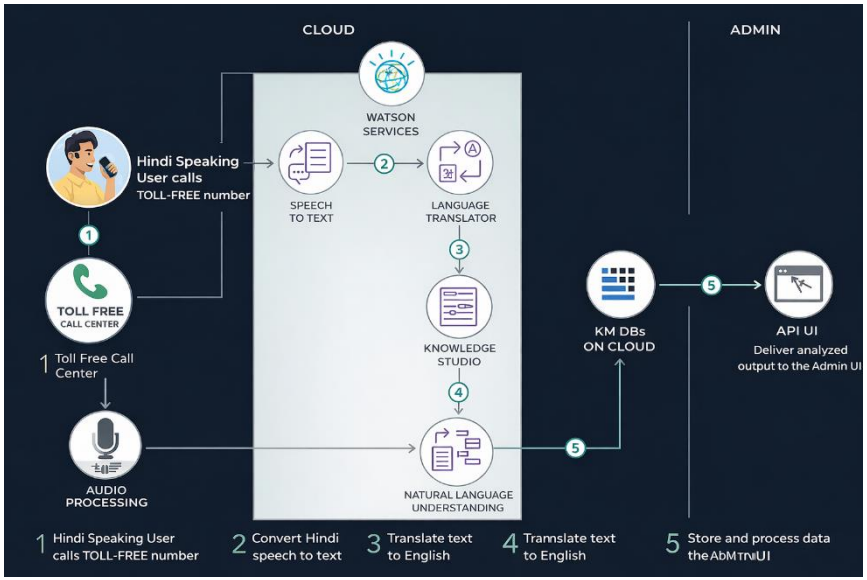

**Table-1: Components & Technologies:**

| S.No | Component | Description | Technology |
|---|---|---|---|
| 1. | User Interface | Allows users to interact with the application through dashboards and reports | HTML, CSS, JavaScript, React.js |
| 2. | Application Logic-1 | Handles user authentication and authorization | Python, Flask |
| 3. | Application Logic-2 | Processes EV range and charging data | Python, Pandas |
| 4. | Application Logic-3 | Performs data analysis and predictions | Python, NumPy |
| 5. | Database | Stores EV data, user details, and charging station information. | MySQL |
| 6. | Cloud Database | Stores backup and large datasets on cloud | AWS RDS / Firebase |
| 7. | File Storage | Stores CSV files and datasets | Local File System / Cloud Storage |
| 8. | External API-1 | Fetches charging station location data | Google Maps API. |
| 9. | External API-2 | Fetches EV-related data if required | Open EV API. |
| 10. | Machine Learning Model | Predicts EV range based on battery data | Linear Regression / Scikit-learn. |
| 11. | Infrastructure (Server / Cloud) | Hosts the application and services | Local Server / AWS Cloud. |

**Table-2: Application Characteristics:**

| S.No | Characteristics | Description | Technology |
|---|---|---|---|
| 1. | Open-Source Frameworks | System supports increase in users and EV datasets. | Cloud Deployment, Modular Architecture. |
| 2. | Security Implementations | Ensures accurate and consistent analysis results. | MySQL, Data Validation. |
| 3. | Scalable Architecture | Application is accessible anytime. | Cloud Hosting |
| 4. | Availability | Fast data processing and dashboard loading. | Optimized Queries, Caching |
| 5. | Performance | Easy to update and modify system features. | Modular Code Structure |