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

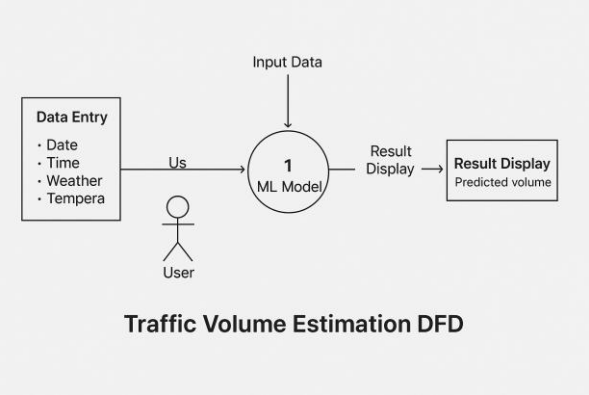
Date	27 june 2025
Team ID	LTVIP2025TMID38854
Project Name	traffictelligence: advanced traffic volume estimation with machine learning
Maximum Marks	4 Marks

Technical Architecture:

The Deliverable shall include the architectural diagram as below and the information as per the table1 & table 2

Example: Order processing during pandemics for offline mode

Reference: https://developer.ibm.com/patterns/ai-powered-backend-system-for-order-processing-during-pandemics/



Traffic Volume Estimation DFD

Guidelines:

- Include all the processes (As an application logic / Technology Block)
- Provide infrastructural demarcation (Local / Cloud)
- Indicate external interfaces (third party API's etc.)
- Indicate Data Storage components / services
- Indicate interface to machine learning models (if applicable)

Table-1 : Components & Technologies:

S.No	Component	Description	Technology
1.	User Interface	Web interface for user input & results	HTML, CSS, JavaScript ,Bootstrap.
2.	Application Logic-1	Input validation, API calling	Python (Flask)
3.	Application Logic-2	Traffic prediction using ML model	Scikit-learn, Pandas, NumPy
4.	Application Logic-3	Date/time parsing, feature engineering	Python
5.	Database	Store user logs, queries, and results	SQLite or MySQL
6.	Cloud Database	Store large volumes of traffic data if needed	Firebase / Google Cloud SQL
7.	File Storage	Store trained model and data files	Local Filesystem / Google Drive
8.	External API-1	Fetch live weather data	OpenWeatherMap API
9.	External API-2	Fetch calendar holidays	Calendarific API or Manual CSV
10.	Machine Learning Model	Predict traffic volume	RandomForestRegressor (scikit-learn)
11.	Infrastructure (Server / Cloud)	Host web app	ocalhost / Replit / PythonAnywhere / AWS

Table-2: Application Characteristics:

S.No	Characteristics	Description	Technology
1.	Open-Source Frameworks	Flask, Scikit-learn, Pandas, NumPy, Bootstrap	All are open-source
2.	Security Implementations	Input sanitization, CSRF protection, hashed passwords if auth is used	Flask features, SHA-256 (if applicable)

S.No	Characteristics	Description	Technology
3.	Scalable Architecture	3-tier: UI → Backend → Model/Database	Flask-based microservice design
4.	Availability	Web-hosted app can be deployed on cloud (24/7 uptime)	AWS / PythonAnywhere / Firebase Hosting
5.	Performance	Caching weather data, trained model pickled, optimized input handling	.pkl model, Flask server, API response cachin

References:

https://c4model.com/

https://developer.ibm.com/patterns/online-order-processing-system-during-pandemic/

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