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

|  |  |
| --- | --- |
| Date | 20 July 2025 |
| Team ID | LTVIP2025TMID20285 |
| Project Name | TrafficTelligence – Advanced Traffic Volume Estimation with Machine Learning |
| Maximum Marks | 4 Marks |

Technical Architecture:  
The following table describes the technical architecture and the technology stack used in the TrafficTelligence project.

Table-1: Components & Technologies

|  |  |  |  |
| --- | --- | --- | --- |
| S.No | Component | Description | Technology |
| 1 | User Interface | Frontend for user to enter traffic input | HTML, CSS, JavaScript (Jinja2) |
| 2 | Application Logic-1 | ML Inference and preprocessing | Python (Flask, Pandas, Sklearn) |
| 3 | Application Logic-2 | Web application routing and form handling | Flask |
| 4 | Database | CSV Dataset for traffic logs | Local CSV (via Pandas) |
| 5 | File Storage | Model files (.pkl), logs | Local filesystem / S3 (optional) |
| 6 | External API-1 | Weather integration | OpenWeatherMap API |
| 7 | External API-2 | Optional location metadata integration | Google Maps / GPS metadata |
| 8 | Machine Learning Model | Predict traffic volume level (Low, Medium, High) | ResNet50 + LSTM, Random Forest |
| 9 | Infrastructure | Deployment and execution | Localhost / Flask / Heroku-ready |

Table-2: Application Characteristics

|  |  |  |  |
| --- | --- | --- | --- |
| S.No | Characteristic | Description | Technology |
| 1 | Open-Source Frameworks | Flask, Pandas, Scikit-learn, Matplotlib, Seaborn | Python libraries |
| 2 | Security | Data validation, local file access only, optional HTTPS support on deployment | Flask validation, HTTPS (Heroku) |
| 3 | Scalable Architecture | Modular Flask + model pipeline, easy to scale or containerize | Flask, Gunicorn (Heroku/AWS) |
| 4 | Availability | Can be hosted on free/paid cloud instances, accessible via web | Heroku / AWS EC2 / Localhost |
| 5 | Performance | Low-latency response (<1.1s), uses efficient model serialization | joblib, Fast Flask API |