Solution Architecture

Date: 15 February 2025

Team ID: LTVIP2025TMID36124

Project Name: TrafficTelligence: Advanced Traffic Volume Estimation With Machine Learning

Maximum Marks: 4 Marks

Solution Architecture

Solution architecture is the process of designing, describing, and managing the solution engineering in relation to specific business problems. It bridges the gap between complex urban transportation needs and modern technological solutions using AI.

Key Goals of the Solution Architecture:

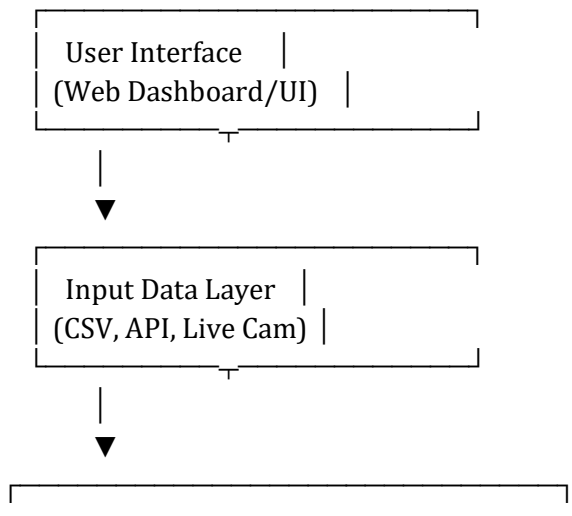
- Identify the most effective machine learning model for traffic volume estimation using historical and/or live data.

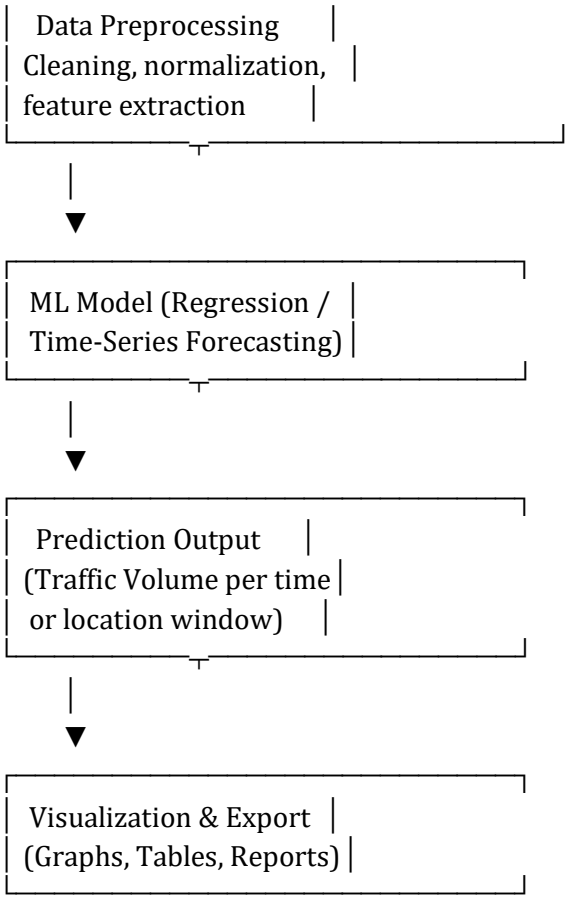
- Structure data flow from raw input (CSV, sensors, or video feed) to prediction output in a web application.

- Integrate backend model processing, data transformation, and frontend UI seamlessly.

- Ensure modularity for future scalability like real-time updates, map integration, or mobile access.

Suggested Architecture Diagram:





Components Breakdown:

Component	Description
Frontend (UI)	HTML/CSS/JS or Python Flask-based interface where users input time/location data and view traffic predictions.
Data Layer	Accepts CSV files, API data from traffic sensors, or mock camera input for historical data.
Preprocessing	Handles missing values, transforms timestamps, and prepares features for model input.
Model Engine	Trained ML model (e.g., Linear Regression, LSTM, or XGBoost) that predicts vehicle count or congestion.

Backend	Flask/Django-based logic that connects data input → model → prediction output.
Output/Export	Graphical charts, downloadable reports, or JSON output formats for integration.