Ideation Phase

TRAFFIC VOLUME ESTIMATION

Project Name: Traffic Volume Estimation

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The **Traffic Volume Estimation** project is a **smart traffic management system** designed to estimate the number of vehicles passing through a specific road, junction, or highway over a period of time. It uses various technologies like sensors, cameras, or machine learning models to collect and analyze traffic data.

it is the process of **measuring or predicting how many vehicles** use a particular stretch of road during a certain time period (per minute, hour, or day). This information helps in understanding traffic patterns, congestion levels, and infrastructure needs.

Step 1: Team Gathering, Collaboration and Selection of Problem Statement

- Domain: Traffic and Transport
- Problem Statement: Develop a machine learning model to predict traffic volume based on time, weather, and event data.
- Objective: To assist urban planners and traffic management departments by forecasting traffic volume trends.

Step 2: Brainstorm, Idea Listing and Grouping

Idea Group	Traffic volume estimation
Data Collection	Historical traffic data, Weather data, Event/Holiday data
Features	Datetime features (hour, day, month), Temperature, Rain, Snow, Holiday,

	Weather condition
Models	Linear Regression, Decision Tree, Random Forest, XGBoost, SVR
Missing Data	Fill numeric values with mean, Categorical with most frequent
Evaluation Metrics	R^2 score, MAE, RMSE
Deployment	HTML + Flask Web Interface
User Input	Web form fields for time, weather, temperature etc.
Challenges	Encoding weather types, scaling features, handling outliers

Step 3: Idea Prioritization

Idea	Priority	Reason
Clean and preprocess data	High	Essential for model accuracy
Build multiple ML models and compare	High	Ensure the best performing model is used
Create simple UI using HTML	Medium	Makes tool usable by non-technical users
Deploy using Flask	Medium	Easy backend integration for form handling
Include feature scaling	Low	Helps improve model performance
Use of advanced deep learning models	Low	Overkill for this problem scope