PROJECT PLANNING DOCUMENT :

TRAFFIC VOLUME ESTIMATION

1. Project Objectives:

Develop a machine learning model that accurately estimates traffic volume based on features like weather, date, time, and holidays.

Create a user-friendly web interface where users can input details and receive real-time traffic volume predictions.

Deploy the model using Flask for interactive web application functionality.

2. Project Milestones & Timeline:

Day1: Requirement analysis and dataset exploration

Day2: Data preprocessing and feature engineering

Day3: Model training, evaluation, and selection

Day4: Model deployment with web interface using Flask

Day5: Documentation, testing, and final submission

3. Task Distribution:

Data Preprocessing & Feature Engineering: Clean the dataset, handle missing values, encode categorical variables, and normalize features.

Model Training & Evaluation: Train multiple models (Linear Regression, Decision Tree, Random Forest, SVR, XGBoost), evaluate using R2-score and RMSE.

Web Interface Development: Design a clean and responsive HTML form and integrate it with Flask backend.

Deployment & Testing: Finalize application deployment using Flask on localhost and test form inputs thoroughly

4. Tools and Technologies Used:

- *Programming Language: Python*
- *IDE: Visual Studio Code*
- *Libraries: Pandas, NumPy, Matplotlib, Seaborn, Scikit-learn, XGBoost, Flask, Pickle*
- *Frontend: HTML, CSS*
- *Deployment: Flask local server*

5. Expected Outcomes:

- *A working ML model with high R2-score and low RMSE*
- *A responsive HTML page with a form to accept user inputs*
- *A working web application that returns traffic volume predictions based on input*
- *Well-documented code and properly structured project directory*

6. Risk Management:

Data Issues: Ensure clean, formatted data; handle null values and categorical encodings carefully.

Model Overfitting: Use train-test split, and validate results to avoid overfitting.

Deployment Errors: Test Flask app thoroughly before deployment; verify model and encoder file paths.

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