TRAFFIC VOLUME ESTIMATION USING MACHINE LEARNING

1.Problem Statement :

The aim of this project is to predict traffic volume based on various features such as weather, time, date, and holiday information. This helps city planners and travellers anticipate road usage patterns and make informed decisions.

2. Objectives:

- *To collect and clean traffic volume datasets.*
- *To explore and visualize data features for better understanding.*
- *To apply machine learning models and predict traffic volume.*
- *To evaluate models based on performance metrics like R^2 score and RMSE.*
- *To deploy the best model as a web application*

3. Existing System:

Currently, traffic management is largely reactive, relying on manual observation or basic sensors. There is limited use of predictive analytics for traffic estimation.

5. Proposed System:

A machine learning-based system that takes inputs such as weather conditions, holidays, and time to predict traffic volume in real-time. It will be user-accessible via a simple web interface.

6. Software and Hardware Requirements:

Software:

- *Python*
- *VS Code*
- *Flask*
- *HTML/CSS*
- *scikit-learn, pandas, NumPy, matplotlib, xgboost, pickle*

Hardware:

- *Minimum 4GB RAM*
- *Internet connection for deployment (optional)*
- *CPU: Intel i3/i5 or equivalent*

7. Assumptions and Constraints:

- *Dataset is limited to a certain region or time period.*
- *The accuracy depends on the quality and quantity of data.*
- *Model may need retraining if traffic patterns change.*