TrafficTelligence: Advanced Traffic Volume Estimation with Machine Learning

Team ID: LTVIP2025TMID60112
Team Size: 4
Team Leader: Chinthakuntla Hemanth
Team Members:
- Bandi Lakshmi
- Botcha Ajay Kumar
- Doraswamy Chowdary

Project Overview:
TrafficTelligence is a machine learning-based system designed to accurately estimate traffic volume on roadways using advanced data-driven approaches. With the increasing complexity of urban transportation systems, real-time and predictive traffic analysis has become essential for traffic management, infrastructure planning, and improving commuter experiences.

Objective:
The goal is to build a robust machine learning model that can predict traffic volume based on various inputs such as time of day, weather conditions, historical traffic data, and sensor inputs. This enables authorities to make data-backed decisions for traffic control and urban planning.

Key Features:
- Utilization of real-world traffic datasets for model training and validation.
- Data preprocessing techniques for cleaning, transforming, and feature engineering.
- Implementation of regression models and time-series forecasting techniques.
- Evaluation using metrics like MAE, RMSE, and R^2 score.
- Visualization tools to present traffic trends and model predictions.

Technologies Used:
- Python, Pandas, NumPy, Scikit-learn
- Jupyter Notebook for model development
- Matplotlib and Seaborn for data visualization
- Machine Learning models: Linear Regression, Random Forest, XGBoost

Conclusion:
TrafficTelligence aims to transform traditional traffic monitoring by introducing intelligent prediction mechanisms. This project highlights how machine learning can be leveraged to address real-world transportation challenges with accuracy and scalability.