

Project Initialization and Planning Phase

Date	9th September 2024
Team ID	LTVIP2024TMID24968
Project Title	Traffic Telligence - Advanced Traffic Volume Estimation with Machine Learning
Maximum Marks	3 Marks

Project Proposal (Proposed Solution) template

This project proposes developing an advanced traffic volume prediction system using regression algorithms such as Linear Regression, Decision Tree, Random Forest, Support Vector Regression, and XGBoost. We will preprocess a comprehensive dataset that includes historical traffic data and influencing factors, then train and evaluate each model to identify the most effective one. The selected model will be serialized in .pkl format and integrated into a user-friendly Flask application, enabling real-time traffic volume predictions.

Project Overview	
Objective	The primary objective is to develop an advanced traffic volume prediction system using machine learning algorithms to optimize urban traffic management.
Scope	The project will focus on developing a traffic volume prediction system using historical data and machine learning algorithms, limited to urban areas with varying traffic conditions. It will include data preprocessing, model training, and deployment of a Flask application on IBM, but will not address physical infrastructure changes or broader transportation policy issues.
Problem Statement	
Description	Urban traffic congestion increases travel times and environmental impacts, exacerbated by traditional traffic management systems that lack real-time adaptability. This project aims to leverage machine learning to provide accurate traffic volume predictions, enhancing traffic flow and commuter experiences.
Impact	Solving urban traffic congestion through accurate volume predictions can reduce travel times, lower emissions, and improved overall air quality. Additionally, it enhances commuter experiences and supports more efficient urban planning and resource allocation.
Proposed Solution	

Approach	The approach involves preprocessing historical traffic data and various influencing factors and training and evaluating multiple regression models to identify the most effective one. The selected model will be integrated into a Flask application for real-time predictions.
Key Features	<p>Real-Time Predictions: Delivers accurate traffic volume estimates using advanced machine learning algorithms through a user-friendly Flask application.</p> <p>Data Insights: Leveraging historical data to enhance adaptive traffic control and urban planning.</p>

Resource Requirements

Resource Type	Description	Specification/Allocation
Hardware		
Computing Resources	CPU/GPU specifications, number of cores	1 x NVIDIA T4 GPU
Memory	RAM specifications	8 GB
Storage	Disk space for data, models, and logs	1 TB SSD
Software		
Frameworks	Python frameworks	Flask
Libraries	Additional libraries	sci-kit-learn, pandas, numpy, matplotlib, seaborn
Development Environment	IDE, version control	<p>IDE: Jupyter Notebook for data analysis and Visual Studio Code for coding and project development.</p> <p>Version Control: Git for version control</p>
Data		
Data	Source, size, format	Dataset from Smartinternz Portal, 22.08 MB, CSV format