# Artificial Intelligence and Machine Learning

# Project Documentation

# 1. Introduction

• Project Title: TrafficTelligence – Predictive Traffic Volume Estimation Using Machine Learning

• Team ID: LTVIP2025TMID59638

• Team Size: 4

• Team Leader: Bethapudi Hema Jessy

• Team Members:

- Amarthaluri Varshitha

- Annangi Harsha

- Abdul Anees

# 2. Project Overview

## • Purpose:

To develop a machine learning-based system that can predict traffic volume using structured data (e.g., climate, holiday, weather conditions) without the need for CCTV cameras or sensors.

## • Features:

- Predicts traffic volume using historical and contextual features  
- Visualizes predictions with performance metrics  
- No hardware or sensor dependency  
- Easily upgradable to include real-time inputs in future versions

# 3. Architecture

## • Frontend:

Basic interface (html and minimal Python UI) used to run the model and view predictions.

## • Backend:

Implemented in Python for data preprocessing, model training, and prediction result display.

## • Database:

No database used. Data is loaded from CSV files during runtime.

# 4. Setup Instructions

## • Prerequisites:

Python 3.8+, pip, pandas, scikit-learn, matplotlib, pandas, numpy, matplotlib, scikit-learn, xgboost.

## • Installation Steps:

git clone <https://github.com/annuu005/TrafficTelligence-Advanced-Traffic-Volume-Estimation-with-Machine-Learning.git>

cd “TrafficTelligence:Advanced Traffic Volume Estimation using MachineLearning”

pip install -r requirements.txt

python app.py

# 5. Folder Structure

A screenshot of a computer

AI-generated content may be incorrect.

# 6. Running the Application

Run the following command in terminal:

-cd “TrafficTelligence:Advanced Traffic Volume Estimation using MachineLearning\Flask”  
-python app.py

# 7. API Documentation

No APIs currently implemented. Future versions may include endpoints using FastAPI or Flask.

# 8. Authentication

Not applicable in the current version.

# 9. User Interface

Console for Input and output display predictions.

# 10. Testing

Unit tests and model evaluation using R² score, MAE, RMSE.

# 11. Screenshots or Demo

# 

# 12. Known Issues

- Limited to historical data  
- Accuracy drops in unseen conditions  
- Minimal interactivity/UI

# 13. Future Enhancements

- Real-time data integration  
- Web-based dashboard (Streamlit)  
- Live traffic maps and alerts  
- Cloud deployment