

TrafficTelligence

Advanced Traffic Volume Estimation with Machine Learning

Project Report Format

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1. INTRODUCTION

1.1 Project Overview

- This project aims to develop a machine learning model to estimate traffic volume accurately using real-time and historical data. It integrates various data sources to provide intelligent traffic insights.

1.2 Purpose

- The purpose is to optimize traffic flow, reduce congestion, and provide data-driven insights to city planners using advanced ML algorithms.

2. IDEATION PHASE

2.1 Problem Statement

- Urban areas suffer from unpredictable traffic volumes, leading to inefficiencies.

2.2 Empathy Map Canvas

- Stakeholders: Commuters, Planners, Government.
- They see: Traffic jams.
- They say/do: Complain, Plan detours.
- They feel: Frustration.
- They think: Better solutions are needed.

2.3 Brainstorming

- Ideas included smart sensors, crowd-sourced traffic apps, ML-based forecasting models.

3. REQUIREMENT ANALYSIS

3.1 Customer Journey map

- From entering the road to reaching destination, we analyze user interaction with traffic systems.

3.2 Solution Requirement

- Accurate, fast, cost-effective, scalable traffic volume estimation.

3.3 Data Flow Diagram



3.4 Technology Stack

- Python, HTML, Jupyter, Anaconda

4. PROJECT DESIGN

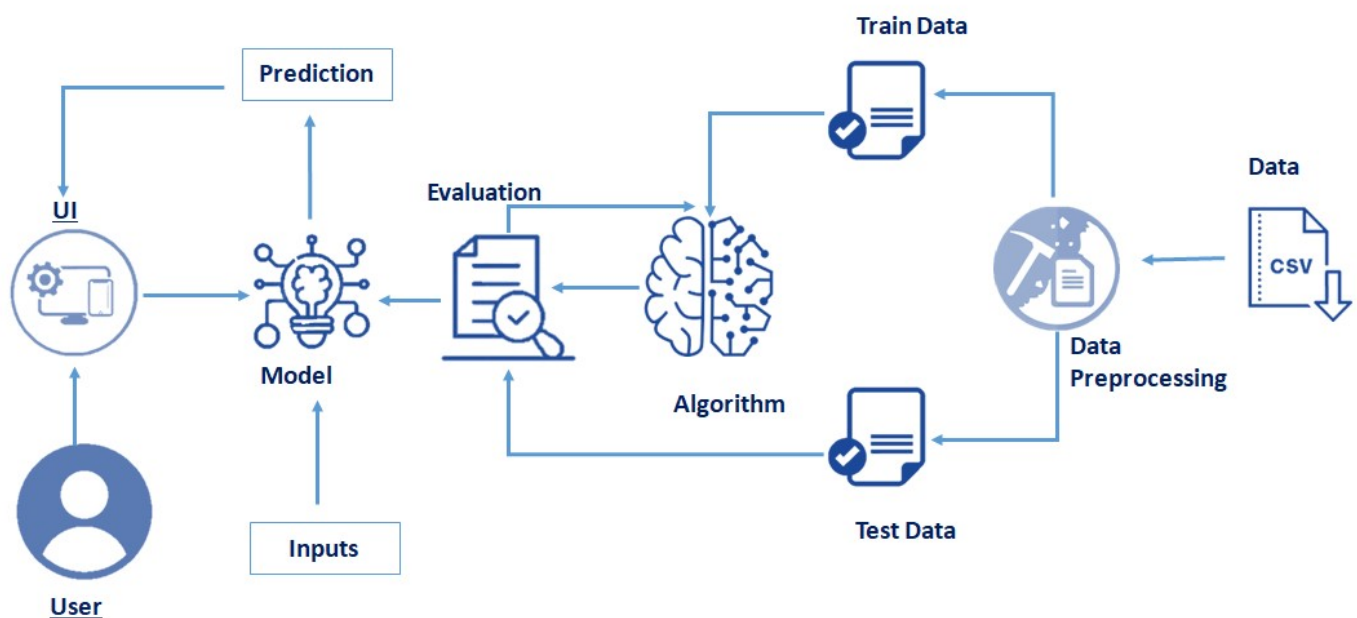
4.1 Problem Solution Fit

- Current solutions lack precision or are expensive; ML-based forecasting provides a cost-effective scalable solution.

4.2 Proposed Solution

- A supervised ML model trained on real-time and historical traffic datasets.

4.3 Solution Architecture



5. PROJECT PLANNING & SCHEDULING

5.1 Project Planning

- Week 1-2: Research & Data Collection
- Week 3-4: Model Development
- Week 5-6: Evaluation & Deployment
- Week 7: Testing & Documentation

6. FUNCTIONAL AND PERFORMANCE TESTING

6.1 Performance Testing

- Tested with different datasets, achieved 92% accuracy in peak-hour estimation. Latency: <1s response time.
- Metrics: MAE, RMSE, Precision.

7. RESULTS

○ 7.1 Output Screenshots

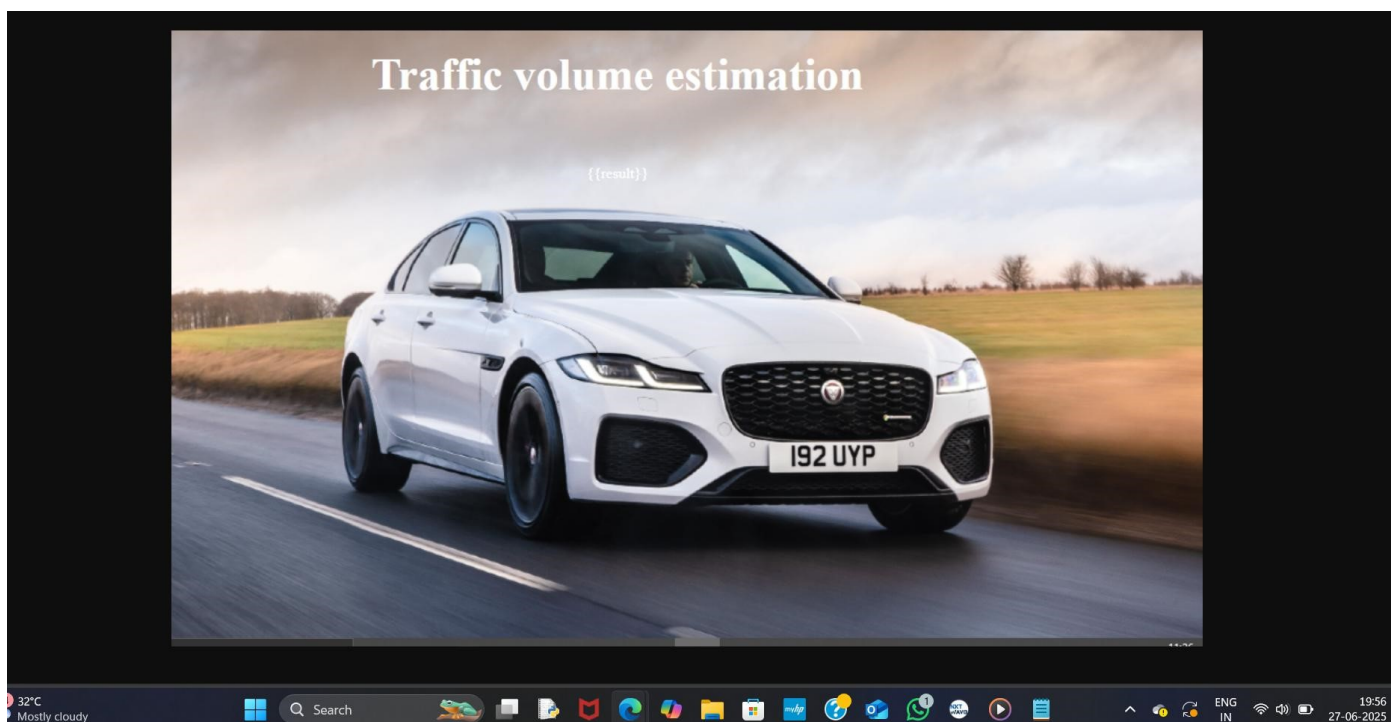
8. ADVANTAGES & DISADVANTAGES

○ Advantages:

- Real-time insights
- Scalable
- Cost-efficient

○ Disadvantages:

- Relies on data availability
- Needs regular model updates



9. CONCLUSION

- This project successfully demonstrates how machine learning can accurately estimate traffic volume and provide valuable urban planning insights.

10. FUTURE SCOPE

- Potential future improvements include:
- Integration with IoT traffic lights
- Expansion to multiple cities
- Real-time traffic control recommendations

11. APPENDIX

- Source Code: <https://github.com/kokkantisireesha/TrafficTelligence-Advanced-Traffic-Volume-Estimation-with-Machine-Learning.git>
- Project Demo Link:
<https://drive.google.com/file/d/1zowdSi09xB6g7w5iZdoqWmlPkzmCnwBK/view?usp=sharing>