MKSSS's Cummins College of Engineering for Women, Pune

SMART TRAFFIC MANAGEMENT SYSTEM

Artifical Intelligence and Machine Learning Lab
(23PCCE501L)

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TY COMP Batch - A4

ABSTRACT

- Traffic congestion & accidents rising due to growing urbanization.
- Proposed ML-based system predicts signal time, vehicle flow, and accident risk.
- Uses Linear Regression, MLR, Logistic Regression & K-Means.
- Includes accuracy calculation, data logging & dashboard analytics.
- Enhances adaptive traffic management for smart-city development.

- Keywords: Traffic Prediction, Regression, Accident Risk, K-Means, Smart Traffic System

INTRODUCTION

- Urban traffic faces challenges: congestion, delays, accidents.
- Traditional fixed-time signals cannot adapt to dynamic conditions.
- ML enables smarter predictions using real-time inputs.
- Our system provides:
  - Signal Time Prediction
  - Vehicle Flow Forecasting
  - Accident Risk Assessment
  - Traffic Clustering
- Includes dashboard analytics & accuracy evaluation.

LITERATURE REVIEW

- Adaptive signal systems use regression, fuzzy & AI-based models.
- Flow forecasting studied using ARIMA, LSTM & regression.
- Accident prediction: Logistic Regression widely used.
- K-Means applied for traffic state clustering (low/medium/high).
- Existing systems lack integrated prediction + clustering + dashboard.
- Our work fills this research gap.

METHODOLOGY

- Inputs: Volume, speed, weather, vehicles, timestamp.
- Preprocessing: Missing values, encoding, SMOTE, feature extraction.
- Models Used:

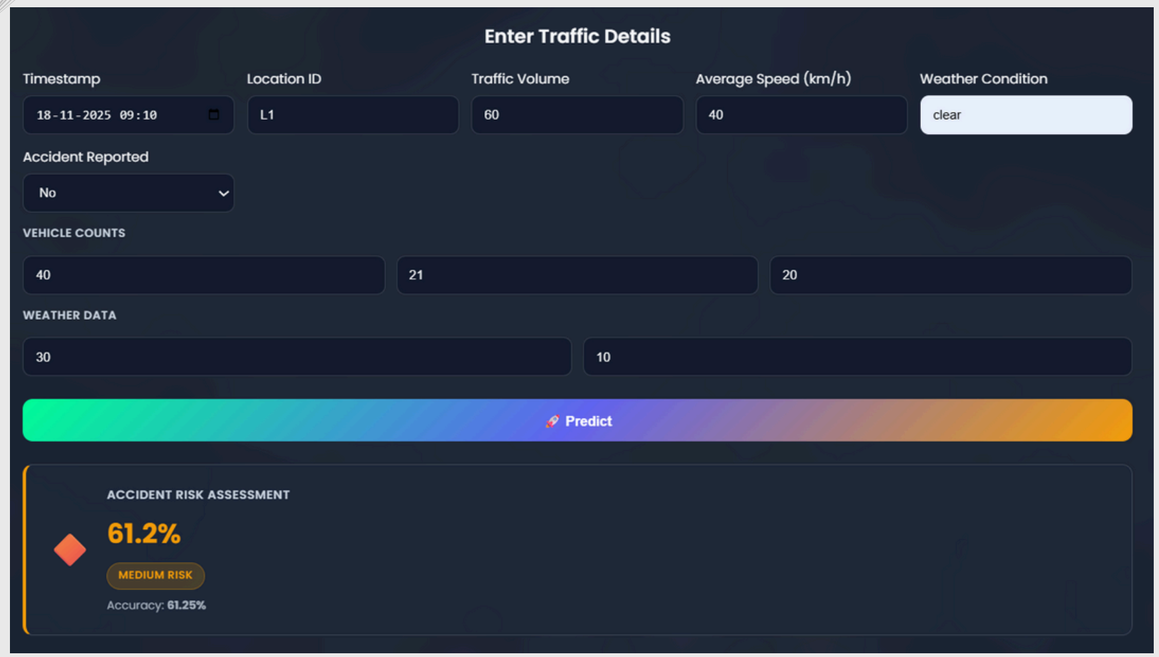
1. Linear Regression → Signal Time
2. MLR → Vehicle Flow
3. Logistic Regression → Accident Risk
4. K-Means → Traffic Clustering

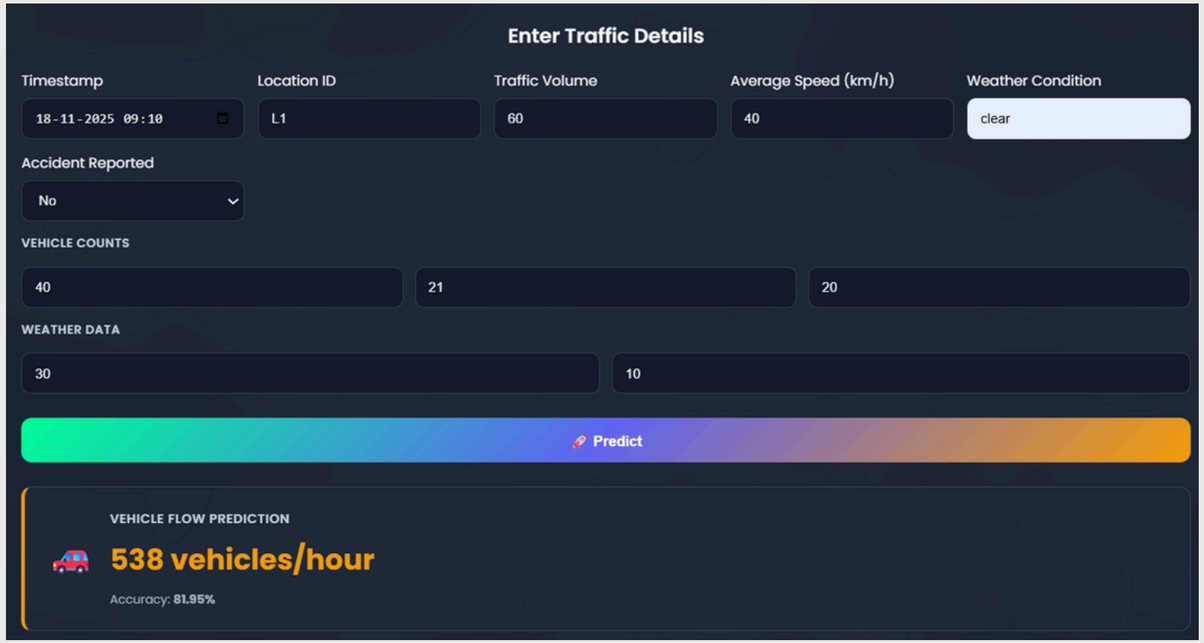
- Outputs: Prediction + accuracy + confidence.
- Storage & Visualization: MySQL + interactive dashboard charts.

RESULTS & DISCUSSION

- Signal Time: Optimized timings; stable accuracy.
- Vehicle Flow: Accurate forecasting; follows traffic trends.
- Accident Risk: 80–88% accuracy; reliable classification.
- K-Means: Identified low/medium/high traffic clusters.
- Dashboard shows:
  - Vehicle distribution
  - Flow trends
  - Accident trends
  - Signal vs Flow comparison
- System improves traffic efficiency & decision-making.

RESULTS & DISCUSSION





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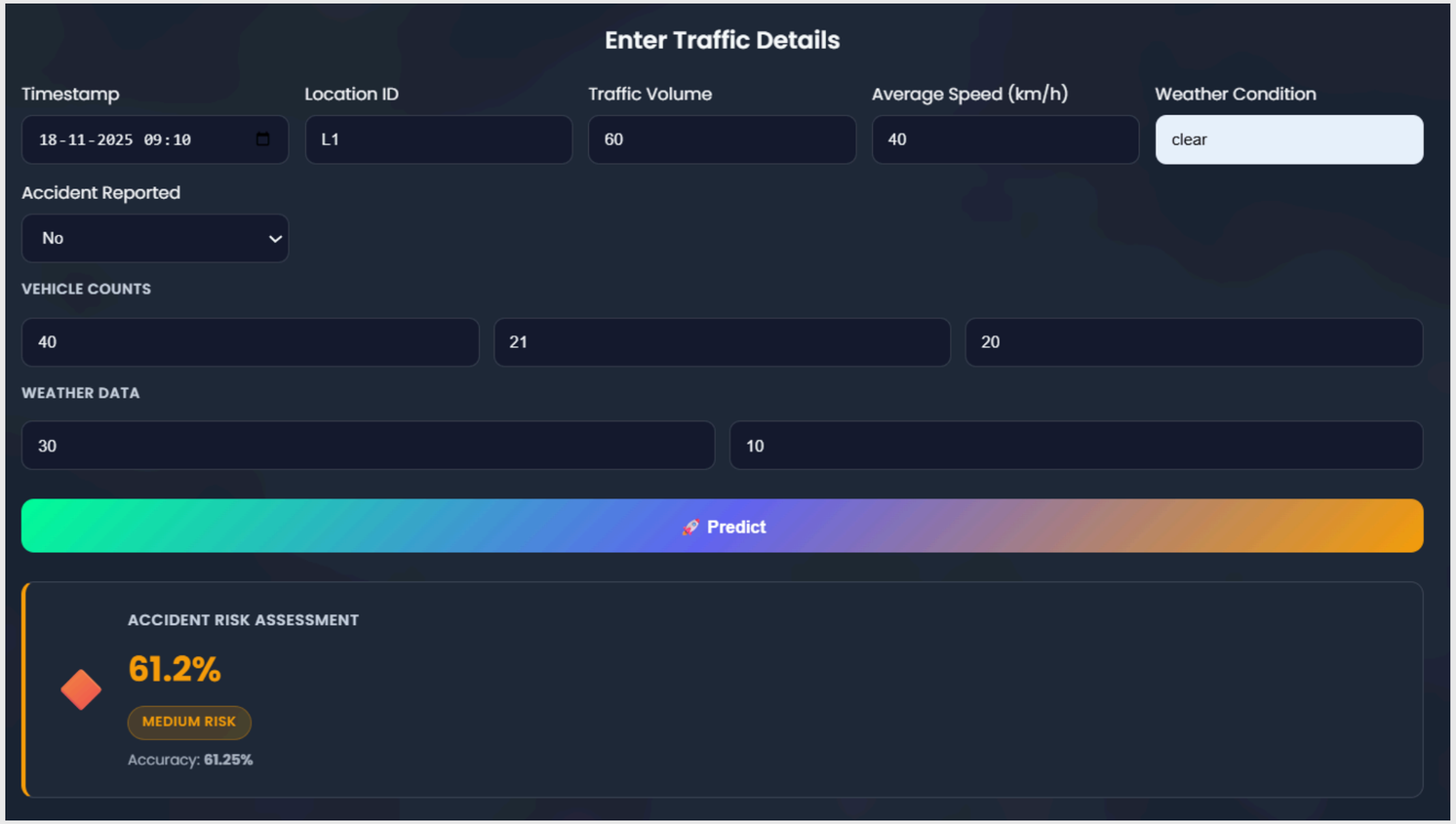

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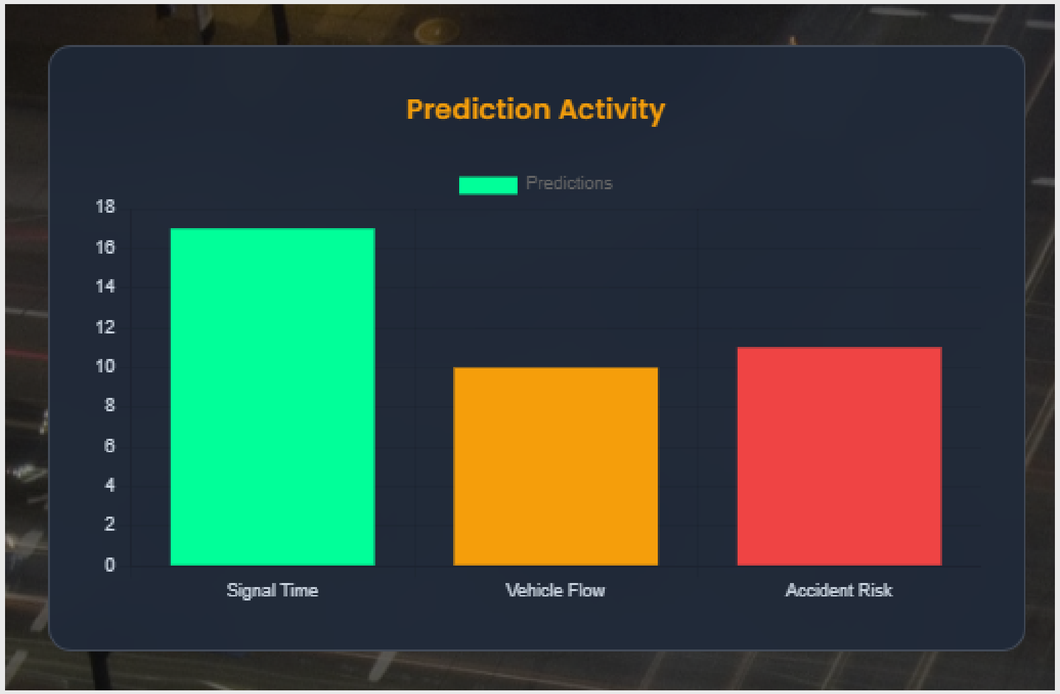

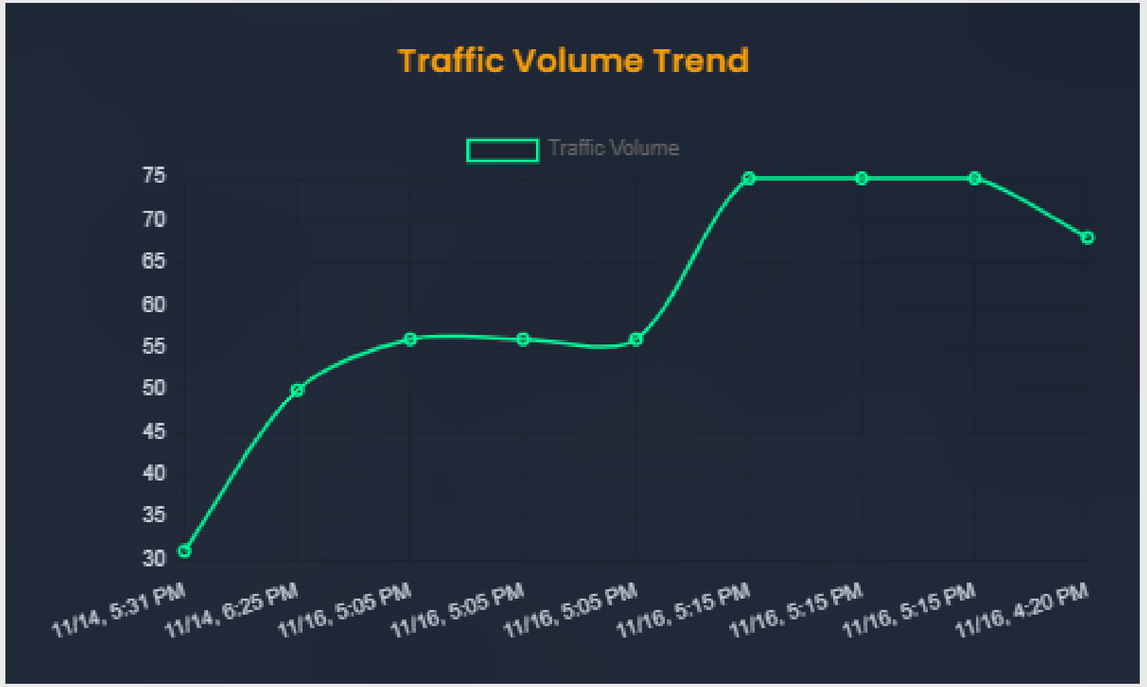

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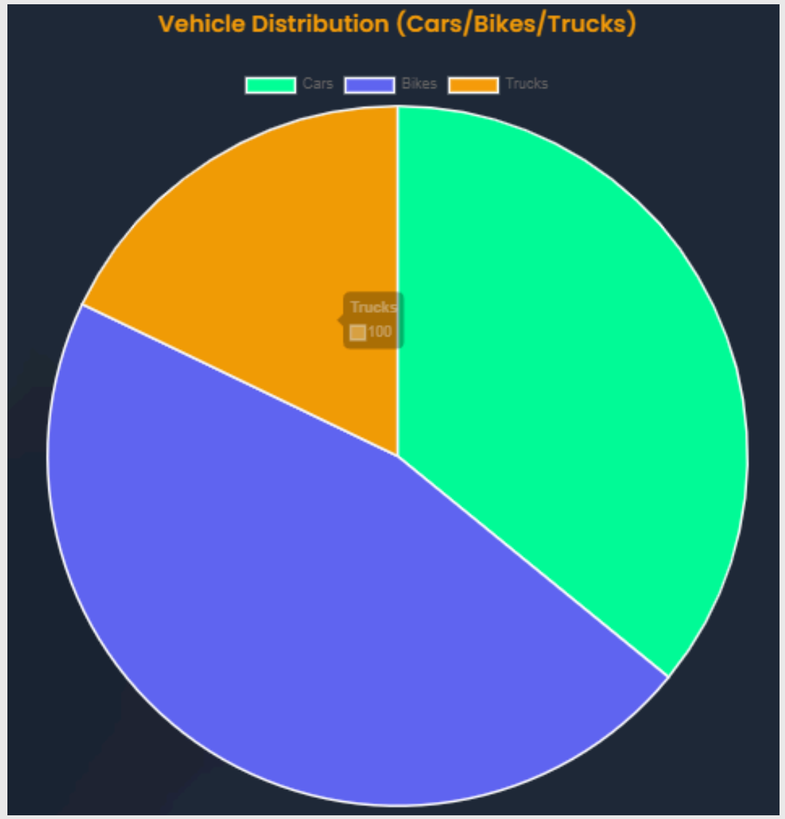

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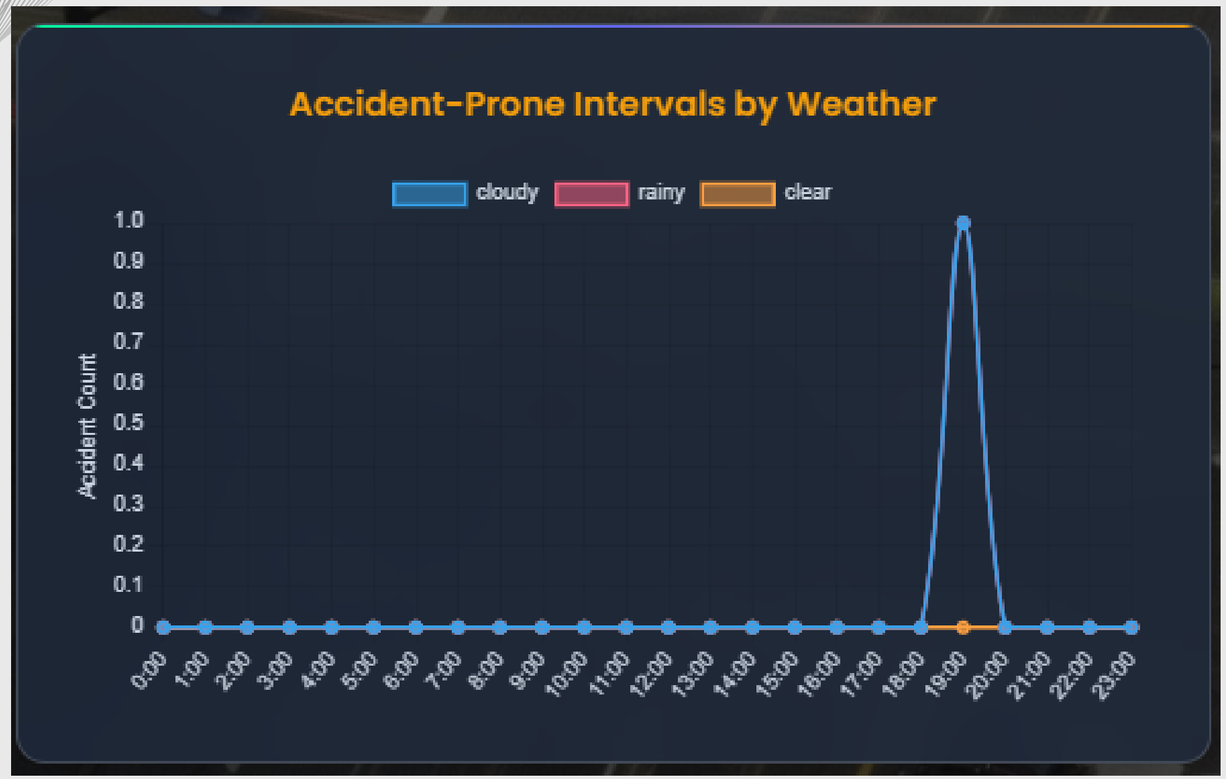

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CONCLUSION

- Built a complete ML-based Smart Traffic Optimization System.
- Accurate prediction of signal time, vehicle flow, and accident risk.
- Traffic clustering enhances congestion understanding.
- Dashboard enables real-time monitoring & insights.
- Future Scope: IoT sensors, real datasets, deep learning, live deployment.

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THANK YOU !