I-Solve Hackathon

In Collaboration With

Bengaluru Traffic Police

Presented By :

Advanced Software Engineering Club

IEEE Society

**Team Name:** Urban Flow

Problem Statement

Mention the Original problem from Unstop.

Design an intelligent traffic signal optimization algorithm that uses machine learning techniques to dynamically adjust signal timings based on traffic flow patterns, congestion levels, and time of day, with the goal of reducing wait times and improving overall traffic flow.

Introduction

Introduction to solution of the given problem statement.

Traffic congestion poses significant challenges in urban areas, leading to longer wait times and reduced air quality. The aim of this project is to design an intelligent traffic signal optimization algorithm that leverages machine learning to dynamically adjust signal timings based on traffic flow patterns, congestion levels, and time of day.
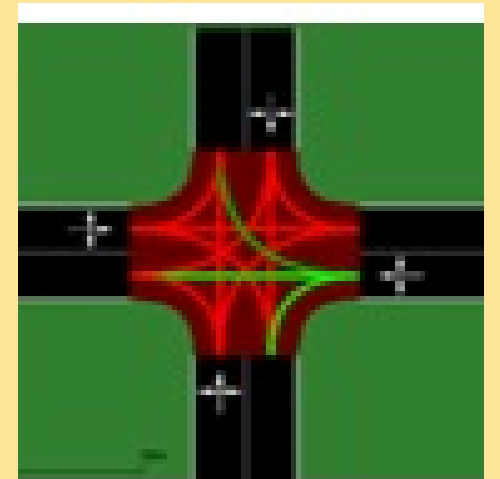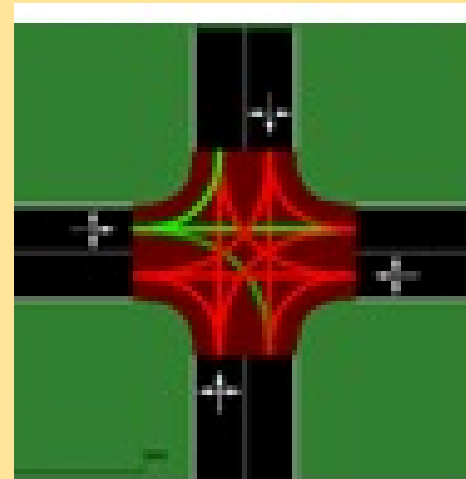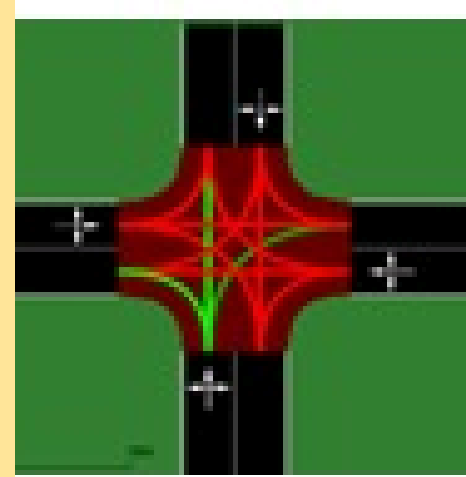
Solution Overview

Brief explanation of the solution and its value analysis....

The proposed solution for optimizing traffic signal timings utilizes machine learning techniques to dynamically adjust signals based on real-time traffic conditions. This system is designed to enhance traffic flow, reduce wait times, and improve overall road safety.

1. Data Collection
2. Data Preprocessing
3. Machine Learning Models
4. Dynamic Signal Control Algorithm
5. Performance Evaluation
6. Expected Impact

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Implementation Plan and Challenges

Make sure to include graphs and event flow diagrams for better understanding.
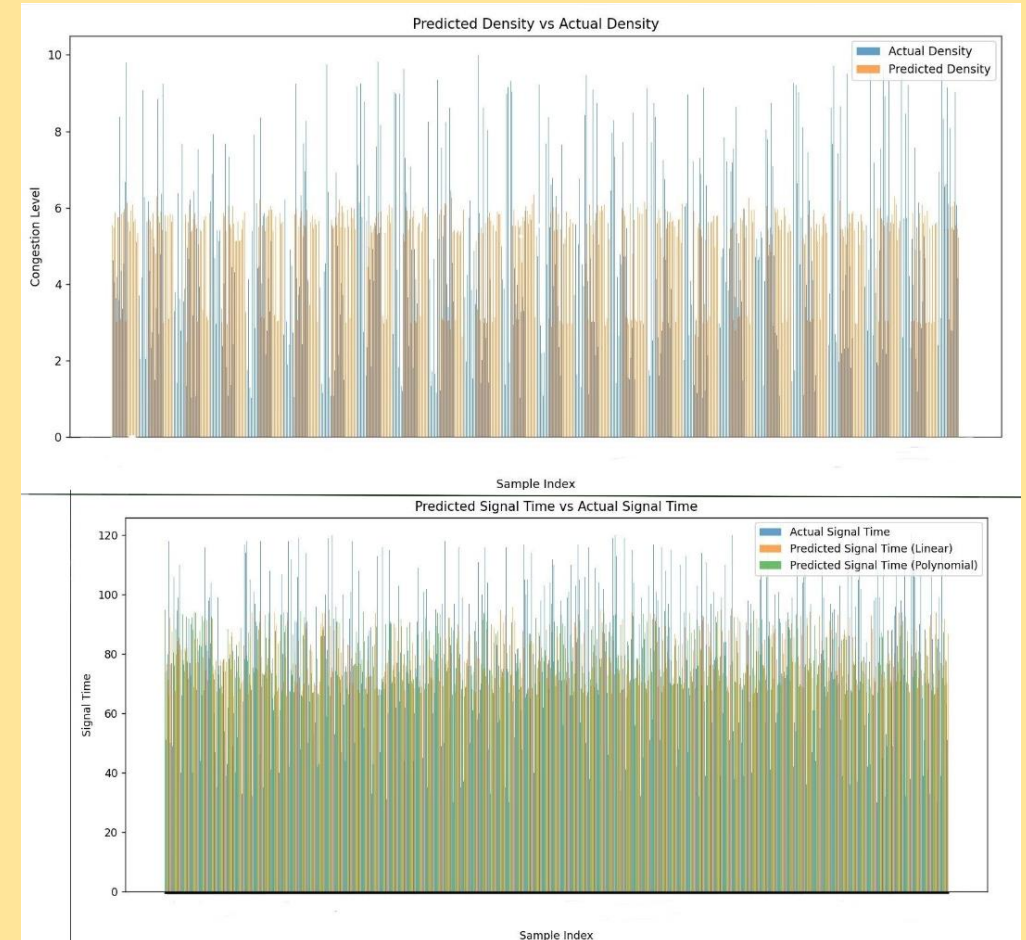
Data Quality

Data Availability

Real-time Processing

Model Generalization

Integration with Existing Systems

Public Acceptance

Regulatory Compliance

Adaptability to Changes

Bar graphs of Predicted Density, Actual Density, and Predicted Signal Time, Actual Signal Time

The graphs illustrate the comparison between actual and predicted congestion levels and signal timings, showcasing the effectiveness of our machine-learning models. By analyzing these results, we can assess the model's accuracy and its potential for optimizing traffic signal timings.
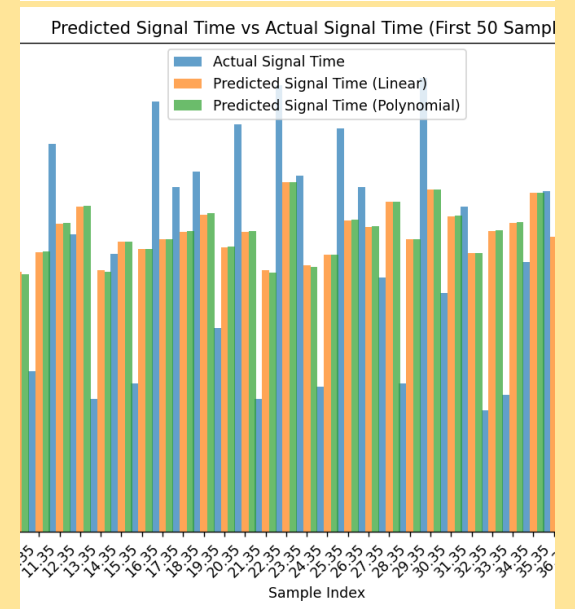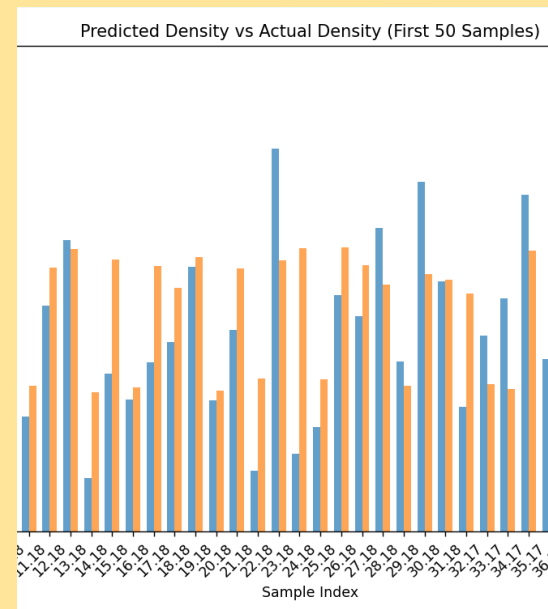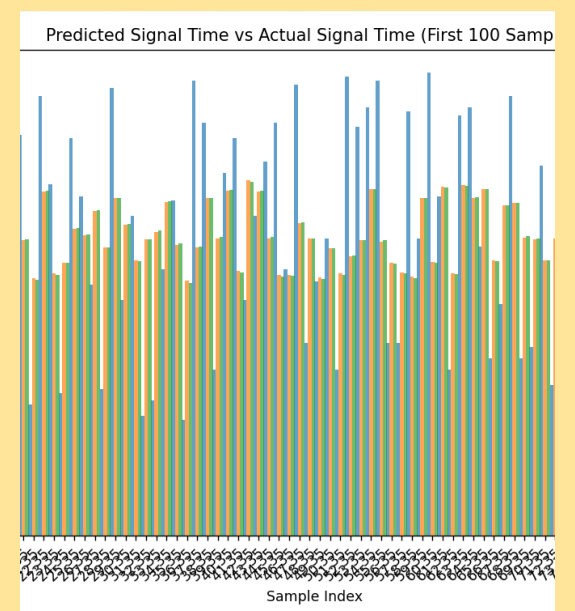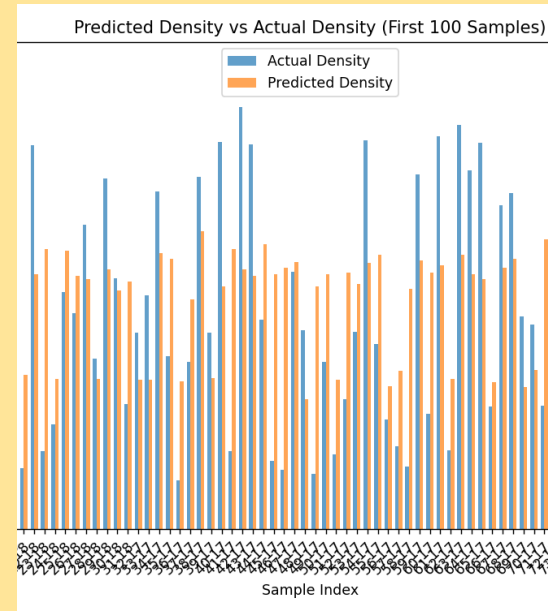
Uniqueness or Innovation Claim

A refined and well-crafted uniqueness claim for the intelligent traffic signal optimization algorithm

The algorithm introduces a new traffic signal phase at highway and main road intersections, allowing simultaneous release from opposing highway lanes. This enhances throughput, enabling quicker vehicle passage and reducing congestion at high-traffic junctions. By catering to high-flow intersections, the solution effectively balances demands from both highways and main roads.
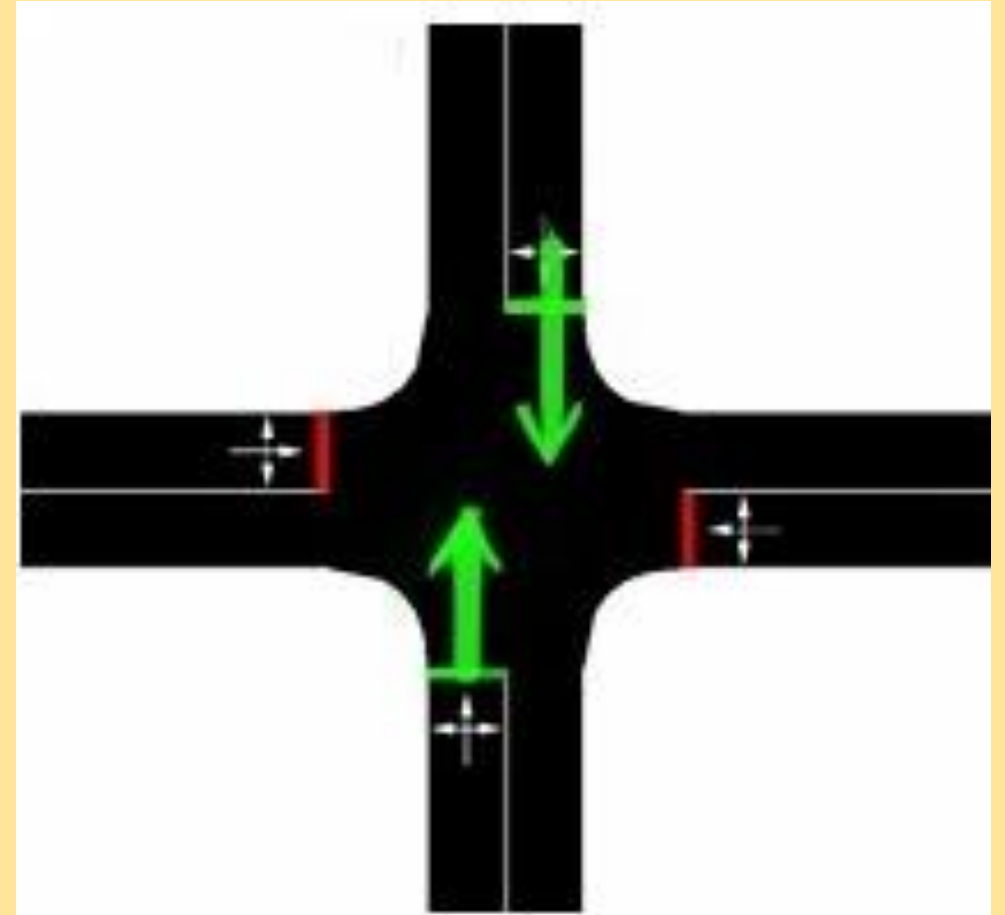
Technical Approach and Tech Stack

Technical approach to solution

Data Collection and Preprocessing

Feature Engineering

Machine Learning Model Development

Dynamic Signal Timing Adjustment

Simulation and Testing

Implementation and Monitoring

Tech Stack to be used in the solution

Programming Languages: Python

Machine Learning Libraries: Tensor, Flowscikit-learn, Pandas

Data Visualization Tools: Matplotlib, Web Frameworks

Version Control: Git

Github link: https://github.com/TSP2005/isolve_traffic_hackathon

Future Scope

Summarize in 5 points the future scope of your solution…

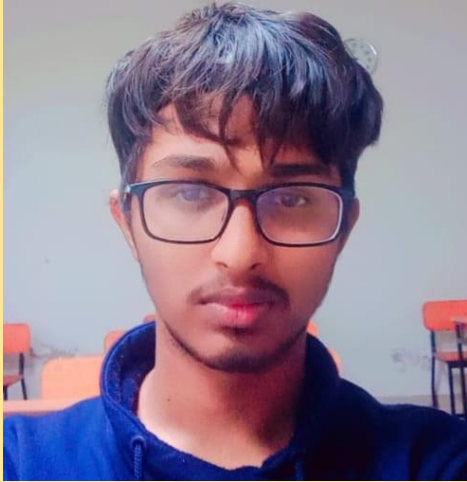Integration with Smart City Infrastructure

Expansion to Pedestrian and Cyclist Traffic Management

Incorporation of IoT Devices

Machine Learning Model Refinement

User Feedback Mechanism

Team Members

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