Team Details

➜ Team name - **Coffee & Code**
➜ Team leader name - Yogesh
➜ Problem Statement – AI for smart cities

Brief about the idea

Type her**AI-Powered Smart Traffic Management System for Smart Cities**
This project proposes an intelligent traffic control system that uses **Artificial Intelligence and Computer Vision** to monitor real-time traffic conditions and dynamically adjust signal timings. By analyzing CCTV video feeds, the system detects vehicle density, predicts congestion patterns, and optimizes traffic flow automatically. It also prioritizes emergency vehicles by creating a smart green corridor, reducing response time.
The solution aims to minimize traffic congestion, reduce fuel consumption, lower carbon emissions, and improve overall urban mobility. By replacing static traffic systems with adaptive AI-based decision-making, the model contributes to building efficient, sustainable, and responsive smart cities

Opportunities

→ How different is it from any of the other existing ideas?
→ How will it be able to solve the problem?
→ USP of the proposed solution

➤ **How different is it from existing ideas?**
Replaces fixed-time traffic signals with **real-time AI-based adaptive control**.
Uses **computer vision for live vehicle density detection** instead of manual or sensor-only systems.
Integrates **traffic optimization + emergency prioritization** in a single platform.
Predictive analytics prevents congestion instead of reacting after it occurs.

➤ **How will it solve the problem?**
Continuously monitors traffic through CCTV feeds.
Dynamically adjusts signal timing based on live congestion levels.
Automatically creates green corridors for ambulances and fire vehicles.
Provides data insights for long-term urban traffic planning.

➤ **USP of the Proposed Solution**
Fully **AI-driven adaptive traffic intelligence system**.
Real-time decision-making with predictive capability.
Reduces congestion, fuel consumption, and emergency response time simultaneously.
Scalable and deployable across multiple city zones.
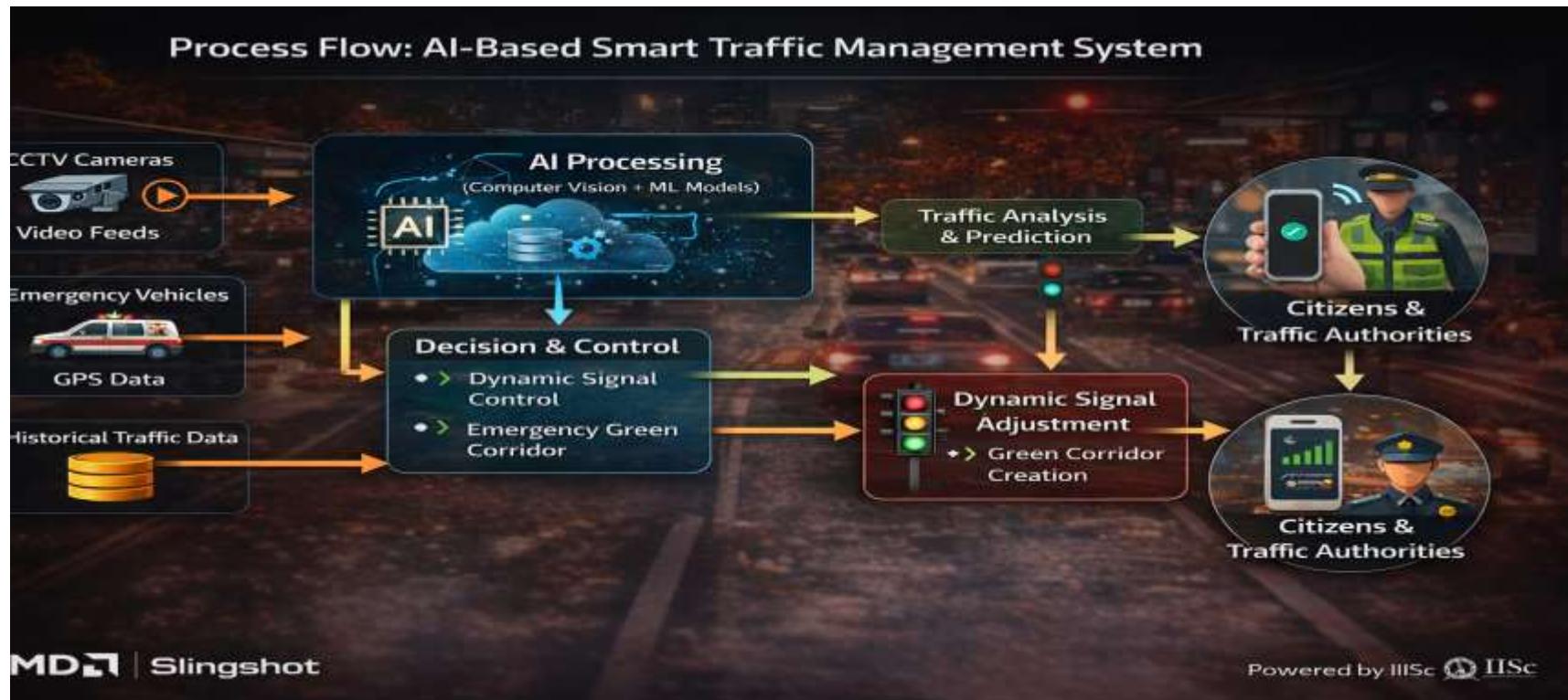
List of features offered by the solution

Key Features of the Proposed Solution
- Real-time vehicle detection using Computer Vision
- AI-based traffic density estimation
- Dynamic signal timing adjustment
- Emergency vehicle priority (Green Corridor system)
- Traffic congestion prediction using ML models
- Smart monitoring dashboard for authorities
- Real-time alerts and notifications system
- Data analytics for long-term traffic planning
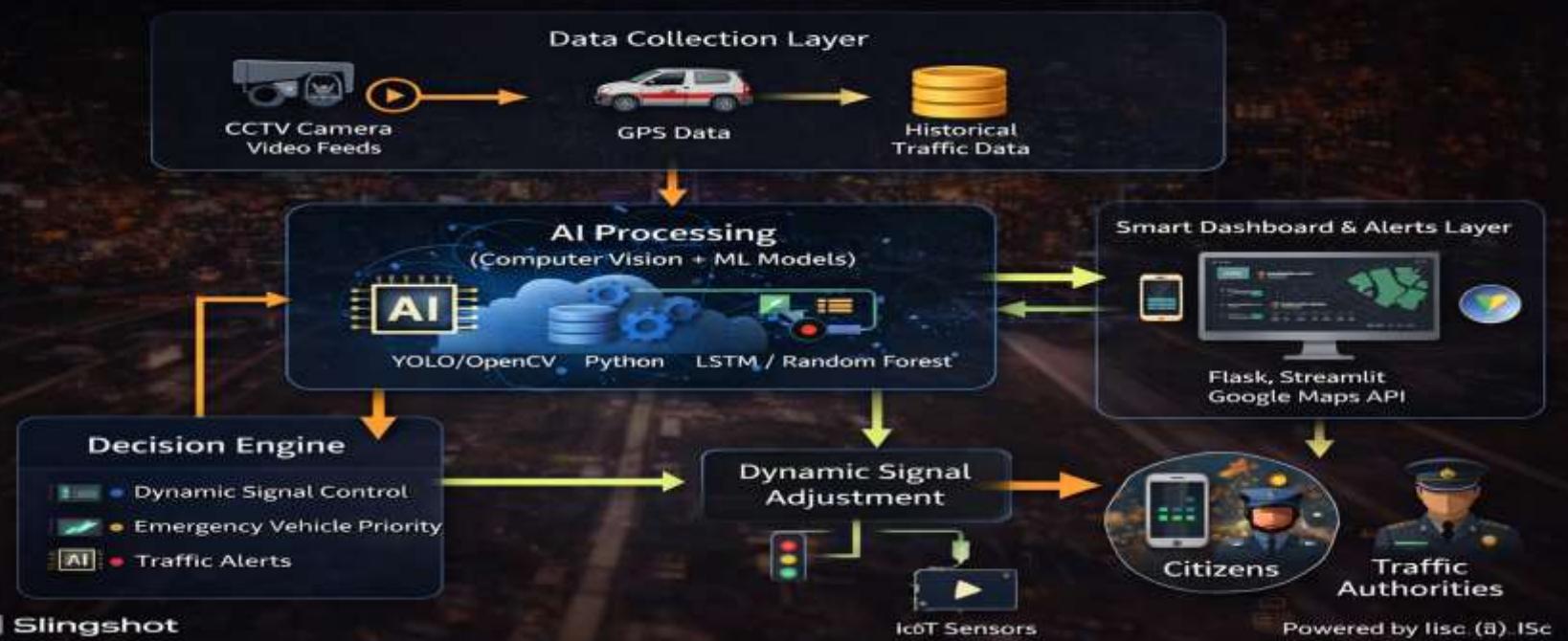
Process flow diagram or Use-case diagram

Architecture diagram of the proposed solution

Architecture of AI-Based Smart Traffic Management System

Technologies to be used in the solution

Technologies Used in the System
◆ **Programming**
Python
◆ **AI & Computer Vision**
OpenCV (Vehicle Detection)
Basic Machine Learning Model (Traffic Prediction)
◆ **Data Handling**
NumPy
Pandas
◆ **Interface**
Streamlit (Simple Dashboard)

Usage of AMD Products/Solutions

Usage of AMD Products / Solutions

◆ **AMD Ryzen Processor**

Used for running AI model training and real-time traffic analysis

Handles computer vision processing efficiently

◆ **AMD Radeon Graphics**

Accelerates image and video processing tasks

Improves performance of OpenCV-based vehicle detection

◆ **AMD AI / Compute Optimization**

Supports parallel processing for faster data analysis

Enables smooth execution of ML models and dashboard system

◆ **Edge Deployment Possibility**

AMD-powered systems can be deployed at traffic control centers for real-time monitoring

Estimated implementation cost (optional)

Estimated Implementation Cost (Prototype Level)

◆ Hardware

CCTV Cameras (4 units) – ₹20,000

Local Processing System (AMD Ryzen PC) – ₹50,000

Networking & Setup – ₹10,000

◆ Software

Python & OpenCV – Open Source (₹0)

ML Libraries – Open Source (₹0)

Streamlit Dashboard – Open Source (₹0)

◆ Deployment & Maintenance

Installation & Configuration – ₹10,000

Basic Maintenance (Annual) – ₹15,000

Add as per the requirements of the contest

The proposed AI-Based Smart Traffic Management System offers a practical and scalable solution to urban traffic challenges. By combining computer vision and machine learning, the system enables real-time traffic optimization and emergency vehicle prioritization.

This solution not only reduces congestion and fuel consumption but also enhances road safety and emergency response efficiency. With further development and large-scale deployment, it can play a significant role in building smarter, more sustainable cities.

Towards intelligent, data-driven urban mobility.