

Problem Statement 4: Agentic AI System for Explainable Traffic Congestion Analysis

The Challenge

Urban traffic management systems generate congestion alerts but fail to explain the underlying causes clearly. This limits trust, interpretability, and actionable decision-making for traffic authorities and city planners.

Proposed Solution

We propose an Agentic AI-based Explainable Traffic Congestion Analysis System that combines retrieval, reasoning, and explanation generation using Large Language Models and structured traffic data.

System Components

- Traffic Data Analysis Agent – Retrieves relevant traffic records from a vector database.
- Congestion Cause Analysis Agent – Correlates congestion with time, road type, weather, and volume.
- Explainable Insight Assistant – Generates human-readable explanations and mitigation strategies.

Technology Stack

- Langflow for agent orchestration
- IBM Granite (watsonx.ai) as the LLM backbone
- Astra DB for Retrieval-Augmented Generation (RAG)
- FastAPI + Streamlit for user interaction

Outcome

The system improves transparency, trust, and usability of AI-driven traffic congestion analysis by providing clear, explainable insights instead of opaque alerts.