Traffic Flow Prediction

CS-367 Artificial Intelligence
Indian Institute of Information Technology, Vadodara

Overview

Section Overview

1. Problem statement

Problem Statement

Traffic Flow Prediction: Urban traffic congestion increases travel times and fuel consumption. Current traffic management approaches are often inadequate for handling complex, dynamic traffic patterns. This project aims to develop a proactive, data-driven traffic management system using probabilistic models to predict traffic flows and congestion patterns.

Research Papers

- Kim, J., & Wang, G. (2016). Diagnosis and Prediction of Traffic Congestion on Urban Road Networks Using Bayesian Network
- Sun, S., Zhang, C., & Yu, G. (2006). A Bayesian Network Approach to Traffic Flow Forecasting
- Horvat, R., Kos, G., & Ševrović, M. (2015). Traffic Flow Modelling on the Road Network in the Cities

Expected outcome

This project develops a comprehensive approach to traffic analysis and prediction using probabilistic models. The expected outcomes include identifying key congestion causes, generating short-term traffic flow predictions, and analyzing congestion patterns.

2 Approach

Approach to the problem statement

Data Collection and Aggregation

Traffic parameters such as speed, intensity, travel time, and vehicle are utilized.

Probabilistic Graphical Modeling

This model captures the probabilistic dependencies between factors influencing traffic, such as the time of day, vehicle size, and travel time.

Traffic Forecasting

The model is used to predict traffic intensity at different intervals.

Model Integration

Integrate the trained network into a real-time traffic management system.

3 Tech Stack

Tech Stack

- **Language:** R used for statistical analysis and handling the probabilistic model.
- **Libraries/Frameworks:** bnlearn, readxl for applying probabilistic model and gathering data from databases.
- **Visualization:** Matplotlib for plotting and visualizing data, and prediction results.