Project 9: Forecasting of Smart City Traffic Patterns

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# Background

As part of India’s Smart City mission, optimizing traffic systems is critical. The goal is to forecast traffic patterns across four major junctions to help city administrators anticipate peak traffic and plan infrastructure efficiently.

# Problem Statement

The city experiences varying traffic loads throughout the year—on weekdays, holidays, and special occasions. The government seeks a robust forecasting model to predict vehicle counts at each junction to mitigate congestion and improve road usage.

# Dataset Overview

Two CSV files were provided: one for training (`train\_aWnotuB.csv`) and another for testing (`datasets\_8494\_11879\_test\_BdBKkAj.csv`). Each file contains timestamps and vehicle counts recorded at four different junctions.

# Design & Implementation

The forecasting was implemented using the Facebook Prophet time series model. For each of the four junctions, a separate model was trained using historical traffic data. The trained models were then used to predict future traffic volumes for each junction.

# Results

The model successfully forecasted vehicle counts across all four junctions. The final output was stored in `SmartCity\_Traffic\_Forecast.csv`. Forecasts captured both trends and weekly seasonality in traffic.

# Learnings

- Handling multi-junction time series forecasting.  
- Effective use of Prophet for real-world forecasting tasks.  
- Importance of aligning test and prediction windows.  
- Realization that urban data must consider temporal patterns like weekends and holidays.