

## Phase2: **T**raffic **M**anagement

Problem: Historical traffic data and machine learning algorithms to predict congestion patterns.

### Introduction:

Traffic prediction is the process of forecasting the volume and density of traffic flow, usually for the purpose of managing vehicle movement, reducing congestion, and generating the optimal (least time- or energy-consuming) route. Traffic prediction is mainly important for two groups of organizations: national/local authorities and logistics companies.

### Smart traffic lights:

Traffic lights are an intelligent traffic control system that combines traditional traffic lights with an array of sensors and artificial intelligence to intelligently route vehicle and pedestrian traffic. They are capable of adapting traffic light controls based on information collected from sensors, edge devices, and video systems. Smart traffic lights can be connected to a cloud-based traffic management platform and are often powered by predictive algorithms for dynamically adjusting traffic signals. Smart traffic lights can help prevent road issues such as congestion, accidents, and rule violations. They are a better preventive measure than traditional traffic lights. However, they cannot miraculously fix all road issues.

### Traffic prediction algorithms:

Traffic prediction is a crucial aspect of smart city planning. There are several algorithms that can be used to predict traffic, including machine learning algorithms such as **ARIMA**, **LSTM**, and **GRU-NN**.

One such system is the **IoT-based traffic prediction and traffic signal control system** proposed by Neelakandan et al. This system uses an **optimized weight Elman neural network (OWENN)** algorithm to classify which places have more traffic. The system also includes a traffic signal control system that uses an Intel 80,286 microprocessor. The proposed system consists of five phases: IoT data collection, feature extraction, classification, optimized traffic IoT values, and traffic signal control system.

Another paper proposes a **statistical time series model** for predicting IoT traffic using real network traces. The model is evaluated using MAE, RMSE, and R-squared values.

To predict and prevent traffic in smart cities, sensor-based techniques are being used. These techniques include using signals from vehicles through Wi-Fi, Bluetooth, and Zigbee from smart devices used in vehicles to analyze the traffic pattern by vehicle count.

### Public transportation enhancement :

Carpooling and ridesharing apps are becoming increasingly popular in India. These apps allow people to share rides with others who are traveling in the same direction, thereby reducing traffic congestion and emissions. Here are some of the most popular carpooling and ridesharing apps in India:

1. **BlaBlaCar**: This app is one of the most popular carpooling apps in India. It allows users to share rides with others who are traveling in the same direction.

2. **sRide**: This app is another popular carpooling app in India. It offers a range of features such as ease of booking, real-time tracking, and more. The app is available on both Google Play and App Store

3. **UberPool**: This service from Uber allows users to share rides with others who are traveling in the same direction. It is budget-friendly and available 24/7 on both Google Play and App Store.

4. **Ola Share**: This service from Ola allows users to share rides with others who are traveling in the same direction. It is quick, affordable, and available 24/7 on both Google Play and App Store.

✓ **Ridely**: This app offers a no-surge pricing policy for its users. It is available 24/7.

✓ **ToGo (Together We Go)**: This app offers easy booking features for its users. It is available 24/7 .

### Conclusion:

IoT devices have been used to develop smart traffic management systems that are more efficient, safer, and offer a more pleasant ride for commuters. lot sensors, cameras, radar, and 5G-equipped technologies can be used to analyse data in near-real time and improve congested roadways, streamlining traffic flow.