BANGALORE TRAFFIC ANALYSIS

**Problem statement:**

Bangalore, one of India’s fastest-growing metropolitan cities, experiences severe traffic congestion, with over 10 million daily travelers. The city’s traffic issues start from poor traffic management, unplanned roadside construction, limited road capacity, and ineffective time-based traffic control. These challenges result in increased travel time, frequent accidents, high pollution levels, and even delays for emergency services such as ambulances.

**Aim:**

This project aims to analyze traffic data for major roads in Bangalore using a comprehensive dataset collected over 2.5 years. It identifies key traffic metrics, visualizes actual vs ideal conditions, and provides insights into road-level congestion, incidents, pollution, and public transport efficiency. The goal is to help urban planners, traffic authorities, and commuters understand traffic patterns and make data-driven decisions.

**Plan:**

|  |  |
| --- | --- |
| **steps** | **implementations** |
| 1 | Problem analysis |
| 2 | Data Collection |
| 3 | Data Cleaning & Preprocessing |
| 4 | Data Analysis |
| 5 | Implement solution |
| 6 | Present the solution |

**Benefits:**

1. Data-Driven Decision Making
2. Improved Road Safety
3. Reduction in Travel Time and Economic Gains
4. Environmental Benefits
5. Enhanced Urban Planning and Infrastructure Development

Programming language used:

* Python

Libraries:

* Pandas (data analysis)
* Matplotlib (data visualization)

Dataset:

* CSV Dataset (source: Kaggle)

**Data set:**

The following data is collected from Kaggle (open-source data provider)

Bangalore traffic data of 2.5 years from 2022 to 2024

### Dataset Columns

* Date
* Area Name
* Road/Intersection Name
* Traffic Volume
* Average Speed
* Travel Time Index
* Congestion Level
* Road Capacity Utilization
* Incident Reports
* Environmental Impact
* Public Transport Usage
* Traffic Signal Compliance
* Parking Usage
* Pedestrian and Cyclist Count
* Weather Conditions
* Roadwork and Construction Activity

**Implementations:**

#### 1.data\_loader.py

* Loads the dataset from CSV
* Cleans column names for consistency
* Returns the processed DataFrame

#### 2. road\_display.py

* Extracts and displays all unique road/intersection names along with their area
* Helps user select a valid road for analysis

#### 3. road\_analysis.py

* Filters dataset by selected road name
* Calculates and displays mean values of key traffic metrics:
  + Traffic volume
  + Average speed
  + Congestion level
  + Incident reports
  + Environmental impact
  + Travel Time Index
  + Road Capacity Utilization
  + Public Transport Usage
  + Traffic Signal Compliance
  + Parking Usage
  + Pedestrian and Cyclist Count
  + Weather Conditions
  + Roadwork and Construction Activity
* Compares actual values with ideal values
* Visualizes both actual values and their deviation from ideal through bar plots

4. main.py

* Integrates the above modules
* Runs the full analysis from loading to visualization
* Asks for user input to select road/intersection

### **How to Run the Project**

1. Place all ‘.py’ files and the dataset CSV in the same folder.
2. Open main.py in any Python IDE or terminal.
3. Run the script: python main.py
4. Select a road/intersection from the displayed list.
5. View ‘ terminal outputs ’ and ‘ graphs ’.

**Output:**

