Use Case 10: Traffic Analysis and Road Safety Improvement

Objective: *Utilize the traffic survey dataset to analyse vehicle composition, speed patterns, and road segment usage for enhancing road safety and traffic management strategies.*

Overview: *The dataset contains comprehensive information about traffic conditions including vehicle classes, speed metrics, and road segments across various dates and locations within Melbourne's suburbs. This use case focuses on leveraging this data to derive insights that support decision-making in urban planning, infrastructure development, and traffic regulation.*

Data source: *Traffic Count Vehicle Classification*

The City of Melbourne employs a contractor to perform traffic counts on roads throughout the municipality. The numbers of vehicles are recorded per hour and split into 12 categories based on the Austroads vehicle classification. Vehicle class 13 is used when the type of vehicle can't be determined.

In the 2017/16 surveys all bikes, motorcycles and maximum speeds were captured. In the 2015 surveys not all surveys captured bikes, motorcycles and maximum speed. In the 2014 surveys no bikes, motorcycles or maximum speed were captured.

This data is designed to be joined to the road corridor data on road_segment and seg_id. Some records have more than one road segment this is because the survey crosses intersecting roads and the intersections have a road segment number. In the Road corridor table some road segments will have the same seg_id.

Use Case Scenario:

1. Traffic Volume and Composition Analysis:

- ***Problem:*** *The city needs to understand the types and volumes of vehicles using different road segments to optimize infrastructure planning and traffic flow management by analyze the dataset to determine the distribution of vehicle classes (e.g., sedans, trucks, articulated vehicles) across different roads and suburbs to dentify peak traffic times and locations where specific vehicle classes dominate, aiding in capacity planning and allocation of resources.*

2. Speed Analysis and Road Safety Assessment:

- ***Problem:*** *Identify high-speed zones and assess compliance with speed limits to improve road safety.*

3. Traffic Flow Patterns and Directional Analysis:

- ***Problem:*** *Understand traffic flow patterns and directional trends to optimize traffic signal timings and improve congestion management.*

4. Vehicle Classification for Infrastructure Planning:

- ***Problem:*** *Plan infrastructure upgrades and maintenance based on the types and weights of vehicles using the roads.*

5. Strategic Road Segment Analysis:

- ***Problem:*** *Identify critical road segments that require attention or improvement based on traffic volume, speed, and vehicle composition by evaluating the dataset to pinpoint road segments with high traffic volume, frequent speeding incidents, or significant presence of heavy vehicles (e.g., trucks, articulated vehicles). Prioritize these segments for safety audits, road design enhancements, or targeted infrastructure investments to improve safety and efficiency.*

Benefits:

- ***Data-Driven Decision Making:*** *Inform urban planning and traffic management strategies with empirical data on traffic patterns and behaviors.*
- ***Enhanced Road Safety:*** *Target interventions to reduce speeding and enhance compliance with traffic regulations.*
- ***Infrastructure Optimization:*** *Allocate resources efficiently for road maintenance and upgrades based on vehicle usage and impact.*

Conclusion: *By leveraging the detailed insights from the traffic survey dataset, Melbourne can enhance its road safety measures, optimize traffic management strategies, and improve the overall efficiency of its transportation network. This approach not only supports safer roads but also contributes to sustainable urban development and improved quality of life for residents.*