**Executive Summary – NYC Collision Dashboard**

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**Date:** July 2025

**a) Introduction**

**Industry Context**

The urban transportation and road safety sector plays a vital role in safeguarding lives, reducing congestion, and ensuring sustainable mobility. In densely populated cities like **New York City**, traffic collisions remain a critical public safety concern, impacting residents, emergency services, and city infrastructure.

**Objective**

The objective of this dashboard is to:

* Track the **volume and fatality** rates of traffic accidents in NYC over time.
* Analyze **accident causes**, **vehicle types involved**, and **geographic concentration** by borough and street.
* Identify **time-based patterns** to help inform policy decisions, enforcement strategies, and safety improvements.

**Problem Statement**

Despite advances in traffic management and safety policies, NYC still recorded over **238,421 accidents**, resulting in **1,236 fatalities**. A closer look is needed to answer:

*What factors are driving these accidents, where and when do they occur most frequently, and what actionable steps can reduce their frequency and severity?*

**b) Methodology**

**Data Transformation & Analysis Steps**

1. **Data Aggregation and Cleaning:**
   * Combined multi-year traffic data (2021–2023) from city crash reports.
   * Removed duplicates Sand categorized missing or ambiguous values (e.g., "Unspecified" contributing factors and unknown vehicle types).
   * Filled down in a few empty rows.
2. **Categorical Grouping:**
   * **Vehicle types**, **streets**, and **accident causes** were grouped and summarized to assess impact by segment.
   * Fatalities were broken down by vehicle category to highlight which modes of transport contribute most to loss of life.
3. **Time Series & Heatmap Visualization:**
   * Used time-series line charts to display **accident trends by month**.
   * Developed a **weekday-hour heatmap** to uncover daily traffic risk periods.
   * Created bar charts to highlight top **contributing factors** and **geographic hot spots**.

**Why This Method?**

This method allows:

* **Pattern recognition over time** to detect seasonal or behavioral trends.
* **Cross-dimensional filtering** by year, cause, vehicle type, or location.
* Immediate identification of **high-risk time windows** and **borough-specific concerns**, enabling proactive intervention.

**c) Conclusion**

**Key Findings**

* **Driver Inattention/Distraction** is the leading contributing factor (58,308 cases), tied closely with "Unspecified" causes.
* **Passenger vehicles** are involved in the majority of fatal collisions (806 deaths), followed by motorcycles (124).
* **Brooklyn (32%)** and **Queens (27%)** account for over half of all accidents, signaling potential infrastructure or enforcement gaps.
* **Accidents peak during afternoon and evening hours**, particularly **3–6 PM**, across all days—with **Sunday and Saturday** showing elevated incident counts, especially after midday.

**Recommendations**

1. **Target Behavioral Causes:**  
   Increase public awareness and enforcement around **distracted driving** and **failure to yield right-of-way**, which combined account for over **30%** of incidents.
2. **Geographic Focus:**  
   Allocate more resources (e.g., patrols, traffic calming interventions) to **Brooklyn and Queens**, as these boroughs exhibit the highest frequency of collisions.
3. **Time-Based Interventions:**  
   Adjust **enforcement schedules and traffic signal timing** during peak accident hours (especially between 3 PM and 6 PM on weekends) to reduce collision risk.
4. **Vehicle-Specific Safety Campaigns:**  
   Introduce targeted campaigns for **passenger vehicle and motorcycle safety**, given their higher fatality contributions.

**Final Note**

This dashboard provides actionable intelligence to support data-driven traffic safety policies in NYC. By understanding the **where**, **when**, and **why** of road collisions, the city can improve its **Vision Zero** strategy, reduce fatalities, and enhance safety for all road users.