Motor Vehicle Collision Dataset Analysis Report: New York City

NYC Collision Trends and Insights

Introduction

New York City's high traffic and busy streets present unique challenges for road safety. This report analyzes motor vehicle collision data from 2012 to 2024, focusing on collision locations, vehicle types, causes, and outcomes. Our goal is to identify patterns, evaluate factors affecting collision severity, and offer recommendations to enhance traffic safety in this densely populated city.

Executive Summary

This report presents an analysis of motor vehicle collision data for New York City, covering the period from 2012 to 2024. The dataset includes details on collision incidents, such as location, vehicle types, causes, and outcomes. The goal of this analysis is to identify collision patterns, assess contributing factors, and suggest improvements for traffic safety. Key findings indicate a significant increase in collisions at urban intersections, a rise in accidents related to distracted driving, and notable differences in collision outcomes based on vehicle types and locations.

1. Data Cleaning

- **Missing Values:**
  - ➢ The dataset initially contained several missing values in columns like *BOROUGH* and *CONTRIBUTING FACTOR*. Missing boroughs were found in around 5% of the records, which were dropped or filled based on contextual information.
- **Irrelevant Columns:** Columns such as *OFF STREET NAME* (which had no impact on the analysis) were removed.
- **Data Type Corrections:** Numeric columns like *NUMBER OF PERSONS KILLED* and *NUMBER OF PERSONS INJURED* were converted from strings to integers for analysis.

2. Data Exploration

- **Total Collisions:** The dataset contained 1,728,192 records of motor vehicle collisions.
- **Borough Distribution:**
  - ➢ Brooklyn had the highest number of collisions, with 821,009 incidents (approximately 48% of total collisions).
  - ➢ Queens followed with 357,088 incidents (approximately 21% of total collisions).

- ➢ Manhattan, Bronx, and Staten Island had the remaining 550,095 incidents combined.

- **Fatalities and Injuries:**
  - ➢ Out of the total incidents, 2,207 resulted in fatalities.
  - ➢ 543,414 incidents involved injuries.

3. Data Analysis

- **Collision Frequency by Borough:**
  - ➢ Brooklyn experienced the highest number of collisions at 821,009 incidents, followed by Queens (357,088) and Manhattan (303,861).
  - ➢ Staten Island had the fewest incidents, with only 55,669 collisions.
- **Collision Severity by Borough:**
  - ➢ Brooklyn had the highest number of fatalities, at 1,019 deaths, representing 46% of all fatalities in the dataset.
  - ➢ Queens had 502 fatalities, while Manhattan recorded 333 deaths.
- **Contributing Factors:**

  The most common contributing factors were:

  - ➢ Driver Inattention/Distraction: Linked to 358,295 incidents.
  - ➢ Failure to Yield: Involved in 111,825 incidents.
  - ➢ Following Too Closely: Contributed to 98,637 incidents.
- **High-Risk Areas:**
  - ➢ Streets like Broadway & Atlantic Ave were identified as high-risk areas with over 230,000 incidents.
  - ➢ Long Island Expressway recorded the fewest incidents, with 8,432 collisions.

4. Results and Discussion

- Brooklyn stands out as having the highest collision and fatality rates, suggesting a need for targeted interventions in this borough.
- Contributing factors like driver distraction and failure to yield were consistent across boroughs, indicating these are key areas to target for public awareness campaigns.

- High-risk areas like Broadway & Atlantic Ave pose significant dangers, with collisions frequently occurring there due to complex traffic patterns and high vehicle and pedestrian volumes.
- Station wagons and sedans accounted for over 50% of collisions, followed by passenger vehicles, which were involved in 349,927 incidents.

5. Recommendations

- **Targeted Safety Measures:**

Implement speed reductions, better signage, and signal improvements at intersections such as Broadway & Atlantic Ave.

- **Driver Education:**

Awareness campaigns on common causes like driver distraction and failure to yield should be promoted, particularly in Brooklyn and Queens.

- **Intersection Redesign:**

High-collision intersections need redesigns with improved traffic controls, including pedestrian safety measures, especially in high-risk areas like Broadway & Atlantic Ave.

- **Vehicle-specific Safety Initiatives:**

Consider policies to address vehicle safety, particularly focusing on sedans, which were involved in the majority of collisions.

Conclusion

This analysis of motor vehicle collisions in New York City identified borough-specific trends, with Brooklyn and Queens seeing the highest rates of collisions and fatalities. Common contributing factors like driver distraction and failure to yield were significant across all boroughs. Targeted safety measures, intersection redesigns, and awareness campaigns are critical steps toward improving road safety and reducing collisions and fatalities.