Motor Vehicle Collision Analysis from NYC

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1. Executive Summary

I analyzed motor vehicle collisions in New York City using a Tableau dashboard. My goal was to identify high-risk areas, understand factors contributing to collisions, and explore trends in injuries and fatalities. I created the dashboard to make decision-making easier for stakeholders by providing actionable insights in a user-friendly way. It includes maps, bar charts, pie charts, and line graphs that show key patterns and statistics.

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2. Introduction

Motor vehicle accidents are a big concern for public safety and health in urban areas. In this project, I used NYC's detailed collision dataset to study traffic patterns, pinpoint dangerous zones, and suggest ways to improve safety. The main goals I set for this project were:

- To identify borough-specific collision patterns.
- To understand the main causes of accidents.
- To track trends in injuries and fatalities over time.

I designed the Tableau dashboard so that policymakers and city planners could explore these insights interactively.

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3. Methodology

3.1 Data Cleaning

- **Missing Values**: Replaced missing values in numerical data with the average (mean) and in categorical data with the most common value (mode).
- **Removed Columns**: Excluded irrelevant fields like ZIP CODE and CONTRIBUTING FACTOR VEHICLE 2 to keep the focus on meaningful data.
- **Consistency**: Standardized formats for dates, times, and locations to ensure consistency across the dataset.

3.2 Data Visualization

- I used heatmaps to show collision density.
- Created bar charts to compare data across boroughs.

- I used line charts to highlight trends over time.
- I included pie charts to show contributing factors to accidents.

3.3 Interactivity

I made the dashboard interactive by adding filters that allow users to:

- Select specific timeframes (Date filter).
- Focus on specific boroughs (Borough filter).
- Analyze causes of collisions (Collision Factors filter).

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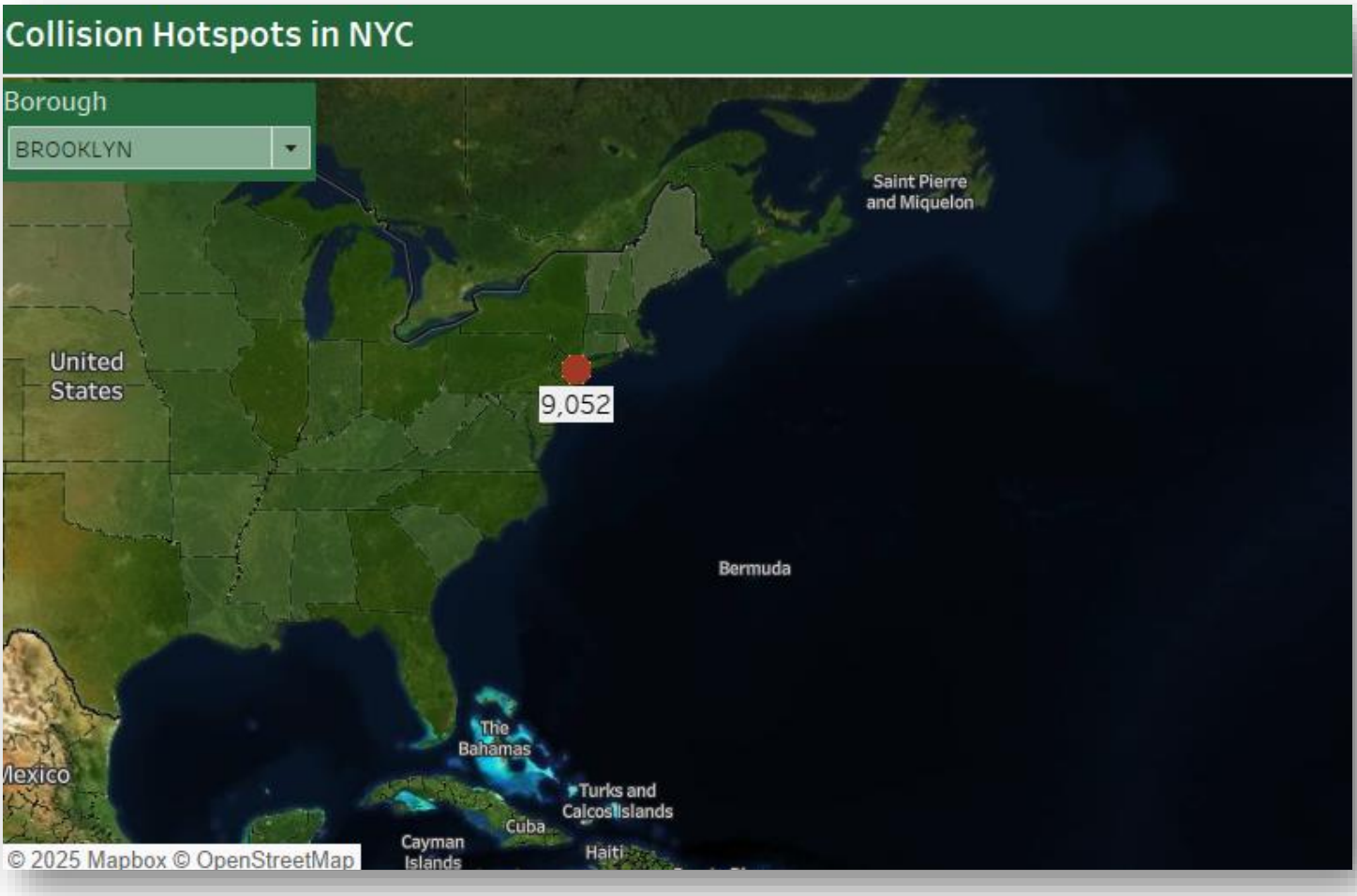
4. Dashboard Components and Insights

4.1 Collision Map



Sheet Name: Collision Map **Title**: Collision Hotspots in NYC

- **What I Did**: I created a heatmap to visualize areas with high collision density.

- **Insight**: Manhattan and Brooklyn have the most high-risk areas, especially around busy intersections.

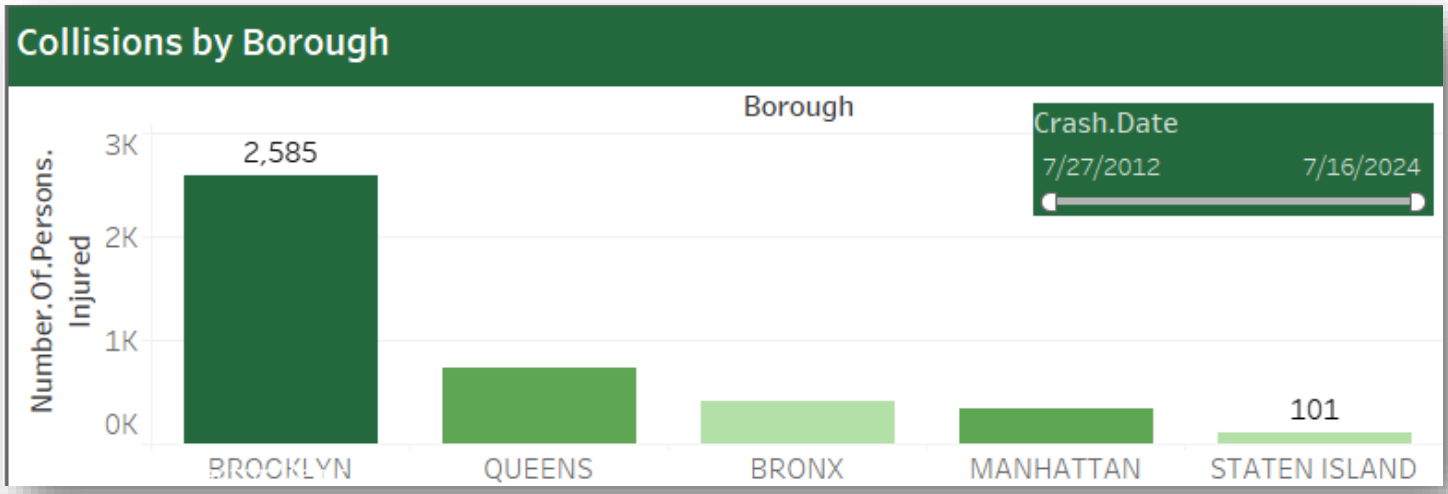
4.2 Trends Over Time

Sheet Name: Trends Over Time **Title**: Collision Trends Over Time

- I used a line chart to show how fatalities and injuries have changed from 2016 to 2024.
- **Insight**: Fatalities saw a sharp decline in 2022, which might indicate better safety measures.

4.3 Borough Analysis

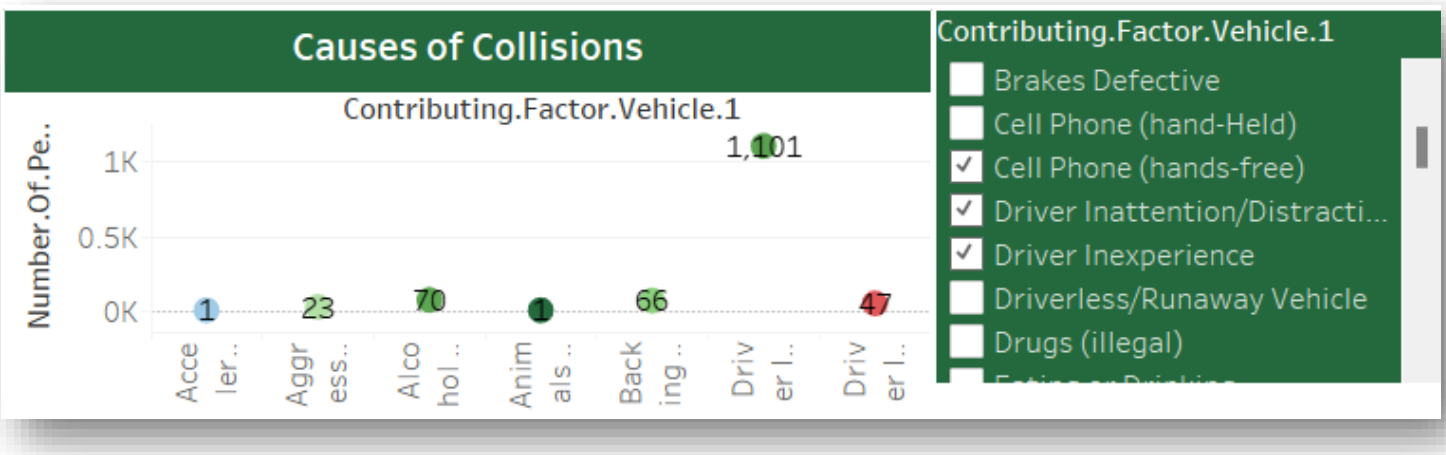
Sheet Name: Borough Analysis **Title**: Collisions by Borough



- I created a bar chart to compare injuries and fatalities across boroughs.
- **Insight**: Queens and Brooklyn have the highest numbers of injuries, while Staten Island has the least.

4.4 Contributing Factors

Sheet Name: Contributing Factors **Title**: Causes of Collisions



- I used a pie chart to display the most common causes of collisions.
- **Insight**: Driver inattention and failure to yield are the top contributors to collisions.

4.5 Quick Stats

Sheet Name: Summary **Title**: Key Collision Insights

- I created a summary sheet to display total collisions, injuries, and fatalities.
- **Insight**: This provides stakeholders with a quick snapshot of critical metrics.

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5. Key Findings

1. **High-Risk Areas**: Manhattan and Brooklyn have the most dangerous areas for collisions.
2. **Temporal Trends**: Fatalities have decreased in recent years, showing progress in safety.
3. **Borough-Level Analysis**: Queens and Brooklyn report the highest injury rates, which indicates a need for targeted interventions.
4. **Leading Causes**: The main causes of collisions are driver distractions and failure to yield.

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6. Recommendations

1. **Urban Planning**: I recommend redesigning intersections and zones with high pedestrian activity to improve safety.

2. **Policy Enhancements**: I suggest introducing stricter laws targeting distracted driving and speeding.
3. **Public Awareness**: Conducting safety campaigns to educate drivers and pedestrians can help.
4. **Technological Upgrades**: Promoting the use of advanced driver-assistance systems (ADAS) would enhance safety.

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7. Conclusion

This Tableau dashboard demonstrates how visual analytics can be a powerful tool for understanding traffic safety. By identifying trends, high-risk areas, and causes of accidents, We provided valuable insights to improve road safety in New York City. Stakeholders can use this information to take meaningful actions.

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8. References:

- Tableau Community. (n.d.). *Creating Dashboards in Tableau*. Retrieved from https://www.tableau.com.
- Vision Zero NYC. (n.d.). *Traffic Safety Data*. Retrieved from https://www.nyc.gov/visionzero.