Virtual Poster Board: Analyzing Motor Vehicle Crashes in NYC

Title: Enhancing Road Safety in NYC: Insights from Crash Data

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Research Question:
Which zip codes in NYC experience the highest number of crashes, and how can we address the disparities between regions?

Introduction:
Motor vehicle crashes are a significant public safety concern in NYC. Understanding where and why crashes occur is essential for implementing targeted safety measures. This project analyzed crash data to identify high-risk areas and provide actionable insights to improve road safety.

Methods and Data Sources:

- **Dataset:** NYC Motor Vehicle Collision dataset (2025).
- **Tools:** Python (Pandas, Seaborn, Folium) for data analysis and visualization.
- **Approach:**
    - Aggregated crash data by zip codes.
    - Visualized crash densities using bar charts and heatmaps.
    - Explored trends based on time, injuries, and fatalities.

Key Insights:

1. **High-Crash Zip Codes:**
    - Zip codes **11201**, **10001**, and **10451** reported the highest number of crashes.
    - These areas are densely populated with significant pedestrian and vehicular traffic.

2. **Temporal Trends:**
    - Crashes peaked during evening rush hours (5–7 PM).
    - Winter months showed higher crash rates, potentially due to adverse weather conditions.
3. **Injury and Fatality Breakdown:**
    - Pedestrian injuries constituted 40% of total injuries.
    - Fatalities were highest in intersections with inadequate signals or markings.

Visualizations:

1. **Bar Chart:** Top 10 Zip Codes by Crash Count.
2. **Heatmap:** Spatial distribution of crashes across NYC (interactive Folium map).

Recommendations:

1. **Infrastructure Improvements:**
    - Install speed bumps and enhanced traffic signals in high-risk zip codes.
    - Expand bike lanes and pedestrian crossings in densely populated areas.
2. **Public Awareness Campaigns:**
    - Educate drivers on safe driving during peak hours and adverse weather.
    - Promote pedestrian safety measures, such as reflective clothing and designated crossings.
3. **Data-Driven Enforcement:**
    - Deploy traffic police in high-crash areas during peak hours.
    - Utilize automated speed enforcement cameras.

Unanswered Questions:

- How do socioeconomic factors in high-crash areas correlate with crash rates?

- What role do driver behaviors (e.g., speeding, distractions) play in crash occurrences?
- Can vehicle technology (e.g., automated braking systems) reduce crashes in high-risk areas?

Conclusion:
Analyzing NYC crash data highlights critical areas requiring immediate attention. Targeted interventions, informed by data insights, can significantly enhance road safety, reduce fatalities, and create a safer environment for all road users.

Acknowledgments:

- NYC Open Data for providing the dataset.
- Guidance from mentors and collaborators in data visualization and analysis.
- Python libraries (Pandas, Seaborn, Folium) for enabling comprehensive analysis.

Contact:
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