A comprehensive study of Road Safety: Analyzing Motor Vehicle Collisions to Enhance Road Safety for Vulnerable Road Users in Underserved Communities

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Introduction

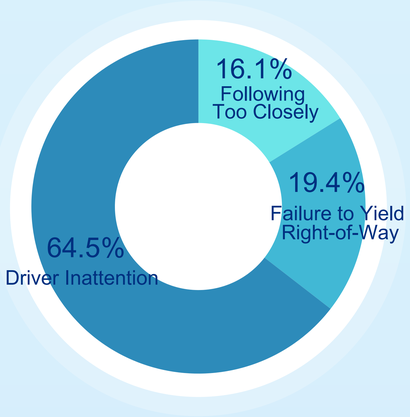
- **Understanding Collisions:** Uncover collision prevalence and impact, underscoring their public health and safety significance.
- **Exploring Contributing Factors:** Investigate drivers, road conditions, and environment in collision causation.
- **Analyzing Geographic Patterns:** Examine collision distribution across boroughs, highlighting high-risk areas.
- **Assessing Temporal Trends:** Study collision frequency variations by time, informing safety interventions.
- **Drawing Safety Insights:** Summarize findings, proposing actionable measures for policymakers and communities.

Methods

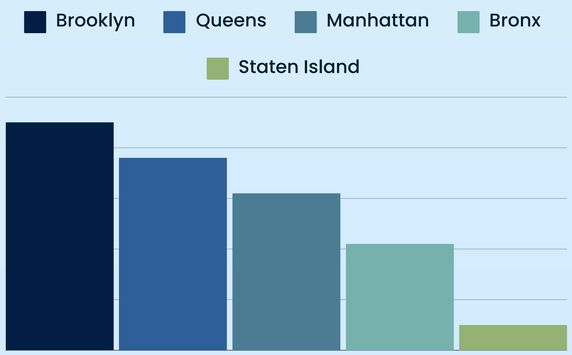
- **Exploratory Analysis:**
  - Utilize natural language processing techniques to analyze collision reports.
  - Examine data to identify key factors contributing to collisions.
  - Predict the frequency and distribution of collision factors across diverse geographic areas.
- **Measures:**
  - Segment collision reports into individual incidents.
  - Calculate the proportion of incidents involving identified contributing factors.
  - Report the average occurrence of contributing factors per incident.
  - Analyze variations in contributing factors based on geographic and temporal factors.

Preliminary Results

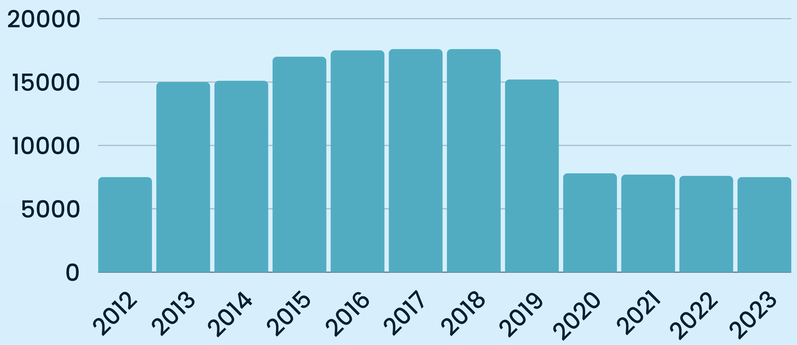
Top Factors



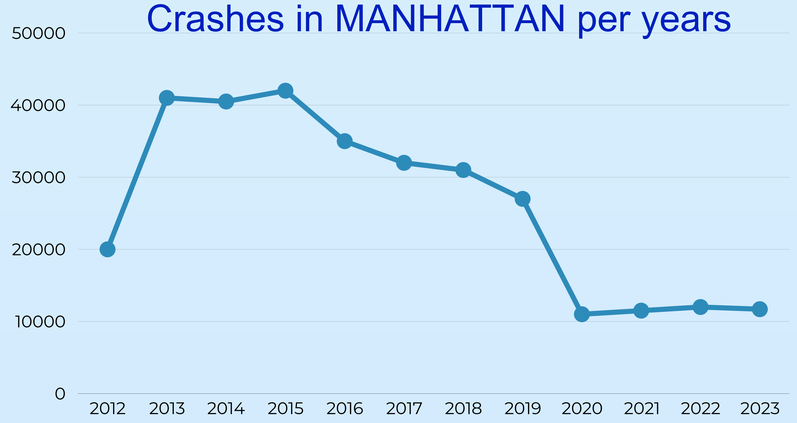
Crashes by Borough



Average Number of Crashes per Year



Crashes in MANHATTAN per years



Conclusions

- **Top Factors:**
  - Driver inattention, failure to yield right-of-way, and following too closely emerged as the primary contributing factors to collisions, highlighting the need for targeted interventions and education campaigns to address these behaviors.
- **Borough-wise Analysis:**
  - Brooklyn, Queens, and Manhattan recorded the highest numbers of crashes, emphasizing the importance of borough-specific strategies to mitigate collision risks and enhance road safety.
- **Temporal Trends:**
  - While the average number of crashes per year remained relatively consistent, a significant decrease was observed during the pandemic year. This underscores the impact of external factors on collision rates and underscores the need for adaptable safety measures.
- **Vision Zero Initiative:**
  - The notable decrease in collisions in Manhattan since the implementation of the Vision Zero initiative in 2015 serves as a promising model for other boroughs with high crash rates. By adopting evidence-based strategies, community engagement, and multi-agency collaboration, similar reductions in collisions can be achieved in other areas, ultimately contributing to safer road environments for all.

Next Steps

Share findings through awareness campaigns among communities, policymakers, and transportation agencies to promote collaboration and informed decision-making in road safety. Enhance data collection by including details on weather conditions, road infrastructure, and age groups.

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