

# Analyzing NYC Motor Vehicle Collisions (2016-2024): Trends, Risks & Predictions

## Introduction

Traffic safety remains a critical issue in urban areas, particularly in New York City, where motor vehicle collisions impact thousands of lives each year. This project analyzes NYC Open Data (Motor Vehicle Collisions Dataset) to identify high-risk accident zones, accident trends, and key contributing factors. By leveraging data science, machine learning, and visualization techniques, this study provides actionable insights for improving traffic safety and policy recommendations.

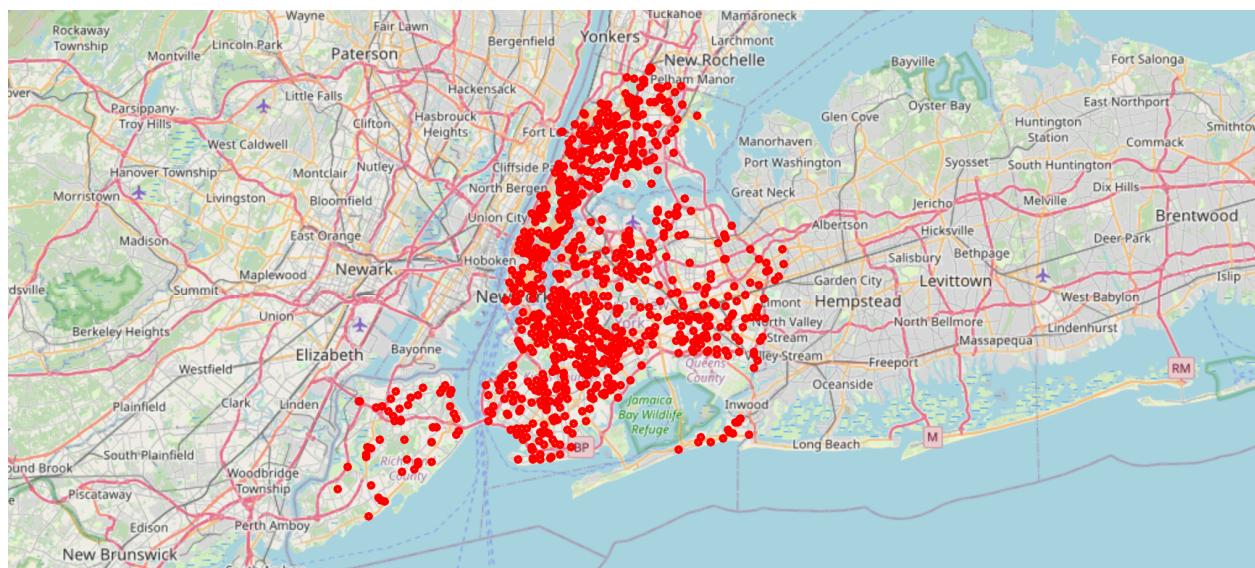
## Methodology

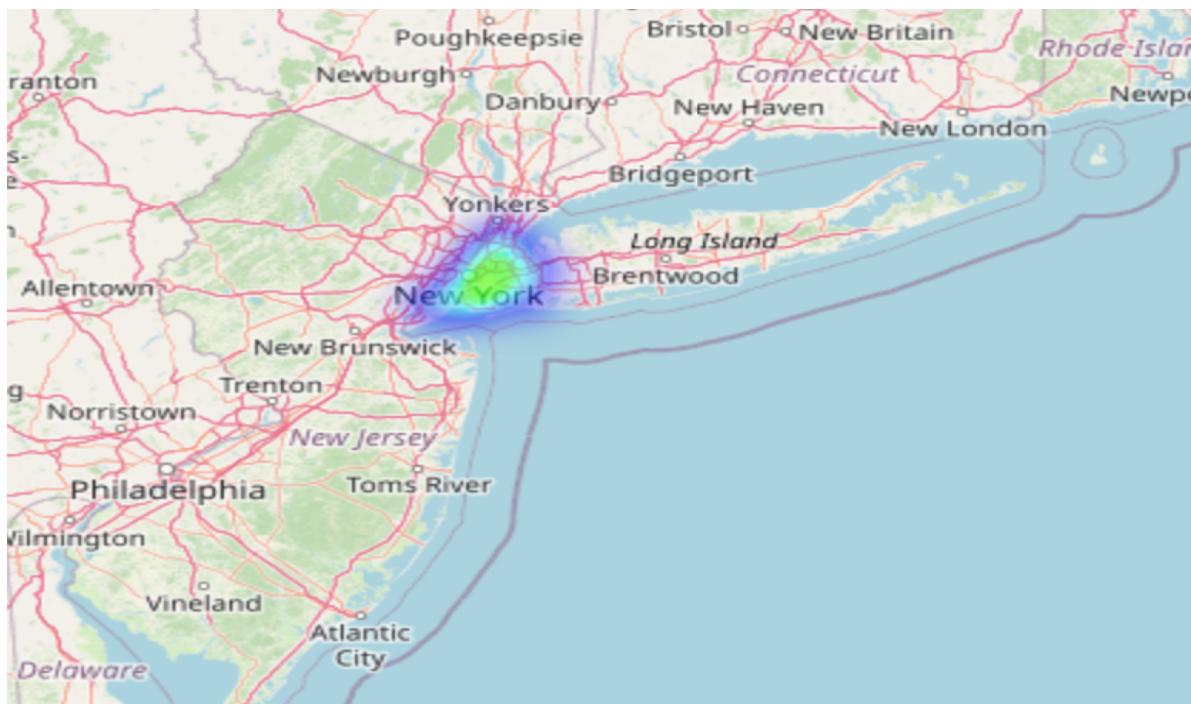
- Data Source: NYC Open Data – Motor Vehicle Collisions Dataset
- Data Processing: Cleaned missing values, handled inconsistencies in location data
- Exploratory Data Analysis (EDA): Identified accident trends, most dangerous streets, and peak hours
- Geospatial Analysis: Mapped high-risk accident zones using latitude & longitude
- Machine Learning Model: Developed a predictive model achieving 99.45% accuracy in accident severity classification
- Visualization: Built an interactive Tableau dashboard for real-time insights

## Observation:

### 1. Peak Accident Hours:

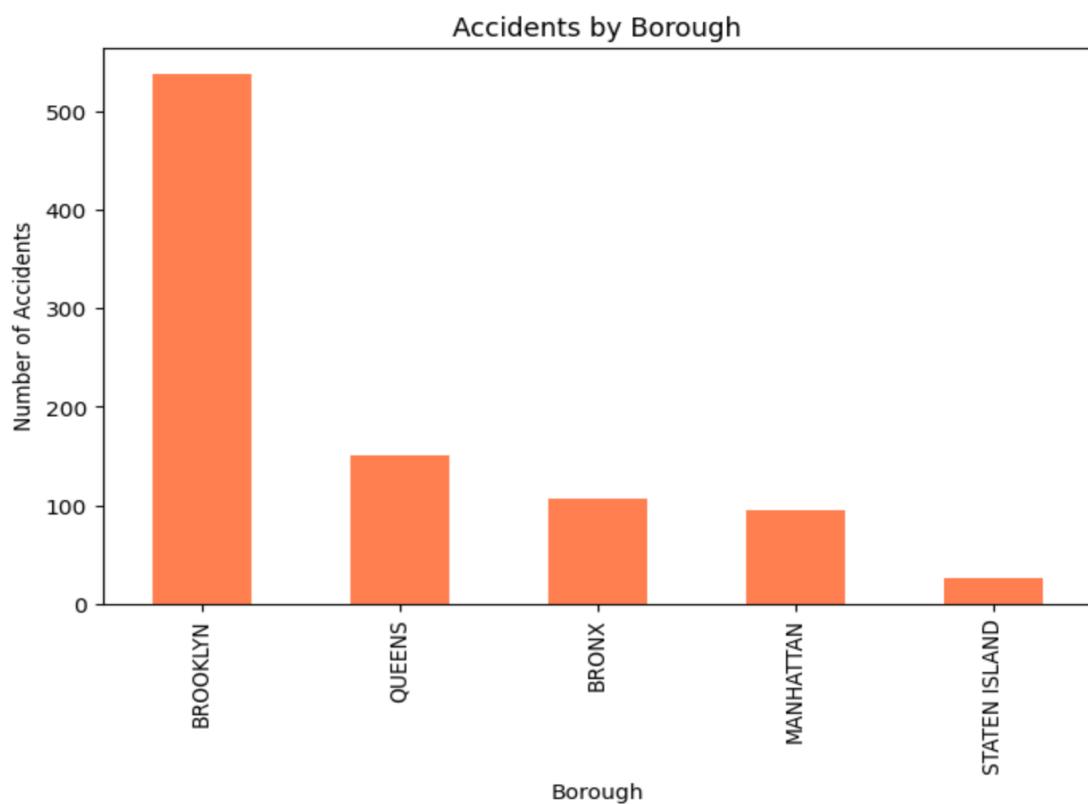
Most accidents occur between 4 PM - 8 PM, corresponding with rush hours.





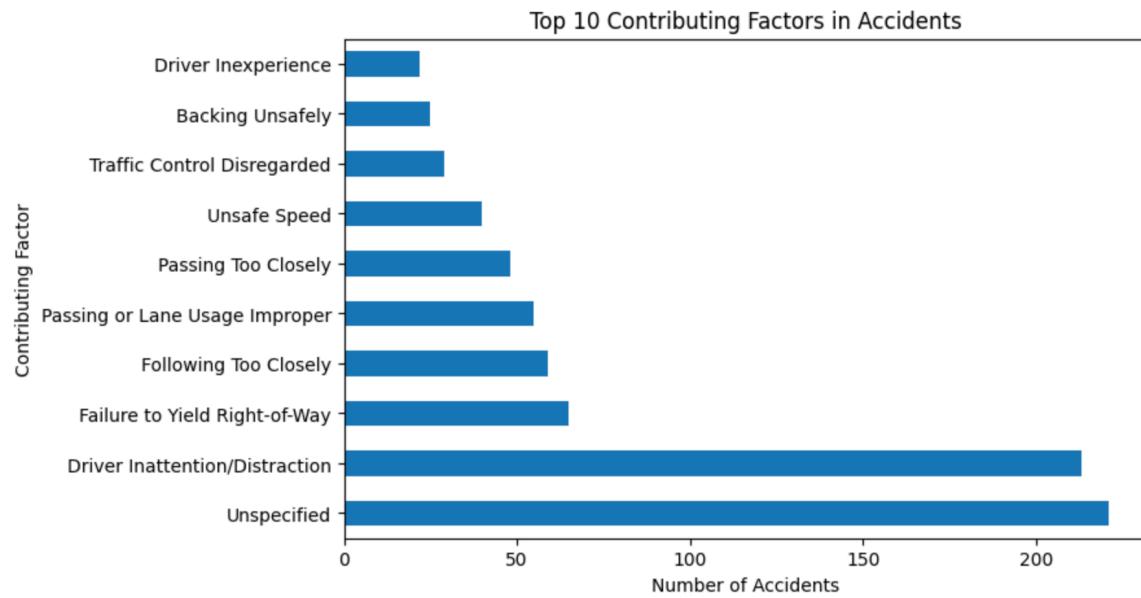
## 2. High-Risk Locations:

Brooklyn and the Bronx recorded the highest number of severe accidents.



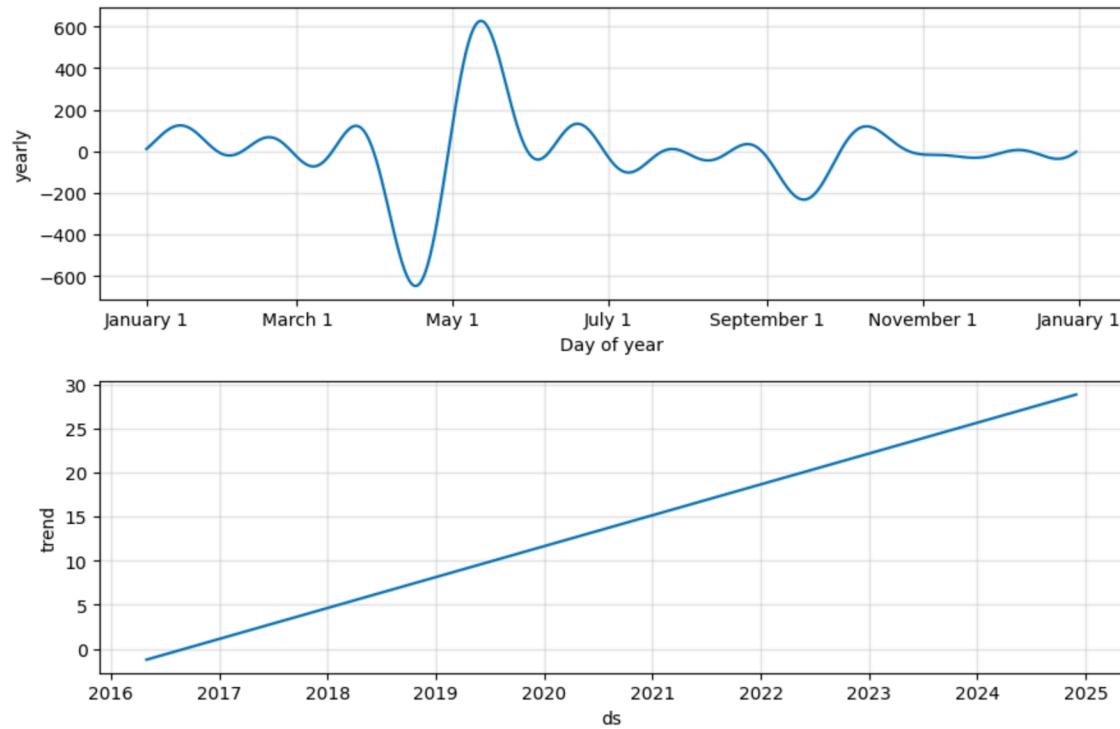
### 3. Top Contributing Factors:

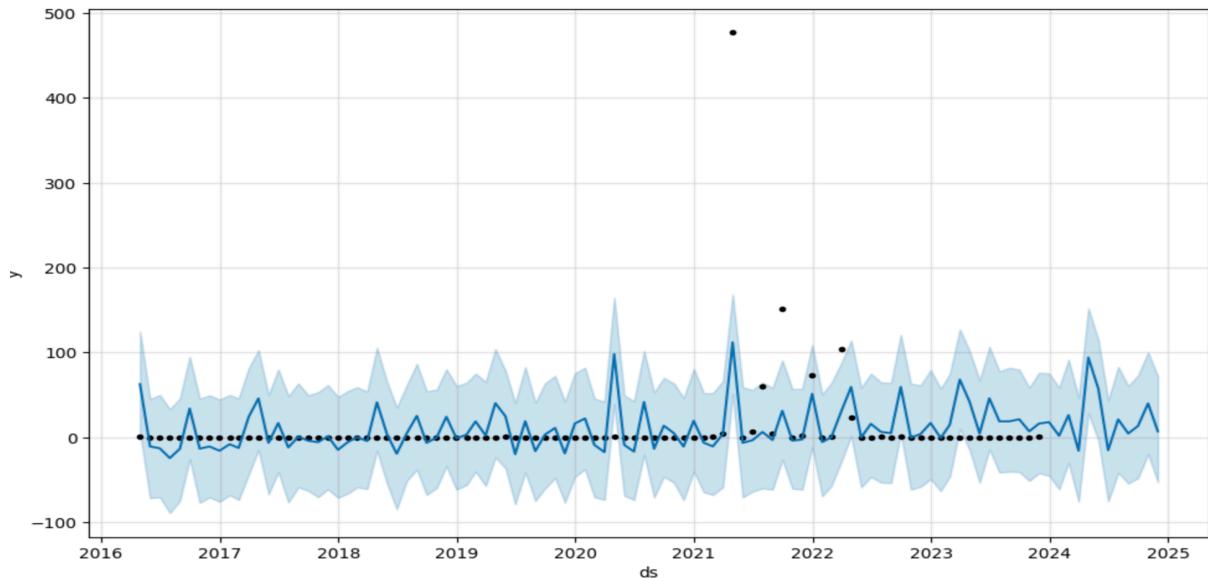
Distracted driving, failure to yield, and speeding were the most common causes.



### 4. Seasonal Trends:

A rise in accidents during winter months, likely due to hazardous road conditions.





## 5. Prediction Model:

Machine learning achieved 99.45% accuracy in classifying accident severity.

	precision	recall	f1-score	support
Non-Severe	0.99	1.00	1.00	182
Severe	0.00	0.00	0.00	1
accuracy			0.99	183
macro avg	0.50	0.50	0.50	183
weighted avg	0.99	0.99	0.99	183

## Future Work:

- Implement speed control measures on high-risk streets and highways.
- Improve pedestrian infrastructure in accident-prone urban areas.
- Enhance data collection methods to reduce missing or inaccurate location data.
- Integrate weather & traffic data into predictive models for more accurate risk assessment.

## Conclusion:

This project provides data-driven insights into NYC traffic safety and highlights the need for better road policies and accident prevention strategies. The analysis can help city planners, policymakers, and transportation authorities take proactive measures to reduce traffic collisions and enhance public safety.