MVC-Findings

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Findings from the Motor Vehicle Crashes Dataset

We will be analyzing a dataset by the city of New York that contains all police reports for motor vehicle collisions from January 2013 to December 2022. In 1998, the NYPD implemented TrafficStat to improve traffic safety by applying the principles of CompStat. To collect uniform traffic safety data, the Police Department implemented the Traffic Accident Management System (TAMS) in 1999, which required the precincts to manually enter a few selected fields from form MV-104AN. As the need for additional traffic data arose, the Department replaced TAMS with the new Finest Online Records Management System (FORMS) in 2016. FORMS allows police officers to electronically enter all MV-104AN data fields, enabling detailed traffic safety analyses to be conducted as applicable. The implementation of FORMS was in response to the Citywide traffic safety initiative, Vision Zero, which aims to eliminate traffic fatalities.

The Motor Vehicle Collisions data table contains information about all the motor vehicle collisions in NYC that are reported to the police. A police report, MV104-AN, is mandatory for collisions resulting in injuries or fatalities or for those causing at least $1000 worth of damage. It is important to note that the data is preliminary and may change if the MV-104AN forms are revised based on updated crash information. **Please note:** This dataset includes entries of nearly two million car crashes that occurred in New York from 2013-2022.

The Impact of Collisions

By subsetting our original dataframe, we can determine the amount of injuries and fatalities that have occurred in motor vehicle accidents over the last ten years. According to our data, there have been a total of 587,331 injuries from vehicle collisions over the past ten years. Of these injuries, 108,036 were pedestrians, 50,384 were cyclists, 423,739 were motorists. In addition, we calculated that there were a total of 2,805 deaths from motor vehicle crashes in New York City from 2013 to 2022. Of these fatalities, 1,423 were pedestrians, 212 were cyclists, and 1,135 were motorists. Analyzing the amount of motor vehicle collisions resulting in injury or death is important as it provides insights into the safety and potential hazards of driving on the roads. By understanding the contributing factors and common patterns associated with these collisions, steps can be taken to improve road safety and reduce the risk of accidents, injuries, and fatalities. This information can inform policy decisions, public awareness campaigns, and targeted interventions aimed at improving traffic safety.

High-Risk Areas in NYC

From the data we collected, we can determine that Brooklyn has had the most motor vehicle collisions while Staten Island has had far less than any other borough. This is relatively the same for the total injuries and the total deaths that occurred; however, one interesting find is the relationship between number of collisions and number of injuries between Manhattan and the Bronx. We can see in the table that Manhattan has had over 100,000 more collisions than the Bronx, but the Bronx has had more motor vehicle collisions than

Manhattan. Analyzing these areas for motor vehicle collisions is important for several reasons. First, it allows for targeted interventions and policies to be implemented in those areas to improve safety and reduce the number of collisions. This can help to save lives, prevent injuries, and reduce property damage. Second, identifying high risk areas can help to allocate resources more efficiently by focusing efforts and resources where they are most needed. Finally, understanding the factors that contribute to high risk areas can help to develop strategies and programs aimed at preventing collisions from occurring in the first place.

The map provided represents fatal collisions across New York City. Each coordinate on the map represents a fatal vehicular accident, whether the fatality represents the driver, a pedestrian, or a cyclist. We can see in the map that a cluster appears more greatly in the northern, narrow section, however, Brooklyn covers a larger portion of the map, which is most of the eastern land. From the previous table we created, Brooklyn had approximately 250 more fatalities than Manhattan. So, as though it appears that more fatal collisions occurred in Manhattan, our data can confirm that fatalities took place all about Brooklyn.

Collision Patterns

Does time have an impact on motor vehicle collisions? ### By Year Motor vehicle collisions were high in 2013 and continued to increase until 2018. Then we see a small fall in 2019 and a significant drop in 2020. According to the New York City Open Data website, the decrease was attributed to a combination of factors, including changes in traffic patterns due to the COVID-19 pandemic, increased enforcement of traffic laws, and the city's Vision Zero initiative aimed at reducing traffic fatalities and injuries. However, it is important to note that the decrease in collisions in 2020 may not necessarily be representative of a long-term trend.

By Day of the Week

The day of the week has been found to have a significant impact on the occurrence of motor vehicle collisions. According to our data, Friday is the day with the highest number of collisions, while Sunday has the least. This trend can be attributed to a variety of factors, including increased traffic congestion, driver fatigue, and higher rates of alcohol consumption on weekends. Understanding the relationship between the day of the week and collision patterns can help policymakers and city planners develop targeted interventions to improve road safety and reduce the incidence of collisions, particularly during high-risk periods.

By the Hour

The time of day can have a significant impact on motor vehicle collisions. According to our data, the highest number of collisions tend to occur during rush hour traffic in the morning and evening. This is likely due to increased traffic volume and congestion. Additionally, collisions are more likely to occur during nighttime hours when visibility is reduced and drivers may be fatigued or impaired. In our graph, we can see that there is a peak of traffic collisions at 7am and 4pm. In addition, collisions are more likely to occur during the late night rather than early morning, indicating that visibility plays a significant role in traffic collisions as opposed to alcoholic consumption. It is important for drivers to remain vigilant and cautious, particularly during peak traffic hours and at night, in order to avoid collisions and keep the roads safe for everyone.

How Humans Play a Role

Our dataset presents a hundred reasons how someone could be involved in a motor vehicle collision. The chart below displays the leading causes of motor vehicle accidents, which includes distracted driving, failure to yield right-of-way, following too closely, backing unsafely, drowsiness, passing too closely, turning improperly, and improper use of passing or lane usage. It is important to determine how humans play a role in traffic collisions because this information can inform policies and interventions aimed at reducing the number of collisions. By understanding the specific human factors that contribute to collisions, such as distracted

driving or impaired driving, targeted educational and awareness campaigns can be developed to address these behaviors. Additionally, this information can inform the development of new technologies and infrastructure improvements aimed at reducing human error, such as automatic emergency braking systems or improved road signage. Ultimately, understanding how humans contribute to traffic collisions can help save lives and reduce the economic and societal costs associated with collisions.

Distracted driving is clearly the most harmful contributing factor in this case with over 100,000 cases involving an injury.

Fatal Contributing Factors

Although distracted driving had significant cases of injuries, driving at an unsafe speed results in far more deaths than distracted driving. Analyzing contributing factors in motor vehicle collisions is important because it helps identify the underlying causes of these accidents. This information can be used to improve road safety policies and practices, such as implementing targeted educational campaigns, improving road infrastructure, and enforcing traffic laws more effectively. Understanding the contributing factors can also help identify high-risk groups or situations, allowing for the implementation of preventative measures. By analyzing contributing factors, we can better understand the root causes of motor vehicle collisions and take action to reduce their frequency and severity.

Unsafe Driving Habits

From our data, we can see that over the past ten years, there have been a significant amount of collisions due to unsafe driving practices. The most harmful of these habits being alcohol involvement. Although traffic laws do have a significant effect on traffic collisions, it is necessary for drivers to remember how important it is to practice safe driving habits to prevent these accidents.

Vehicle-Related Problems

Humans play a significant role in traffic collisions; however, it is not always their fault. Sometimes, people experience vehicular problems during operation. Here in the graph, we can see the top leading vehicle problems that have caused traffic collisions. These vehicle problems include defective brakes, steering failure, tire failure, defective accelerator, and defective headlights. Analyzing vehicle-related problems in traffic collisions is important to identify patterns of vehicle defects or malfunctions that contribute to collisions. By understanding these patterns, manufacturers and regulators can make improvements to vehicle design, maintenance, and safety features to prevent future collisions and protect the occupants of vehicles. It also helps to identify if certain types of vehicles are more prone to accidents and if there are any specific mechanical problems that should be addressed. Additionally, by identifying common vehicle-related issues in accidents, law enforcement and insurance companies can make more informed decisions about fault and liability. Overall, analyzing vehicle-related problems in traffic collisions can lead to improved safety on the roads and help prevent future accidents.

The Significance of Analyzing this Dataset

Motor vehicle collisions are a major public safety concern that can result in injuries, fatalities, and property damage. Analyzing data on the frequency and patterns of car crashes can provide valuable insights for developing and implementing effective strategies to reduce collisions and promote safe driving practices. By examining factors such as contributing factors, high-risk areas, and human behavior, stakeholders can work towards improving road safety for all. As such, continued analysis and monitoring of collision data is essential for identifying areas of concern and evaluating the effectiveness of interventions. Through this ongoing effort, we can strive to reduce the number of motor vehicle collisions and promote safer, more sustainable transportation systems.