

# NYC Motor Vehicle Collisions - Analysis

1. NYC Collisions : Data Overview
2. Assumptions & Data  
Processing
3. EDA, Facts & Findings
4. Conclusion



## Motor Vehicle Collisions – Collisions

**Source :** Google Big Query Public dataset  
*NYC MV collisions*

**Scope :** Information on reported motor vehicle collisions in NYC. Each row represents a collision event.

**Data Available:** Jul 2012 to Jul 2021

### Key Attributes:

- Unique Key
- Borough
- Timestamp
- Contributing factor
- Vehicle type
- # Persons killed
- # Persons Injured
- Latitude
- Longitude
- Location

## Assumptions

- Reported motor vehicle collision is for illustrative purpose
- Usage of Google Maps APIs for finding the borough details\*
- Ignore the rows where we don't have rich data
- Assuming persons killed is the total of cyclists, motorists and pedestrians killed

## Data Pre-processing

### Null Value Treatment:

- Reverse geocoding using Gmaps API for finding the borough using the latitude & longitude (however it was not used in this analysis). Hence, null values are ignored
- Imputed '0' for persons killed/ injured for the null values

### Feature Extraction:

- Extracted relevant datetime fields and grouped them for categorical analysis
- Segregated to label whether a collision is a fatal incident or not

### TopN Analysis

- Top 10 or Top 15 factors that contribute to the collisions
- Top vehicle models/ types that contribute to the collisions

1.1M

NYC Collisions\*

20%

Injuries

<1%

Fatalities

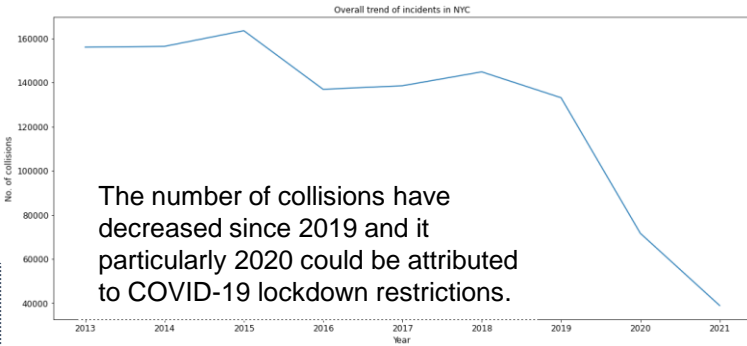
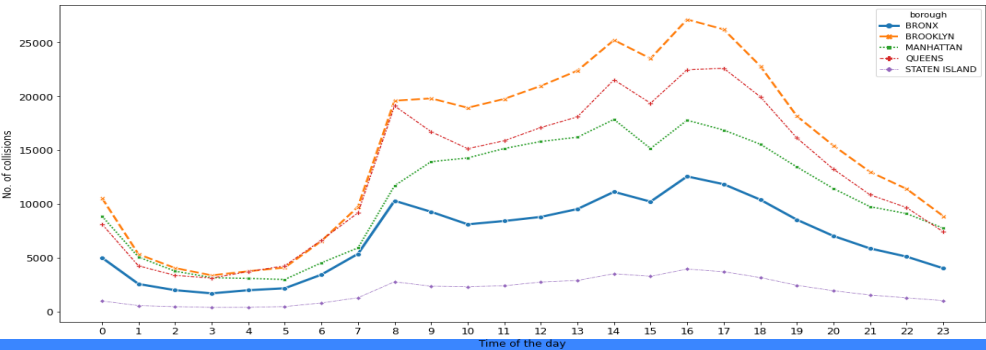
- Ignored the columns that had more than 50% null values such as contributing factors 3-5, vehicle type 3-5, off street name
- Also, considered data only from the beginning of 2013 till 2021

Borough	Collisions	Collisions %
BROOKLYN	360650	32.19%
QUEENS	307885	27.66%
MANHATTAN	259069	21.13%
BRONX	165231	15.17%
STATEN ISLAND	46514	3.85%
Total	1139349	100.00%

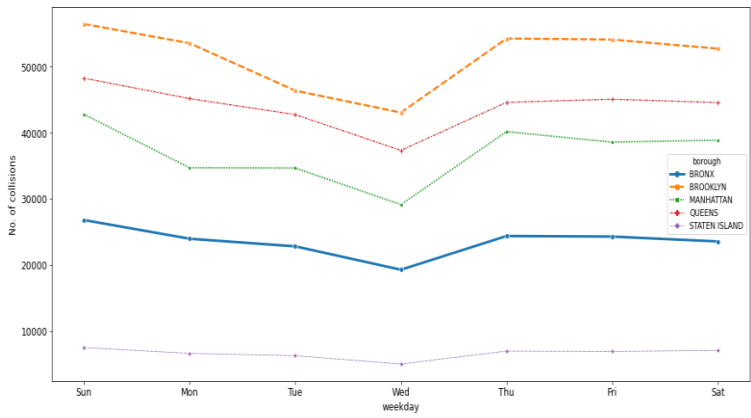
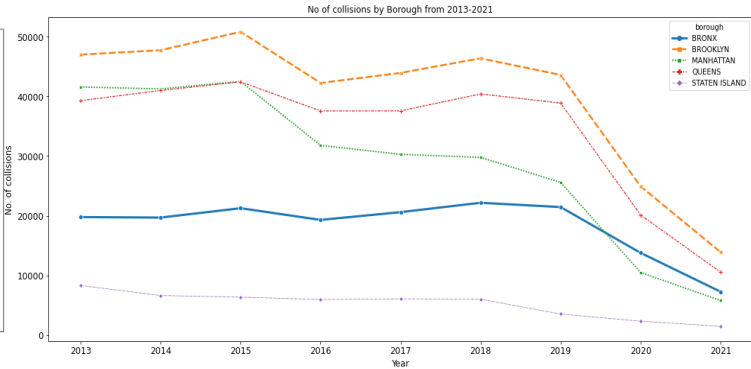
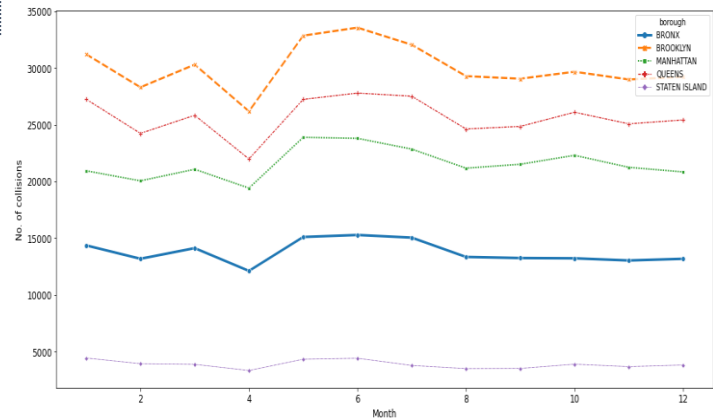
Brooklyn borough leads the total number of collisions, injuries

Borough	injuries%	fatalities%
BROOKLYN	22.29%	0.12%
BRONX	21.59%	0.10%
QUEENS	20.16%	0.12%
STATEN ISLAND	18.96%	0.14%
MANHATTAN	15.45%	0.08%
Total	19.92%	0.11%

Staten Island's fatalities have been higher to overall collisions



The number of collisions have decreased since 2019 and it particularly 2020 could be attributed to COVID-19 lockdown restrictions.



- Manhattan is the borough with least injuries and fatalities % and it had also shown the decreasing trend of collisions.
- We could use the best practices from Manhattan to apply at Brooklyn
- Between years 2016-19, the trend of collisions was constant to slightly increasing
- Weekends witness a higher degree of collision incidents whereas Wednesdays are least
- Summer/Spring Months record a slightly increased incidents of collisions
- Noon-Evening see the highest collisions and as expected midnight-early morning see fewest incidents

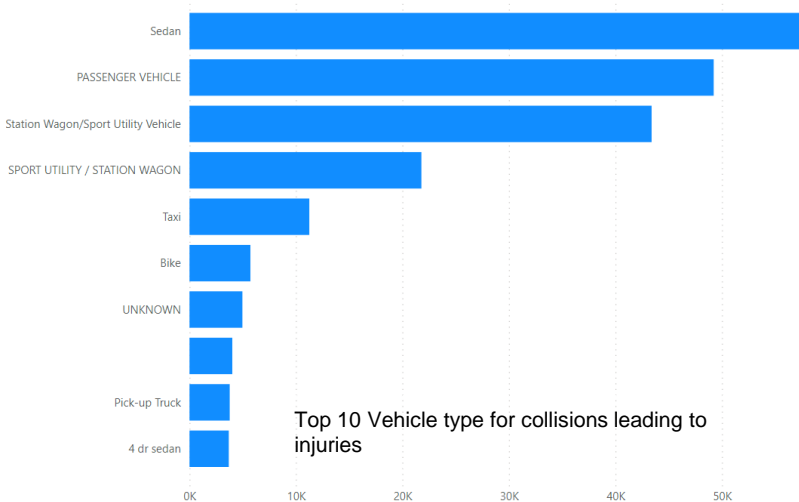
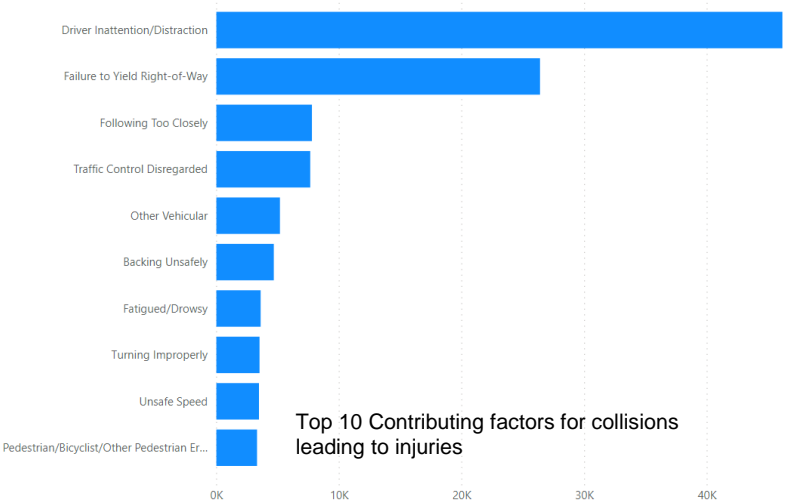
\* After data preprocessing

SEASON	12AM-6AM	12PM-6PM	6AM-12PM	6PM-12AM	Total
Fall	2.2%	10.9%	5.3%	6.1%	24.5%
Spring	2.1%	11.3%	5.2%	6.1%	24.7%
Summer	2.5%	11.9%	4.9%	6.8%	26.2%
Winter	2.2%	10.9%	5.4%	6.1%	24.6%
Total	9.1%	44.9%	20.9%	25.1%	100.0%

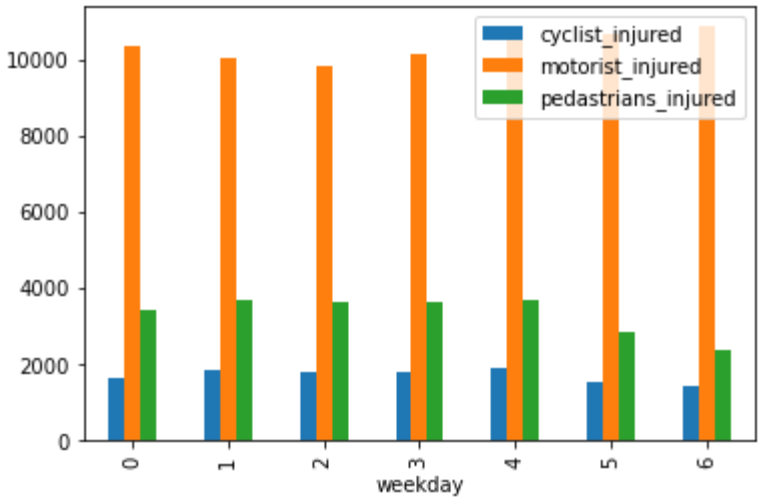
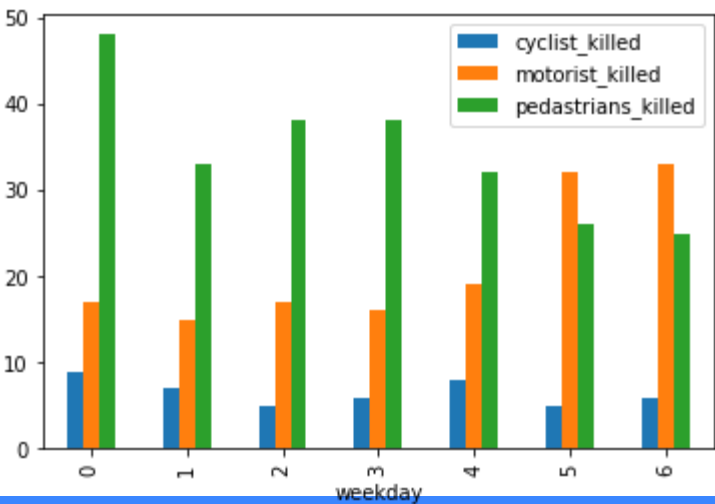
- From the heatmap, we see that % of collisions across all the seasons happen the most during 12-6PM
- Could be attributed to dark in the winter and people commuting more often during summer/spring.

Only for Brooklyn

- Motorists are killed higher in number; get injured higher during the weekend which could be due to higher usage
- Pedestrians are killed highest on Monday (could be due to collisions in rushing to workplace/business) and are injured in lower number during the weekend
- Weekdays - Fatigue / drowsy is a major reason -- could be because of work & we already saw evenings are the times when most incidents occur
- Alcohol involvement cases were higher during weekend
- Following too closely/ Passing too closely are another contributing factors during weekdays that could be because people want to reach their destinations faster
- Collisions due to Box Trucks/Pickup Trucks reduce drastically during weekends particularly on Sunday due to the fact they don't work



- Leading among the contributing factors, are Driver Inattention/Distracted and Failure to yield Right of way
- In the years 2016-19, together the above factors accounted for 48% of the overall injuries
- Sedans, Passenger vehicles are the two highest contributing vehicles to injury.
- In the years 2016-19, together Sedans, station wagons accounted for 71% of the overall injuries



## Challenge of Weekend-Motorists

- With the help of a developed public transport network, and a fully operational one, weekends offering prices at a cheaper rate than the weekdays could promote in people using public transport during the weekends
- Normally, maintenance & repair work happens during the weekends which prevents usage during weekend and opting to personal vehicles. So, instead it could be worked at the nights / non-peak hours in the weekdays
- Checks on speed limit, signal crossing etc., with increased fines

## Challenge of Peak hours(weekdays) in the Evening

- Peak hours are a real challenge even with a very good infrastructure. There have been multiple ways for controlling it like dynamic pricing (increased fare during peak hours), or pooling to reduce the vehicles on road, promoting cycle to work etc., We need to continue doing that. Cyclists involved in the collisions or injuries were lower and cycling also is an exercise. The borough needs to work with business in promoting cycle/walk to work schemes but also ensuring the right infra in place. More lights for visibility need to be taken care.

## Promoting Safety

- Unsafe Speed, Unsafe lane changing, following / passing too closely, turning improperly, using lane improperly are basic road principles which needs to be promoted everyday, everywhere. It must be in the culture as I think it is very important to make the public respect the rules.
- Promote WFH culture (a common thing now after COVID-19) to reduce the commutation and vehicle on road as Drowsiness/Fatigue is a reason for few collisions. People returning home from work could be causing the same.

## Challenge of Alcohol

- Alcohol consumption and collisions because of that is a common observation during the weekend
- Increased fines / higher level of punishments forced should be continuously reviewed for preventing any injuries/fatalities from alcohol consumption and leading to a collision