

SSC 442 - Final Project

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PowerPoint reference: https://www.linkedin.com/in/hoyuli/overlay/1593491717863/single-media-viewer/?profileId=ACoAABGobQoBad3aoz8Aka2DErr_wx3A9UJhl50

Analysis reference: <https://www.kaggle.com/datasets/mysarahmadbhat/nyc-traffic-accidents/code>

NYC Traffic Accidents Analysis

Background and Motivation

The focus of this project is the examination of motor vehicle collisions that were reported by the New York City Police Department from January to August of 2020. Each record in the dataset, obtained from Kaggle, represents a unique collision and includes various details such as the date, time, and location of the accident, as well as additional data.

The analysis will compare the percentage of total accidents by month, providing a snapshot of the trend over time. These statistics will be visually represented through the use of maps, which will demonstrate the frequency of accidents in different boroughs of New York City. Furthermore, the analysis will also determine the most common streets, days, and times when accidents are likely to occur.

The ultimate goal of this project is to provide recommendations to the city of New York on how this analysis can be used to prevent future accidents. By highlighting the most common accident hotspots, times, and contributing factors, city planners and law enforcement officials will be equipped with the information necessary to implement effective safety measures and reduce the number of accidents in the city.

Methodology

Loading libraries

```
library(tidyverse)
library(ggthemes)
library(ggmap)
```

Data preparation

```
# First of all, that's read the data and take a glimpse what it contains
df = read.csv("NYC Accidents 2020.csv")
glimpse(df)
```

```
## Rows: 74,881
## Columns: 29
## $ CRASH.DATE      <chr> "8/29/20", "8/29/20", "8/29/20", "8/29/2~
## $ CRASH.TIME      <chr> "15:40:00", "21:00:00", "18:20:00", "0:0~
## $ BOROUGH         <chr> "BRONX", "BROOKLYN", "", "BRONX", "BROOK~
## $ ZIP.CODE         <int> 10466, 11221, NA, 10459, 11203, NA, 1045~
## $ LATITUDE         <dbl> 40.89210, 40.69050, 40.81650, 40.82472, ~
## $ LONGITUDE        <dbl> -73.83376, -73.91991, -73.94656, -73.892~
## $ LOCATION         <chr> "POINT (-73.83376 40.8921)", "POINT (-73~
## $ ON.STREET.NAME   <chr> "PRATT AVENUE", "BUSHWICK AVENUE", "8 AV~
## $ CROSS.STREET.NAME <chr> "STRANG AVENUE", "PALMETTO STREET", "", ~
## $ OFF.STREET.NAME  <chr> "", "", "", "1047 SIMPSON STREET", "4609~
## $ NUMBER.OF.PERSONS.INJURED <int> 0, 2, 1, 0, 0, 1, 0, 0, 0, 0, 0, 1, 0~
## $ NUMBER.OF.PERSONS.KILLED <int> 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0~
## $ NUMBER.OF.PEDESTRIANS.INJURED <int> 0, 0, 1, 0, 0, 0, 0, 0, 0, 0, 0, 1, 0~
## $ NUMBER.OF.PEDESTRIANS.KILLED <int> 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0~
## $ NUMBER.OF.CYCLIST.INJURED <int> 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0~
## $ NUMBER.OF.CYCLIST.KILLED <int> 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0~
## $ NUMBER.OF.MOTORIST.INJURED <int> 0, 2, 0, 0, 0, 1, 0, 0, 0, 0, 0, 0, 0~
## $ NUMBER.OF.MOTORIST.KILLED <int> 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0~
## $ CONTRIBUTING.FACTOR.VEHICLE.1 <chr> "Passing Too Closely", "Reaction to Unin~
## $ CONTRIBUTING.FACTOR.VEHICLE.2 <chr> "Unspecified", "Unspecified", "", "Unspe~
## $ CONTRIBUTING.FACTOR.VEHICLE.3 <chr> "", "", "", "Unspecified", "", "", "", "~
## $ CONTRIBUTING.FACTOR.VEHICLE.4 <chr> "", "", "", "Unspecified", "", "", "", "~
## $ CONTRIBUTING.FACTOR.VEHICLE.5 <chr> "", "", "", "", "", "", "", "", "", "", "~
## $ COLLISION_ID     <int> 4342908, 4343555, 4343142, 4343588, 4342~
## $ VEHICLE.TYPE.CODE.1 <chr> "Sedan", "Sedan", "Station Wagon/Sport U~
## $ VEHICLE.TYPE.CODE.2 <chr> "Station Wagon/Sport Utility Vehicle", "~
## $ VEHICLE.TYPE.CODE.3 <chr> "", "", "", "Sedan", "", "", "", "", "Se~
## $ VEHICLE.TYPE.CODE.4 <chr> "", "", "", "Motorcycle", "", "", "", "", "~
## $ VEHICLE.TYPE.CODE.5 <chr> "", "", "", "", "", "", "", "", "", "", "~
```

```
# Check for missing values
sum(is.na(df))
```

```
## [1] 37643
```

```
# Drop all the NAs
df <- na.omit(df)
```

```
# We also need to drop LATITUDE equal 0, otherwise it will cause problems when we plot
df<- df[df$LATITUDE != 0,]
```

```
#Check if all the NAs are dropped
sum(is.na(df))
```

```
## [1] 0
```

```
# Drop some unnecessary columns
df = df %>% select(1:18)
glimpse(df)
```

```
## Rows: 47,686
```

```
## Columns: 18
## $ CRASH.DATE      <chr> "8/29/20", "8/29/20", "8/29/20", "8/29/2~
## $ CRASH.TIME      <chr> "15:40:00", "21:00:00", "0:00:00", "17:1~
## $ BOROUGH         <chr> "BRONX", "BROOKLYN", "BRONX", "BROOKLYN"~
## $ ZIP.CODE        <int> 10466, 11221, 10459, 11203, 10459, 10466~
## $ LATITUDE        <dbl> 40.89210, 40.69050, 40.82472, 40.64989, ~
## $ LONGITUDE       <dbl> -73.83376, -73.91991, -73.89296, -73.933~
## $ LOCATION        <chr> "POINT (-73.83376 40.8921)", "POINT (-73~
## $ ON.STREET.NAME   <chr> "PRATT AVENUE", "BUSHWICK AVENUE", "", "~
## $ CROSS.STREET.NAME <chr> "STRANG AVENUE", "PALMETTO STREET", "", ~
## $ OFF.STREET.NAME  <chr> "", "", "1047 SIMPSON STREET", "4609 SNY~
## $ NUMBER.OF.PERSONS.INJURED <int> 0, 2, 0, 0, 0, 0, 0, 0, 0, 1, 0, 0, 2, 2~
## $ NUMBER.OF.PERSONS.KILLED <int> 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0~
## $ NUMBER.OF.PEDESTRIANS.INJURED <int> 0, 0, 0, 0, 0, 0, 0, 0, 0, 1, 0, 0, 0, 0~
## $ NUMBER.OF.PEDESTRIANS.KILLED <int> 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0~
## $ NUMBER.OF.CYCLIST.INJURED <int> 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0~
## $ NUMBER.OF.CYCLIST.KILLED <int> 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0~
## $ NUMBER.OF.MOTORIST.INJURED <int> 0, 2, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 2, 2~
## $ NUMBER.OF.MOTORIST.KILLED <int> 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0~
```

Map plotting the people killed by motor vehicle in NYC

```
qplot(data = df, x = LONGITUDE, y = LATITUDE, matype = "terrain",
       darken = 0, geom = "auto", color = NUMBER.OF.PERSONS.KILLED ,
       alpha=I(.5), size = I(0.0000001),
       zoom = 10, extent = "panel", f = 0.005,
       xlab = "", ylab = "", main = "NYC Traffic Accidents Killed") +
  theme(axis.ticks = element_blank(), axis.text = element_blank()) +
  theme(legend.position="none")
```

i Map tiles by Stamen Design, under CC BY 3.0. Data by OpenStreetMap, under ODbL.

NYC Traffic Accidents Killed

