Incidence of Crime in Toronto: An Exploratory Data Analysis

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Major Crime in Toronto

In this analysis, the focus will be on Major Crime in Toronto.

As defined by the Toronto Police Service, Major Crime Indicator Categories include:

- ❖Assault
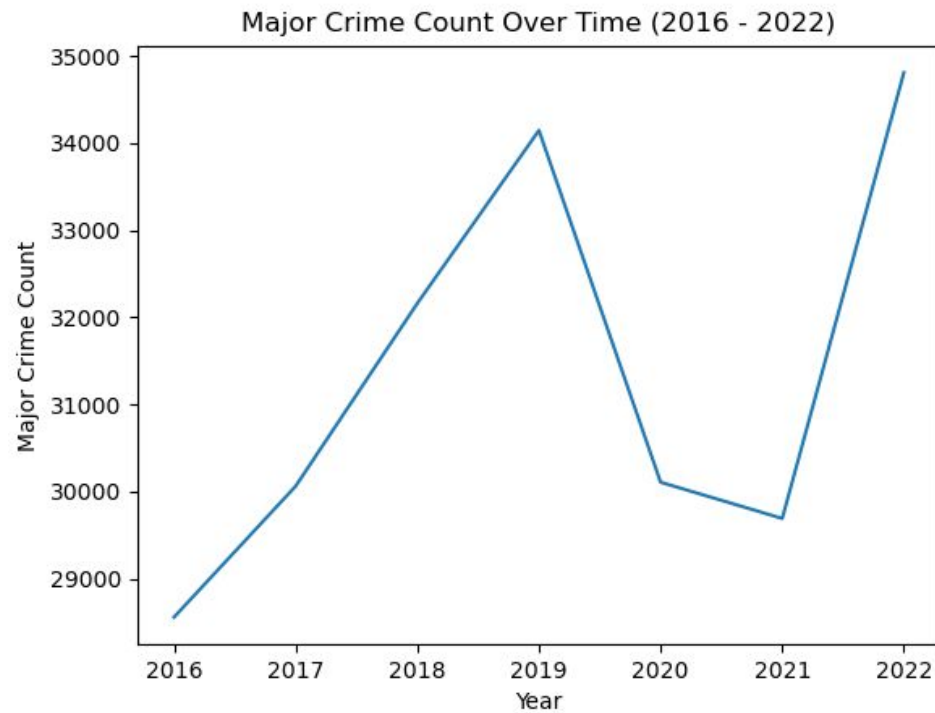- ❖Auto Theft
- ❖Break and Enter
- ❖Robbery
- ❖Theft Over

Data Sources

❖ Toronto Police API : Major Crime Indicators Open Data & Victims of Crime

❖ Census Canada API

❖ Government of Canada Canadian Centre for Climate Services API
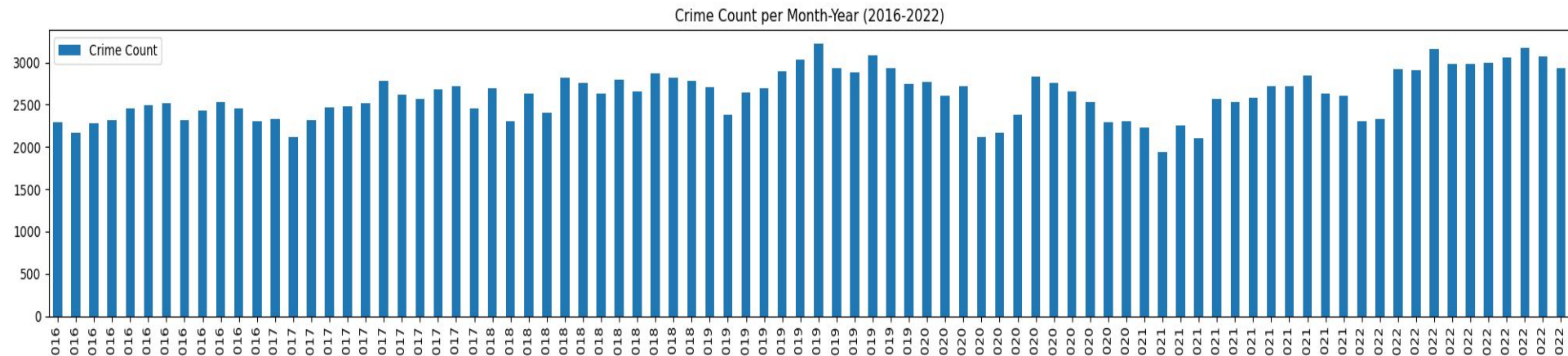
Major Crime in Toronto 2016 - 2022

Major Crime Count Over Time (2016 - 2022)

❖ MCI steadily increasing from 2016 up to 2019

❖ Significant drop in 2020 and 2021

❖ Mainly due to the pandemic and lockdowns

❖ Significant increase in 2022 with less COVID 19 restrictions

Major Crime in Toronto 2016 - 2022
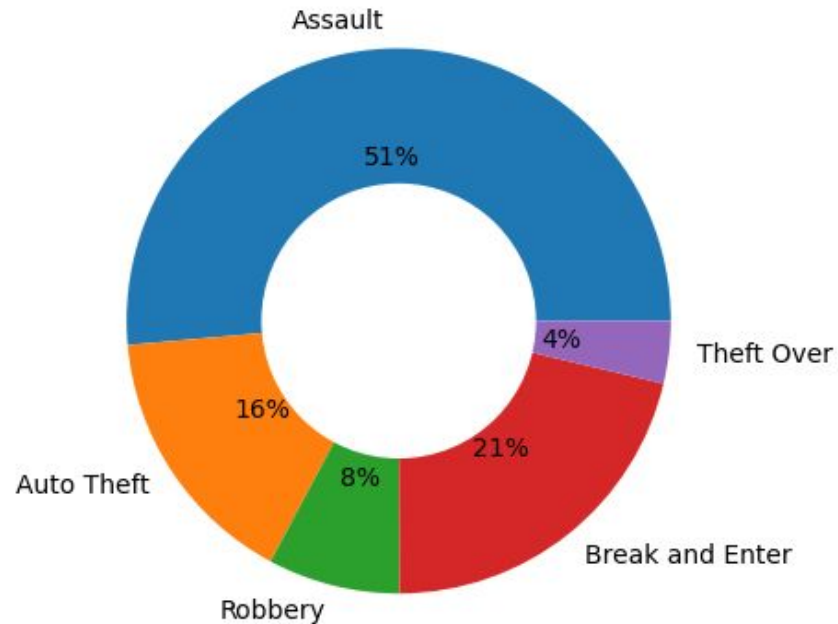

Crime Count per Month-Year (2016-2022)

Throughout the years, crime trends observed :

❖ Crime count at highest in July before 2021 and in May in 2022

❖ Slow and gradual decrease up until October

❖ February is the month with the lowest number of MCI
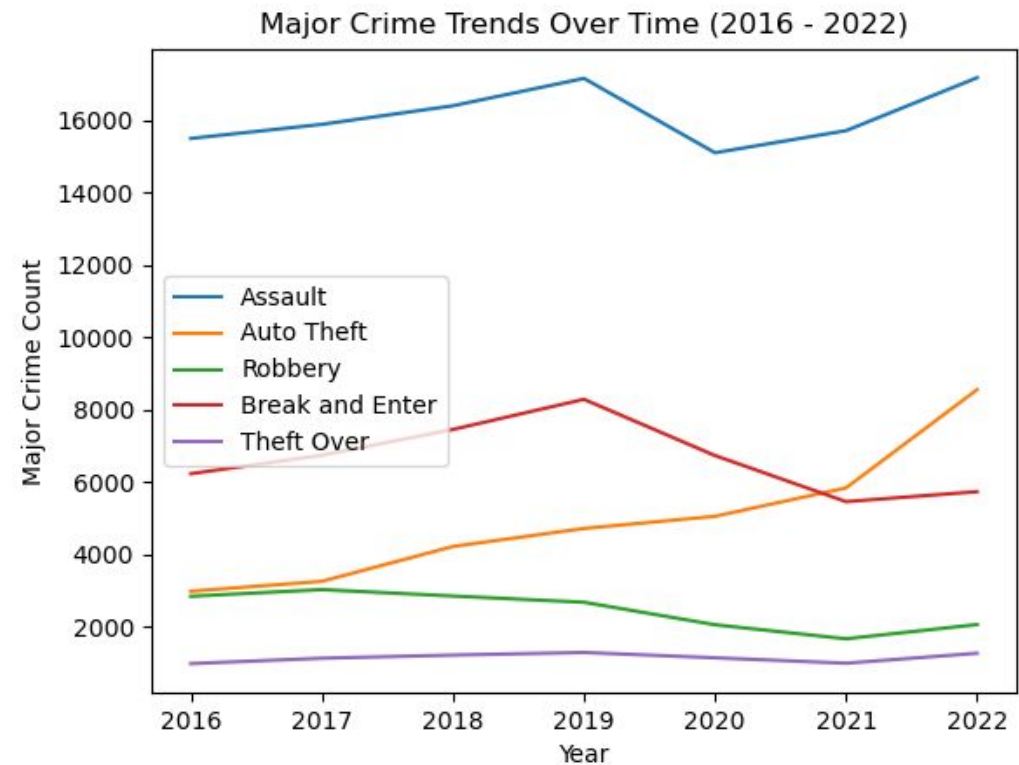
Major Crime in Toronto 2016 - 2022

❖ Top 3 most common crimes are: Assault, Break and Enter and Auto Theft

❖ Assault represents 51% of MCI

❖ Theft Over and Robbery are the least common crimes in Toronto

Major Crime in Toronto 2016 - 2022

❖ Assault represent the most common crime in Toronto

❖ Auto Theft kept increasing while all other MCI decreased between 2019-2021

Major Crime Trends Over Time (2016 - 2022)

Major Crime in Toronto 2016 - 2022

Percentage of change year over year :

2019 - 2021

- ❖ With the exception of Auto Theft, every indicator decreased in 2020
- ❖ In general, the total MCI decreased, down about 13%

2021 - 2022

- ❖ All indicators on the rise, up about 17%

|	Assault	Auto Theft	Robbery	Break and Enter	Theft Over	Total MCI
2016	nan%	nan%	nan%	nan%	nan%	nan%
2017	2.51%	9.13%	6.45%	8.15%	15.01%	5.26%
2018	3.23%	29.47%	-5.83%	10.57%	7.62%	6.98%
2019	4.61%	11.78%	-6.02%	11.16%	5.86%	6.18%
2020	-11.97%	7.09%	-23.11%	-18.73%	-11.3%	-11.83%
2021	4.04%	15.5%	-18.78%	-18.88%	-13.0%	-1.38%
2022	9.3%	46.41%	23.42%	5.03%	27.49%	17.23%

Major Crime in Toronto 2022

Major Crime Count By Month 2022
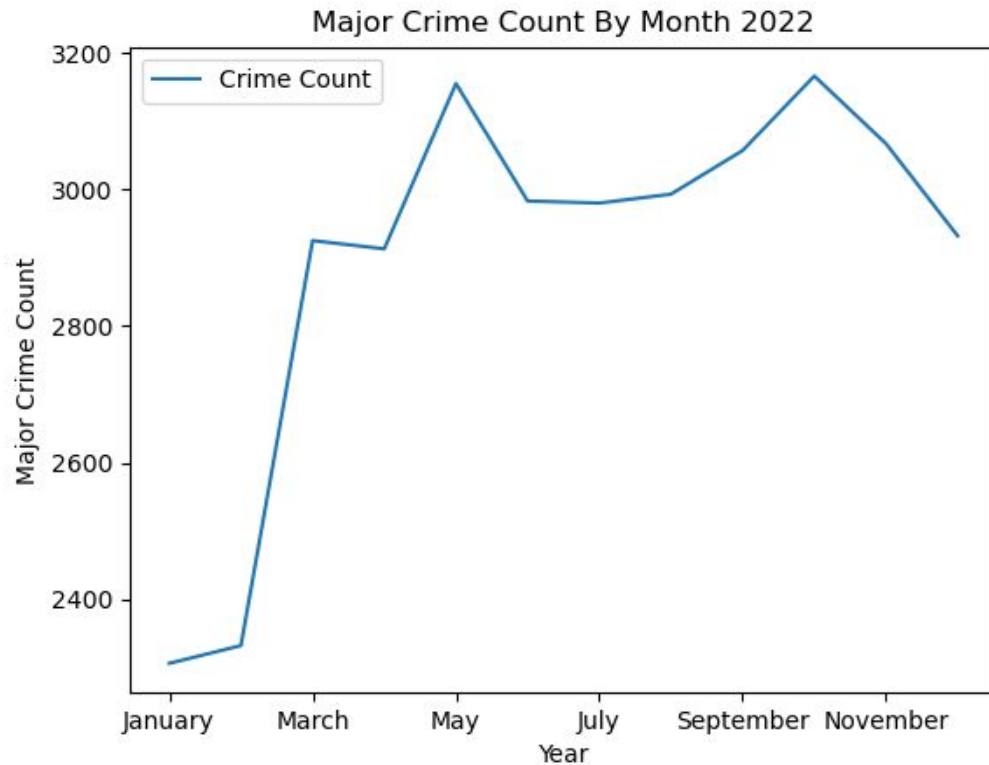
❖ Crime count at highest in May and October

❖ Crime count drop in Winter time

Major Crime in Toronto 2022

Major Crime in Toronto 2022
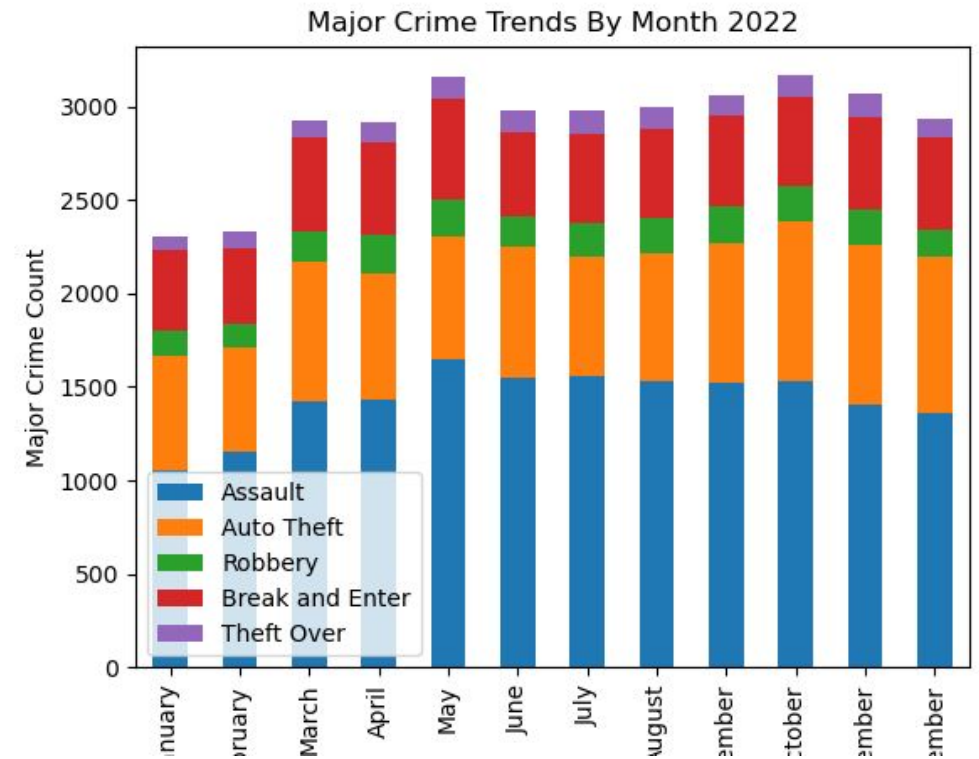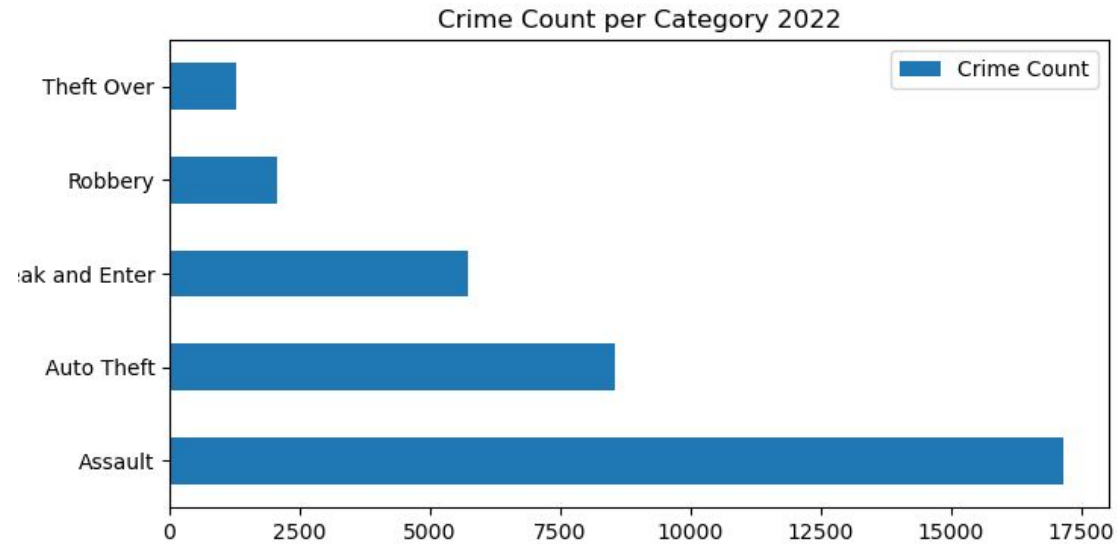
Top 20 Safest Neighbourhoods in 2022

Guildwood, **Bayview Woods-Steels** and **Woodbine-Lumsden** would be the safest neighbourhoods with the lowest number of crimes

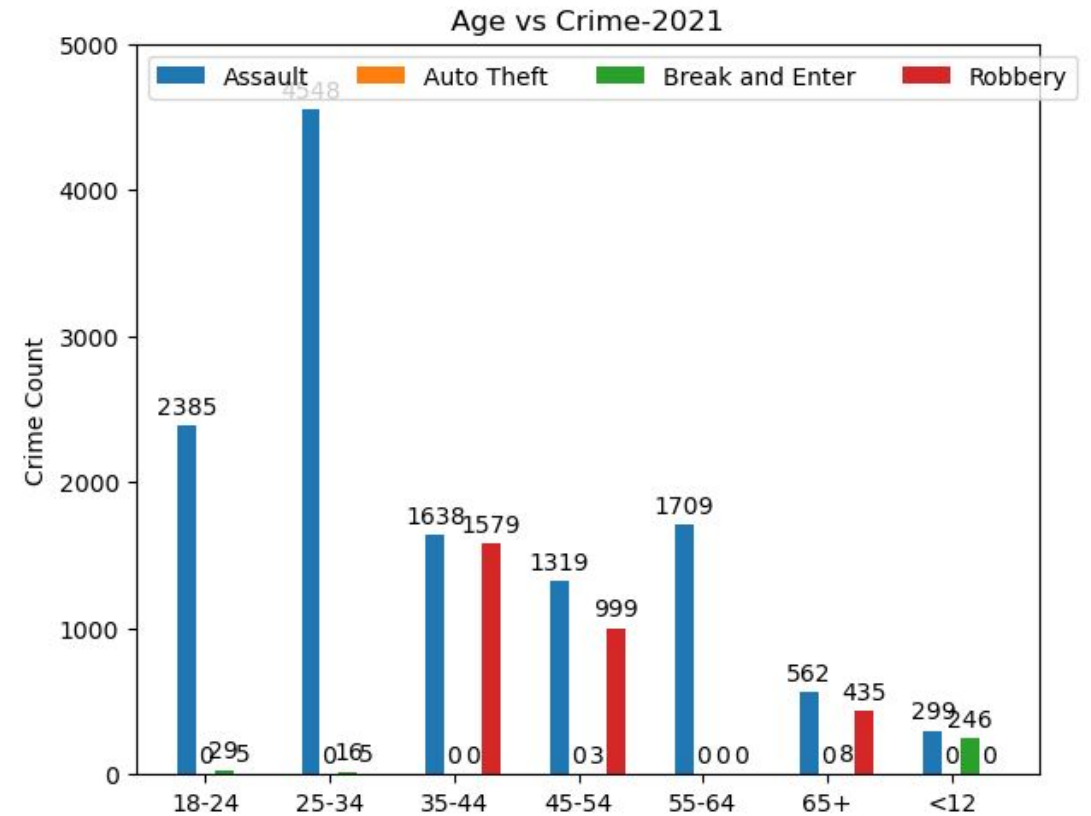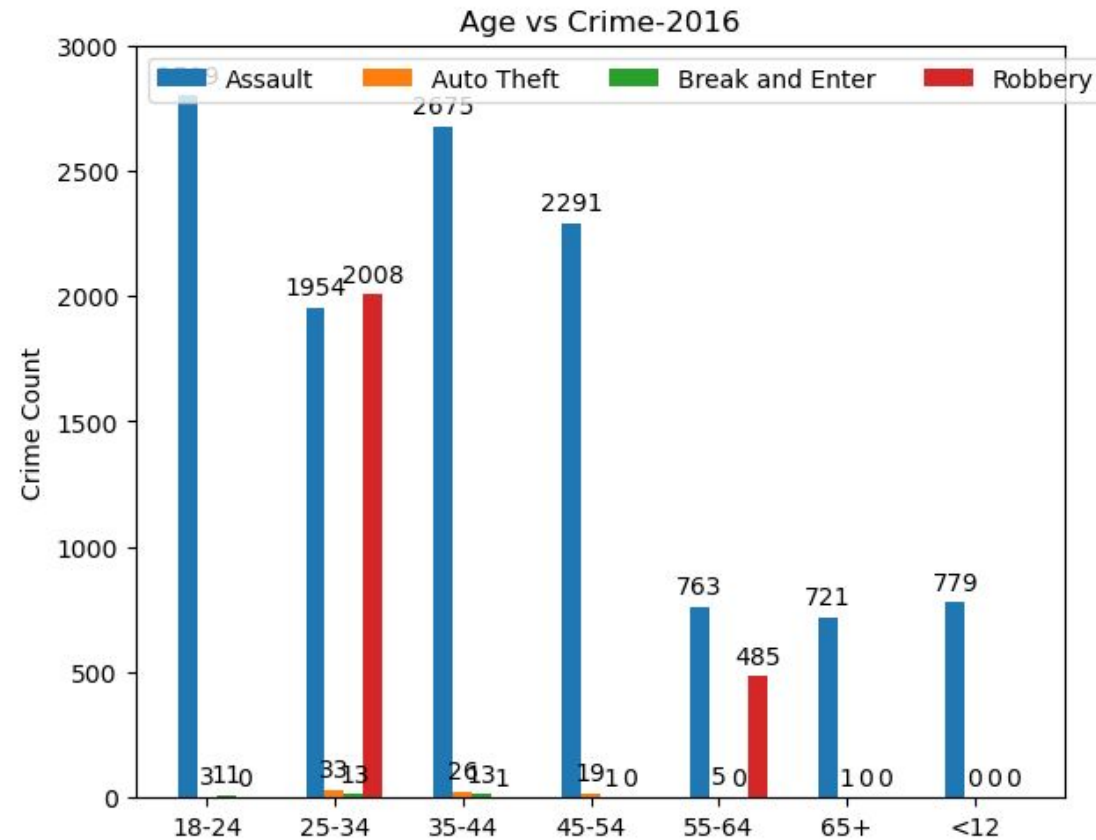# Major Crime in Toronto 2022

West Humber-Clairville, **Moss Park** and **Downtown Yonge East** would be the worst neighbourhoods to live in, with the highest number of crimes
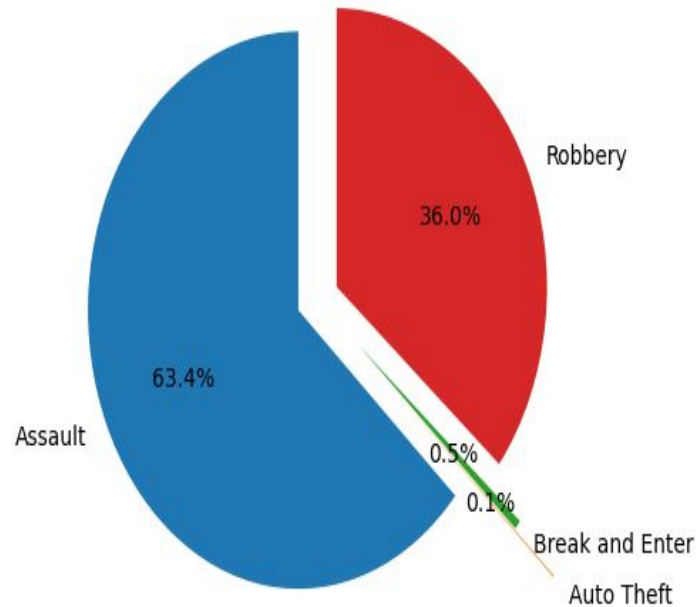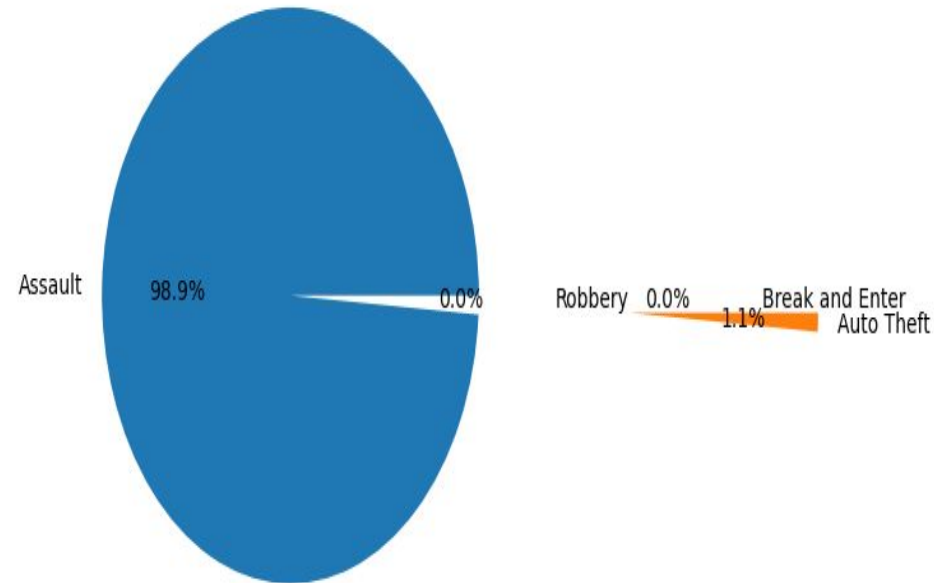

Top 20 Worst Neighbourhoods in 2022

Crimes vs Age Group in 2016 & 2021

Crimes vs Gender in 2016

Female vs. Crime

- Robbery 36.0%
- Assault 63.4%
- Break and Enter 0.5%
- Auto Theft 0.1%

Male vs. Crime

- Assault 98.9%
- Robbery 0.0%
- Break and Enter 0.0%
- Auto Theft 1.1%

Unidentified Gender vs. Crime

- Assault 85.7%
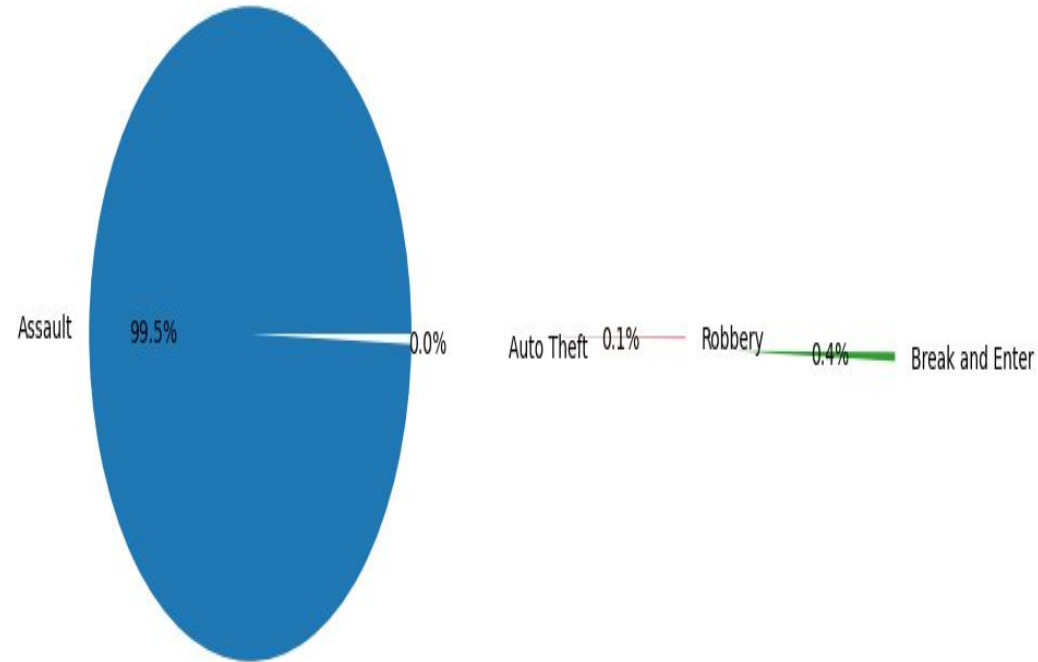- Robbery 14.3%
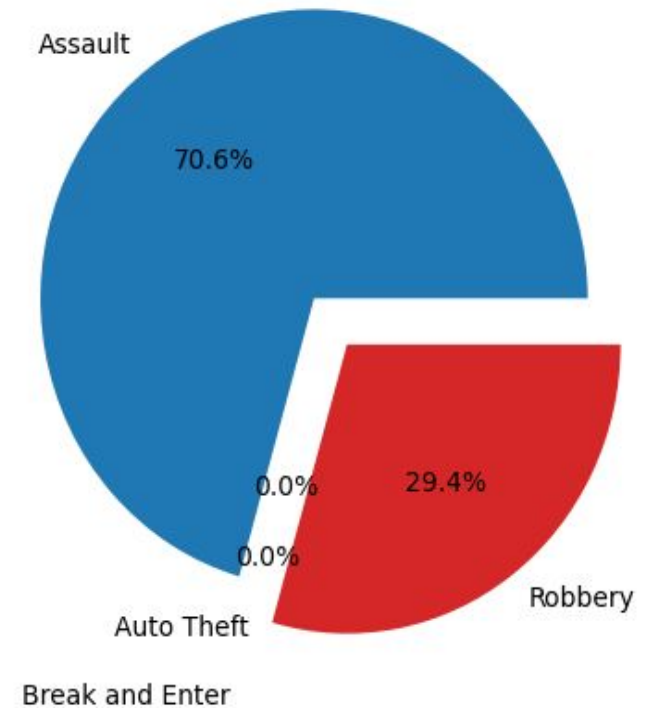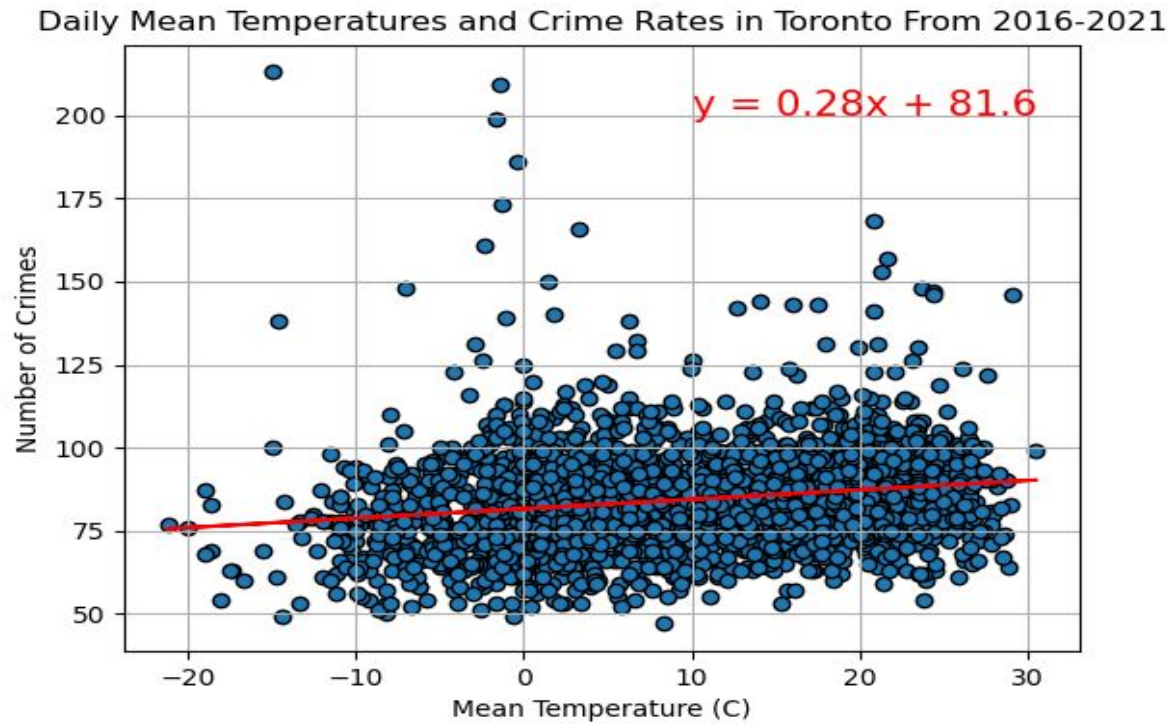- Break and Enter 0.0%
- Auto Theft 0.0%

Crimes vs Gender in 2021

Female vs. Crime
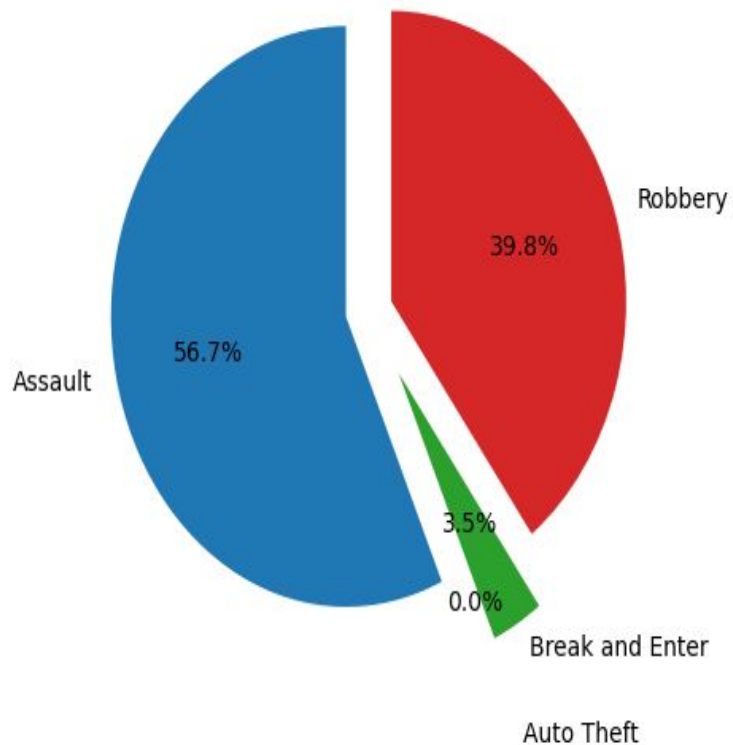
Male vs. Crime

Unidentified Gender vs. Crime

Crime and Weather: Linear Regression Analysis

Daily Mean Temperatures and Crime Rates in Toronto From 2016-2021

$y = 0.28x + 81.6$

A **positive relationship** between the incidence of crime and temperature is observed; the number of crimes committed per day increases with the daily mean temperature.
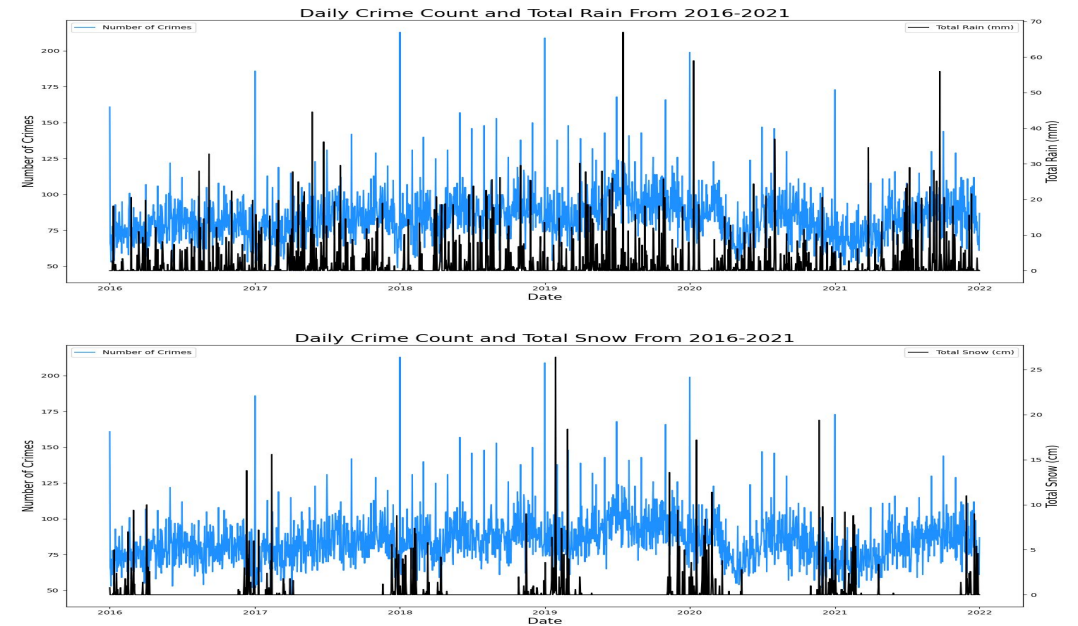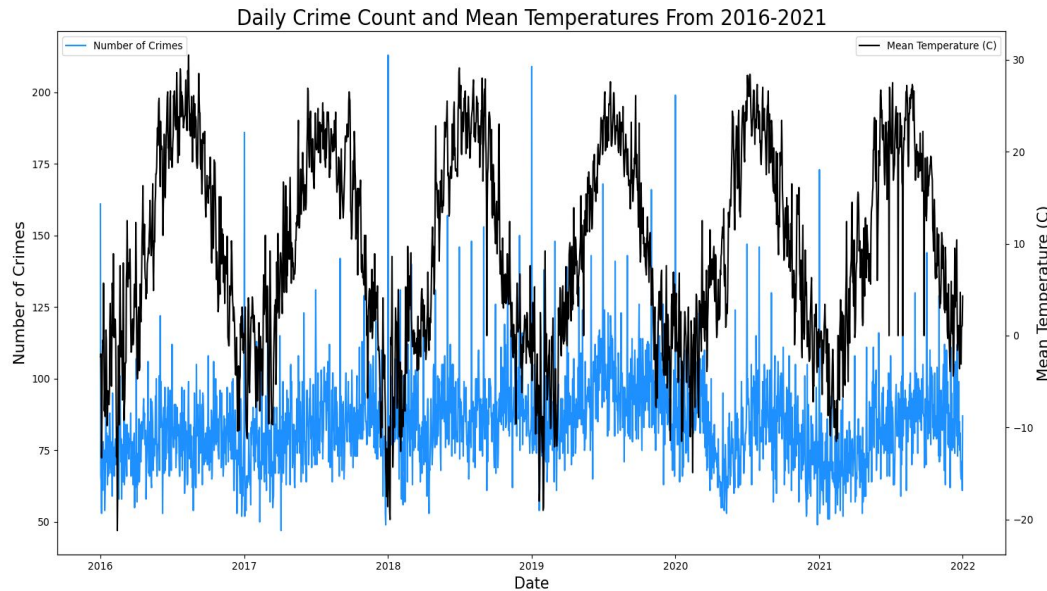
Crime and Weather: Linear Regression Analysis
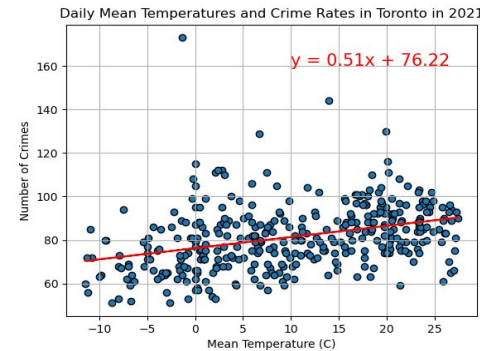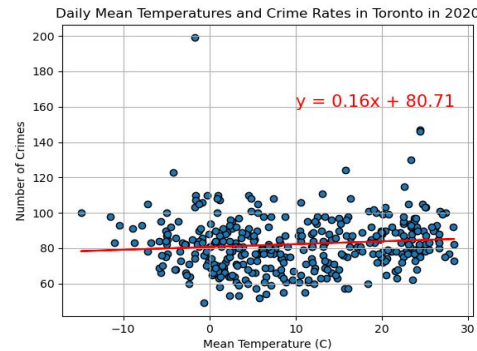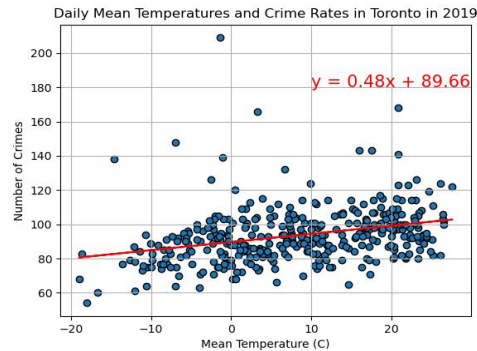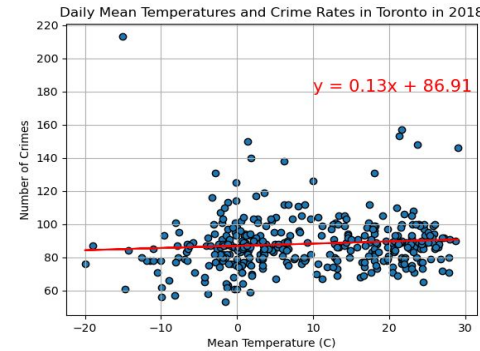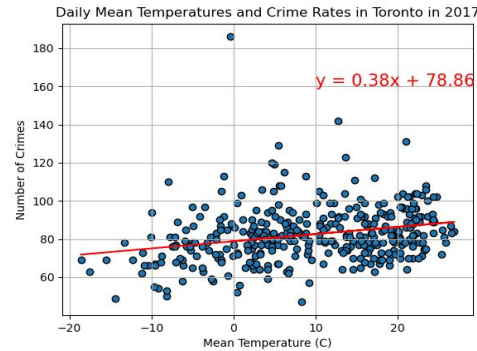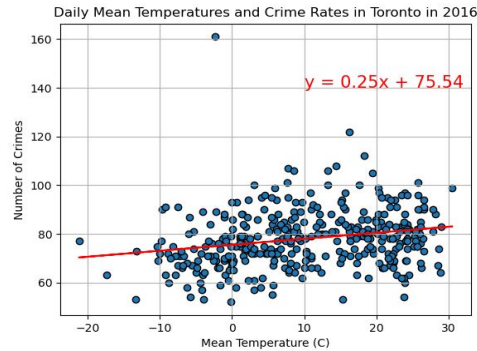
Yearly regression analysis reaffirms positive relationship between mean temperatures and crime rates, with some minor discrepancies (see 2020 linear regression)

Crime and Weather: Analyzing Trends

❖ Mean temperatures and number of crimes committed move together (positive relationship)
❖ Total snowfall and number of crimes committed move in the opposite direction (negative relationship), reaffirming observed relationship between the incidence of crime in warmer weather

Crime and Weather: Distribution of Mean Temperature by Crime Type

Crime Type vs Temperature
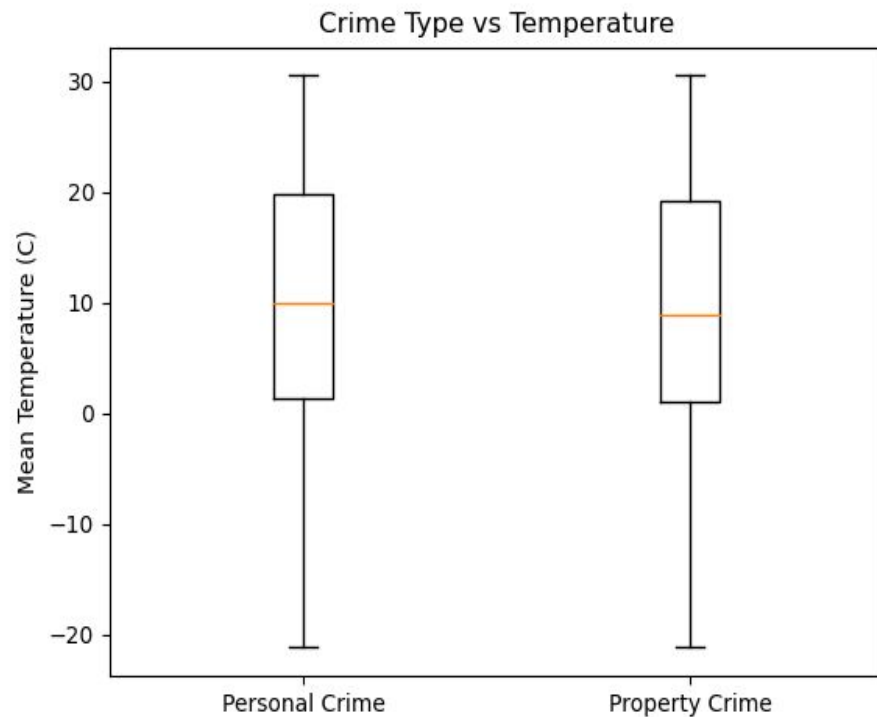
- ❖ Major crime categories have been grouped into two primary buckets: **personal crime** (assault) and **property crime** (auto theft, robbery, break and enter, general theft)
- ❖ No significant/discernible differences between personal and property crime in terms of spread, skewness and general distribution of data
- ❖ Median value for property crime is slightly lower

Thank You For Your Attention

Questions?