Toronto Crime Data Visualization

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Introduction

EXHIBIT 1: Safe Cities Index 2017 overall results

Average 72

1	Tokyo	89.80	21	New York	81.01	41	Moscow	63.99
2	Singapore	89.64	22	Taipei	80.70	42	Jeddah *	62.80
3	Osaka	88.87	23	Washington, DC	80.37	43	Delhi	62.34
4	Toronto	87.36	24	Paris	79.71	44	Lima	61.90
5	Melbourne	87.30	25	Milan	79.30	45	Mumbai	61.84
6	Amsterdam	87.26	26	Dallas *	78.73	46	Bogota *	61.36
7	Sydney	86.74	27	Rome	78.67	47	Riyadh	61.23
8	Stockholm	86.72	28	Abu Dhabi	76.91	48	Casablanca *	61.20
9	Hong Kong	86.22	29	Buenos Aires	76.35	49	Bangkok	60.05
10	Zurich	85.20	30	Doha	73.59	50	Johannesburg	59.17
11	Frankfurt	84.86	31	Kuala Lumpur *	73.11	51	Cairo *	58.33
12	Madrid	83.88	32	Beijing	72.06	52	Tehran	56.49
13	Barcelona	83.71	33	Athens *	71.90	53	Quito *	56.39
14	Seoul	83.61	34	Shanghai	70.93	54	Caracas *	55.22
15	San Francisco	83.55	35	Santiago	70.03	55	Manila *	54.86
16	Wellington *	83.18	36	Kuwait City	67.61	56	Ho Chi Minh City	54.33
17	Brussels	83.01	37	Rio de Janeiro	66.54	57	Jakarta	53.39
18	Los Angeles	82.26	38	Sao Paulo	66.30	58	Dhaka *	47.37
19	Chicago	82.21	39	Mexico City	65.52	59	Yangon *	46.47
20	London	82.10	40	Istanbul	65.23	60	Karachi *	38.77

* New cities

Data Set

Crime Data:

Index	Unique ID
occurrencedate	Date of occurrence
reporteddate	Date occurrence was reported
premisetype	Premise where occurrence took place
occurrencedayofyear	Occurrence day of year
occurrencedayofweek	Occurrence day of week
MCI	Major Crime Indicator related to the offence
Hood_ID	Neighbourhood ID Assigned to occurrence after offsetting X and & Coordinates to nearest intersection node
Neighbourhood	Neighbourhood Name Assigned to occurrence after offsetting X and & Coordinates to nearest intersection node

Data Set

GeoJson Data:

HOODNUM	Neighbourhood ID
HOOD	Neighbourhood Name
coordinates	Longitude and Latitude of each neighbourhood

Population Data:

Hood_ID	Neighbourhood ID
Population	Population of each neighbourhood

Tools

Programming Language:

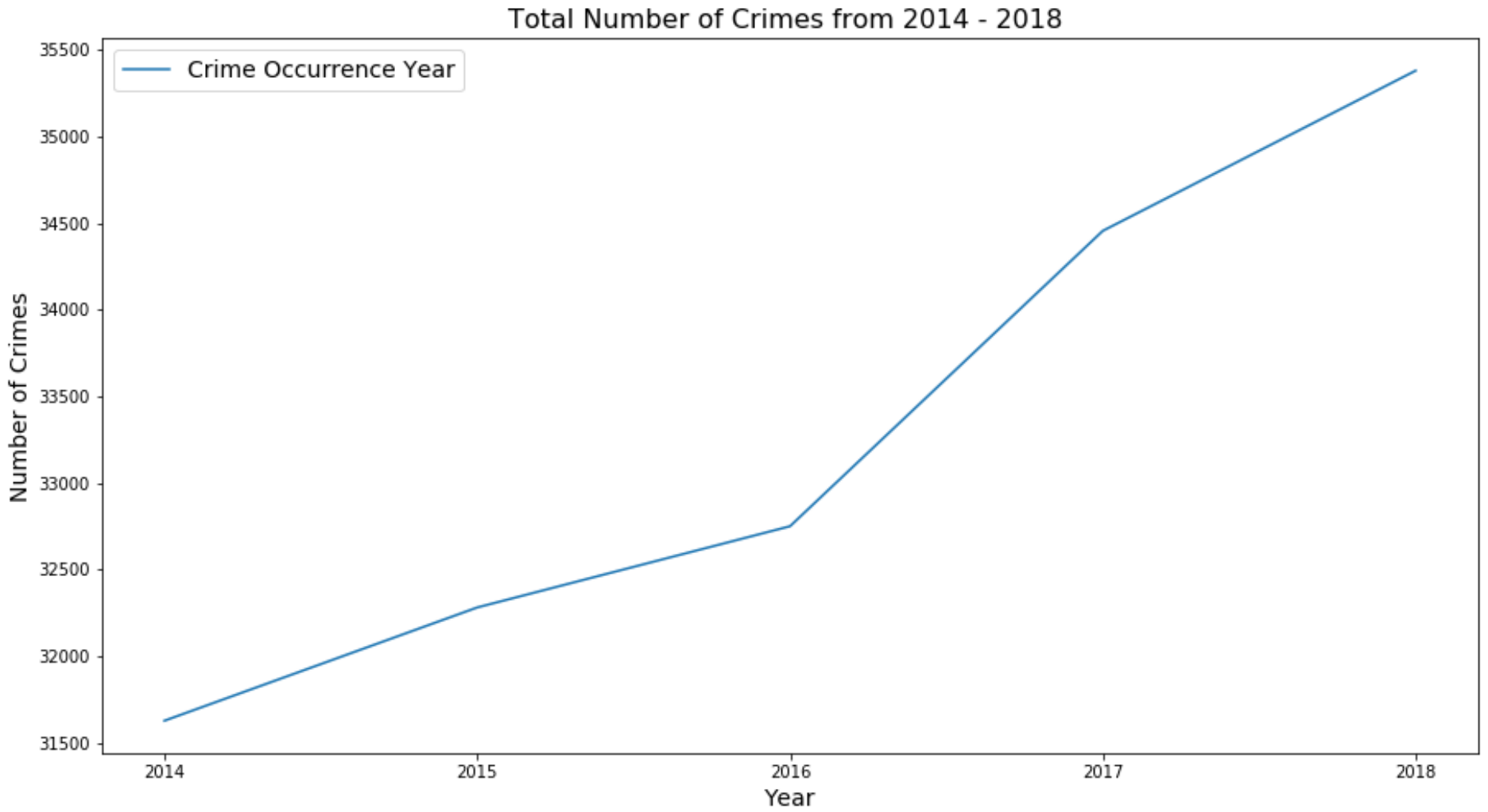
- Python

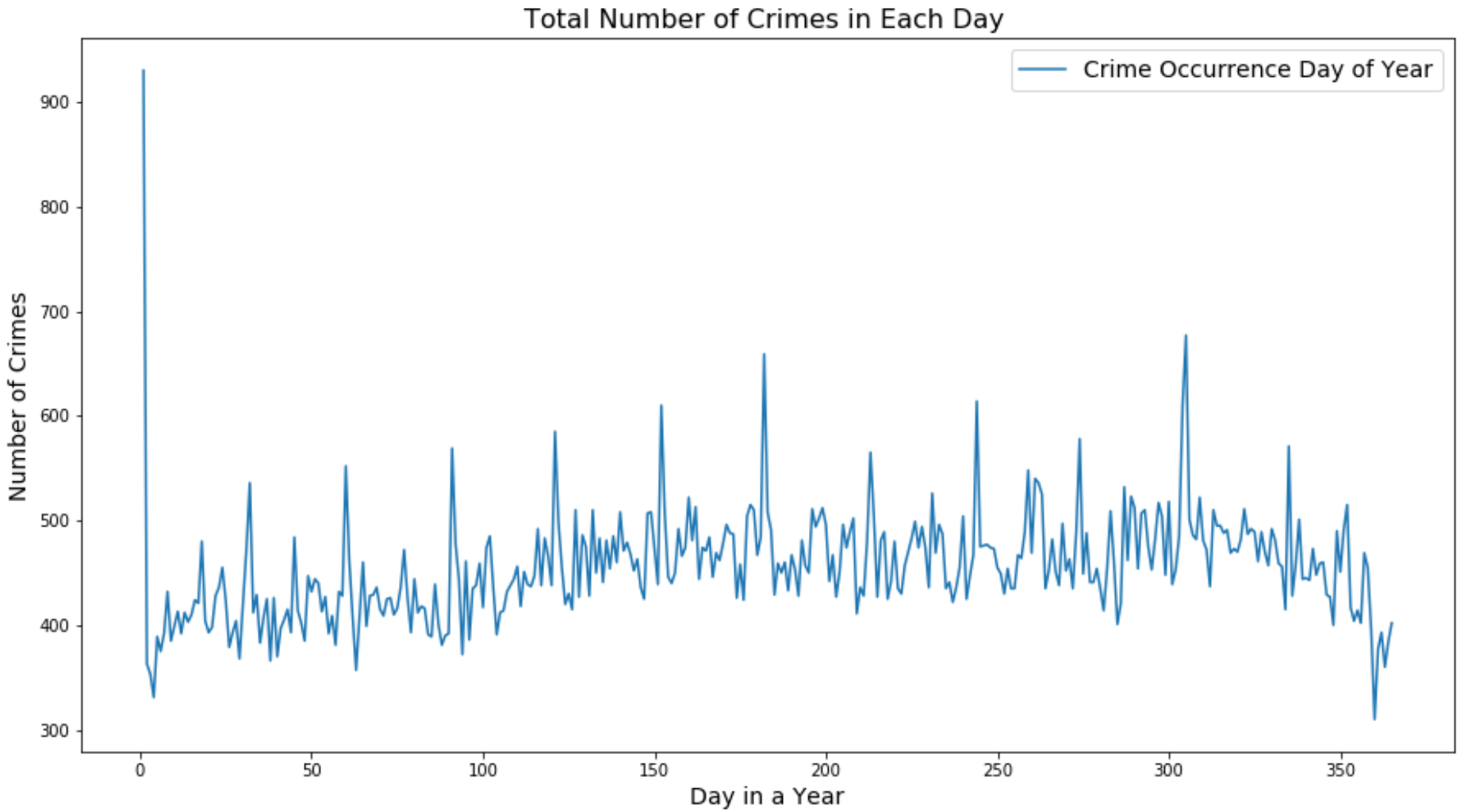
Libraries:

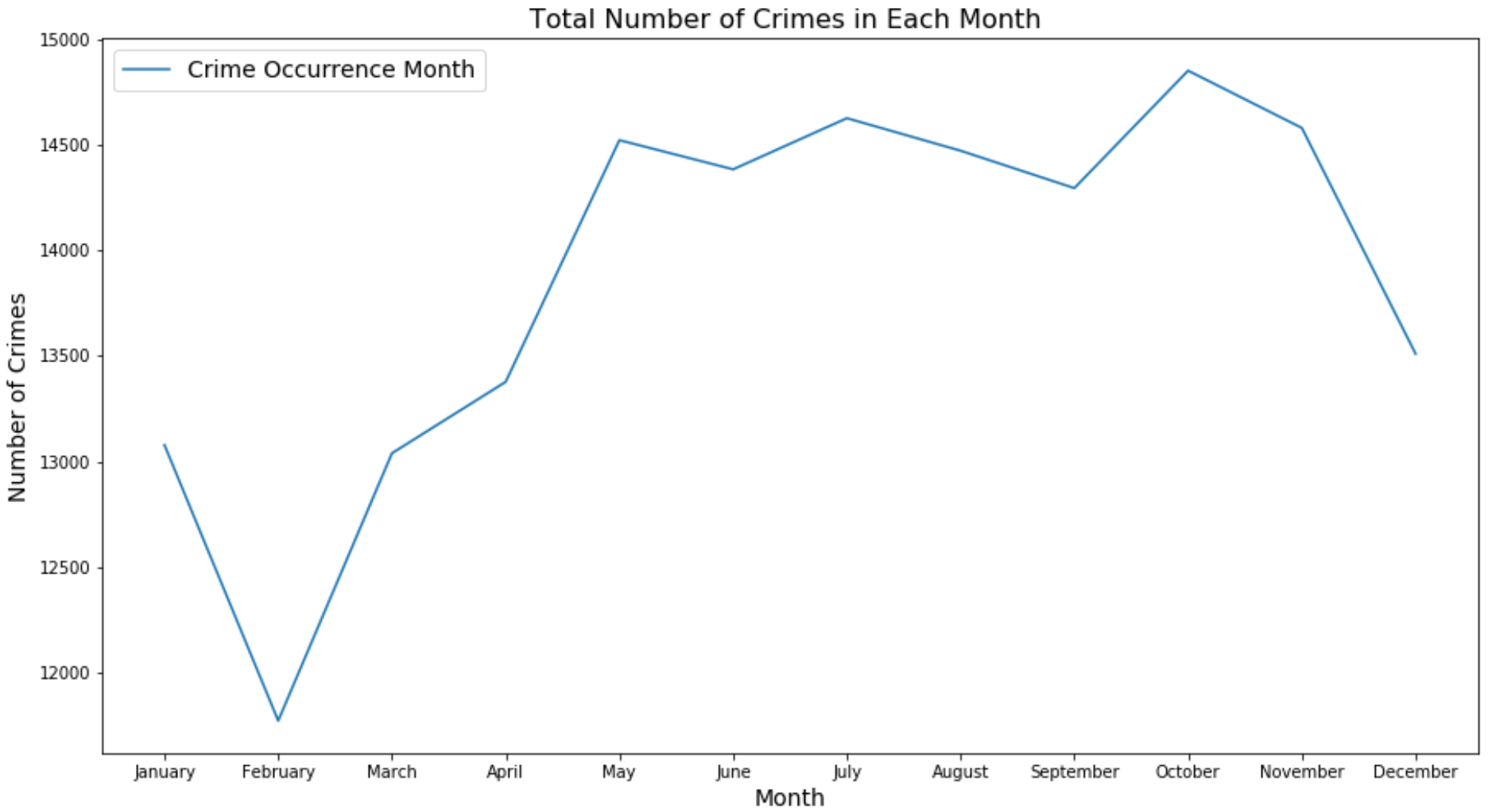
- Pandas
- Numpy
- Matplot
- Seaborn
- Folium

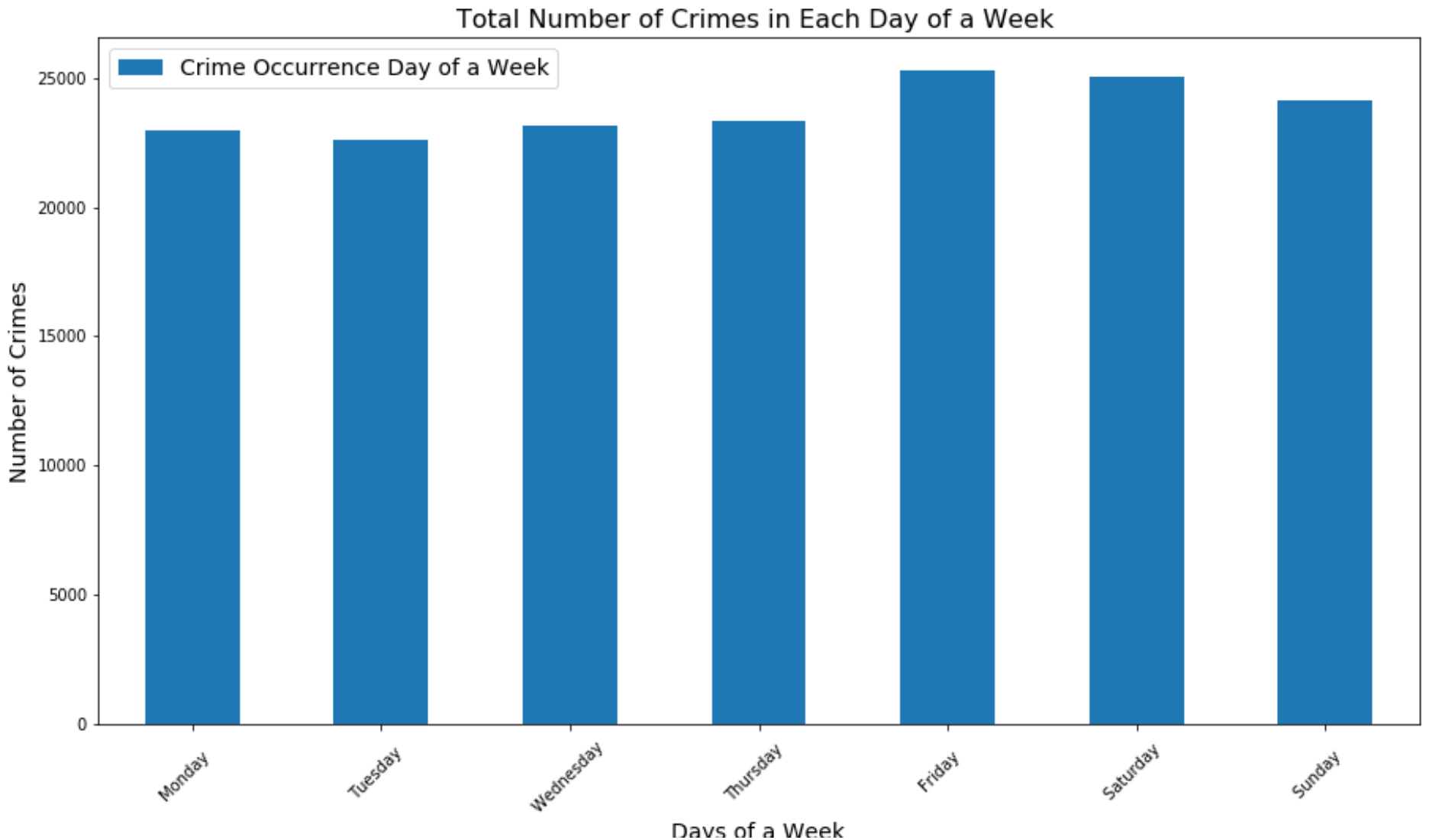
Environment:

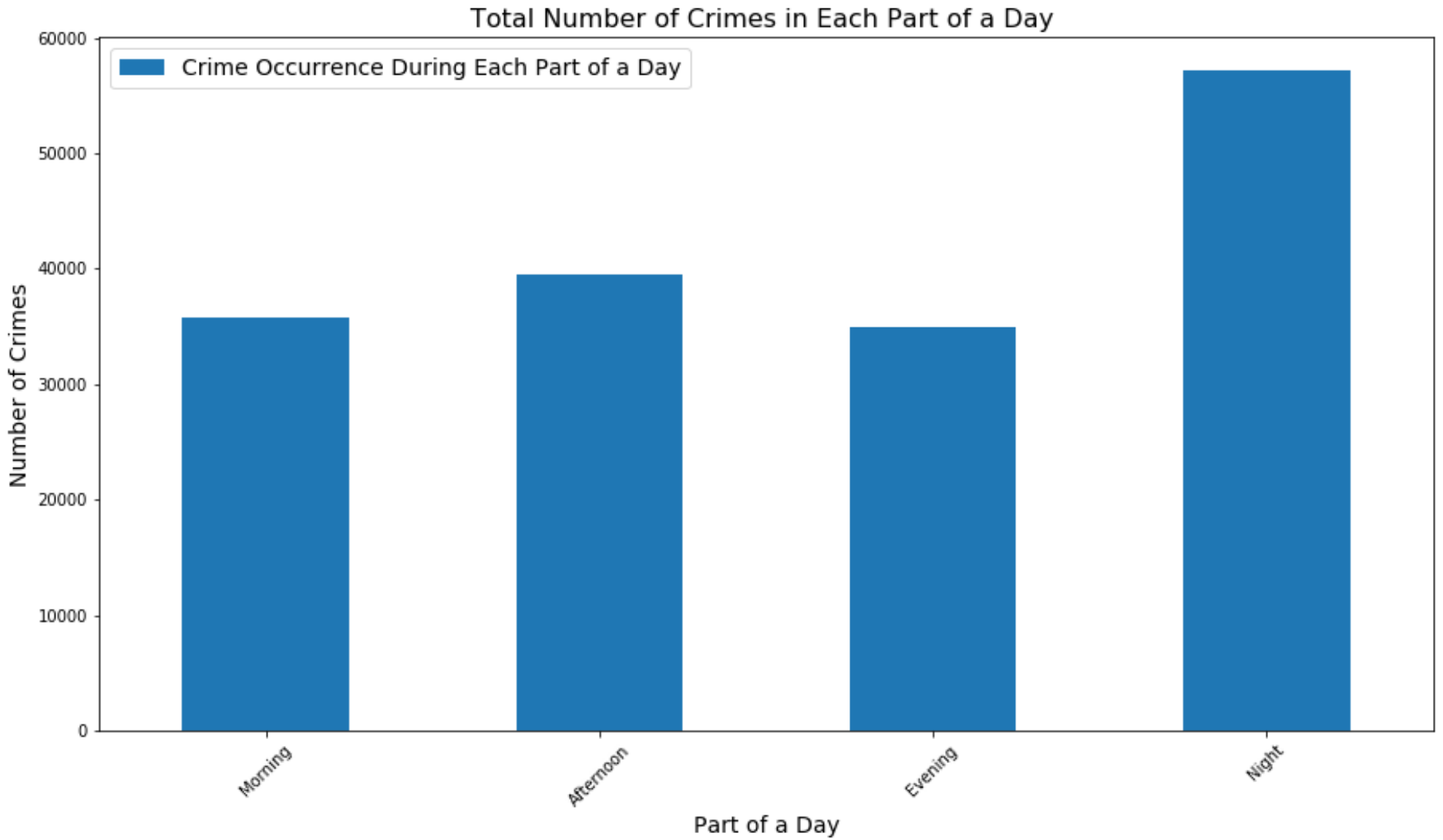
- Jupyter Notebook

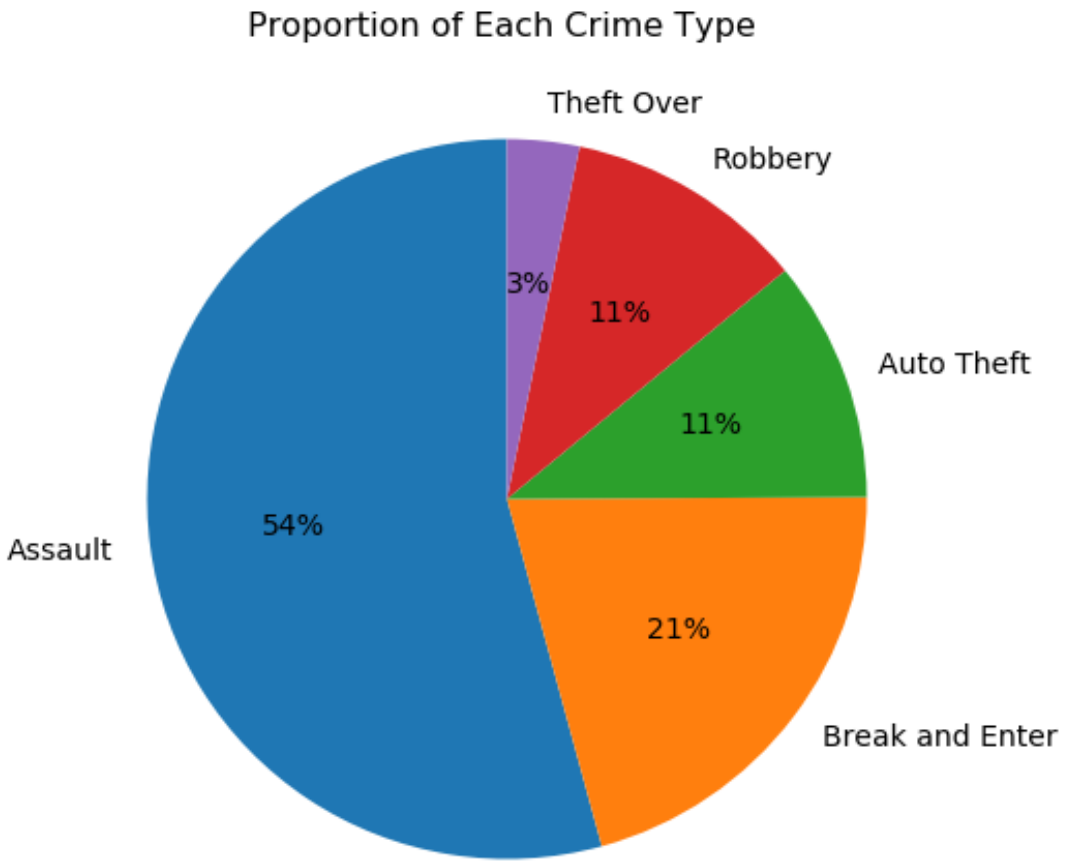

Total Number of Crimes from 2014 - 2018
Crime Occurrence Year
Number of Crimes
35500
35000
34500
34000
33500
33000
32500
32000
31500
2014
2015
2016
2017
2018
Year

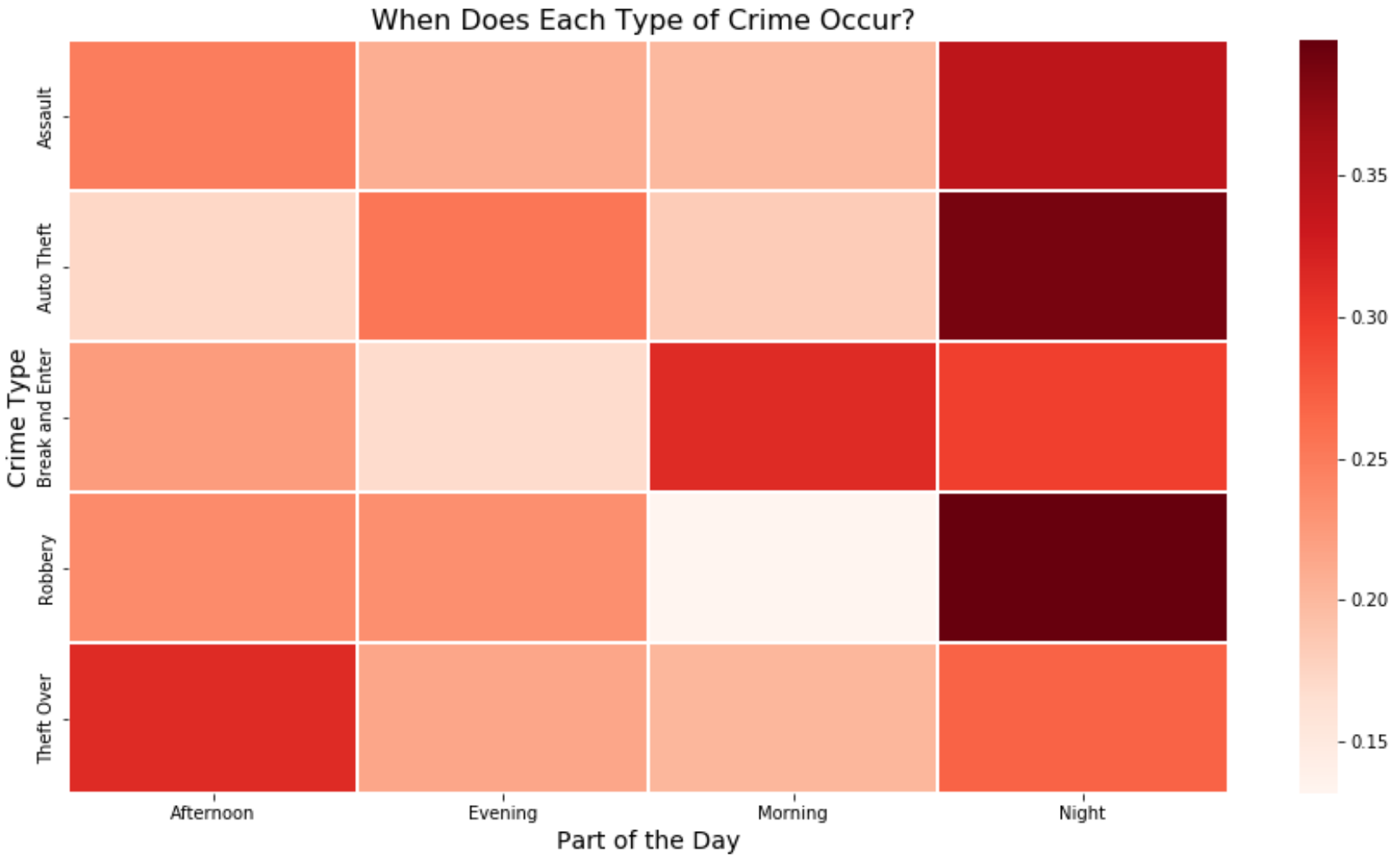

Total Number of Crimes in Each Day
Crime Occurrence Day of Year
Number of Crimes
900
800
700
600
500
400
300
0
50
100
150
200
250
300
350
Day in a Year

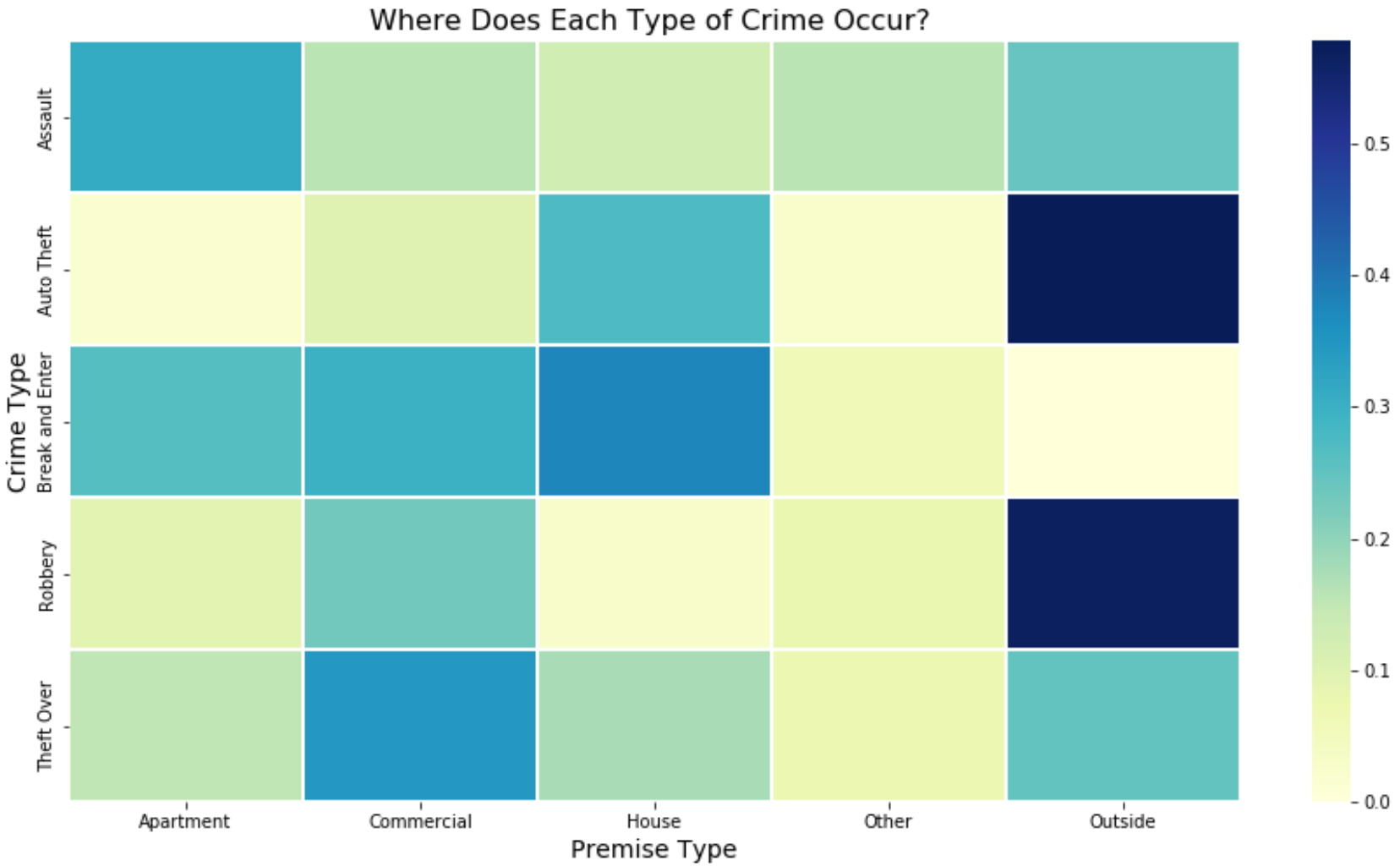

Total Number of Crimes in Each Month
Crime Occurrence Month
Number of Crimes
15000
14500
14000
13500
13000
12500
12000
January
February
March
April
May
June
July
August
September
October
November
December
Month

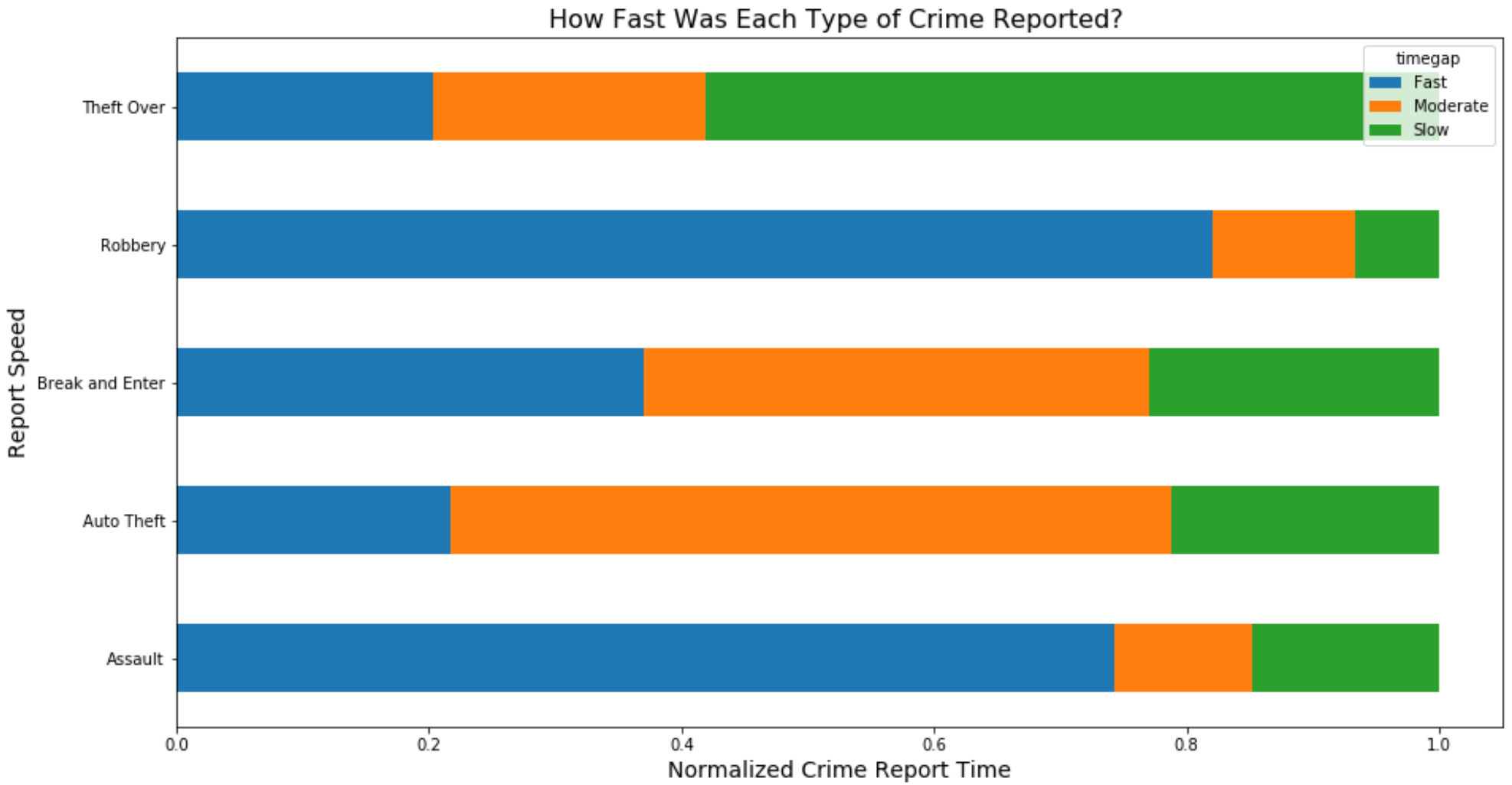

Total Number of Crimes in Each Day of a Week
Crime Occurrence Day of a Week
Number of Crimes
25000
20000
15000
10000
5000
0
Monday
Tuesday
Wednesday
Thursday
Friday
Saturday
Sunday
Days of a Week


Total Number of Crimes in Each Part of a Day
Crime Occurrence During Each Part of a Day
Number of Crimes
60000
50000
40000
30000
20000
10000
0
Morning
Afternoon
Evening
Night
Part of a Day

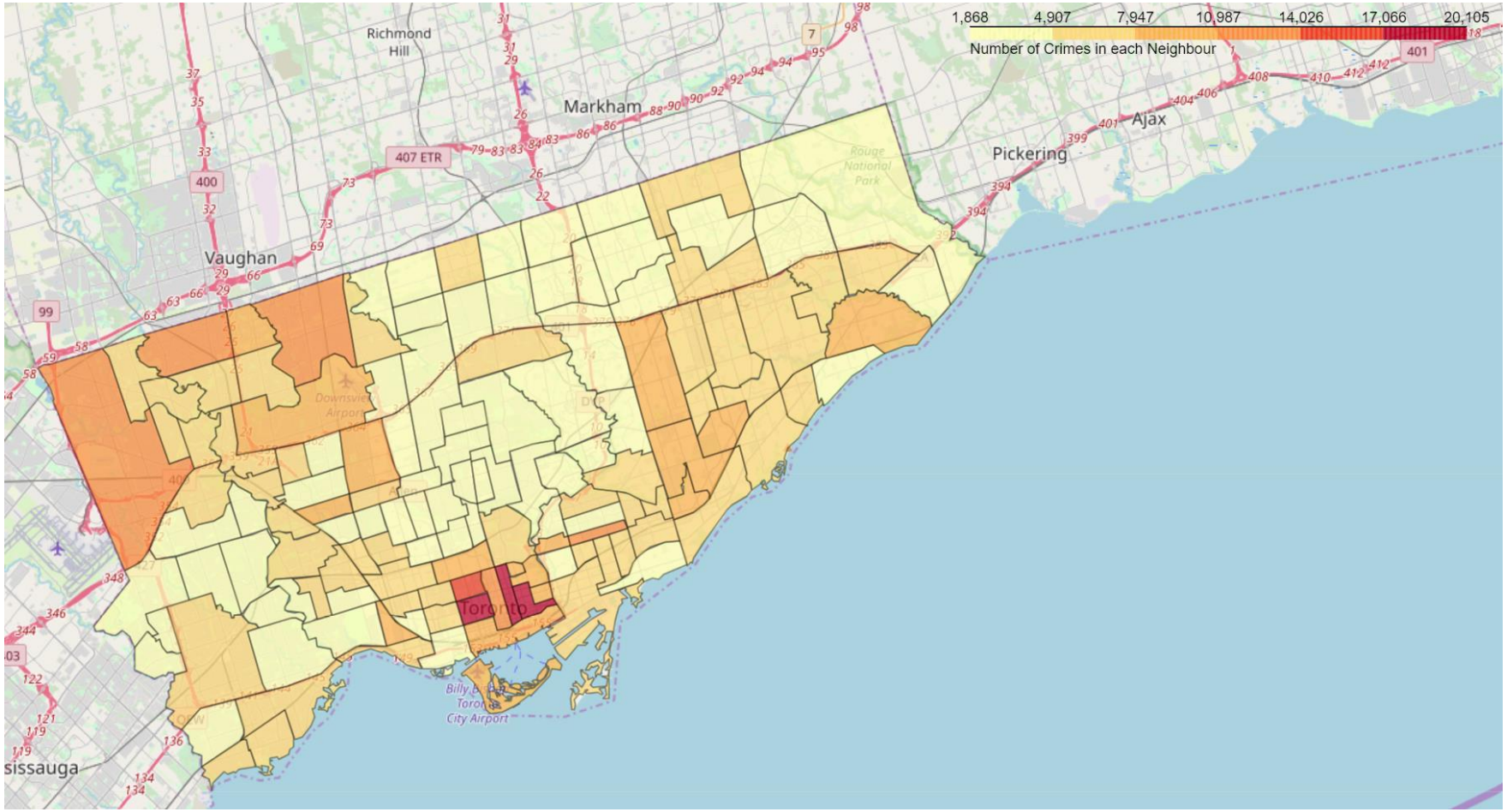

Proportion of Each Crime Type
Theft Over
Robbery
Auto Theft
Break and Enter
Assault
3%
11%
11%
21%
54%


When Does Each Type of Crime Occur?
Crime Type
Assault
Auto Theft
Break and Enter
Robbery
Theft Over
Afternoon
Evening
Morning
Night
Part of the Day
0.35
0.30
0.25
0.20
0.15


Where Does Each Type of Crime Occur?
Crime Type
Assault
Auto Theft
Break and Enter
Robbery
Theft Over
Apartment
Commercial
House
Other
Outside
Premise Type
0.5
0.4
0.3
0.2
0.1
0.0


How Fast Was Each Type of Crime Reported?
timegap
Fast
Moderate
Slow
Theft Over
Robbery
Break and Enter
Auto Theft
Assault
Report Speed
0.0
0.2
0.4
0.6
0.8
1.0
Normalized Crime Report Time

Crime Rates of Each Neighbourhood

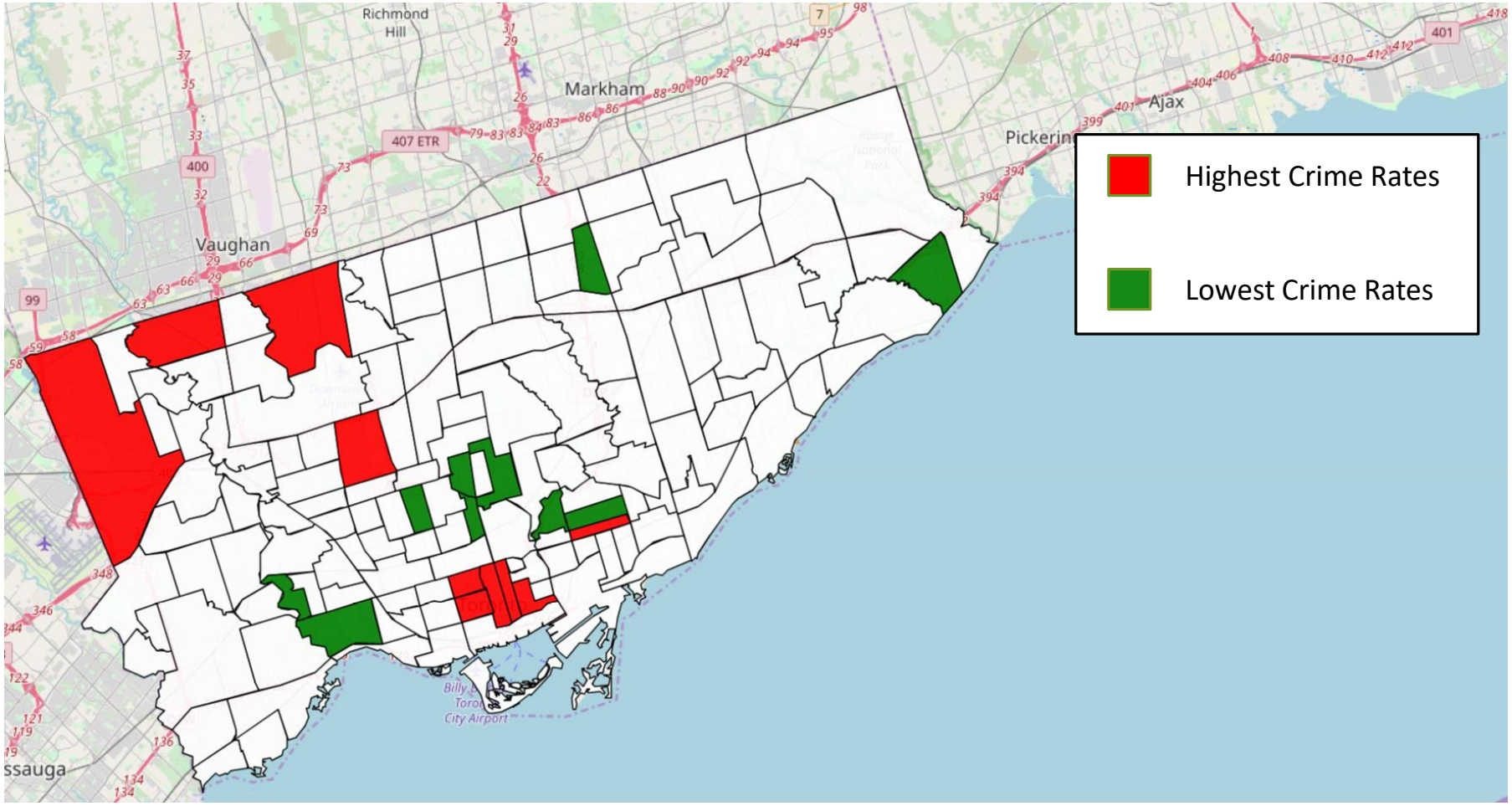


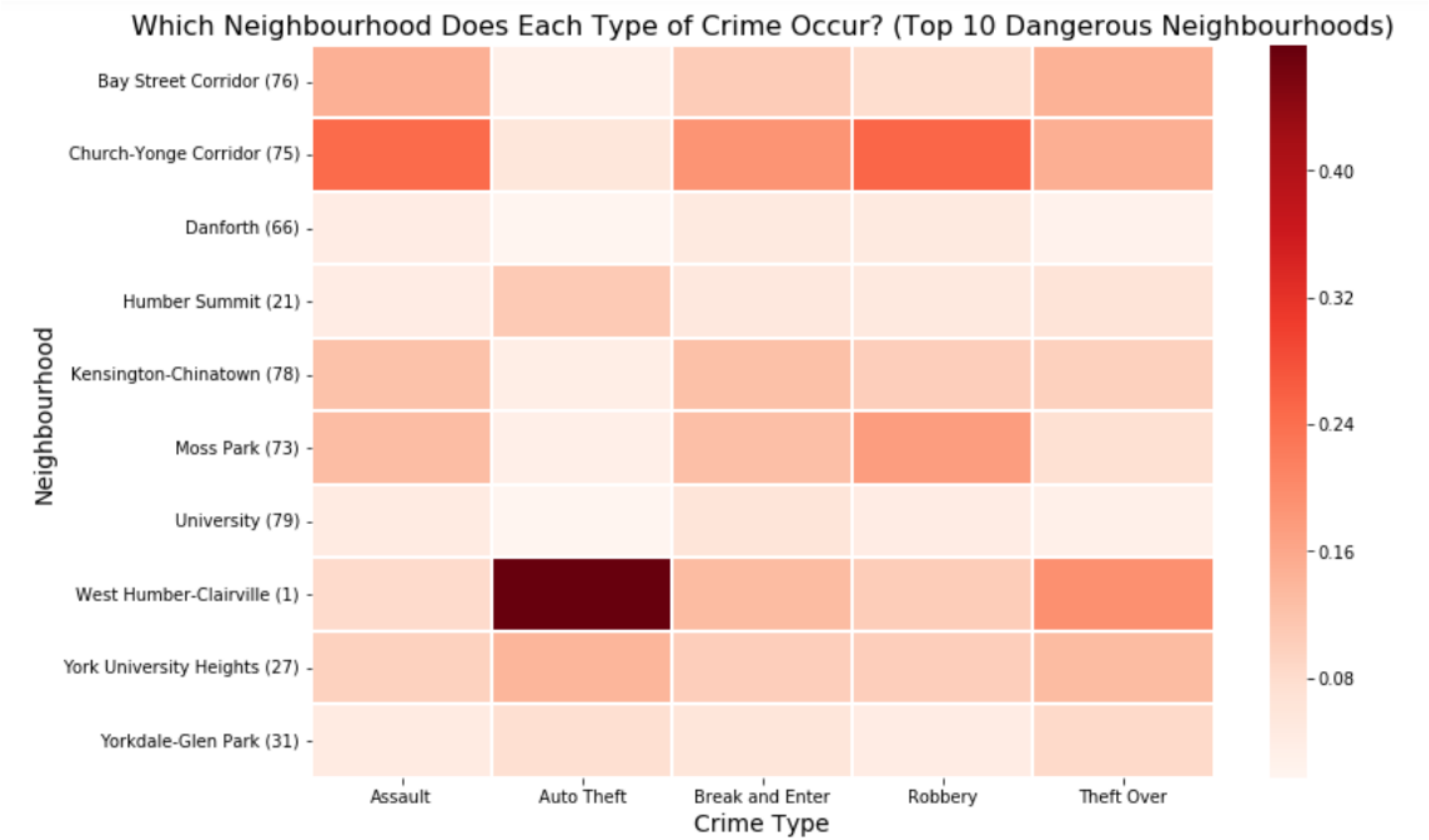
Top 10 Highest Crime Rates

1. Church-Yonge Corridor
2. Kensington-Chinatown
3. Moss Park
4. University
5. Bay Street Corridor
6. West Humber-Clairville
7. Humber Summit
8. Danforth
9. York University Heights
10. Yorkdale-Glen Park

Top 10 Lowest Crime Rates

1. Yonge-St.Clair
2. Centennial Scarborough
3. Lambton Baby Point
4. Mount Pleasant East
5. Humewood-Cedarvale
6. Broadview North
7. Pleasant View
8. Danforth East York
9. High Park-Swansea
10. Yonge-Eglinton




Which Neighbourhood Does Each Type of Crime Occur? (Top 10 Dangerous Neighbourhoods)
Neighbourhood
Bay Street Corridor (76)
Church-Yonge Corridor (75)
Danforth (66)
Humber Summit (21)
Kensington-Chinatown (78)
Moss Park (73)
University (79)
West Humber-Clairville (1)
York University Heights (27)
Yorkdale-Glen Park (31)
Assault
Auto Theft
Break and Enter
Robbery
Theft Over
Crime Type
0.40
0.32
0.24
0.16
0.08

Conclusion

Total Number of Crimes increased from 2017 – 2018

Robbery:

- Night/Afternoon
- Saturday/Thursday
- March/May
- On the street /Commercial Building
- Church-Yonge Corridor

Future Work:

Add demographics data for each neighbourhood to see more detailed insights of crimes in Toronto (housing price, age ,first language, etc)

References

Adamw523. (2013). Adamw523/toronto-geojson. Retrieved from https://github.com/adamw523/toronto-geojson

City of Toronto. (2018). Neighbourhood Profiles. Retrieved from https://www.toronto.ca/city-government/data-research-maps/neighbourhoods-communities/neighbourhood-profiles/

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