



2024 SAS SAFE ROADS COMPETITION

TORONTO ROAD SAFETY

Presented by Conchada, Mitzie Irene; Dona, Mary Claire; and Francisco, Karen Ann
Centennial College



Road Map

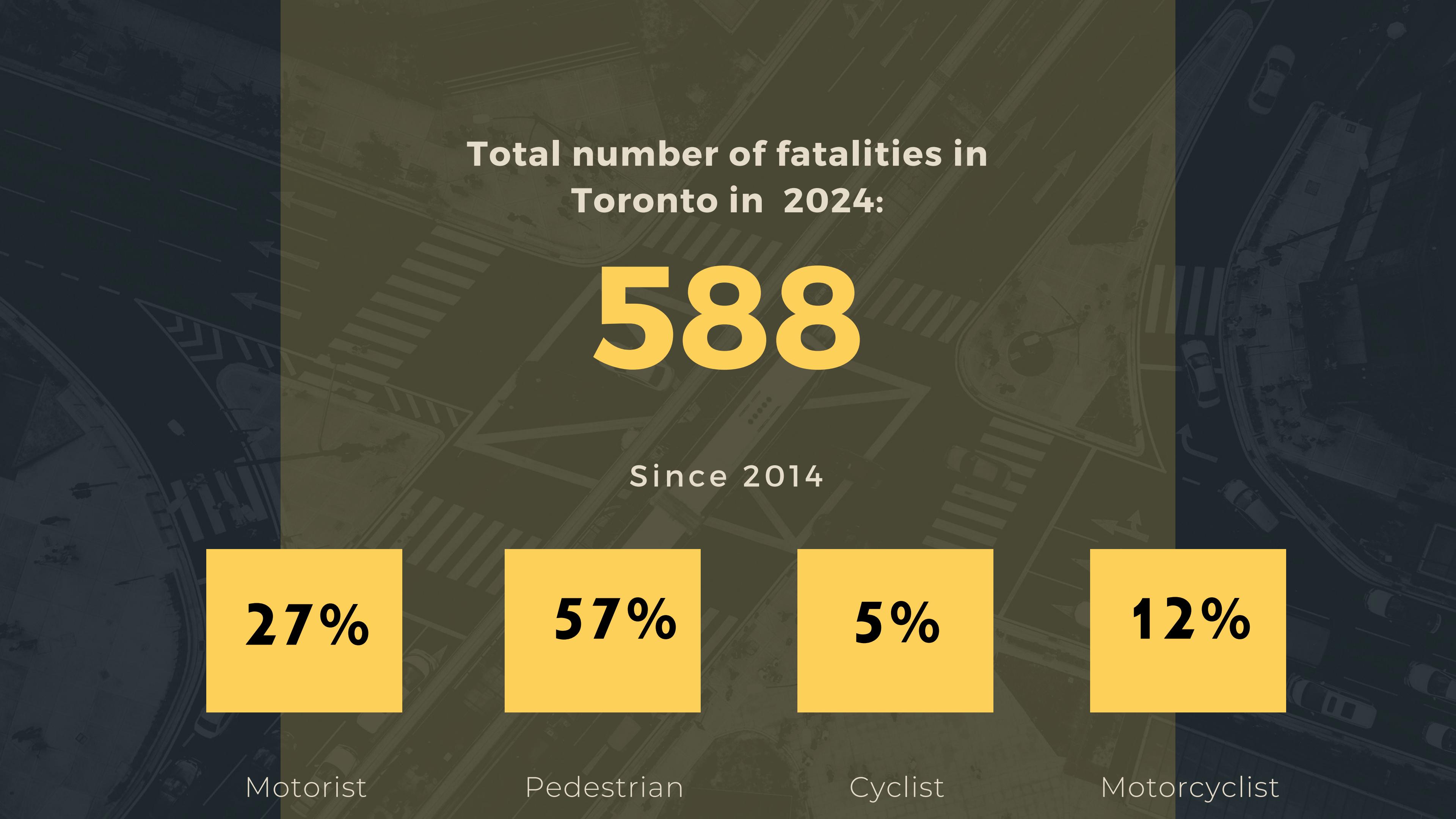
- Overview of the Study
- Research Objectives
- Data Exploration
- Design and Modelling
- Analysis and Insights
- Conclusion and Policy Recommendations



Overview of the Study

- Toronto is Canada's largest city
- 4th most populous in North America
- Ranked first in Canada for traffic congestion
- Rationale for Toronto's Vision Zero Program in 2016





Total number of fatalities in
Toronto in 2024:

588

Since 2014

27%

57%

5%

12%

Motorist

Pedestrian

Cyclist

Motorcyclist

Research Problem

What are the relationships between location, day and time with incidence of collision types. Moreover, how do these factors affect fatality?

Scope and Limitations

- Toronto Policy Service Motor Vehicle Collision Dataset 2014-2023



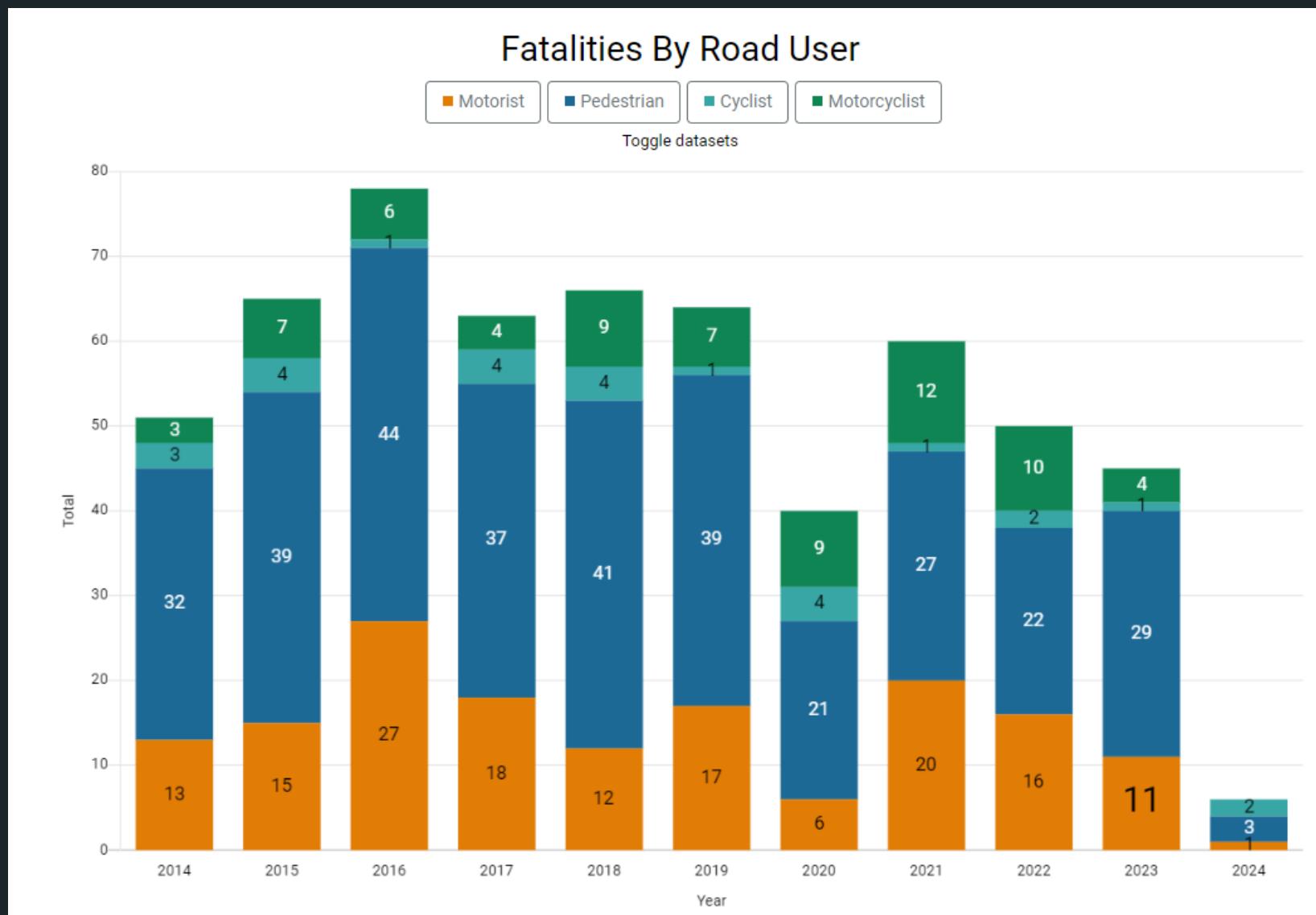
Research Objectives

1. Perform exploratory analysis on the Motor Vehicle Collision database from Toronto Police Services and other sources
2. Utilize predictive analysis to find patterns that might predict future incidents
3. Provide recommendations for policy consideration



Exploratory Analysis

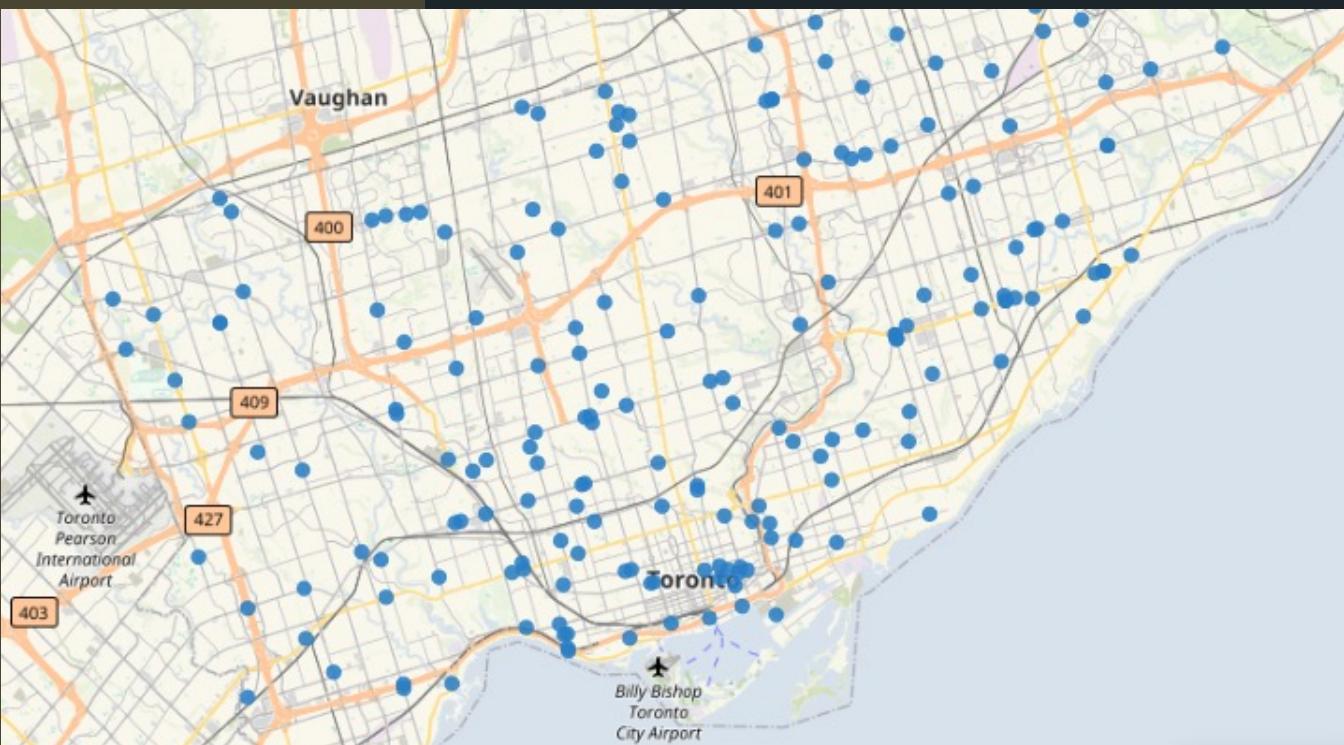
Fatalities by road user (2014-2024)



Exploratory Analysis: MVC Dataset

Fatality (at least 1)

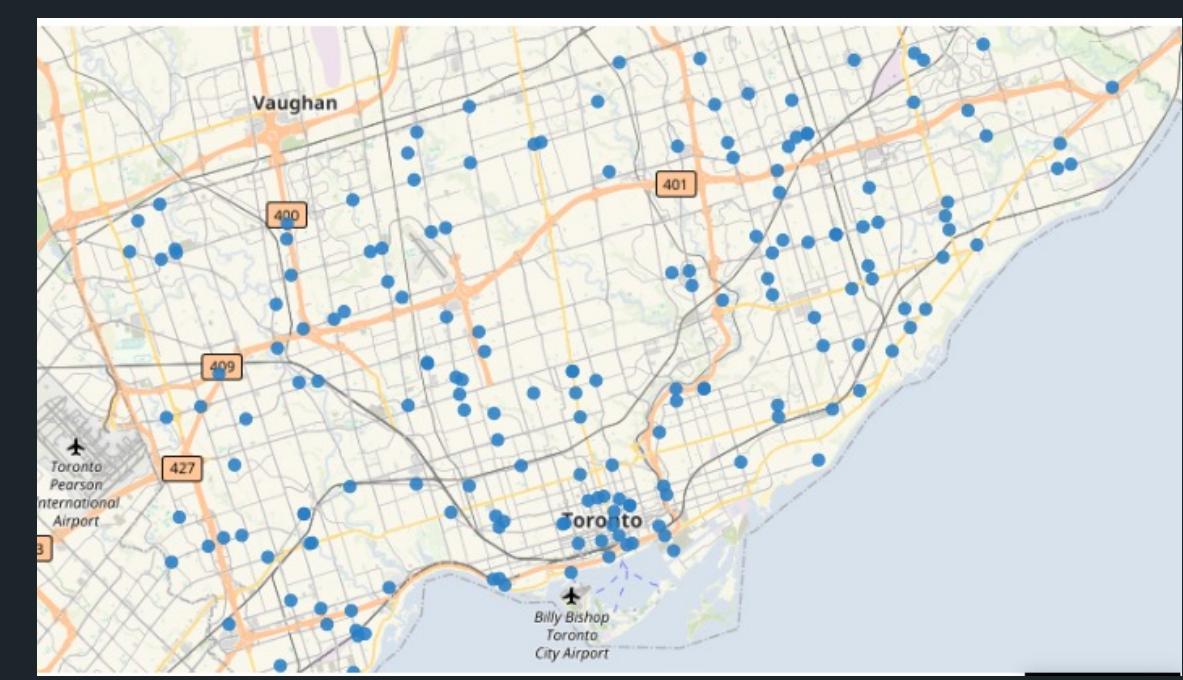
(2014-2016)



(2017-2019)



(2020-2023)



Exploratory Analysis: MVC Dataset

Fatalities per Road User

Pedestrian

PEDESTRIAN	FATALITIES				Total
	0	1	2	3	
N/R	6,073	0	0	0	6,073
NO	630,029	239	2	1	630,271
YES	16,133	325	2	1	16,461
Total	652,235	564	4	2	652,805

Automobile

AUTOMOBILE	FATALITIES				Total
	0	1	2	3	
N/R	6,073	0	0	0	6,073
NO	2,940	13	0	0	2,953
YES	643,222	551	4	2	643,779
Total	652,235	564	4	2	652,805

Motorcycle

MOTORCYCLE	FATALITIES				Total
	0	1	2	3	
N/R	6,073	0	0	0	6,073
NO	642,274	493	4	2	642,773
YES	3,888	71	0	0	3,959
Total	652,235	564	4	2	652,805

Passenger

PASSENGER	FATALITIES				Total
	0	1	2	3	
N/R	6,073	0	0	0	6,073
NO	596,215	401	2	1	596,619
YES	49,947	163	2	1	50,113
Total	652,235	564	4	2	652,805

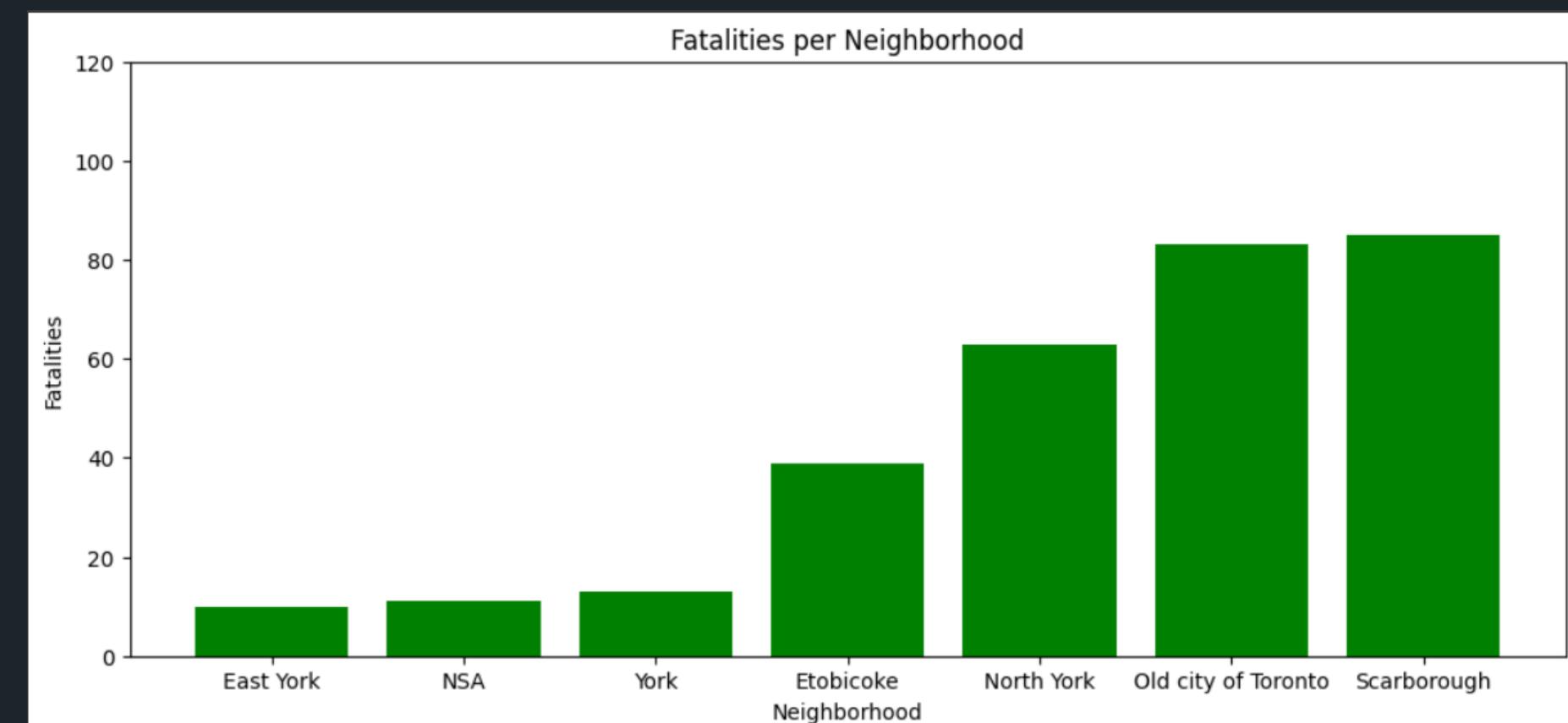
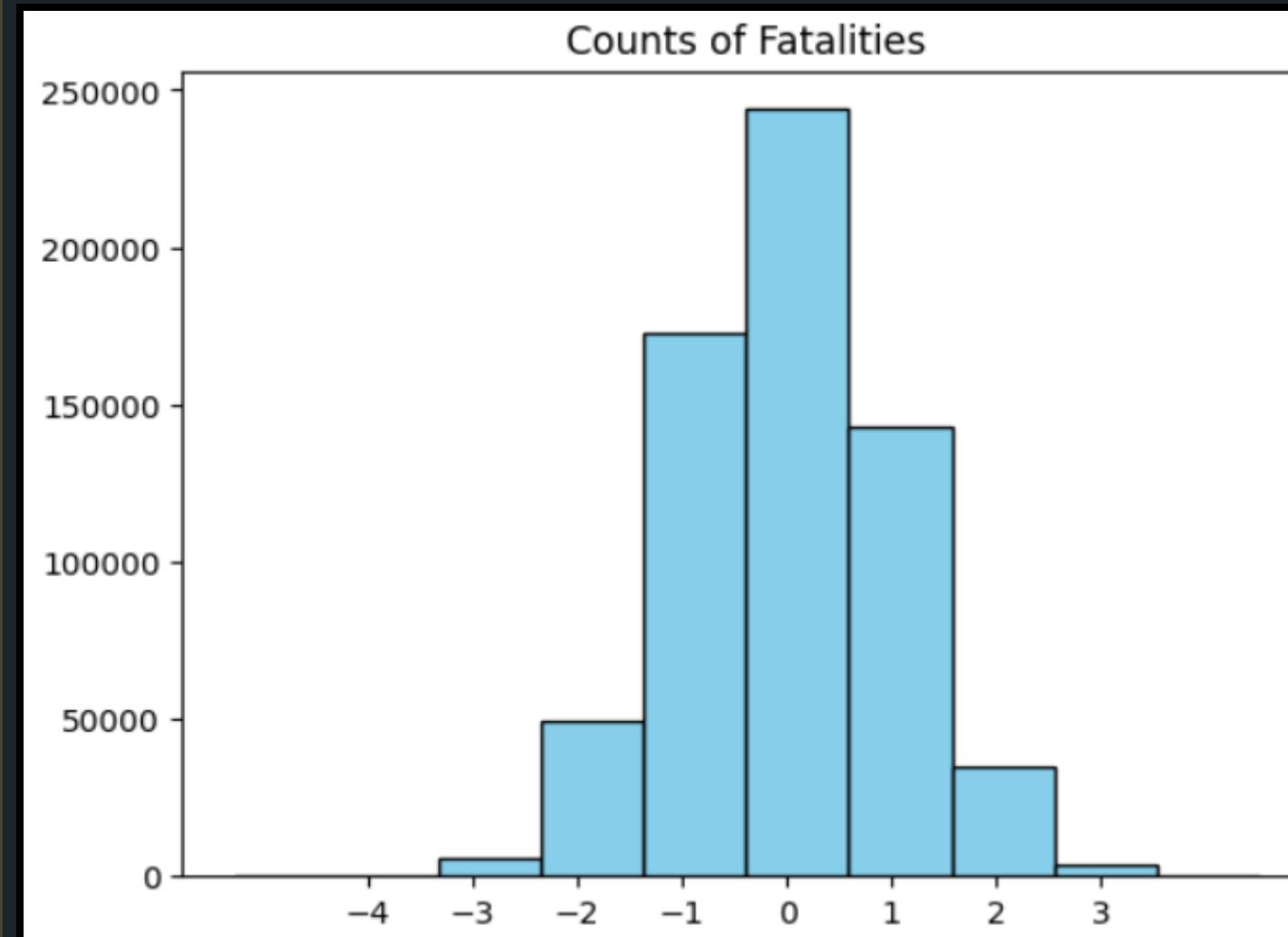
Bicycle

BICYCLE	FATALITIES				Total
	0	1	2	3	
N/R	6,073	0	0	0	6,073
NO	636,103	538	4	2	636,647
YES	10,059	26	0	0	10,085
Total	652,235	564	4	2	652,805



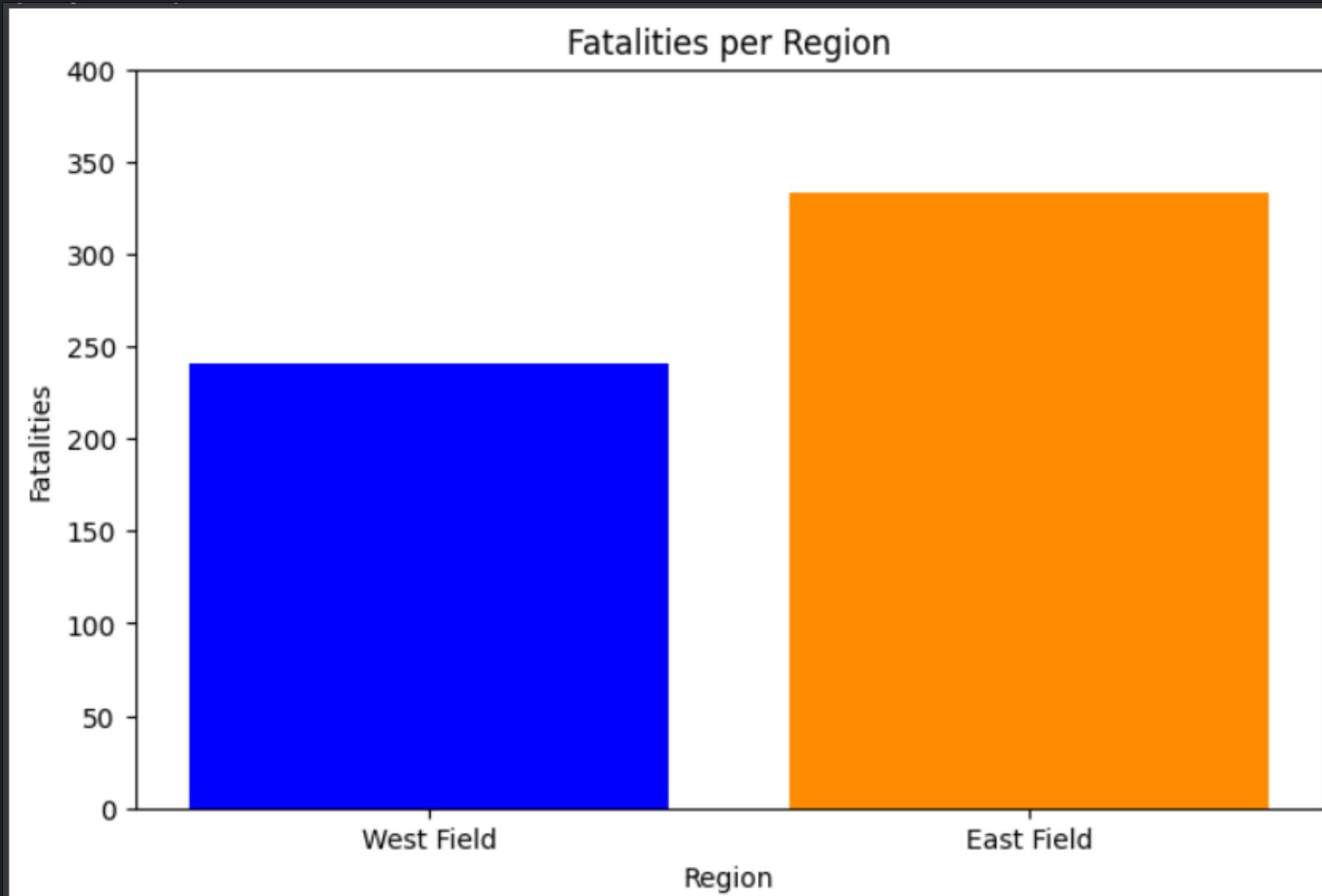
Exploratory Analysis: MVC Dataset

Fatalities



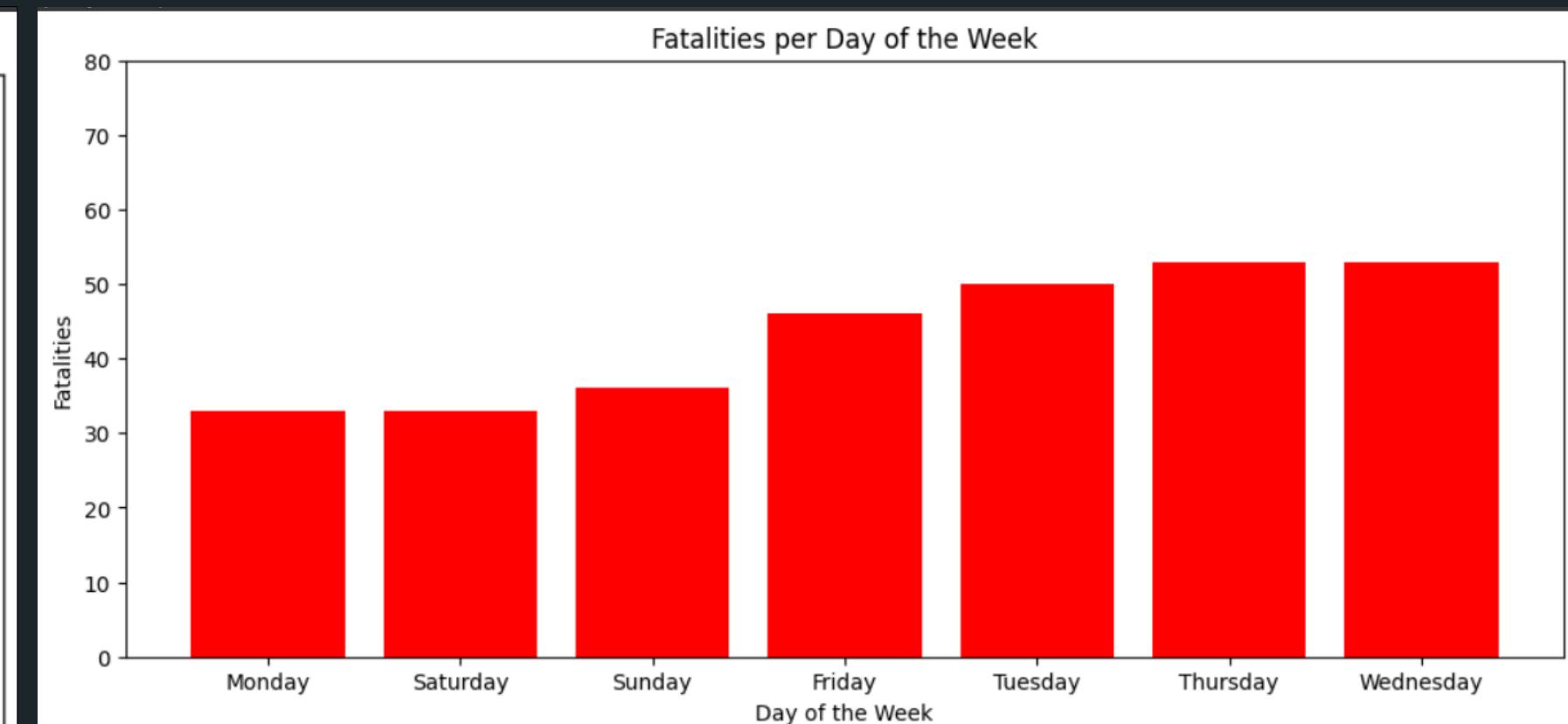
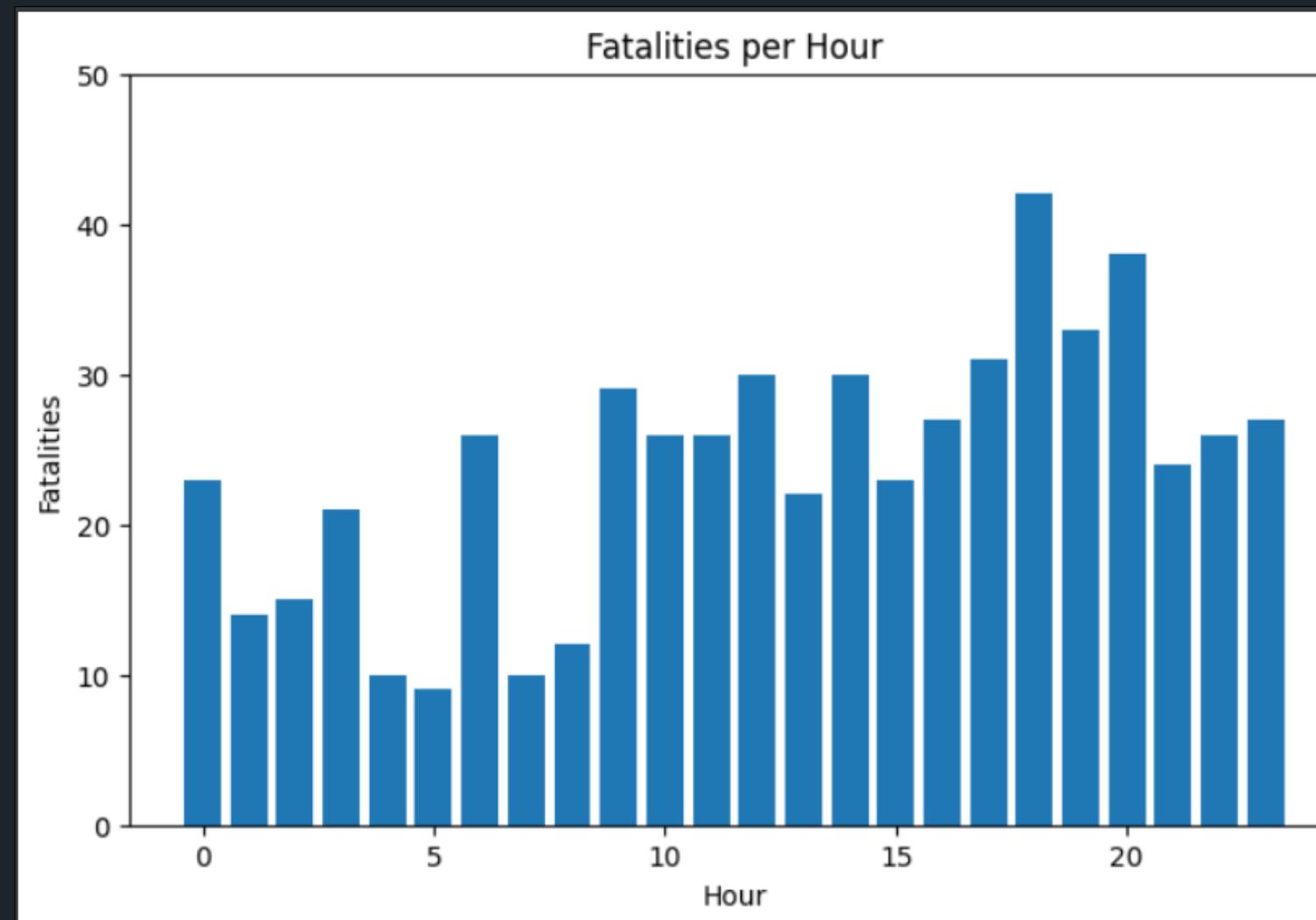
Exploratory Analysis: MVC Dataset

Fatalities



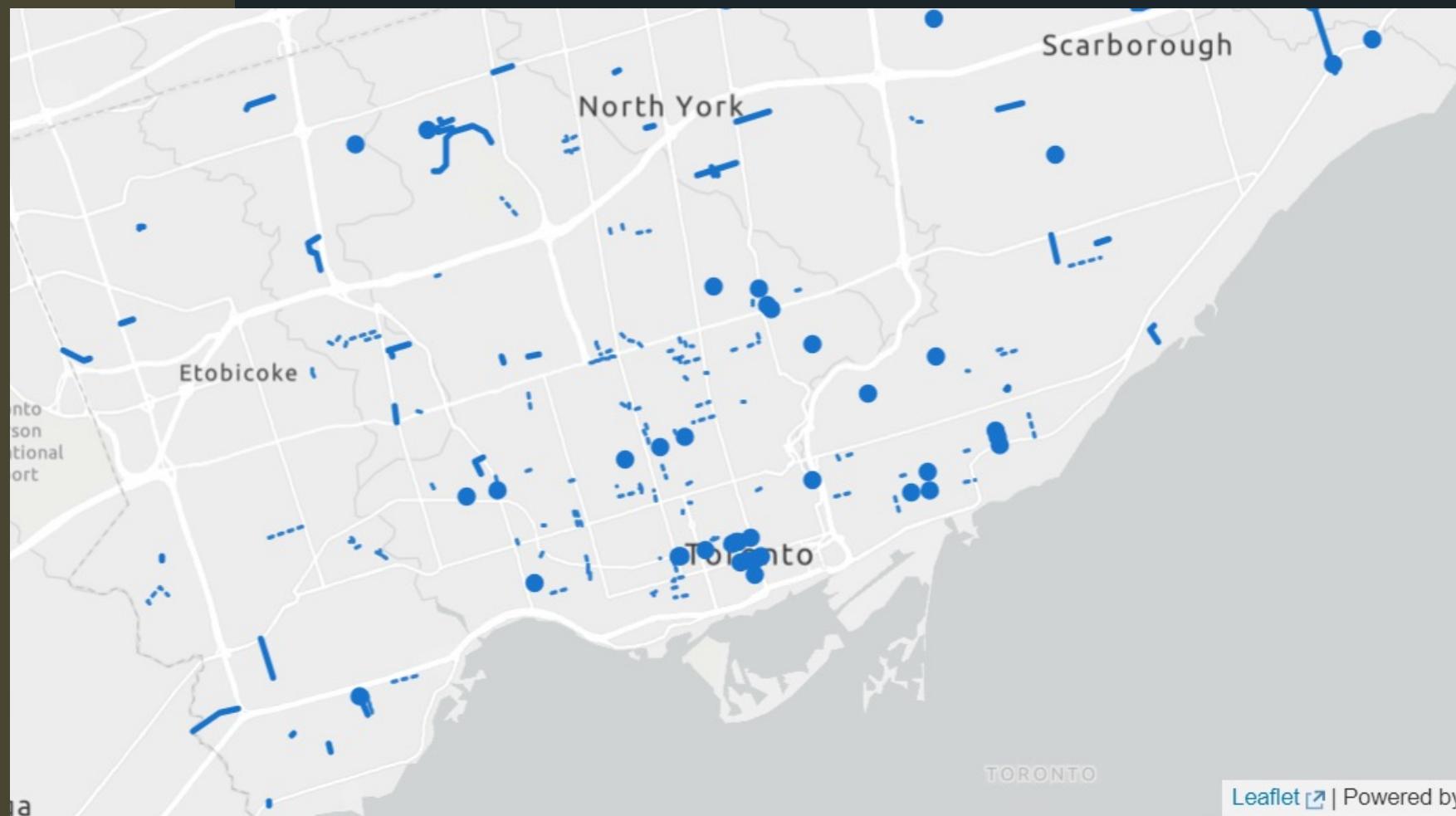
Exploratory Analysis: MVC Dataset

Fatalities

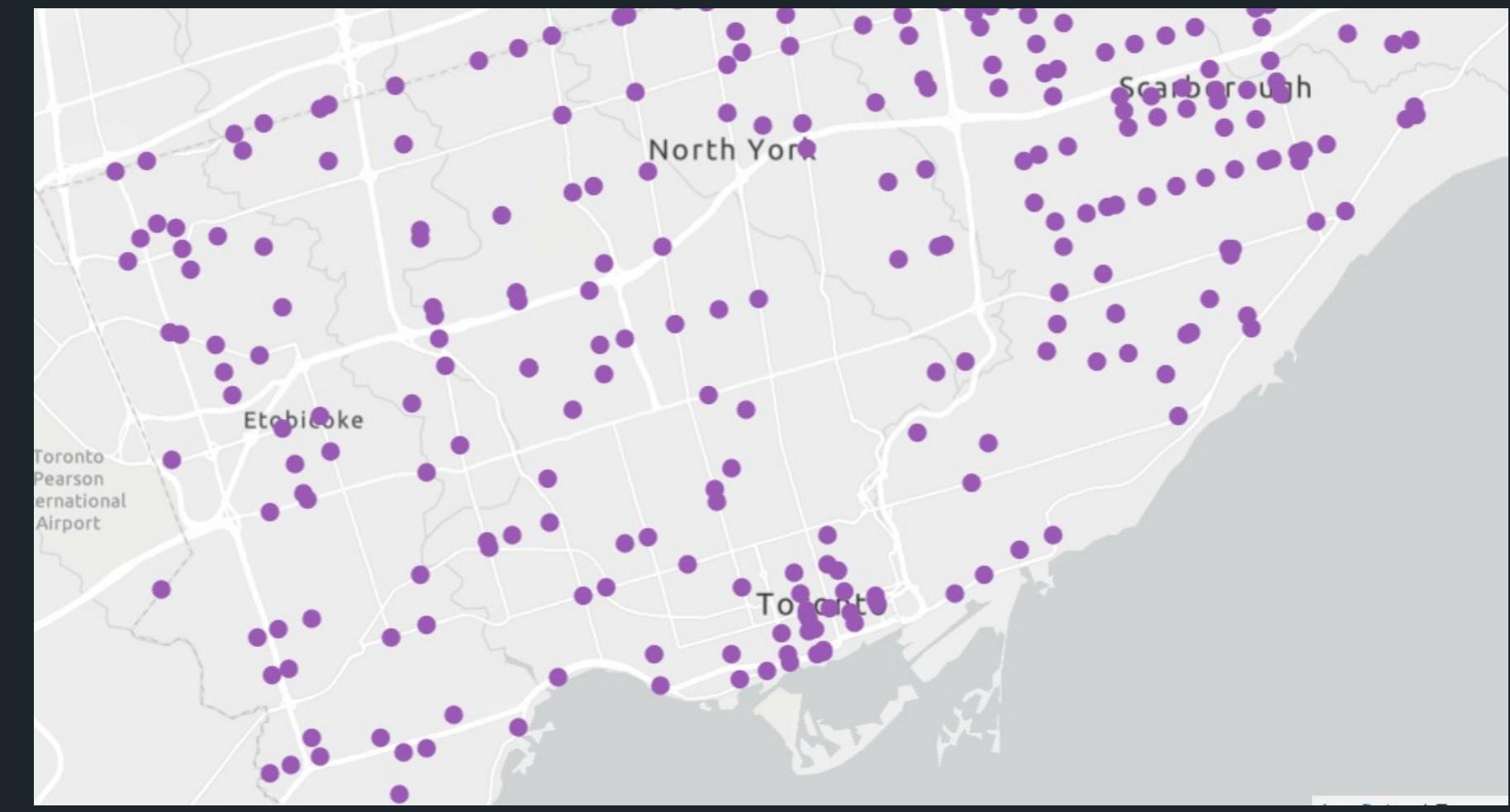


Exploratory Analysis: City of Toronto

Engineering Improvements

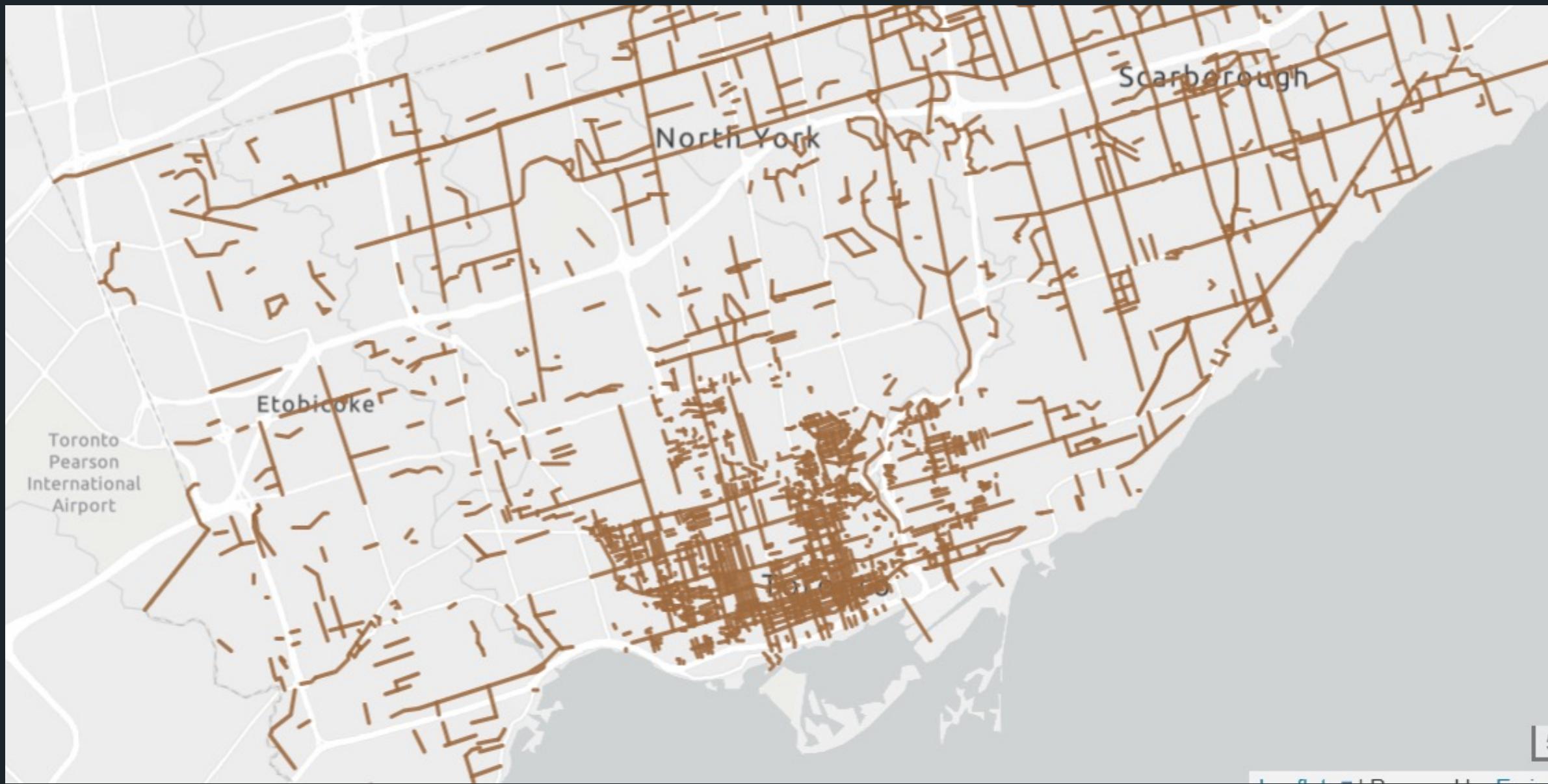


Automated Enforcement



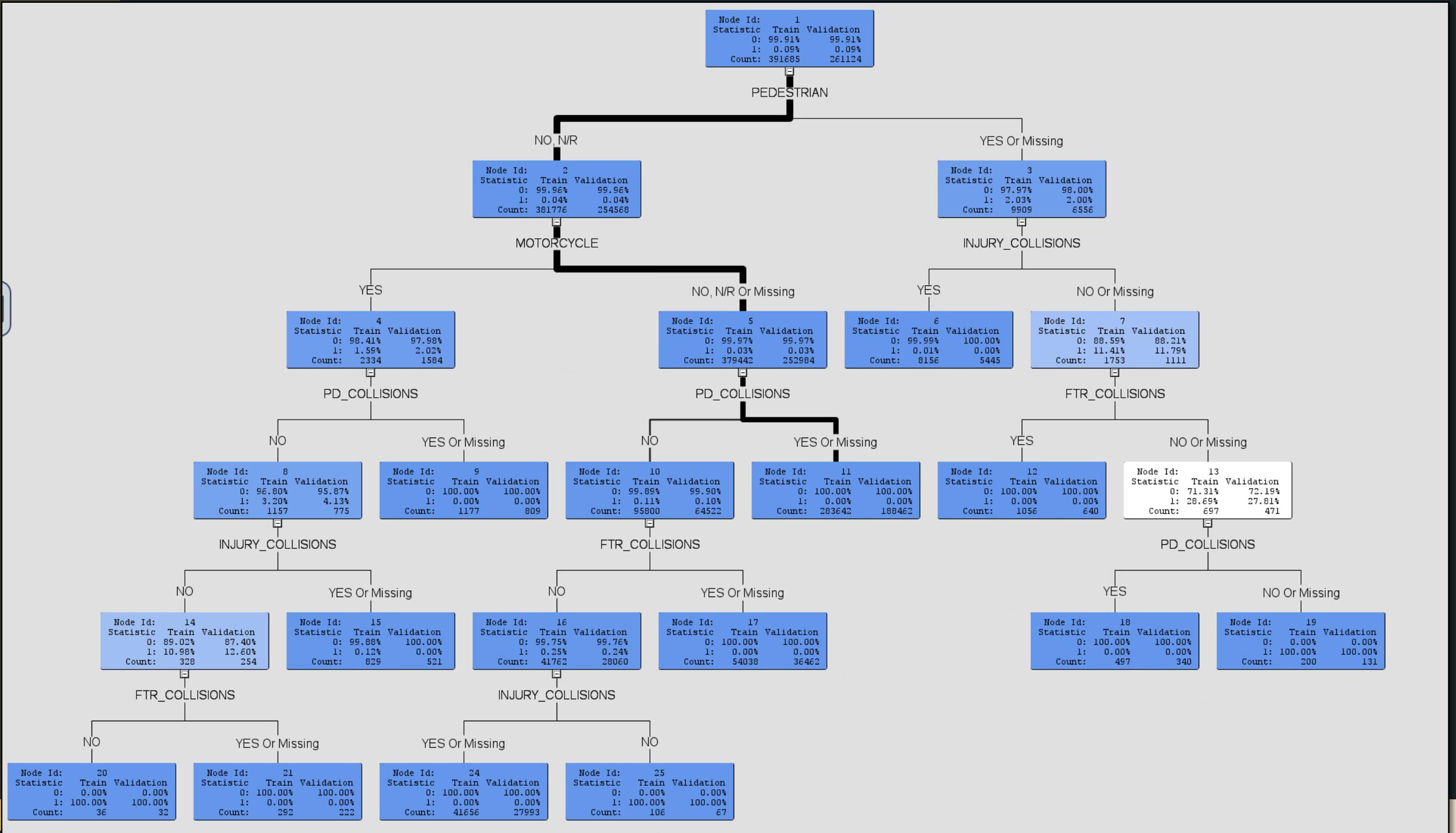
Exploratory Analysis: City of Toronto

Speed Limit Reductions



Design and Modelling

Decision Tree



Insights:

- Pedestrian
- Motorcycle



Design and Modelling

Logistic Regression



Full Regression Sequential Regression Models

- Forward
- Backward
- Stepwise

Insights:

- Motorcycle (99.4)%
- Pedestrian (99.7%)



Conclusions

- Collisions involving Pedestrian and Motorcycle mostly cause fatalities
- Existing policies may not have an impact yet on road safety

Recommendations

- Improve pedestrian safety such as:
 - Revisit traffic calming policy (i.e. speed bumps and humps)
 - Optimize AI technology in security cameras especially in high traffic pedestrian areas i.e. school zones
- Dissemination information among new comers i.e. international students, immigrants
- Include other vulnerable road users (i.e. motorcycle, bicycle, scooter) in the Vision Zero Program



References

- City of Toronto. (2024). Traffic calming. <https://www.toronto.ca/services-payments/streets-parking-transportation/traffic-management/traffic-calming/>
- City of Toronto. (2024). Fatalities – Vision Zero. <https://www.toronto.ca/services-payments/streets-parking-transportation/road-safety/vision-zero/vision-zero-dashboard/fatalities-vision-zero/>
- City of Toronto. (2024). Vision Zero mapping tool. <https://www.toronto.ca/services-payments/streets-parking-transportation/road-safety/vision-zero/safety-measures-and-mapping/>
- Toronto Police Service. (2024). Fatal collisions dashboard. <https://www.tps.ca/data-maps/data-analytics/fatal-collisions/>



The background of the slide is a grayscale aerial photograph of a city street. The street is lined with buildings, trees, and parked cars. Several people are walking on the sidewalks. The perspective is from above, looking down the length of the street.

Thank you!

Contact us:

mconchad@my.centennialcollege.ca

kfranc61@my.centennialcollege.ca

mdona@my.centennialcollege.ca



2024 SAS SAFE ROADS COMPETITION

TORONTO ROAD SAFETY

Presented by Conchada, Mitzie Irene; Dona, Mary Claire; and Francisco, Karen Ann
Centennial College