

RISKY COMMUTES FOR CYCLISTS IN BOSTON

Paul Bastide

OVERVIEW

- The City of Boston is the largest city in Massachusetts with 800,000 inhabitants and 1.3 million commuters.
- The City of Boston provides insights on the locations of neighborhoods, fatalities and incidents.
- This project identifies incident hotspot neighborhoods and suggests less incident prone neighborhoods of travel for users.
- The project helps Boston cyclists be better prepared to travel in the neighborhoods they pass through. Given the appropriate data, the problem is:
 - What level of risk is there in commuting through the Boston neighborhoods and streets to avoid?

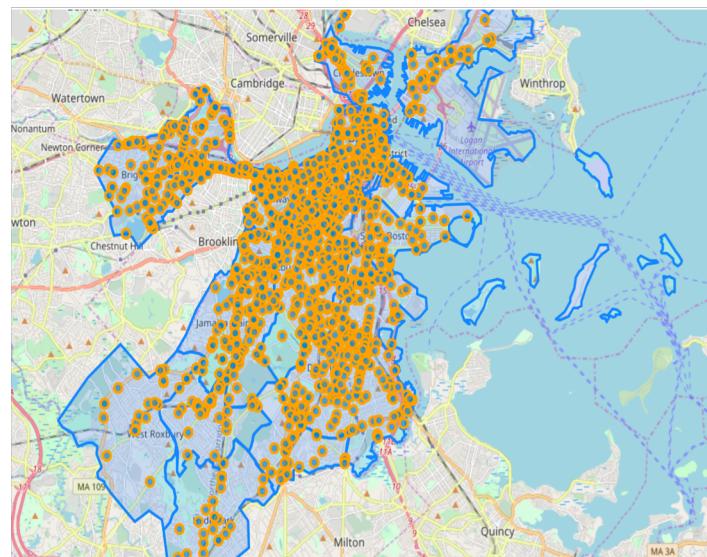
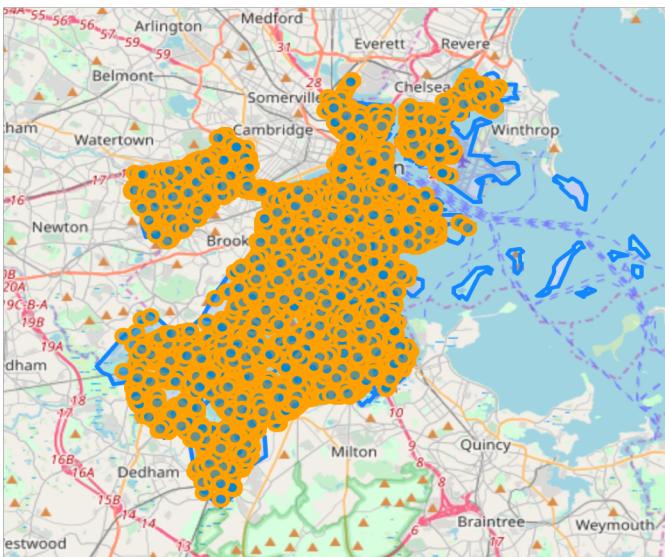
Data acquisition and cleaning

- The data sets used in the analysis are:
 - Vision Zero Crash Records
 - Crash <https://data.boston.gov/dataset/vision-zero-crash-records>
 - Fatality <https://data.boston.gov/dataset/vision-zero-fatality-records>
 - Boston Neighborhoods
 - <https://data.boston.gov/dataset/boston-neighborhoods>
- The data is in the GeoJSON and CSV format and generally contains more data on all traffic incidents. The incidents need to be pruned to the usable portion (only bike). The CSV data needs to be augmented with neighborhood related data. (pinpoint where each incident occurs)

<u>_id</u>	<u>date_time</u>	<u>mode_type</u>	<u>location_type</u>	<u>street</u>	<u>xstreet1</u>	<u>xstreet2</u>	<u>x_cord</u>	<u>y_cord</u>	<u>lat long</u>	<u>neighborhood</u>
2015-01-21 15:07:00,ped,Street,CENTRE ST,RITCHIE ST,LAMARTINE ST,	764320.75,294290	8.64,-71.1000694606,42.3227879775								

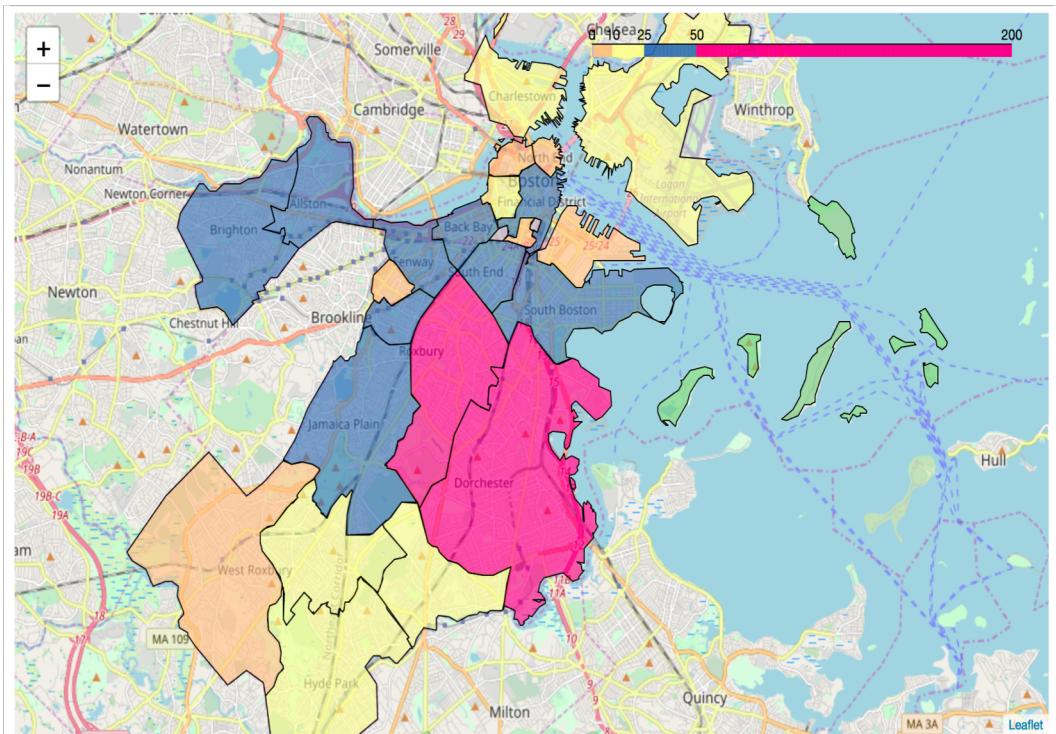
- The data is from 2015 to end of 2018.

View of All and Bike Incidents



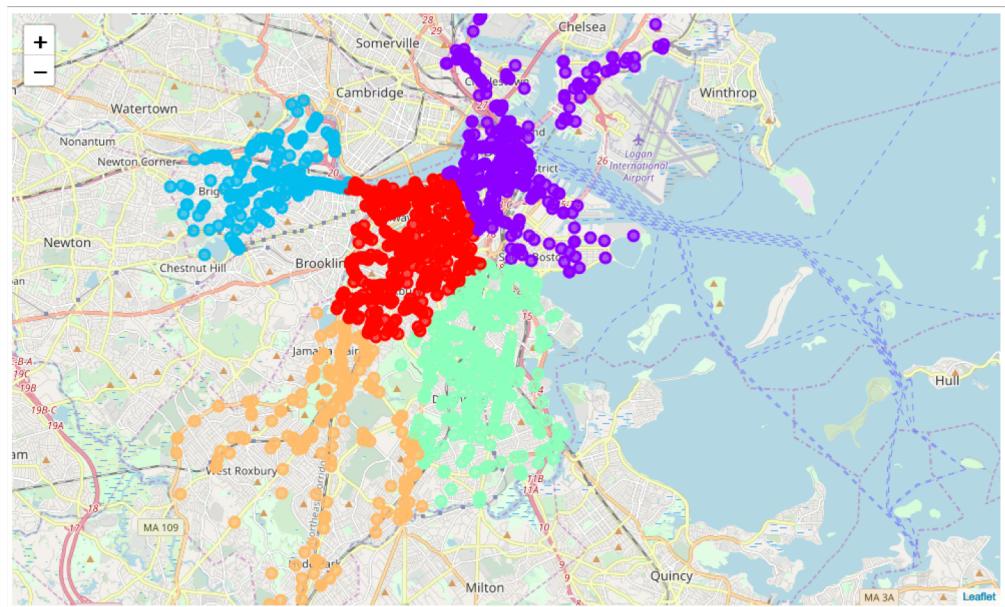
- The first image highlights the locations of all incidents.
- The second image highlights the location of just the bike incidents.
 - The second image shows the Boston Islands and the Airport have no Bike incidents.

Incidents per Neighborhood



• Dorchester	280
• Roxbury	204
• Jamaica Plain	139
• Allston	136
• Back Bay	131
• Fenway	115
• Brighton	105
• Downtown	87
• South End	80
• South Boston	75
• Mission Hill	57
• Charlestown	43
• Beacon Hill	37
• Roslindale	35
• East Boston	34
• Mattapan	30
• Hyde Park	26
• West End	24
• South Boston Waterfront	22
• West Roxbury	21
• North End	17
• Chinatown	16
• Longwood	15
• Bay Village	3
• Leather District	3

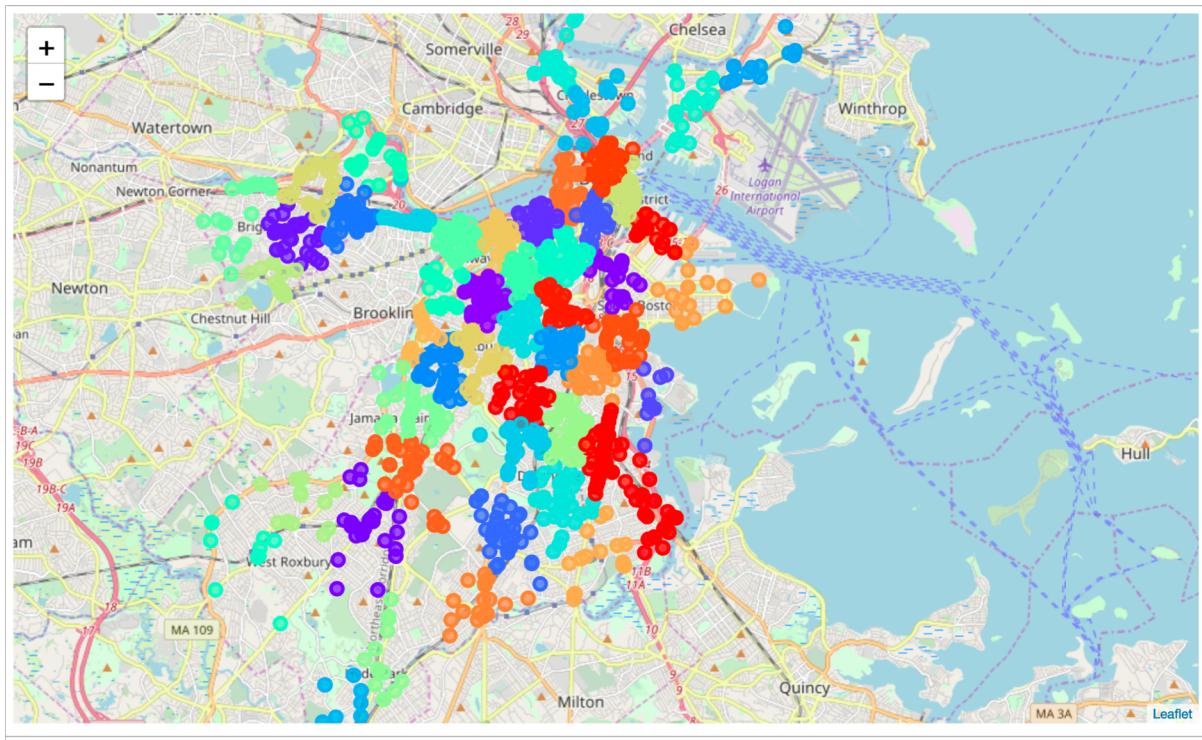
Clustering of Incidents (lat/long)



Example data

	lat	long
3	42.305413	-71.069163
12	42.320627	-71.091100

25 clusters



Conclusion

- The City of Boston cyclists' take risks moving in traffic to their destinations.
- This analysis discovers many incident clusters in Dorchester and Roxbury neighborhoods and a number of streets to avoid Dorchester Avenue and Tremont Street.
- Armed with this information cyclists are better prepared to travel to their destinations, and the City of Boston is able to make investment decisions on infrastructure and policing to better support cyclists.
- There is an opportunity for further work, and the risks for cyclists may further be refined and more precisely calculated. To determine street level congestion, as a feature of the risk model, the model may use Waze Data Feeds to account for 'Moving Vehicles' – the data would need to be aggregated over time and used to predict when and where risk exists, and how-to re-pattern the cyclist commute habits.