A SAFER SEATTLE

Mitigating Risks of Severe Traffic Accidents in Our City

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TRAFFIC ACCIDENTS:
PAST AND FUTURE

- Traffic accident totals in the city have slowly trended downward over the past several years. However, there is further need for improvement.

- While we can't control the weather, there are steps we can take to identify factors associated with traffic accidents, especially more severe accidents.

- Once we have identified these factors, we will propose actions to be taken to improve safety and save lives.

THE DATA

- The dataset was provided by the Seattle Police Department and recorded by Traffic Records. It includes all types of collisions from 2004 to present.

- The data was comprised of 37 features and a severity rating for each accident. There were 194,673 accidents total.

- Data features ranged widely including accident date, location, weather conditions, road conditions, and whether or not anyone involved was speeding or under the influence of drugs or alcohol.

CLEANING THE DATA

- Duplicate, highly similar and highly correlated features were removed, along with features that contained mostly null values with no way of interpreting their actual values.

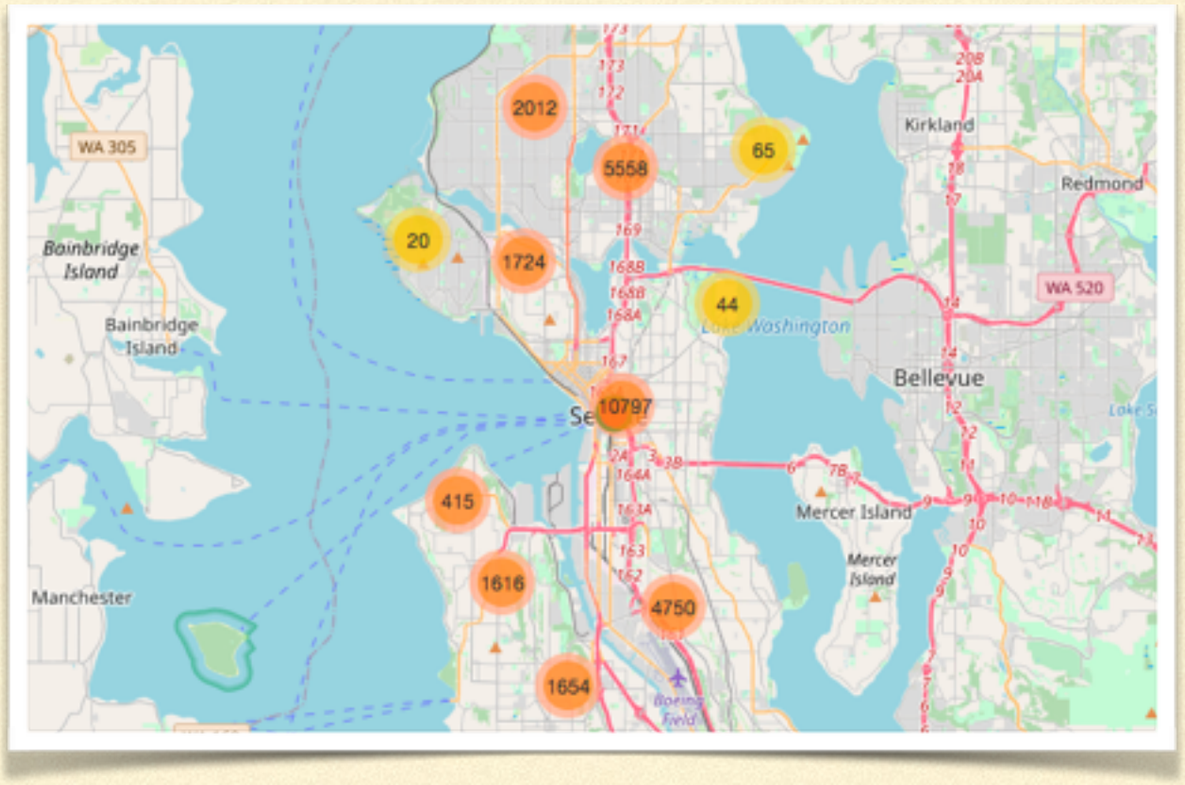
- A small percentage of accidents had no location data. These were removed as they often had many other missing data and represented a very small proportion of the total accidents.

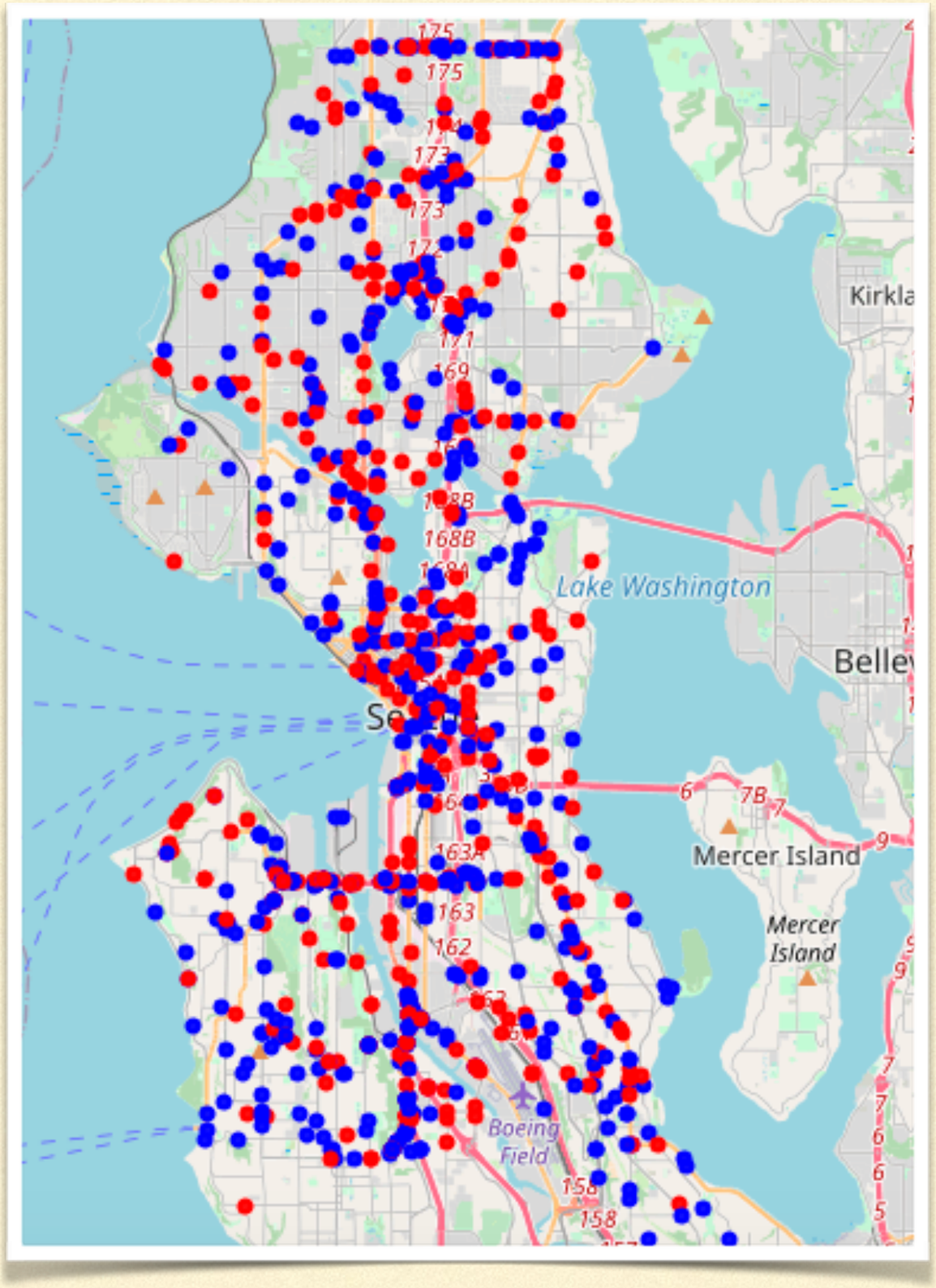
- We limited our dataset to the last 3 complete years of data: 2017-2019.

- Because weather conditions were of specific interest in this study, we limited the cleaned dataset for our models to only 5 features: X-Coordinate, Y-Coordinate, Weather Conditions, Speeding, and Under The Influence.

Exploratory Analysis

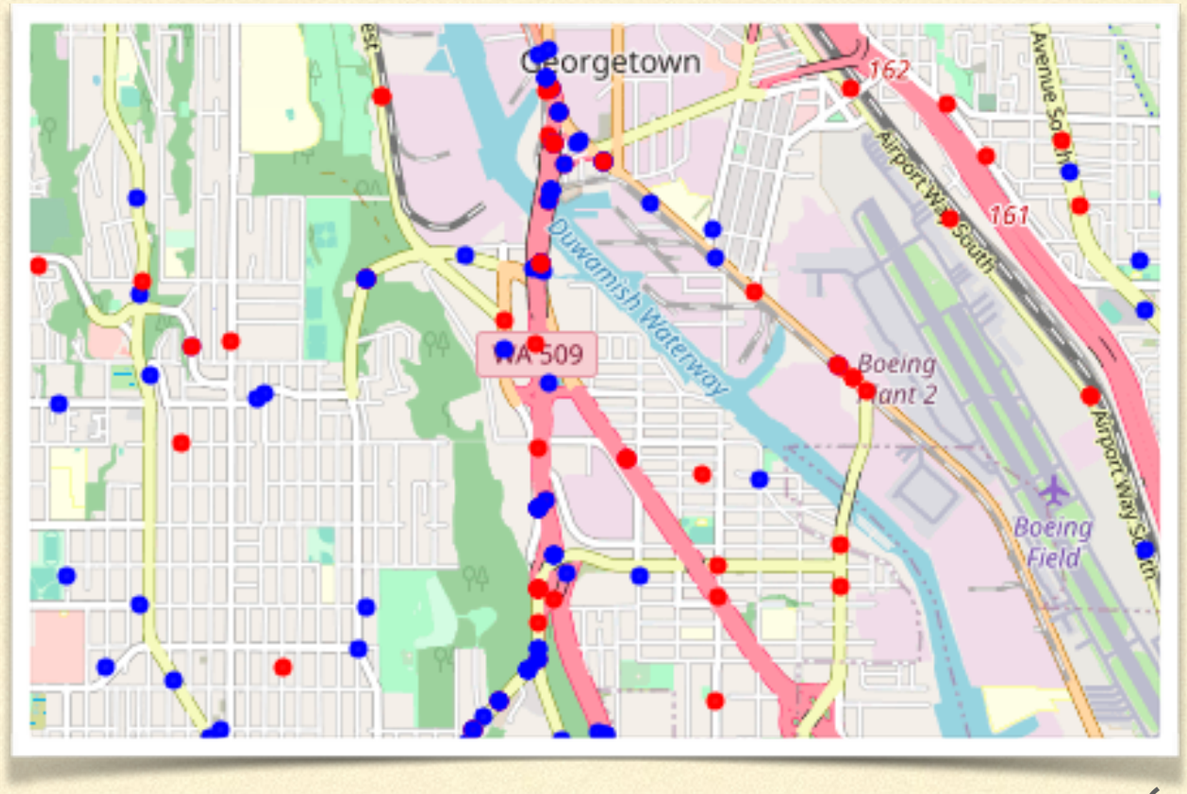
- Folium maps were used to explore accident locations.
- City-wide, we found a very high proportion of accidents along the I-5 corridor running North-South through the city.
- The James St.-6th Avenue Intersection saw nearly 65% more accidents than any other in the city.
- Also, 45% of the James & 6th accidents were severe compared to a 32% average city-wide.





Speeding Accidents

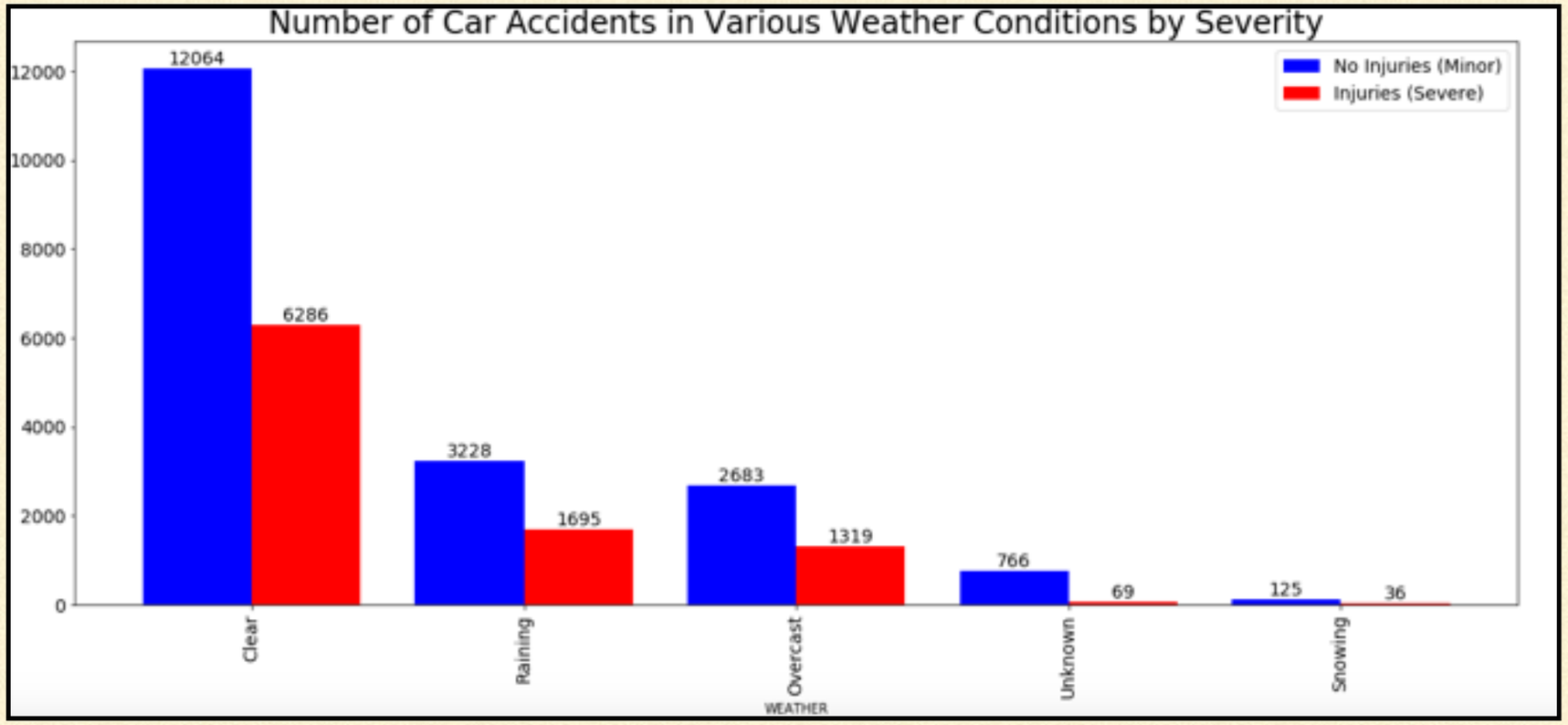
- Accidents involving speeding were mapped out and observed.
- The map below shows a high concentration of speed-related accidents along and near WA-509 near Boeing Field.
- While the proportion of severe accidents was not unusually high, this could serve as a focal point for lowering speed-related accident counts.



Road and Weather Conditions

- Seattle is notorious for rainy weather, averaging 152 days of precipitation per year. That's 42% of the days in a calendar year. Given the resulting wet road conditions, we might reasonably assume that rain and snow would be associated with a high number of traffic accidents.
- On the contrary, data shows that, if anything, car accidents are more likely to happen in clear, sunny conditions. .
- Also, there is no statistically significant difference in the proportion of severe accidents on clear days and the proportion of severe accidents on wet weather days.

- The percentage of severe accidents in the following weather conditions:
  - Clear: 34.26%
  - Raining: 34.43%
  - Snowing: 22.36%



CLASSIFICATION MODELS

ALGORITHM	F1 SCORE	JACCARD SCORE
Logistic	0.516749599	0.520860666
SVM	0.567583865	0.559740715
Decision Tree	0.599676821	0.610721794
KNN	0.697891257	0.699160325

- We constructed various classification models in hopes of predicting the severity of a given accident.
- Four models were run, with their resulting F1 and Jaccard Scores shown.
- The K-Nearest Neighbors Model clearly performed best.

CONCLUSION

- Constructed a useful model for predicting the severity of a traffic accident in the city.
- Features that could be added to the dataset for further research could include 'Texting While Driving', vehicle data (year, make, model), 'Car Insurance', and whether or not a major event was taking place (e.g., Seahawks football game) within a certain distance.
- Wet weather conditions did not play a role in increasing the number of severe accidents nor total accidents.
- The James St. - 6th Avenue Intersection should be monitored and investigated further to determine an action plan to minimize the number and severity of accidents there.
- Consider steps to decrease the number of accidents along the I-5 corridor such as promoting public transport use to lower the number of vehicles on the road.
- Increase surveillance along and near WA-509 near Boeing Field to lower the instances of speeding vehicles before they result in accidents.

PHOTOGRAPH CITATION

- *Seattle*. [Photograph]. Retrieved from *https://www.mansionglobal.com/articles/it-s-now-or-never-to-cut-a-deal-in-seattle-123028*