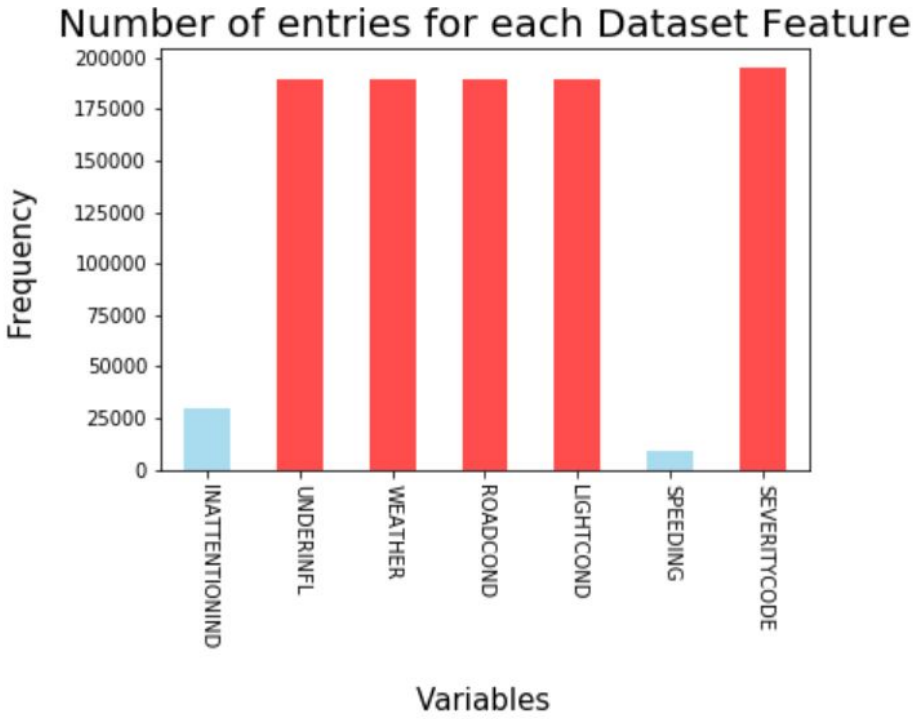
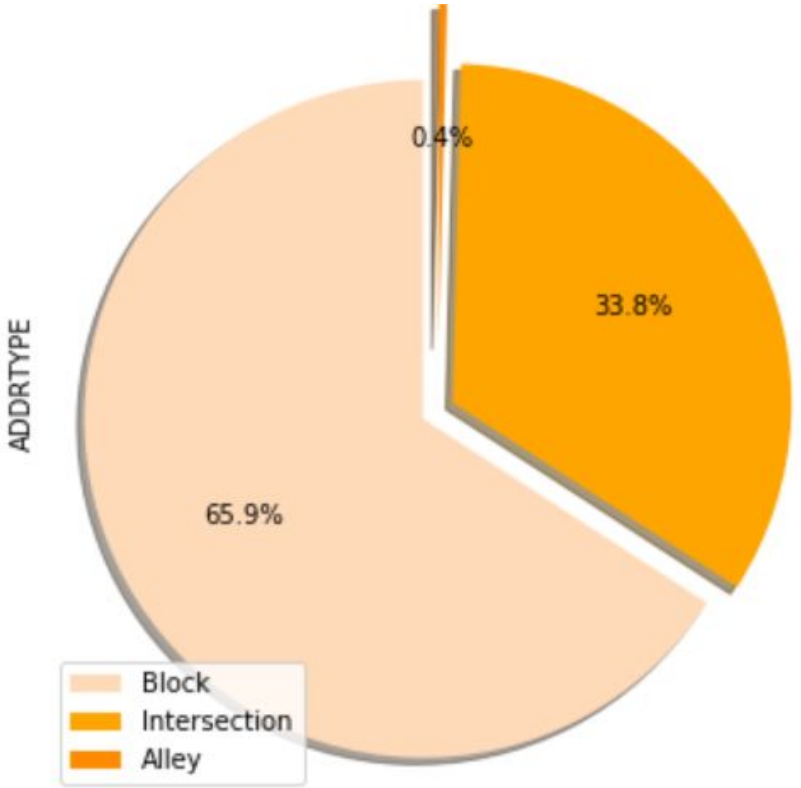
Seattle Car Accident Severity

By: Timothy Miglin

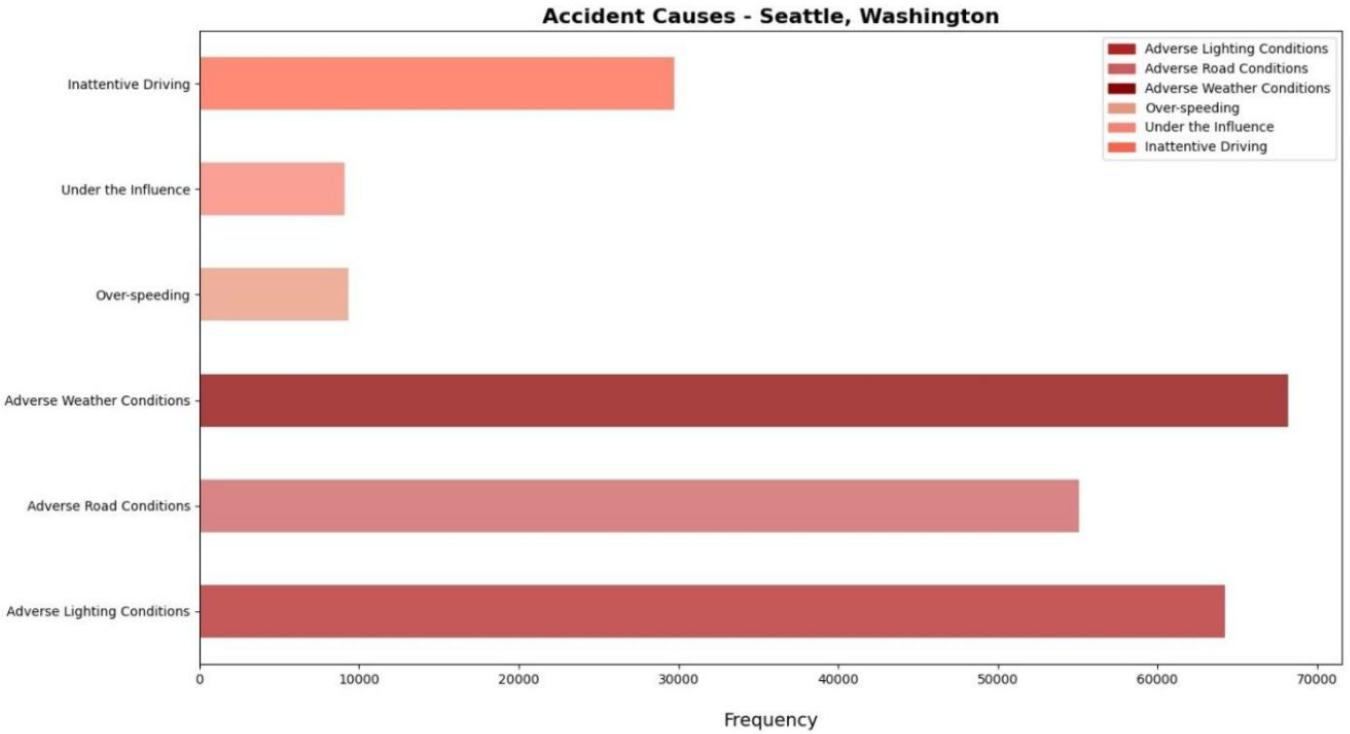
The Feature Set



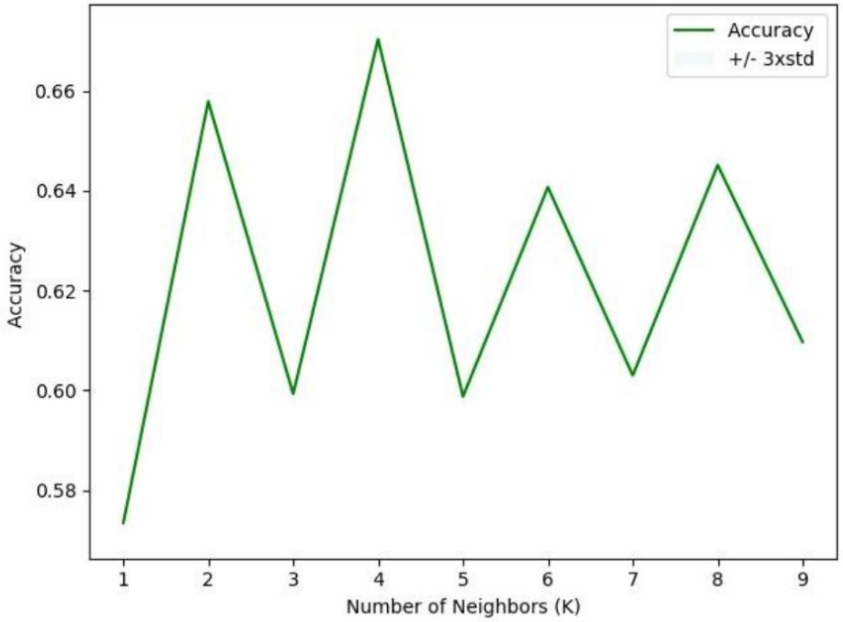
Accident Environment



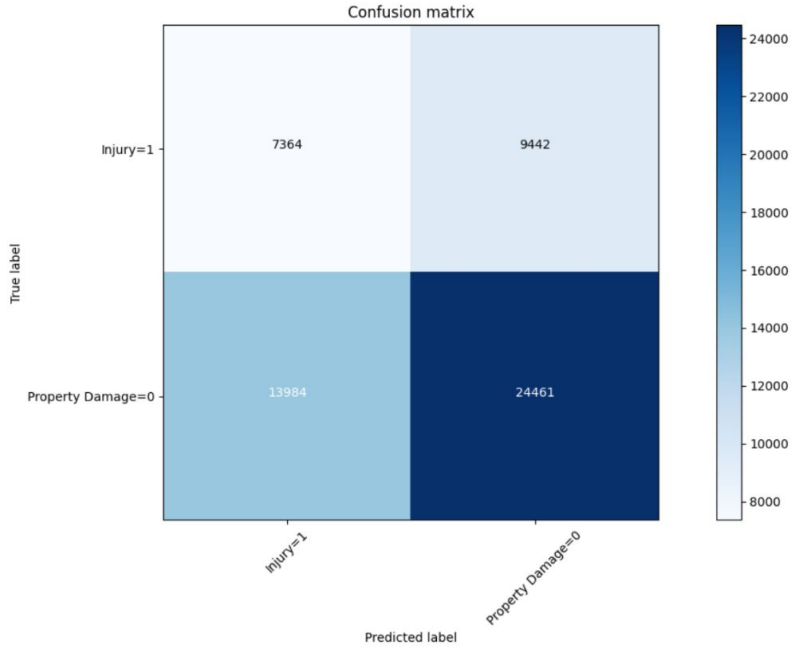
Frequency of accident cause



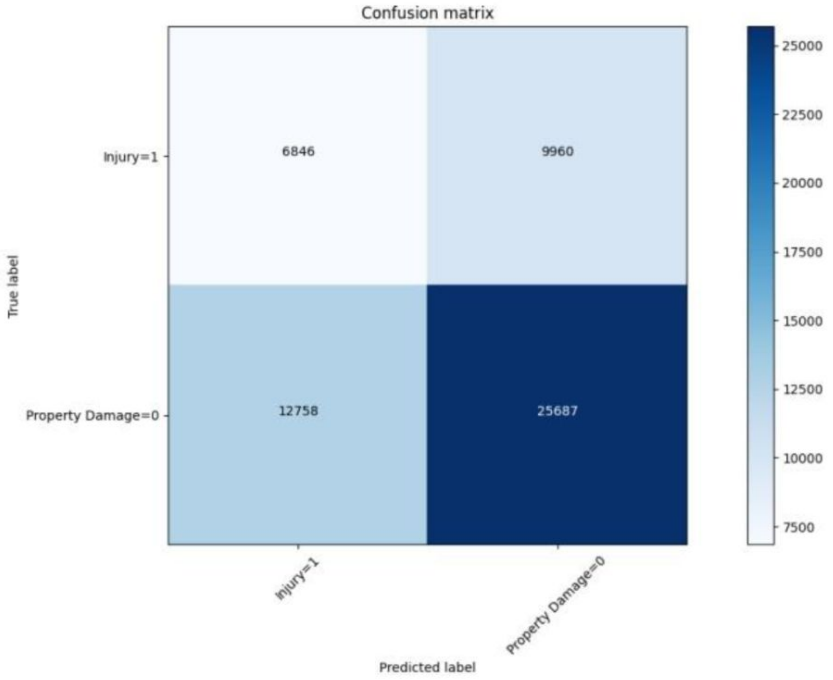
k-Nearest Neighbor



Decision Tree



Logistic Regression



Classification Metrics

$$\text{precision} = \frac{|\{\text{relevant documents}\} \cap \{\text{retrieved documents}\}|}{|\{\text{retrieved documents}\}|}$$

$$\text{recall} = \frac{|\{\text{relevant documents}\} \cap \{\text{retrieved documents}\}|}{|\{\text{relevant documents}\}|}$$

$$F = 2 \cdot \frac{\text{precision} \cdot \text{recall}}{\text{precision} + \text{recall}}$$

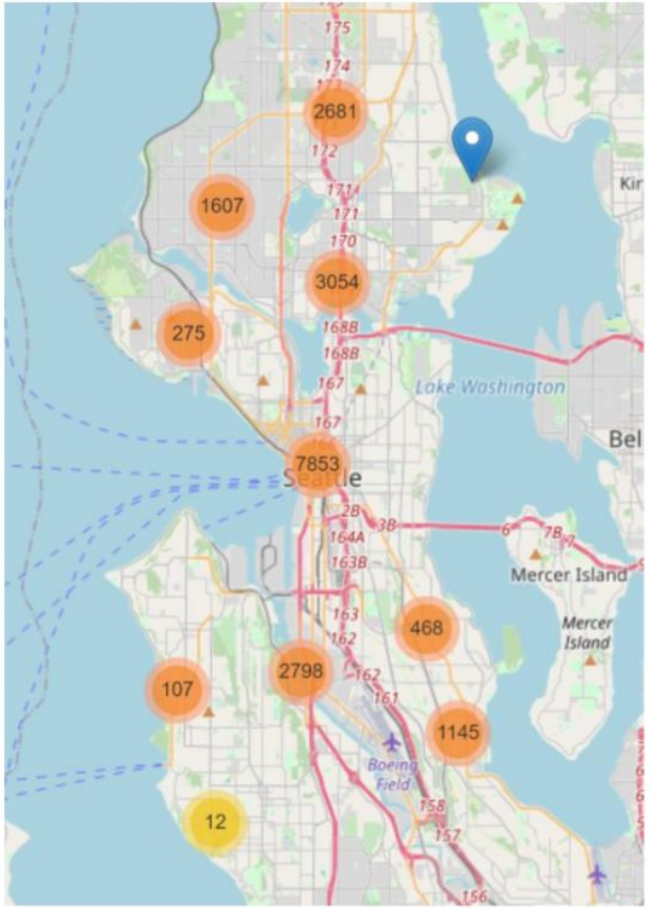
Classification Metrics (cont.)

- Precision: Precision refers to the percentage of results which are relevant, in simpler terms it can be seen as how many of the selected items from the model are relevant. Mathematically, it is calculated by dividing true positives by true positive and false positive
- Recall: Recall refers to the percentage of total relevant results correctly classified by the algorithm. In simpler terms, it tells how many relevant items were selected. It is calculated by dividing true positives by true positive and false negative
- F1-Score: f1-score is a measure of accuracy of the model, which is the harmonic mean of the model's precision and recall. Perfect precision and recall is shown by the f1-score as 1, which is the highest value for the f1-score, whereas the lowest possible value is 0 which means that either precision or recall is

Results

Model	Target Result	Precision	Recall	Avg f1-score
KNN	0	0.93	0.70	0.75
	1	0.08	0.32	
Decision Tree	0	0.73	0.71	0.61
	1	0.31	0.33	
LR	0	0.31	0.73	0.44
	1	0.74	0.30	

Concentration of Accidents



Reccomendations

- **Additional signage to inform drivers of hazardous road conditions or highly concentrated crash areas**
- **Diligent evaluation of high crash area lighting and road conditions, look for improvements, additions, or possible replacement**
- **Change in traffic patterns, e.g. addition of new lanes, additional traffic lights, better outlined pedestrian walkways**

Questions?