CAR ACCIDENT SEVERITY

Victoria Quinn | Coursera Capstone | August 24, 2020

Predicting Car Accident Severity

- Car accidents are an unfortunate part of life when driving
- However, there are many factors going into how and why car accidents happen
- If we can understand these factors, we can use them to predict future accidents
- We can also use them in the future for things like self-driving cars

Data

- The data was pulled from the city of Seattle incident reports
- The data ranges from 2004-2020, with 38 features
- In total, it has 194,674 rows

```
Dry                   124510
Wet                    47474
Unknown                15078
Ice                     1209
Snow/Slush              1004
Other                    132
Standing Water           115
Sand/Mud/Dirt             75
Oil                       64
Name: ROADCOND, dtype: int64
```

Road Conditions

- This variable was chosen because of how changes in road condition affect cars
- Roads that are wet or slippery require longer breaking times to slow to a stop
- A sufficiently slippery road might cause a car to swerve or fishtail

```
Daylight                       116137
Dark - Street Lights On         48507
Unknown                        13473
Dusk                            5902
Dawn                            2502
Dark - No Street Lights         1537
Dark - Street Lights Off        1199
Other                            235
Dark - Unknown Lighting           11
Name: LIGHTCOND, dtype: int64
```

Light Conditions

- Darker streets require more concentration and alertness from a driver
- Details and objects may be hidden by shadow until it is too late to brake

```
Parked Car     47987
Angles         34674
Rear Ended     34090
Other          23703
Sideswipe      18609
Left Turn      13703
Pedestrian      6608
Cycles          5415
Right Turn      2956
Head On         2024
Name: COLLISIONTYPE, dtype: int64
```

Collision Type

- Car accident severity might be impacted by how a collision happened
- A sideswipe usually indicate a less severe accident, where a left turn might indicate a car turning left hit an oncoming car

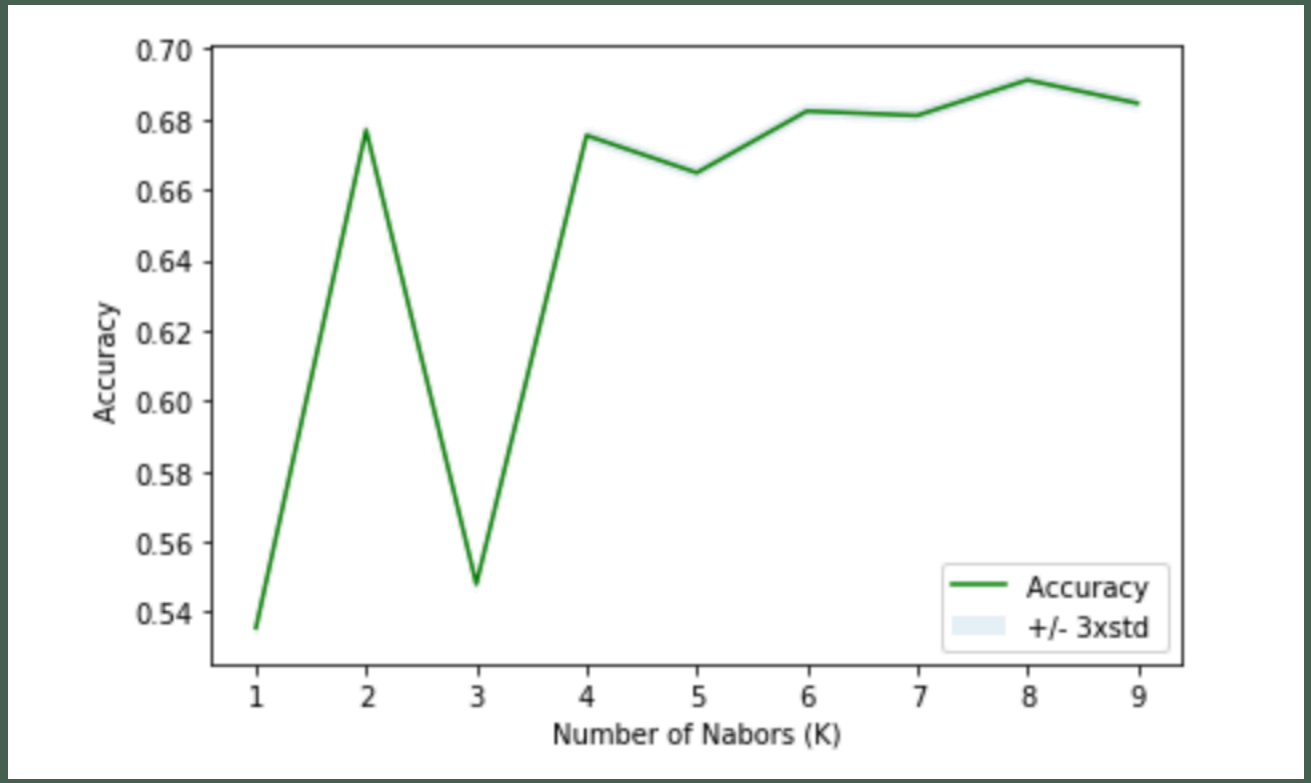
	index	LIGHTCOND
1	Daylight	89676
2	Dark - Street Lights On	34361
3	Dusk	4458
4	Dawn	1709
5	Dark - No Street Lights	992

	index	ROADCOND
1	Dry	95215
2	Wet	34717
3	Ice	631
4	Snow/Slush	585
5	Standing Water	48

	index	COLLISIONTYPE
1	Angles	33758
2	Parked Car	33755
3	Rear Ended	32670
4	Sideswipe	17650
5	Left Turn	13363

Cleaning

- The dataset has to be cleaned before it can be used in a model
- The previously discussed variables are set to indices and only the top factors in each are chosen



KNN

- The K-Nearest Neighbors model is chosen
- The test size is 0.4
- +/- 3 Standard Deviations

```
The best accuracy was with 0.6911526515368052 with k= 8
```

Results

- R is about 69%, meaning that the model can predict severity with about 69% accuracy

Conclusion

- While the model is fairly simple, it can be said that road conditions, light conditions, and collision type all majorly factor in to the severity of a car crash
- In general, drivers need to slow down and be more careful in conditions where the road is wet or otherwise slippery, and when the light is dim or the sun has set.
- Cars should also probably be more aware of cars when turning or those that are parked, as those were the majority of collision type accidents. Along with the road conditions, drivers should also be aware of other cars breaking, as that was the third-greatest cause of collisions in that column.