Development of Model for Estimate Severity of an Collision Vehicle

Business Problem

Traffic accidents are a very serious problem in society as many human lives are lost or the physical damage generated may carry out a long recovery process. In this sense, the prevention of traffic accidents is a very important issue to consider because it saves lives and also reduces material damage.

According to the data on traffic accidents, the factors that cause the probability of a traffic accident that they cause are diverse. Such as drunkenness, drug use, inattention, excessive speed, weather, road condition, etc. Among the factors there are some that can allow us to determine that in certain areas, under certain physical conditions of the road and weather, it is possible to determine the high probability of a serious traffic accident.

So we main problem is ¿how we can predict the fatality of an accident?

Data

The data has the size: (194673, 38)

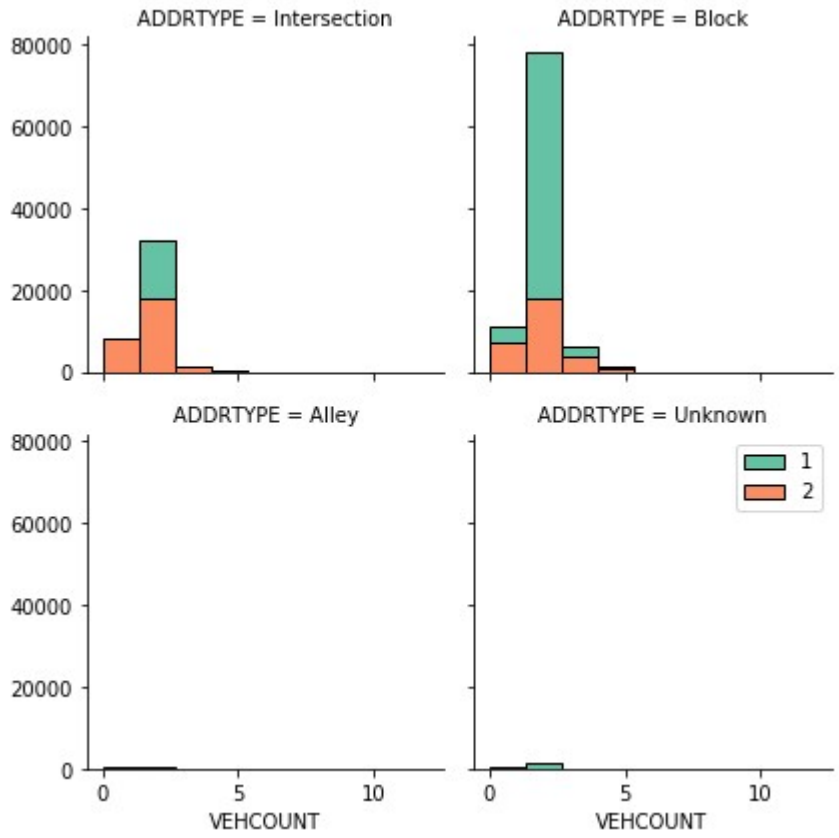
The data that we have are: Alley, Block, Intersection, Angles, Cycles, Head On,Left Turn, Parked Car, Pedestrian, Rear Ended, Right Turn, Sideswipe, At Intersection (but not related to intersection),At Intersection (intersection related), Driveway Junction,Mid-Block (but intersection related),Mid-Block (not related to intersection), Ramp Junction,Blowing Sand/Dirt, Clear, Fog/Smog/Smoke, Overcast,Partly Cloudy, Raining, Severe Crosswind,Sleet/Hail/Freezing Rain, Snowing, Dry, Ice, Oil,Sand/Mud/Dirt, Snow/Slush, Standing Water, Wet,Dark - No Street Lights, Dark - Street Lights Off,Dark - Street Lights On, Dark - Unknown Lighting, Dawn,Daylight, Dusk

In this study we analyze the relationship between the severity of an accident and the various factors that most influence the severity of an accident, which will allow us to have a model to estimate where an accident is most likely. I found that accidents in parking lots are mild, that most accidents occur in the afternoon, with a dry track and in block address type. I built a linear regresion model for predict the severity of an trafic accident. This model can be used to alert drivers to be more careful and avoid a traffic accident, thus avoiding material and human losses

Methodology

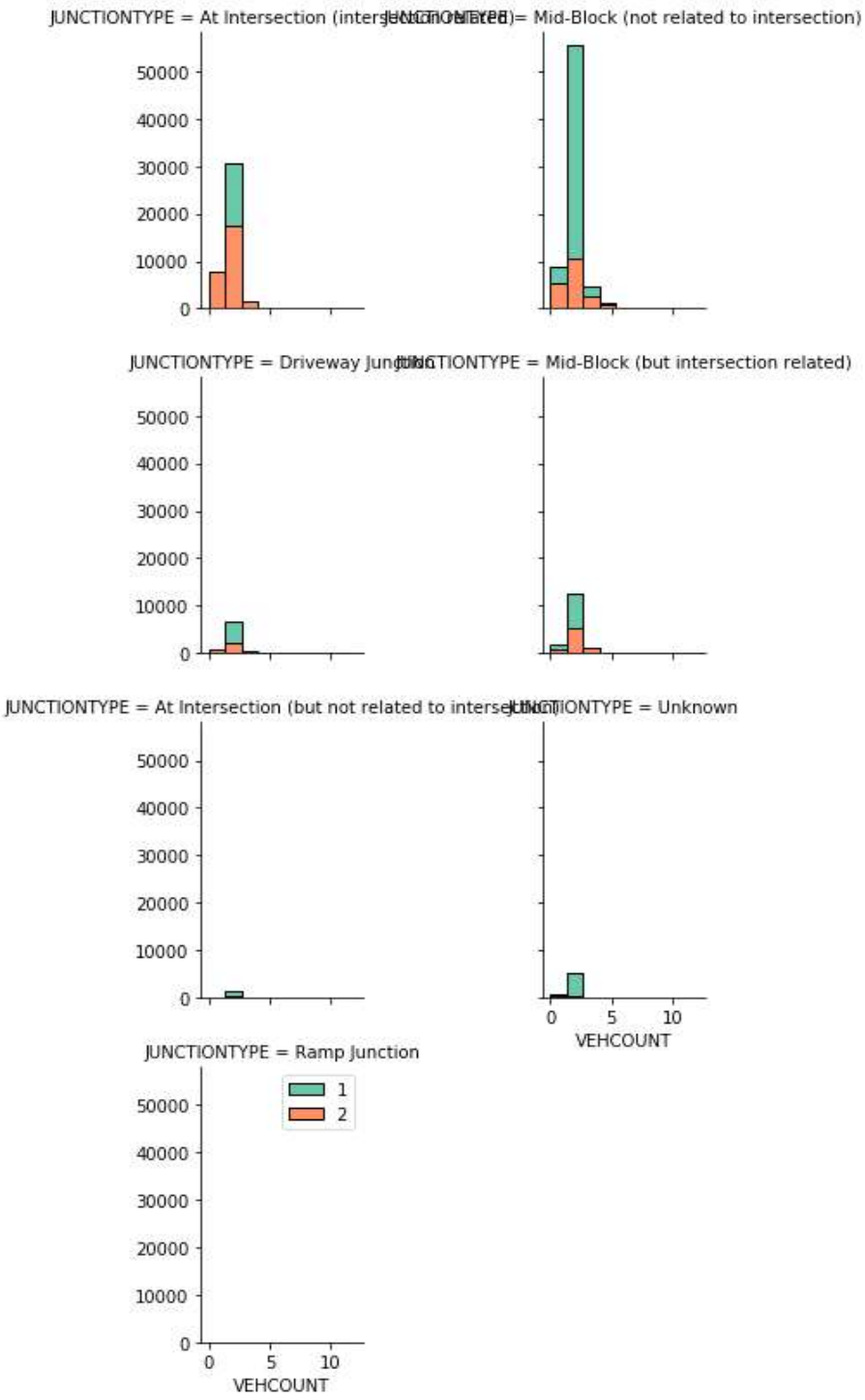
Relationship beetween severity collision with address type

The influence of the type of direction (alley, block, intersection) on the severity of an accident is notorious, it is not the same to drive on an alley or on an intersection. In the next figure, we observe more serious traffic accidents in block address type followed in with a great difference of intersection address type. In alley address type the influence of severity accident it's minimal.



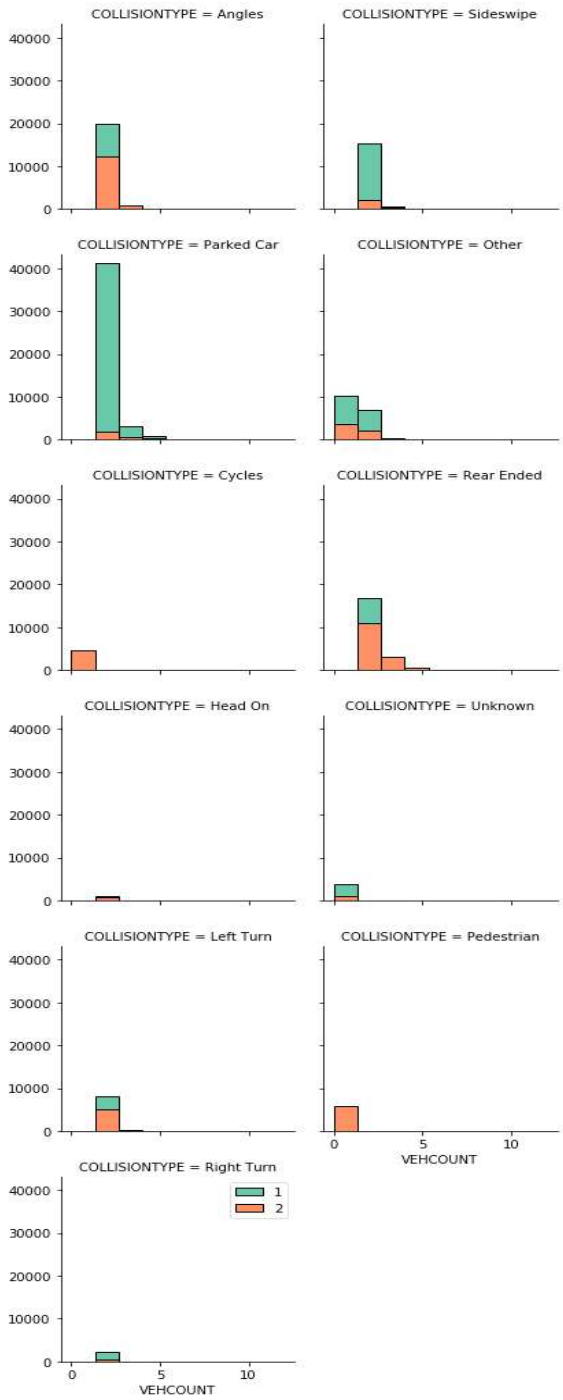
Relationship beetween severity collision with junction type

In the next figure, we observe the strong influence of junction type over severity collision, specifically in 4 types: at mid-block (not related to intersection), intersection, mid-block (but intersection related), driveway, at intersection (but not related to intersection. All of them from highest to lowest degree.



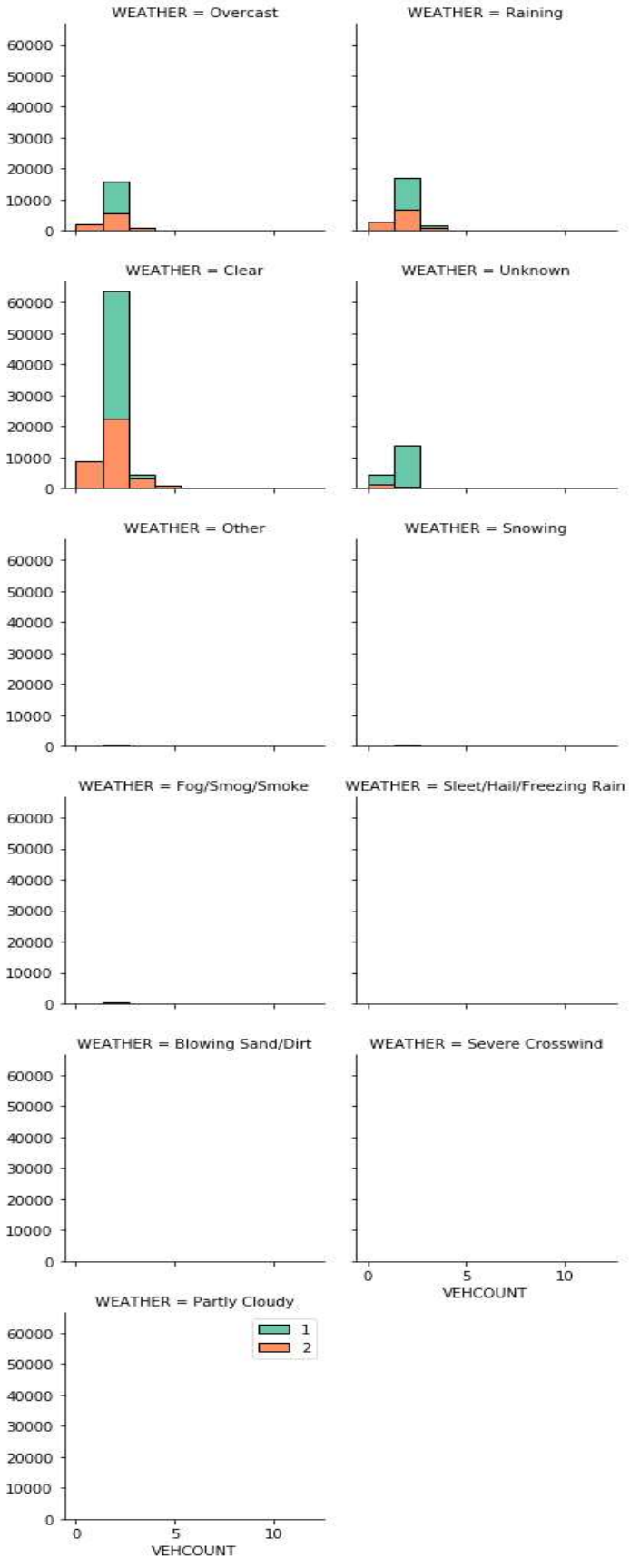
Relationship beetween severity collision with collision type

Th result of the next figures show the parker car collision type how is the more type of accident but generate the lower accident. The next more strong influence over the severity accident are: angles, sideswipe, rear ended, left turn, pedrestian, cycles, right turn



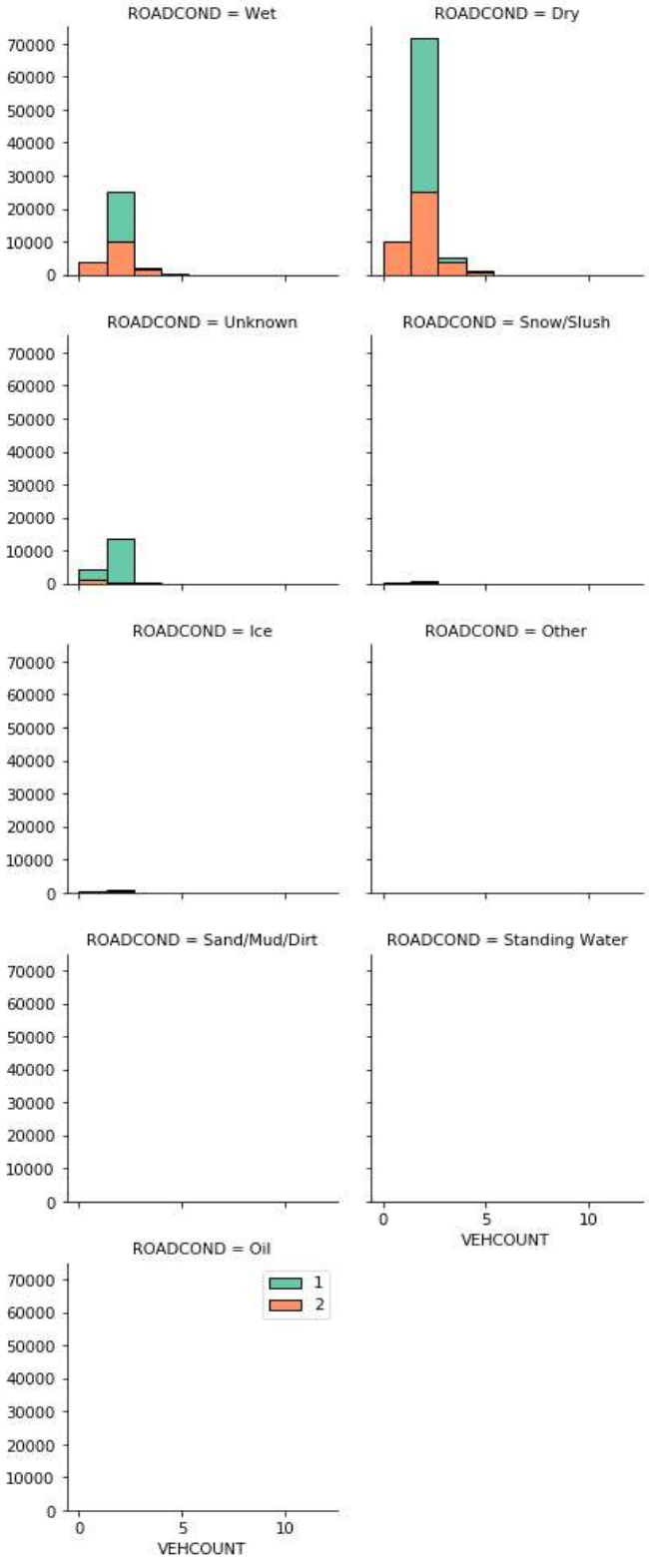
Relationship beetween severity collision with wheater

Contrary to what one might think about the high probability of having an accident when it is raining or in overcast, or snowing, the figures show that there are a greater number of accidents when the day is clear.


WEATHER = Overcast
WEATHER = Raining
WEATHER = Clear
WEATHER = Unknown
WEATHER = Other
WEATHER = Snowing
WEATHER = Fog/Smog/Smoke
WEATHER = Sleet/Hail/Freezing Rain
WEATHER = Blowing Sand/Dirt
WEATHER = Severe Crosswind
WEATHER = Partly Cloudy
60000
50000
40000
30000
20000
10000
0
0
5
10
VEHCOUNT
1
2

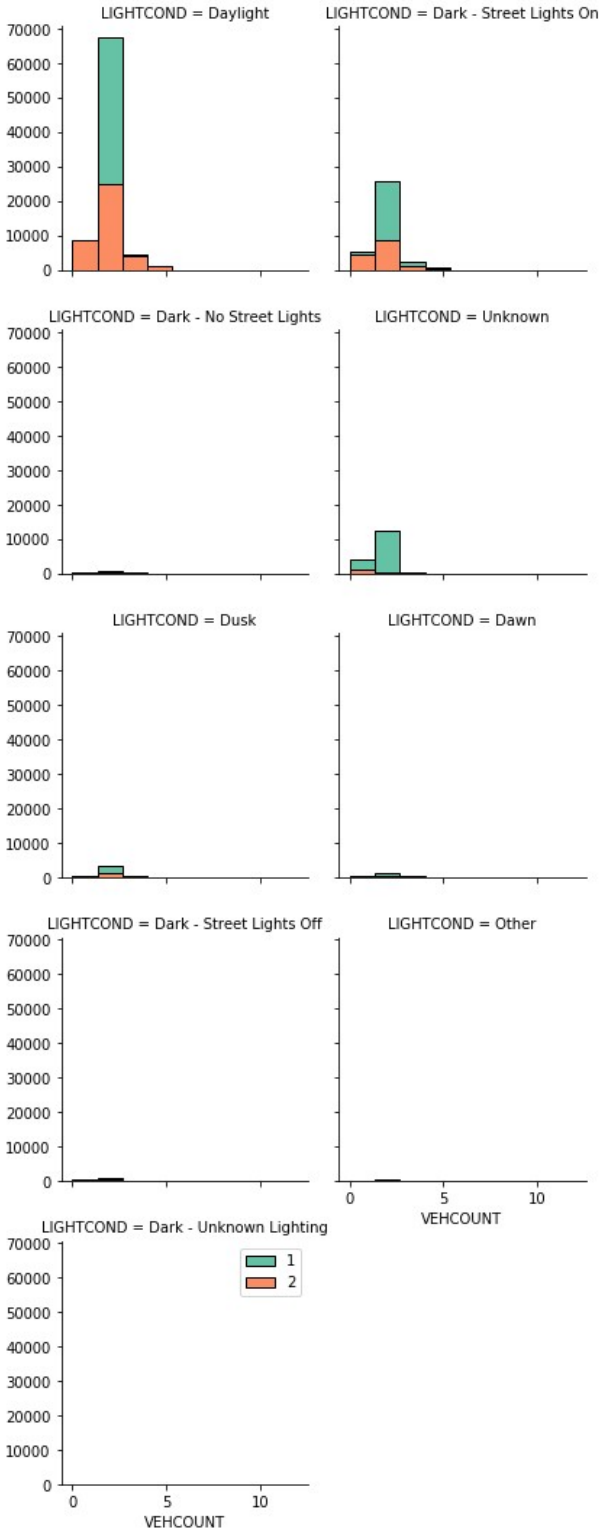
Relationship beetween severity collision with roadcond

We noted only two factors to have strong influence over accident: wet and dry



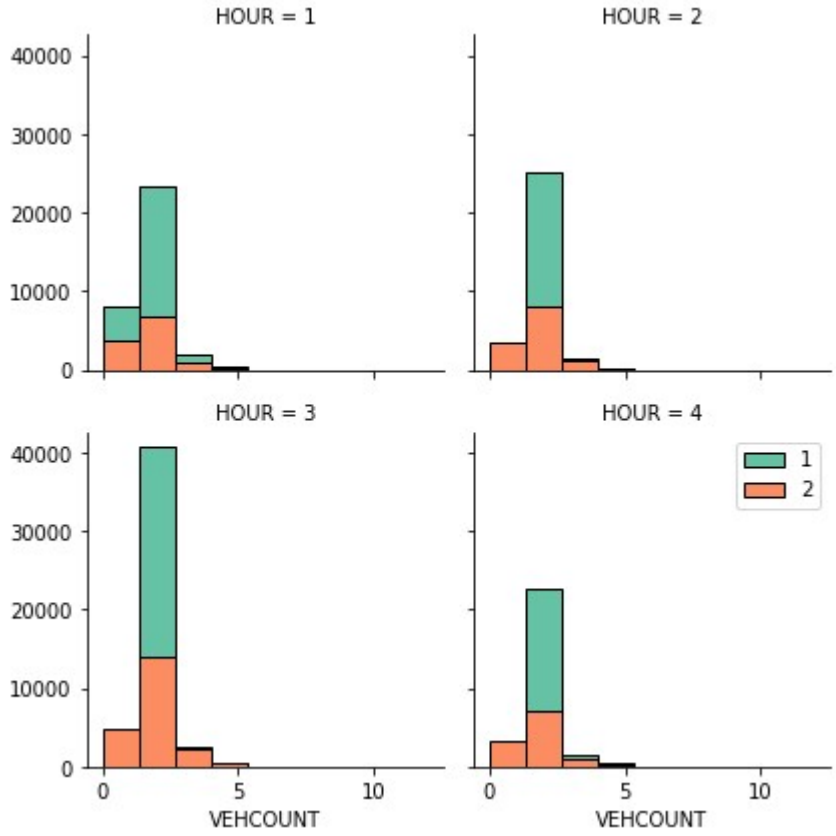
Relationship beetween severity collision with light cond

In the next images, we notes that accident in the night is moree when street light are on



Relationship beetween severity collision with the time of day

There was not much difference between the time of day and the severity of an accident, but it was found that during the afternoon there are more cases of accidents reported. We desestimated this features.



Results

I can observe for this case that applying the knn method we obtain a greater precision. I can also observe that decision tree is the method with the most unfavorable results or with less precision. For the

Discussion

I can observe for this case that applying the knn method we obtain a greater precision. I can also observe that decision tree is the method with the most unfavorable results or with less precision. For the generation of the model because of hardware, I use 10000 rows data.

It was found that for parking lot accidents, the accidents are mostly mild. It was found that there is a higher probability of having a serious accident when roadcond = dry, also when the wheater = overcast, raining or clear. If the type of collision is at an angle or rear ended, there is a greater probability of having a serious accident. In an intersection the probability of having a serious accident is also high.

Conclusion

In this study we analyze the relationship between the severity of an accident and the various factors that most influence the severity of an accident, which will allow us to have a model to estimate where an accident is most likely. I found that accidents in parking lots are mild, that most accidents occur in the afternoon, with a dry track and in block address type. I built a linear regresion model for predict the severity of an trafic accident. This model can be used to alert drivers to be more careful and avoid a traffic accident, thus avoiding material and human losses