Track speed analysis:

Motivation and Background:

Traffic security is a very serious issue in the United States, every year, there are about 1923000 people got injured or even died in the traffic accidents. Among those accidents, the majority of the traffic accidents appear in the intersection. In the road intersection, the traffic accidents are very likely to appear if the gap between the two tracks is too close. When the gap is too close, it leaves drivers very limit among of time to react if there are some wrong with their front tracks.

So it seems that have the understanding of gaps between tracks is very essential to determine the likelihood of traffic accidents. If the average gap between tracks in the intersection is too small, then it is very likely that there might be more likely to have traffic accidents.

The gap between two cars are determined by how long a track needs to move to the position of the track in his front. The gap is calculated by dividing the distance between two tracks with the last track's speed.

When we consider gaps between the cars, the direction of the cars' might be a factor. We can try to determine whether the average gap between different direction might be different. Another important factor came into my mind is the volume of the cars. Would traffic volume effect the average gap between two cars? Would the effects significant? To know the answer of those question, we need to set traffic volume as the factor.

So the two factors in this study is traffic volume and traffic direction. The response variable is the average gap between cars.

Aims
1:
compare the average gap of tracks in different directions, such as south to north, east to west, south to west, and so on.
2:
 compare the average gaps of traffic in different traffic volume, what is the gaps between two car if the traffic is light? what is the gap between the traffic is heavy? Would the traffic volume effects the average gaps between tracks?

data:
This study are going to be an observational study. The Data is obtained though the intersection videos I obtained from my computer vision lab. the track information, such as speed, position, gaps, types of the tracks is generated though the traffic analysis tool I build. Although the tool is still not 100 percent completed, I am pretty confident of the accuracy of the data this tool generated. The generated data is stored in Amazon Web Service database. Below are some lines of this dataset. I can download these data and analysis by using R code. I will focus on Gap, start_timestamp, Approach(direction).

track_id	Class	Approach	Gap	average_speed	start_timestamp
36	car	NBT	9.4	36.5149	2019-08-05 11:01:05.2
68	car	NBT	21.9	32.159	2019-08-05 11:01:27.1
74	car	NBT	7.5	38.3896	2019-08-05 11:01:34.6
75	car	NBT	0	31.425	2019-08-05 11:01:40.0