

Causes for Collisions in Seattle-USA

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1. Introduction

In 2019, an estimated 38,800 people lost their lives to car crashes, in 2018 39,404 deaths and in 2017 40,231 deaths. About 4.4 million people were injured seriously enough to require medical attention in crashes last year. Thousands of lives and millions of dollars lost due to accidents and collisions per year. This makes travelling risky and unsafe. But if we could identify the factors that tolerate collisions to occur, we can prevent them from occurring or at least reduce them.

In this project was conducted to study the relation between collisions and factors associated with those collisions. Specifically, this report been targeted to residents and drivers in Seattle area in USA.

1.1. Problem

By using this study results residents within Seattle can be notified with the results to improve their knowledge in the tolerance for accidents and make a systematic procedure to notify drivers about the risk associated with specific conditions was studied during this project

2. Data Set

Based on definition of our problem, environmental factors that was influence our decision are:

- Locations of collisions occurred
- Junction type
- Weather
- Road condition
- Light condition

Apart from the environmental factors,

Following human factors was also considered:

- In-attention of the driver
- Use of drugs

Studied above factors correlated with collisions.

3. Methodology

3.1. Data collection and Data cleaning

Respective data was collected from SDOT Traffic Management Division using following link:

<https://s3.us.cloud-object-storage.appdomain.cloud/cf-courses-data/CognitiveClass/DP0701EN/version-2/Data-Collisions.csv>

Selected following features for the data set:

- Locations of collisions occurred
- Junction type
- Weather
- Road condition
- Light condition
- In-attention of the driver
- Use of drugs

As independent variable.

- Collision severity

As dependent variable & Removed all empty rows which gives balanced data set. Furthermore, renamed columns according to requirement.

3.2. Data Analysis

Mapped collision coordinates in Seattle map in order to identify high intensity collision zones.

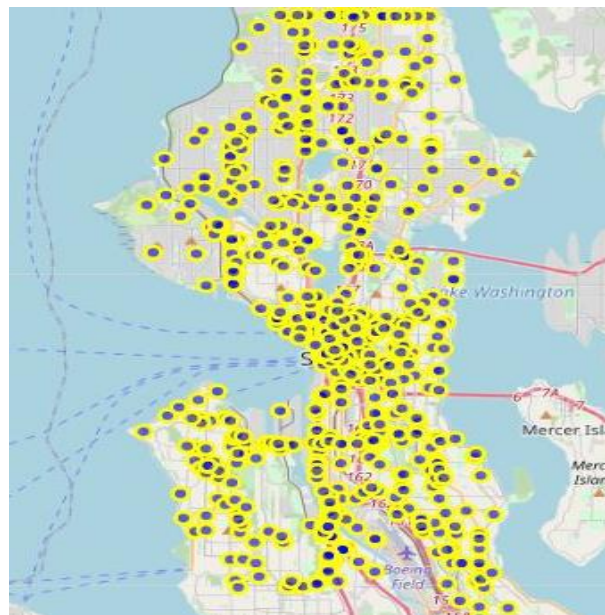


Figure 1: Map of collision coordinates

Count of collisions were plotted with junction types as follows,

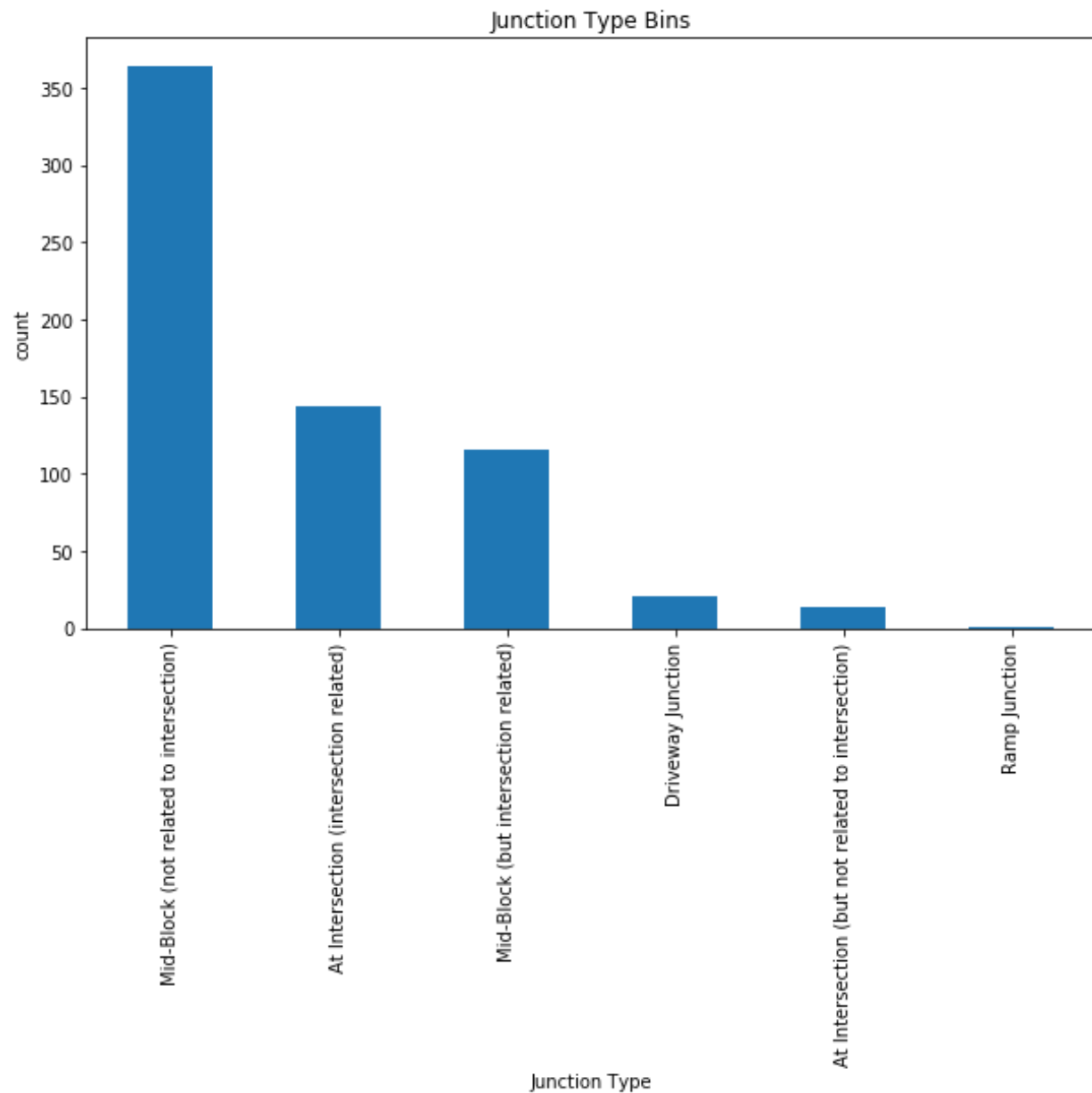


Figure 2: Graph of Junction type vs. Collision count

According to bar chart Mid-Block (not related to intersection) & At Intersection (intersection related) cause more collisions.

Analyzed data set for collision count with regard to the in-attention of driver. According to the result all the collisions were occurred due to in-attention of the driver.

Count of collisions were plotted with Drug use as follows,

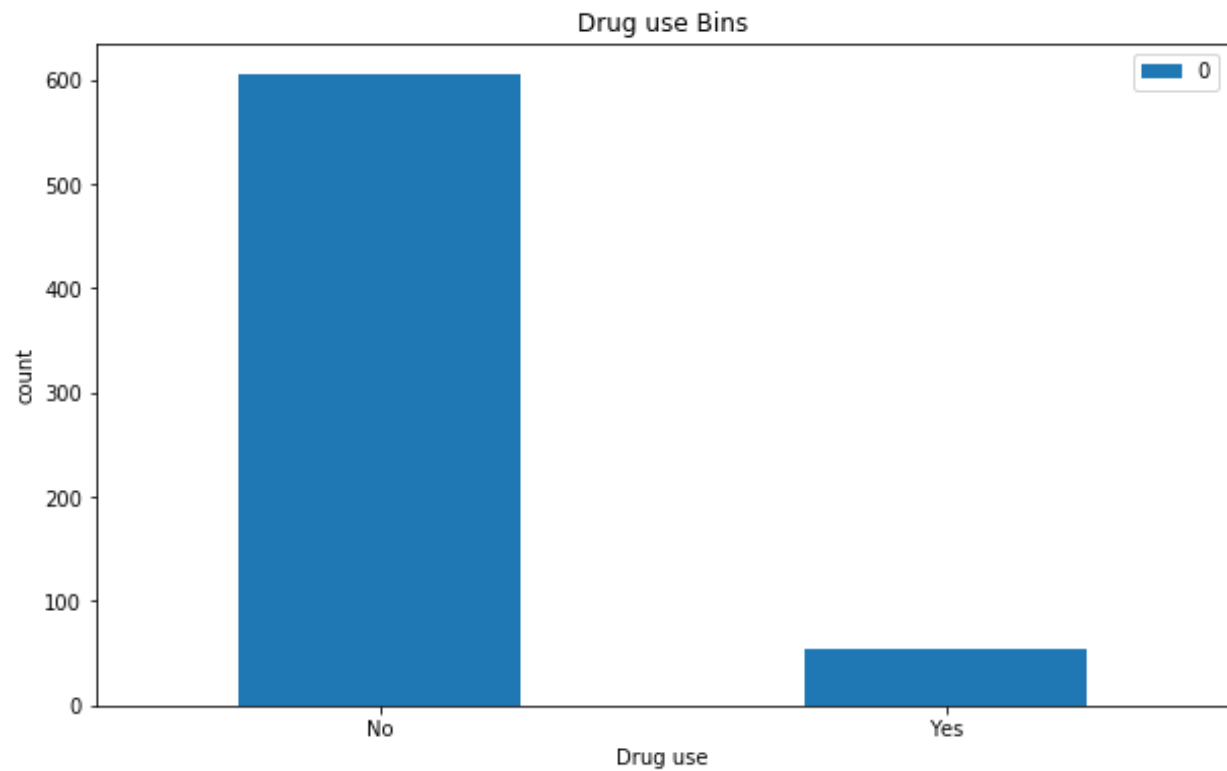


Figure 3: Drug use Vs. Collision count

It appears to be there isn't much impact of drug use for collisions in this dataset.

Count of collisions were plotted with Weather condition as follows,

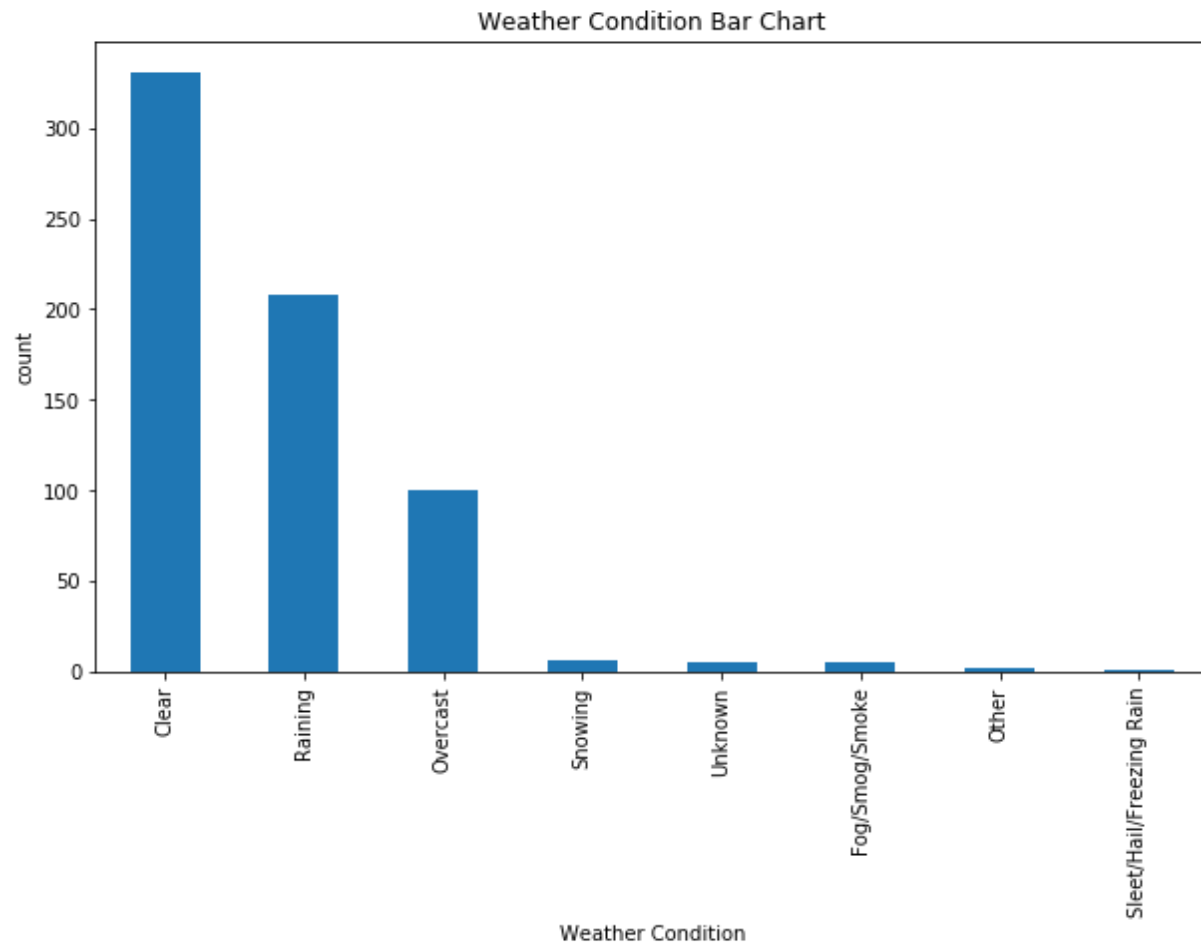


Figure 4: Weather condition Vs. Collision count

Most collisions occurred in Clear & Raining weather conditions.

Count of collisions were plotted with Road condition as follows,

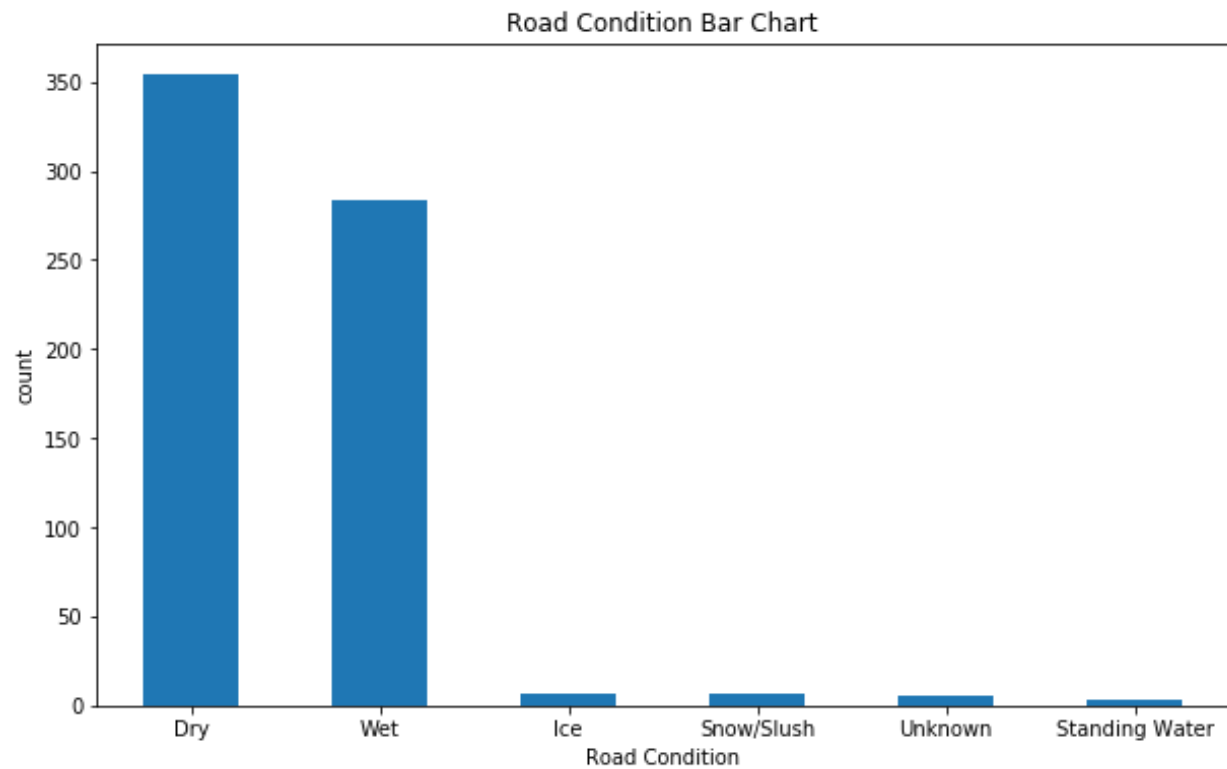


Figure 5: Road condition Vs. Collision Count

Most collisions occurred during Dry and Wet conditions.

Count of collisions were plotted with Light condition as follows,

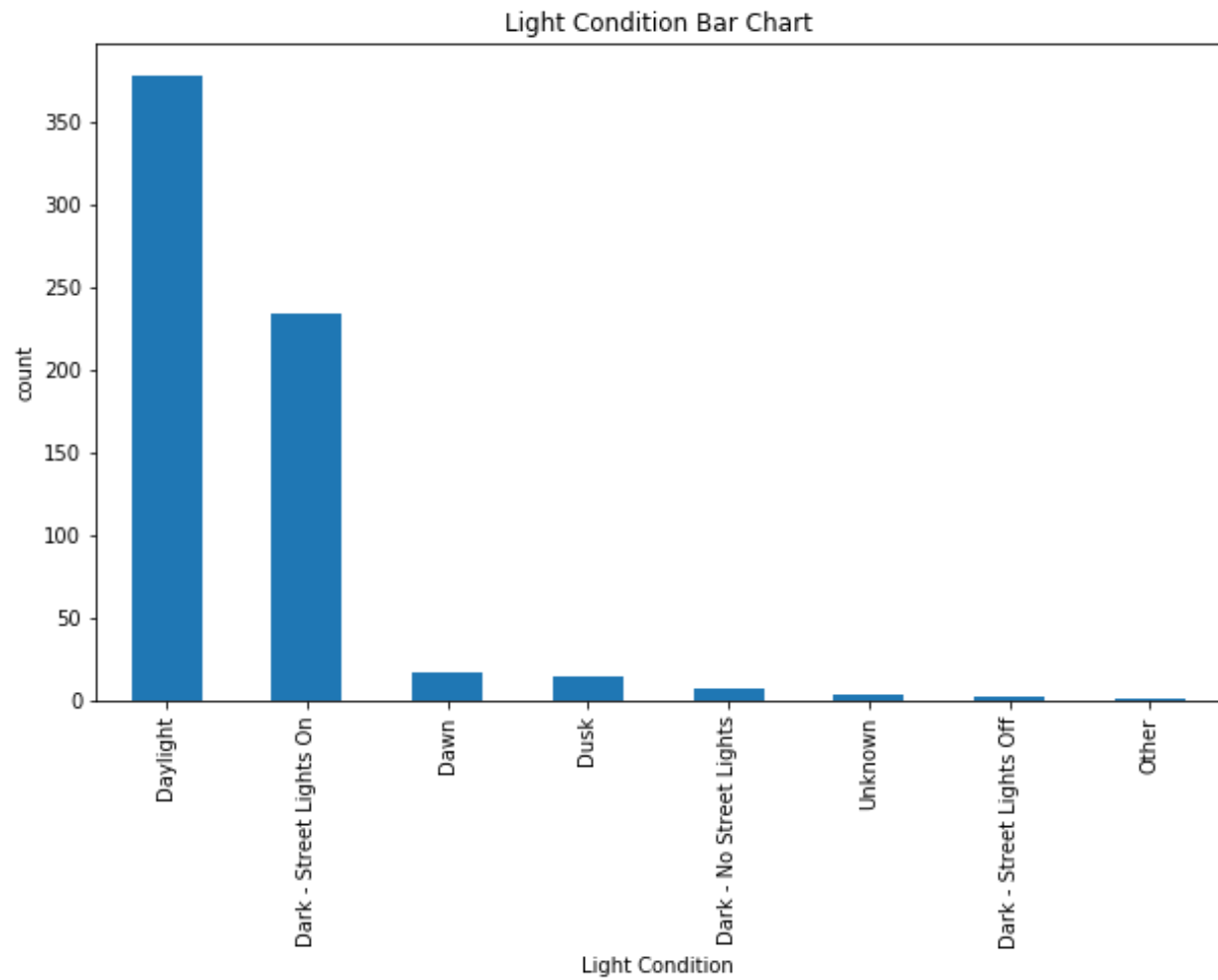


Figure 6: Light condition Vs. Collision count

Most collisions occurred during Daylight and Dark-Street Lights On conditions.

4. Results & Discussion

When studying the collision distribution map we can see that most of cases occurred in Mid-blocks. We have confirmed that using the Junction type vs. collision count bar chart. During data analysis it confirmed that all collisions have been occurred due to in-attention when driving. When we consider Drug use relationship with collisions it appears to be there isn't much impact of drug use for collisions in this dataset. Bad weather impact on collision is much less according to our analysis because most of the collisions occurred during Clear weather conditions and there is an impact by Rainy conditions for collisions occurred in Seattle. Furthermore, when we consider Road conditions most of collisions occurred during the dry and followed by wet road conditions which relates to clear and Rainy weather conditions. When comparing light condition with collisions most of collisions occurred during day light and followed by Dark and Street lights on conditions rather than completely dark conditions. Speeding have caused all the collisions in the data set.

5. Conclusion

All the collisions occurred mainly due to Speeding and In-attention. Rather than bad Weather, Road and Light conditions most collisions occurred in good conditions. It may suggest that in good driving conditions drivers pay less attention to driving and tend to speed. Also by taking necessary actions to notify drivers about the collision risk at Mid-block junctions which tend to reduce almost 50% of collisions.