

Seattle Traffic Incidents

From Insurance Perspective



Seattle skyline, picture copied from freeimages.com (website claims to be no copyright)

Seattle

- Seattle is the 14 largest cities in the US.
- Estimated total number of cars are 444,000.
- With the increase in number of cars, insurance demands are rising.
- General outlook is that insurance is a burden.
- Customers are mostly dissatisfied by the insurance when it comes to payment of claims.

Objective

- To make the customers (general populace) aware of driving conditions in Seattle and give recommendations.
- Give information on Seattle Traffic Condition to Insurance Companies to give better quote,
- And make satisfactory payments in case their customer gets in an incident

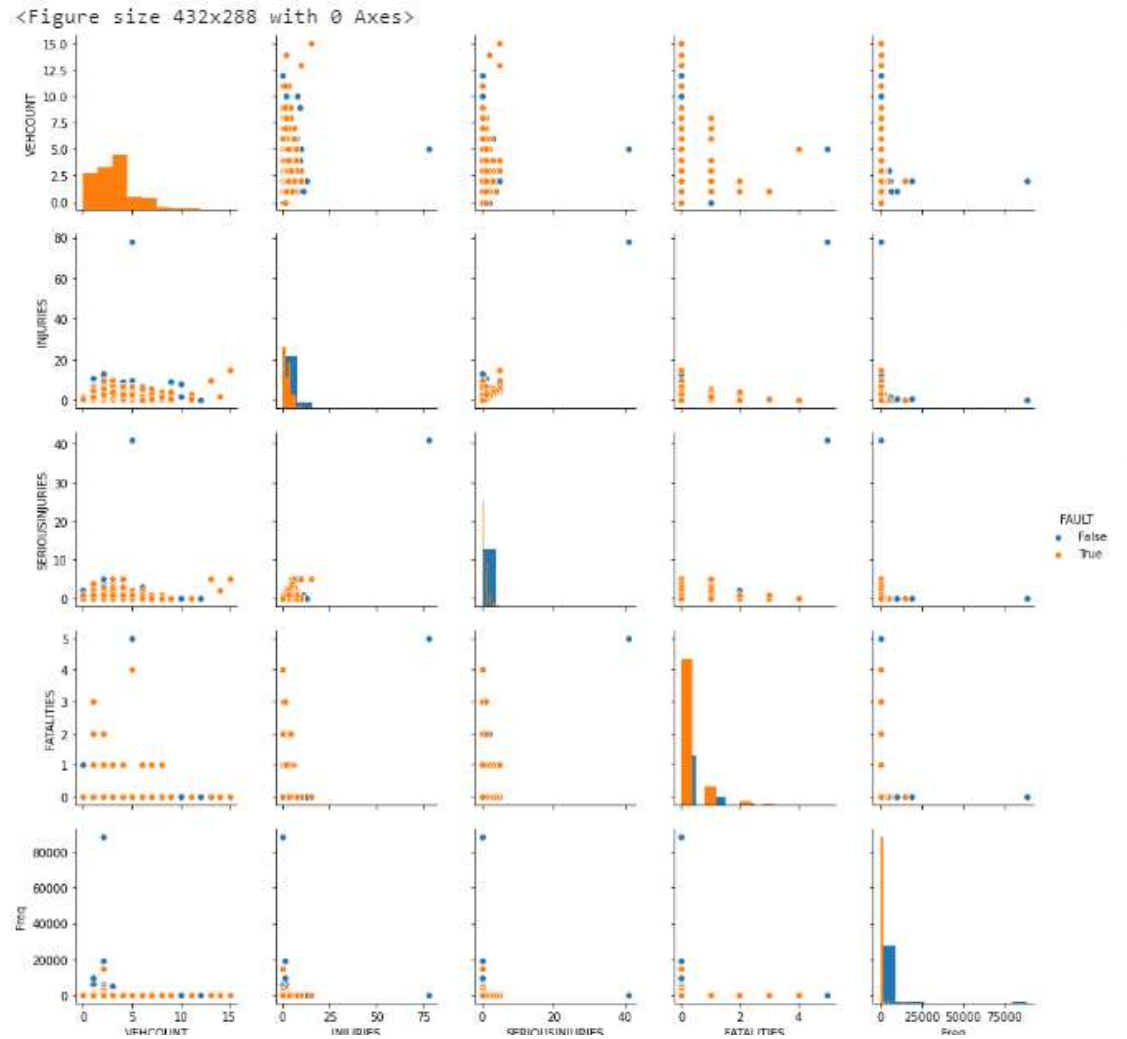
Analysis

- Driver's Fault Analysis
- Time of Accident Analysis
- Distance from City Center
- Analysis of Parked Cars in Incidents

Driver's Fault Analysis

- Analysis of Incidents where Drivers are
 - Speeding
 - Under Influence
 - Inattentive (Distracted Driving)

SNS Plot of Drive Incidents



Drivers' Fault Analysis – Result and Discussion

- Orange color dots show that the driver was Speeding, Under Influence or Distracted, either of two or all three.
- Higher number of Injuries, Serious Injuries, Fatalities and Vehicles involved when Driver is Speeding, under influence or distracted.
- The message is clear,

No Speeding, Texting / Talking or Intoxication
While Driving.

Time of Accident Analysis

- Analysis of Number of Incidents within an Hour in Seattle.
- Polynomial Analysis shows the following results.

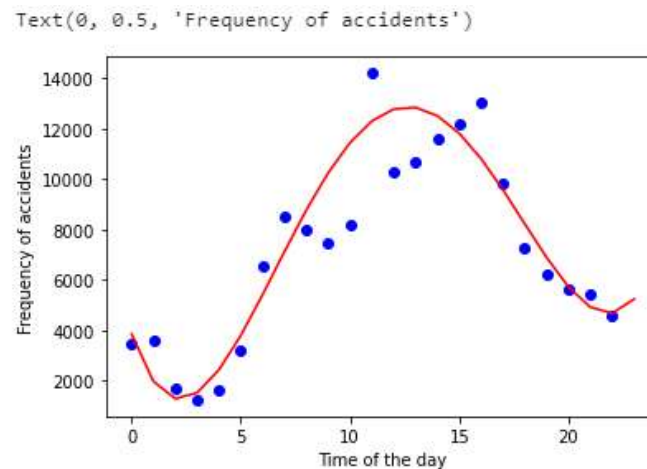
$$Y_t = X_t^4 - 2574.8 * X_t^3 + 744.598 * X_t^2 - 51.67 * X_t + 1.0556$$

Where,

Y_t = Number of Incidents.

X_t = Hour of Incidents.

Trend of Time of Accidents



- Trend shows that more incidents happen as the noon approaches.
- Lower accidents during the early hours of the day and late nights.

Distance from City Center

- Analysis of Number of Incidents (Frequency) from the Center of the city.
- Polynomial Analysis results are,

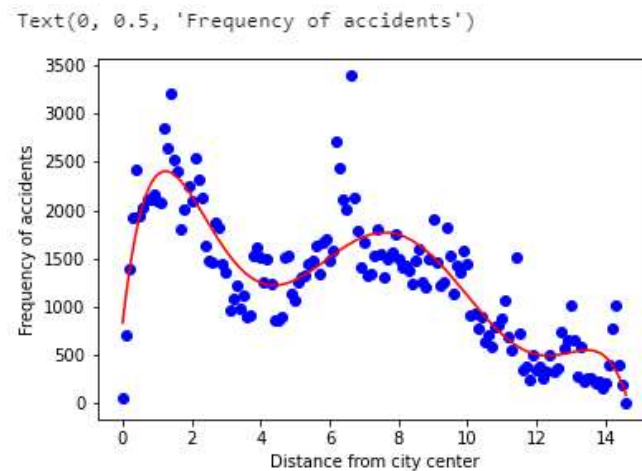
$$Yd = Xd^6 + 3129.44 * Xd^5 - 2065.35 * Xd^4 + 527.85 * Xd^3 - 63.12 * Xd^2 + 3.544 * X - 0.0756$$

Where,

Yd = Frequency of Accidents.

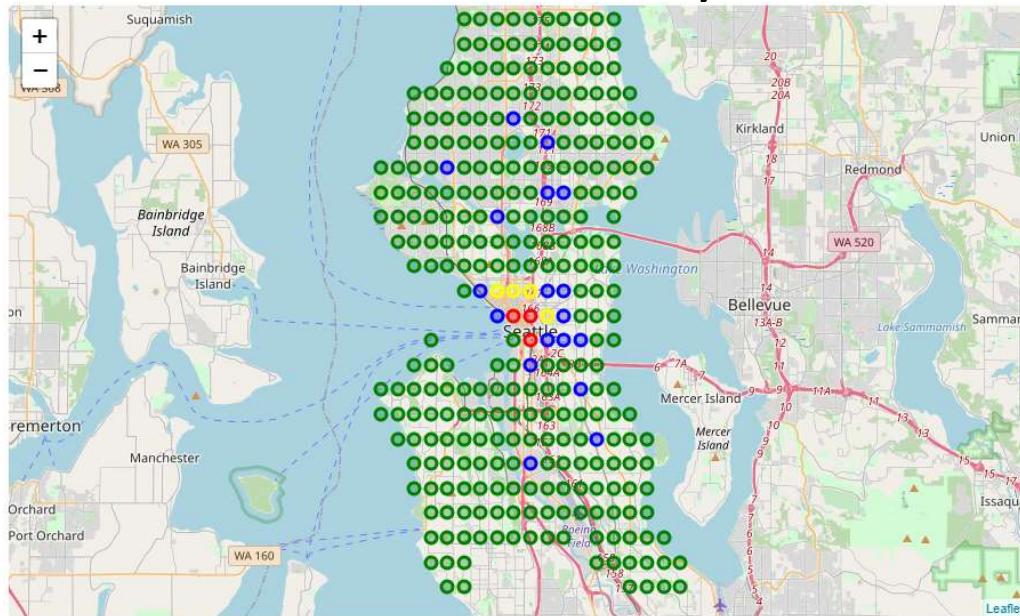
Xd = Distance from Center of City (in Kms).

Distance from City Center (Contd.)



- Complex results with 6 Degree of Polynomial Equation.
- Good for initial quote by the insurance company.
- Folium maps can give more accurate results.

Distance from City Center (Contd.)



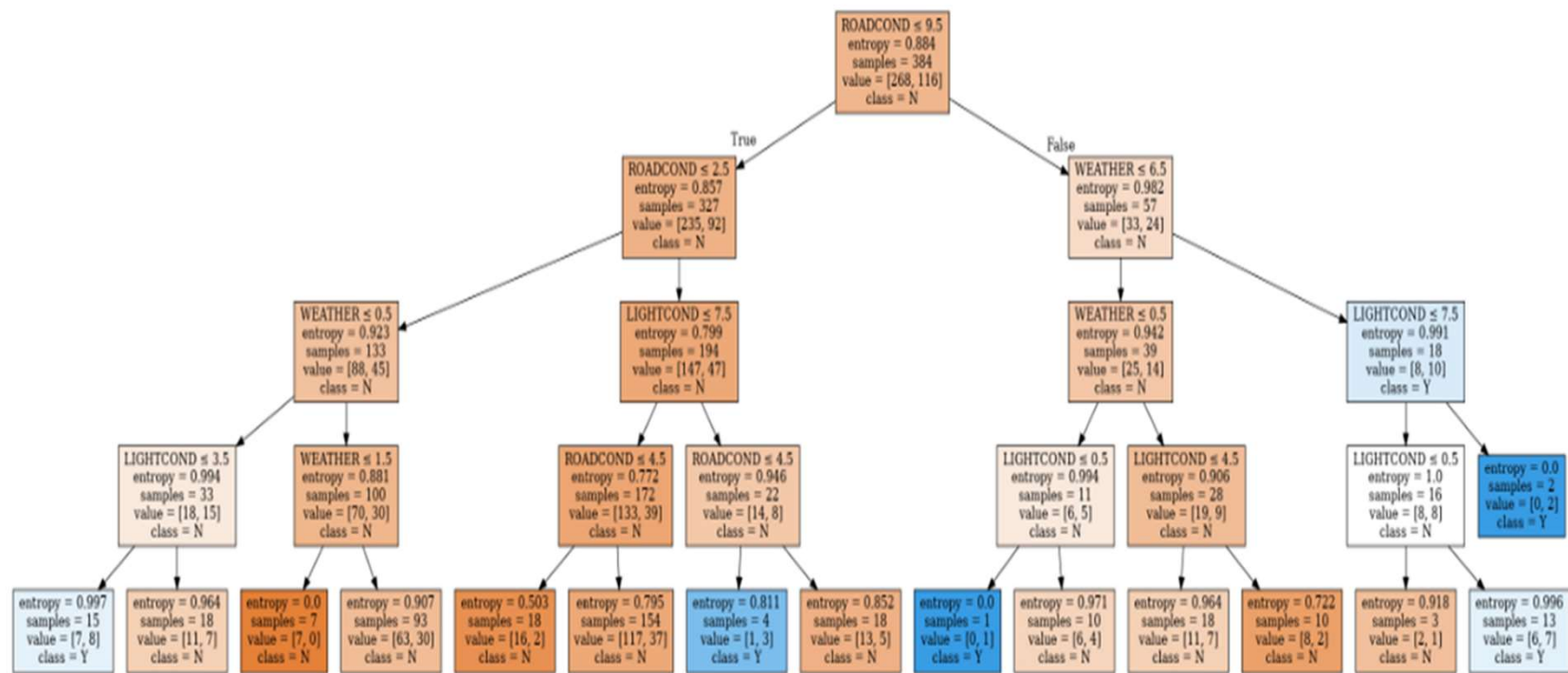
Color	Incident Frequency
Red	4500 - 6000
Yellow	3000 - 4500
Blue	1500 - 3000
Green	1 – 1500

Higher Incident Rates near Pioneer square, Westlake and First Hill have very high frequency of accidents, followed by areas like University Street, Seattle Center, Yesler Terrace.

Analysis of Parked Cars in Incidents

- Decision Tree Analysis of Parked Cars hit during an Incident.
- Variables considered were Road Conditions, Weather Conditions and Lighting on Streets.
- The Results show that Road Conditions make most of the impact.
 - Parked Cars can be hit when favorable conditions exist. (we cannot do anything about it.
 - Also, if Road Conditions are Oily or snow/slush with good lighting conditions.
 - Road Conditions are unknown, Weather is snow, sleet or unknown, light condition is known and it is not daylight.

Decision Tree for Parked Cars in Incidents



Discussion – Customers' Responsibility.

- To improve the insurance experience, customers (drivers) and insurance companies have equal responsibility.
- Rules like Driving with in Speed limit, no texting and talking while driving and absolutely no drinking and driving must be followed.
- Can stricter rules be implemented on this?
- Avoid driving during peak hours (10:00 am to 2 pm).
- Companies that require drivers to work during those hours can work around to change timings or give better training to their drivers.
- Avoid driving in the areas near Pioneer square, Westlake, First Hill University Street, Seattle Center and Yesler Terrace. At least during peak hours/.

Discussion – Insurance Companies' Responsibility

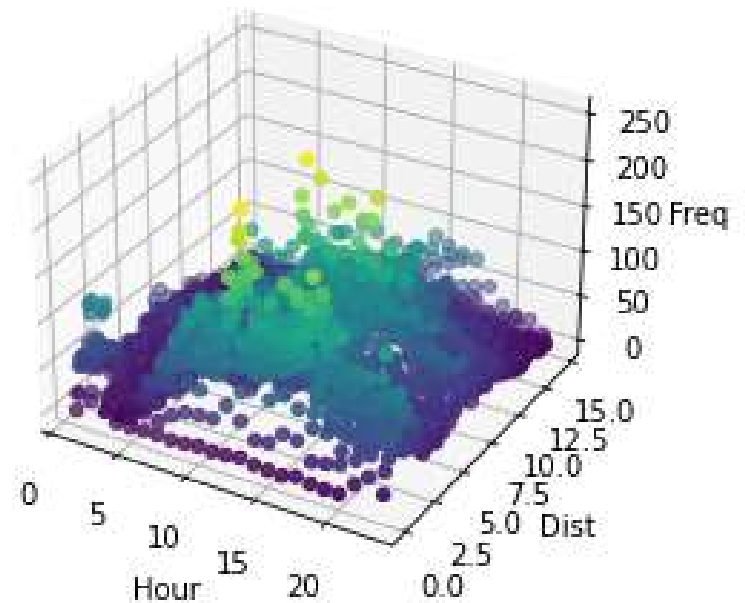
- Get Accurate information about drivers' previous records on driving habits.
- Get information about driving locations, home and work address and reduce or increase quote based on these locations.
- Get information about driving timings to see if driver is in high frequency time zone to adjust the quote.
- Give a better quote (rather than lower) to improve the payment on claim.

Future

- A time and distance analysis can be done. This will be a multiple polynomial regression.

(3D plot shown)

- A dynamic map of Seattle with number of accidents in hour. An animation showing frequency of incidents with change in time.



Thank You

A big 'Thank You' to all the readers.