

# Accident Severity Prediction

## Introduction

Each year millions of people die in traffic accidents, not to mention an additional number of people that are injured or disabled. If the locations of traffic accidents could be predicted, this could have a huge beneficial impact in potentially helping to reduce their number each year. It could also be useful in an insurance context, in order to predict risk, as well as for governments and local road authorities looking to create more efficient systems of road maintenance and improvements. The aim of this project is to predict the severity of road accidents in Seattle, US to help drivers and traffic police department.

Road accident is most unwanted thing to happen to a road user, though they happen quite often. The most unfortunate thing is that we don't learn from our mistakes on road. Most of the road users are quite well aware of the general rules and safety measures while using roads but it is only the laxity on part of road users, which cause accidents and crashes. Main cause of accidents and crashes are due to human errors.

Road accidents are extremely common. Often times they lead to a loss of property and even life. With this analysis, I am attempting to understand these factors and their relation with accident severity. This analysis has multiple applications like an app that will prompt the drivers to be more careful depending on the weather and road conditions on any given day or a way for the police to enforce more safety protocols. In this instance, I am using the data from the City of Seattle's police department which has been downloaded as a file with name accident\_data.csv.

## Different factors of Roads contribute in Accidents:

**Drivers:** Over-speeding, rash driving, violation of rules, failure to understand signs, fatigue, alcohol.

**Pedestrian:** Carelessness, illiteracy, crossing at wrong places moving on carriageway, Jaywalkers.

**Passengers:** Projecting their body outside vehicle, by talking to drivers, alighting and boarding vehicle from wrong side travelling on footboards, catching a running bus etc.

**Vehicles:** Failure of brakes or steering, tyre burst, insufficient headlights, overloading.

**Road Conditions:** Potholes, damaged road, eroded road merging of rural roads with

highways.

**Weather conditions:** Fog, snow, heavy rainfall, wind storms, hail storms.

**Preventive measures for accidents:**

- Education and awareness about road safety
- Strict Enforcement of Law
- Engineering:
  - Vehicle design
  - Road infrastructure

**Direct Consequences of Accidents:**

- Fatality (Death)
- Injury
- Property Damage

**Methodology**

This project uses a combination of accident data from the Seattle to predict the accident severity as severe and light. Two algorithms are considered for implementation.

**KNN classifier**

KNN can be used for both classification and regression predictive problems. However, it is more widely used in classification problems in the industry. To evaluate any technique we generally look at 3 important aspects:

- Ease to interpret output
- Calculation time
- Predictive Power

We can implement a KNN model by following the below steps:

- Load the data
- Initialise the value of  $k$
- We can use the KNN library for implementation

**Logistic Regression**

In statistics, the logistic model is used to model the probability of a certain class or event existing such as pass/fail, win/lose, alive/dead or healthy/sick. This can be extended to model several classes of events such as determining whether an image contains a cat, dog, lion, etc. Each object being detected in the image would be assigned a probability between 0 and 1,

with a sum of one. Logistic regression is used in various fields, including machine learning, most medical fields, and social sciences

### **Advantages of given work**

When weather conditions are bad at the junction intersection point, this model can alert drivers to remind them to be more careful. Also could be helpful to the travel police department in deciding where to install more traffic signs, or maybe adding CCTV systems.