

Applied Data Science Capstone

Capstone Project - Car Accident Severity



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1. Introduction

The goal of this project is the prediction of road accident severity. This study utilized a dataset consisting of 194672 recorded accidents and 37 attributes in Seattle City in Washington State by Seattle Department of Transportation (SDOT). Analysed and build balanced machine learning models were developed by applying prediction methods in this research. One of the important indicators for measuring the efficiency of service provision in road network systems of each country is the number of road accidents. The main purpose of the study aims analysis of injury accident and fatal accident to predict the accident severity. Its measurement comprehensively considers statistical relationship among variables such as average speed on road section, average traffic volume per day, period of time, weather conditions, physical characteristics of accident area, and causes of accident.

1.1 Business Problem Definition

In this project, the following question have been tried to be answered accurately, both in terms of studying the number of injury and fatal accident, weather condition as well as a complete study of the information related to Seattle transportation network systems.

- Predict the road accident severity in the Seattle transportation system.

1.2 Target the Right Audiences

Specifically, insurance and public transport companies, as well as the municipality and all passengers traveling on intercity routes are among those who will be interested in the results of this research. Numerous reasons can contribute to road accidents. Rough road conditions, bad weather condition such as wet ground Poor lighting can impair visibility, confined or congested traffic routes can increase the likelihood of collisions. Consequently, municipalities or road construction and public transport companies can review the results of this study to provide appropriate solutions to prevent road accidents. Also, passengers can avoid unnecessary travel by checking the weather conditions and road traffic before their trip.

2. Related Research

Due to the rapid spread of car accident and its impact on fatal indicator in each country, a large number of studies have been conducted in this regard. In this section, I have reviewed two related articles and outlined the methods they have presented.

1. Impacts of accident severity factors and loss values of crashes on expressways in Thailand ¹
2. Prediction for Traffic Accident Severity: Comparing the Bayesian Network and Regression Models ²

¹ Vatanavongs Ratanavaraha, Sonnarong Suangka, Impacts of accident severity factors and loss values of crashes on expressways in Thailand, IATSS Research, Volume 37, Issue 2, 2014, Pages 130-136, ISSN 0386-1112, <https://doi.org/10.1016/j.iatssr.2013.07.001>.

² Fang Zong, Hongguo Xu, Huiyong Zhang, "Prediction for Traffic Accident Severity: Comparing the Bayesian Network and Regression Models", Mathematical Problems in Engineering, vol. 2013, Article ID 475194, 9 pages, 2013. <https://doi.org/10.1155/2013/475194>.

The first paper focuses on finding factors that affect the accident severity. The speed on a road section influences the severity of crashes. (Vatanavongs et al., 2014).

The second paper presents a comparison between two modeling techniques, Bayesian network and Regression models, by employing them in accident severity analysis. Three severity indicators, that is, number of fatalities, number of injuries and property damage, are investigated with the two methods, and the major contribution factors and their effects are identified. (Fang et al., 2013).

References

Vatanavongs Ratanavaraha, Sonnarong Suangka, Impacts of accident severity factors and loss values of crashes on expressways in Thailand, IATSS Research, Volume 37, Issue 2, 2014, Pages 130-136, ISSN 0386-1112, <https://doi.org/10.1016/j.iatssr.2013.07.001>.

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<https://data.seattle.gov/Land-Base/Collisions/9kas-rb8d>

<https://www.arcgis.com/home/index.html>