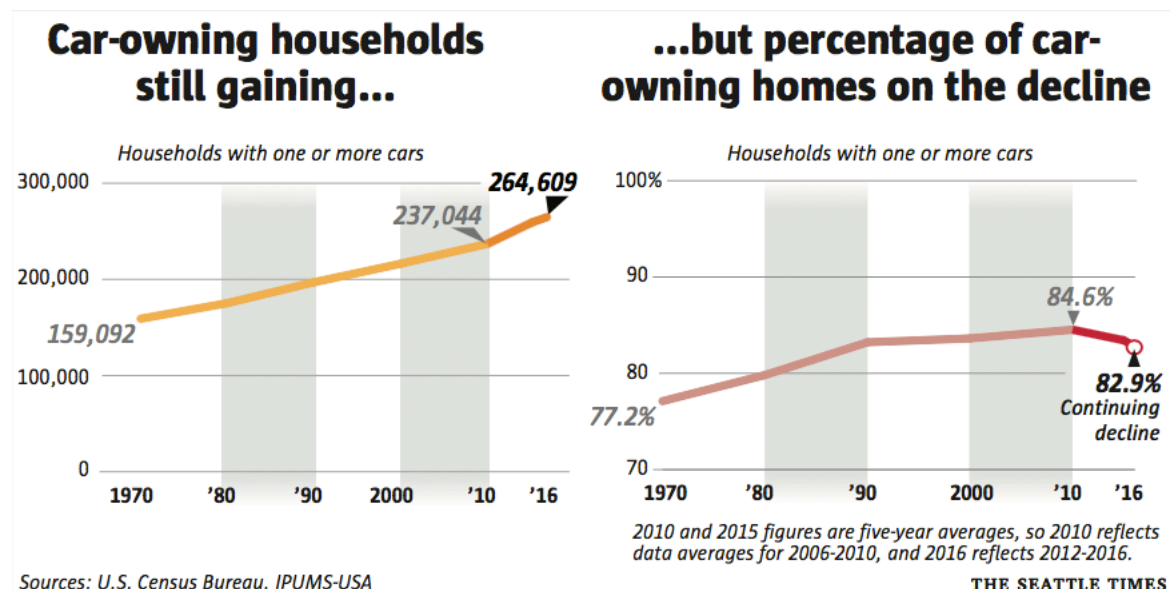**Car Accident Severity Prediction**

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**INTRODUCTION**

1. The IBM Data Science Professional Certificate Capstone Project is built based on the collision dataset from the Seattle Police Department. This collision set will be used to predict the severity of traffic accidents.

**BUSINESS UNDERSTANDING**

2. <u>Seattle, Washington</u>. Seattle [1] is the largest city in both the state of Washington and the Pacific Northwest region of North America. According to U.S. Census data released in 2019, the Seattle metropolitan area's population stands at 3.98 million, making it the 15th largest in the United States.

3. <u>About Seattle's Car Population</u>. The total number of personal vehicles in Seattle hit a new high of nearly 444,000 in 2016. And about 265,000 Seattle households have at least one car, also a record [2]. The increase in car density in Seattle streets meant a higher probability of accidents, which also necessarily led to higher occurrences of severe collisions. Such collisions are experienced as damages to property at the lower end of the severity scale, and loss of lives at the other end of the spectrum.
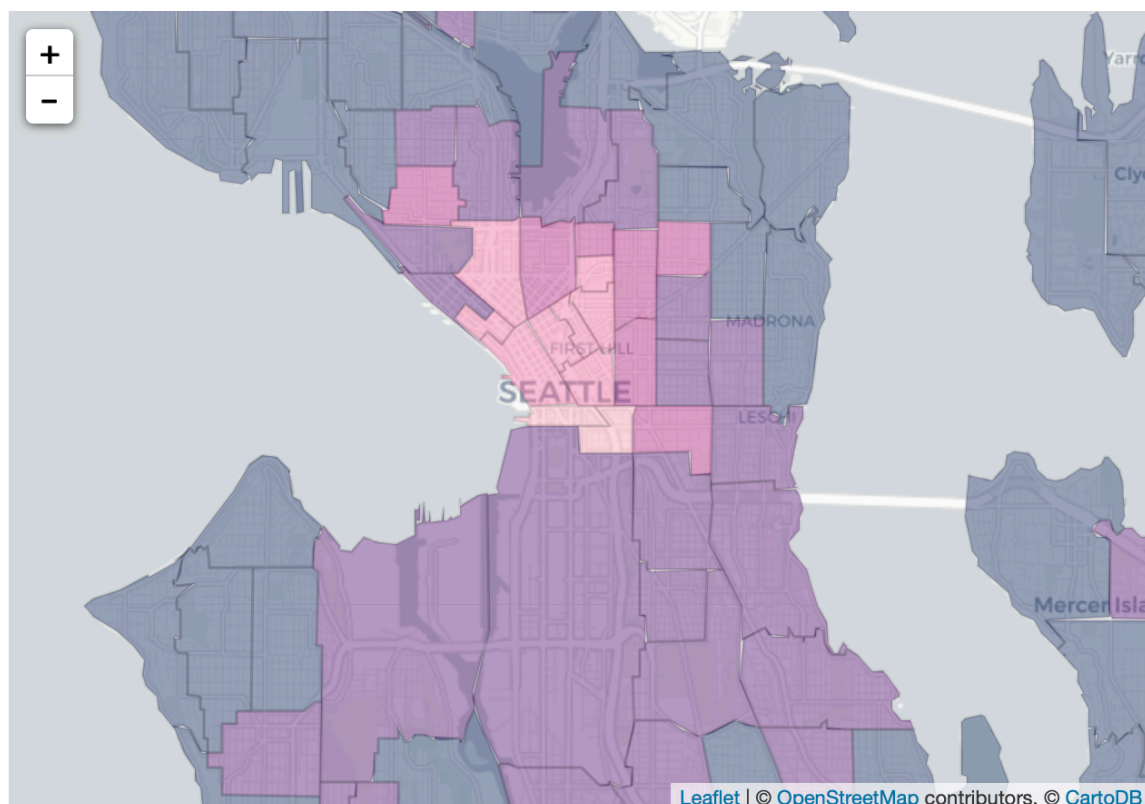


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4. <u>Business Objectives</u>. The economic and societal harm from motor vehicle crashes amounted to a $871 billion in a single year, according to the National Highway Traffic Safety Administration. In a study which examined the economic toll of car and truck crashes in 2010, when 32,999 people were killed, 3.9 million injured and 24 million vehicles damaged, $277 billion was attributed to economic costs. Harm from loss of life, pain and decreased quality of life due to injuries was pegged at $594 billion[3].

## Where are our cars?

Downtown Seattle and the University District contain the only census tracts in the city where the majority of households don't own a car.



**HOUSEHOLDS WITH ONE OR MORE CARS**

| 91% and up | 76- 90% | 61-75% | 46-60% | 0-45% |

*Source: U.S. Census*                                   EMILY M. ENG / THE SEATTLE TIMES

5. Traffic accidents are a significant source of deaths, injuries, property damage, and a major concern for public health and traffic safety. Accidents are also a major cause of traffic congestion and delay. Effective management of accident is crucial to mitigating accident impacts and improving traffic safety and transportation system efficiency. Accurate predictions of severity can provide crucial information for emergency responders to

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[3] https://www.pbs.org/newshour/nation/motor-vehicle-crashes-u-s-cost-871-billion-year-federal-study-finds, extracted 6 Oct 2020, last updated 29 May 2014.

evaluate the severity level of accidents, estimate the potential impacts, and implement efficient accident management procedures[4].

6. <u>Business Value</u>. Knowing the contributing factors to an accident, as well as the corresponding severity can help direct public resources to mitigate the risks and probability to where it matters most, and reduce the occurrence of accidents. Sharing processed data of contributing factors with the public through education and awareness programs, including the use of appropriate street signs in accident-prone areas will also contribute to reducing accident rates.

[4] Fang Zong, Huiyong Zhang, Hongguo Xu, Xiumei Zhu, Lu Wang, "Predicting Severity and Duration of Road Traffic Accident", Mathematical Problems in Engineering, vol. 2013, Article ID 547904, 9 pages, 2013. https://doi.org/10.1155/2013/547904