Find the Safest Car from Real-World Collision Data

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Objectives

Traditionally, vehicle safety is assessed by organizations such as National Highway Traffic Safety Administration, who perform hundreds of tests in the controlled environment. But how about **a safety rating based on real world accident data**? Can we evaluate the vehicle safety from millions of real-world collision outcomes?

Our goal in this project is to build a vehicle safe score model, as well as a web page that allows people to look up and browse safety scores for vehicle models.

Dataset

38.2 million semi-structured collision records from **3 states** spanning from **2006 - 2018,** covering **150**+ different vehicle Make/Model/Year.

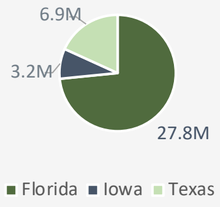

Fig 1. Data Source by State

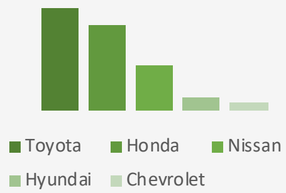

Fig 2. Top Frequent 5 Brands

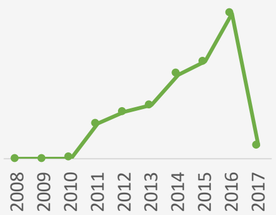

Fig 3. Data Source by Year

Our Process

- Data Loading and Cleaning
- Data Exploration
- Automatic Text Mapping using NLP
- Safety Score Model Development
- Web Design

Safety Score Model: Regression Analysis

Intuition: under the same circumstance, If **driver** in vehicle A is **more likely to get severe injured** than the driver in vehicle B, then vehicle A might be **less safe**.

When a collision happened,

- Has the driver been severely injured?
- Has the car been severely damaged?

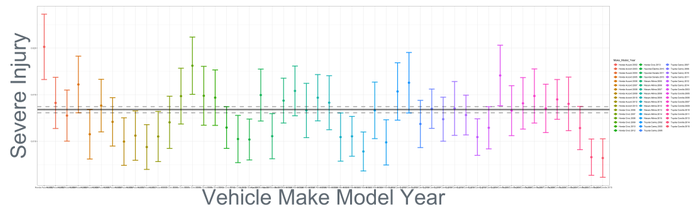

Fig 4. Average Severe Driver Injury by Different Models

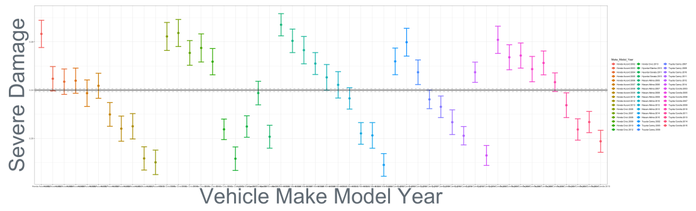

Fig 5. Average Severe Vehicle Damage by Different Models

We built two binary classification models to separately estimate the probabilities of **severe driver injury** and that of **severe vehicle damage** for each vehicle make model and year.

Multiple control variables are included in the model to eliminate factors such as:

- ✓ Vehicle Age
- ✓ Manner Of Crash
- ✓ Speed Limit
- ✓ ...
- ✓ Road Surface Condition
- ✓ Driver Age
- ✓ Driver Restrain Used

Final Score <- 80% Prob of Severe **Driver Injury** + 20% Prob of Severe **Vehicle Damage**

Web Demo Welcome to visit our web page @ https://capstone2020-c2c5d.web.app/ !

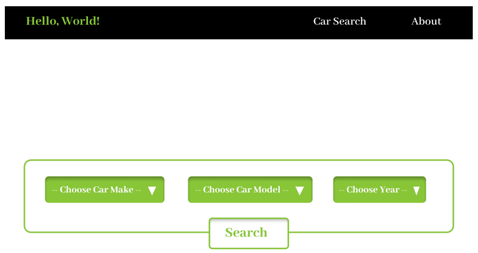

Fig 6. Vehicles Searching

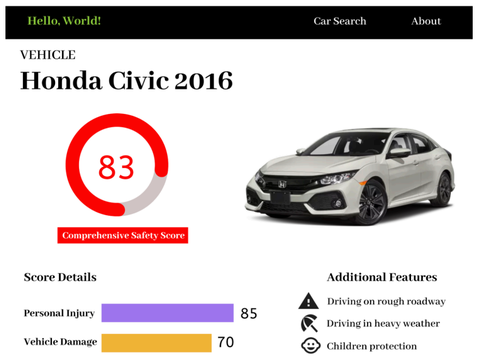

Fig7. Rating Demonstration

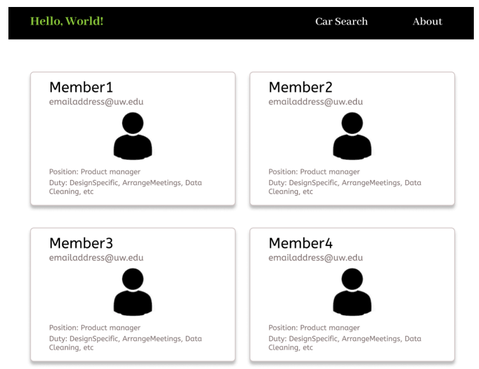

Fig 8. Name Card