PREDICTING INJURY SEVERITY FROM CAR COLLISION DATA

Building models to help emergency services predict what car accidents might have victims with serious injuries

WHY PREDICT INJURY SEVERITY?

• If we develop models that emergency services could use, they could better allocate resources at the time of an accident

HOW CAN WE DO IT?

• When there is an accident, and someone calls 911, there are a number of questions that they can be asked to ascertain information about the accident

LIKE WHAT?

- I. Was the collision head on?
- 2. Was it at an intersection?
- 3. What is the lighting like around the area?
- 4. What about the weather?
- 5. Whether a driver was speeding?

SO WE BUILT SOME MACHINE LEARNING MODELS TO PREDICT INJURY SEVERITY

HOW ACCURATE ARE THE MODELS?

Table 1. Precision and recall model performance of machine learning models predicting the severity of an injury

Model	Injury Severity	Precision	Recall	FI-Score
KNN	Mild	0.65	0.61	0.63
	Severe	0.63	0.67	0.65
Decision Tree	Mild	0.64	0.78	0.70
	Severe	0.72	0.56	0.63
SVM	Mild	0.66	0.73	0.69
	Severe	0.70	0.62	0.66
Logistic Regression	Mild	0.65	0.74	0.69
	Severe	0.70	0.60	0.65

MODEL OVERALL PERFORMANCE

Table 2. FI-Scores and Jaccard Index				
Model	Jaccard Index	FI-Score		
KNN	0.64	0.64		
Decision Tree	0.67	0.66		
SVM	0.68	0.67		
Logistic Regression	0.67	0.67		

SUMMARY

- Our best Support Vector Machine model can predict with an accuracy of 0.7
 whether an 'severe' or 'mild' injury would likely have been sustained based on
 these factors. This SVM model had a Jaccard Index of 0.68 and an FI-Score of
 0.67.
- While we aren't perfect yet, more research in this area will improve these statistical models which might one day improve the how car collisions are responded to, and hopefully save lives.