

An aerial, high-angle photograph of a busy city intersection. The image shows multiple lanes of traffic, crosswalks with white stripes, and traffic lights. Several cars are visible, some blurred due to motion, indicating a fast-paced environment. The overall color palette is dark and muted, with a blue-grey tint. The text 'TRAFFIC COLLISION MODELING' is overlaid in a large, white, serif font, centered in the upper half of the image. A thin white vertical line is positioned to the left of the text. A solid white circle is located in the top right corner.

# *TRAFFIC COLLISION MODELING*

*Jamie Carnevale*



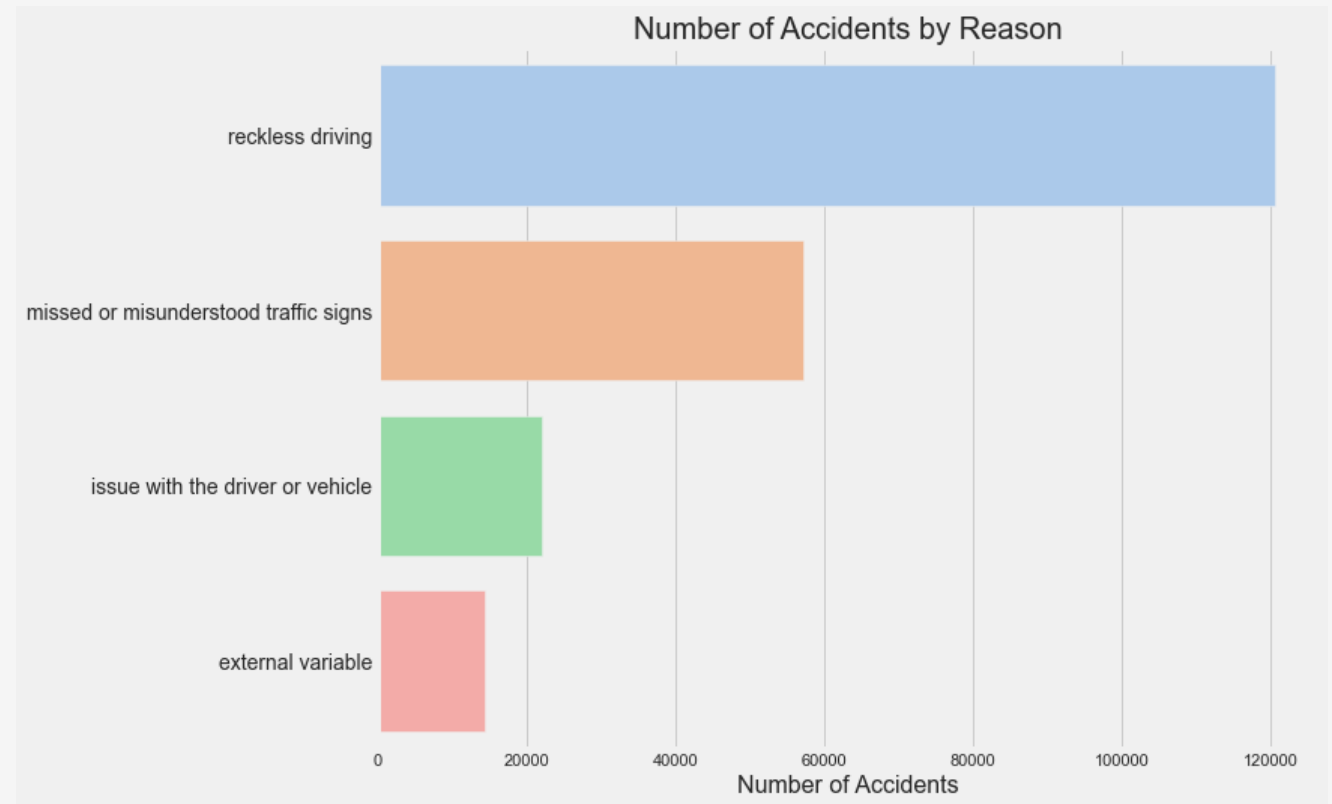


# *Hello Chicago Traffic Safety Board*

- Created a classification model to predict the primary contributory cause of a car accident
- From this model, there are some key factors
  - Entering Traffic Lane From Parking
  - Physical Condition Impaired - Alcohol
  - Accident Occurred at a Stop Sign/Flasher

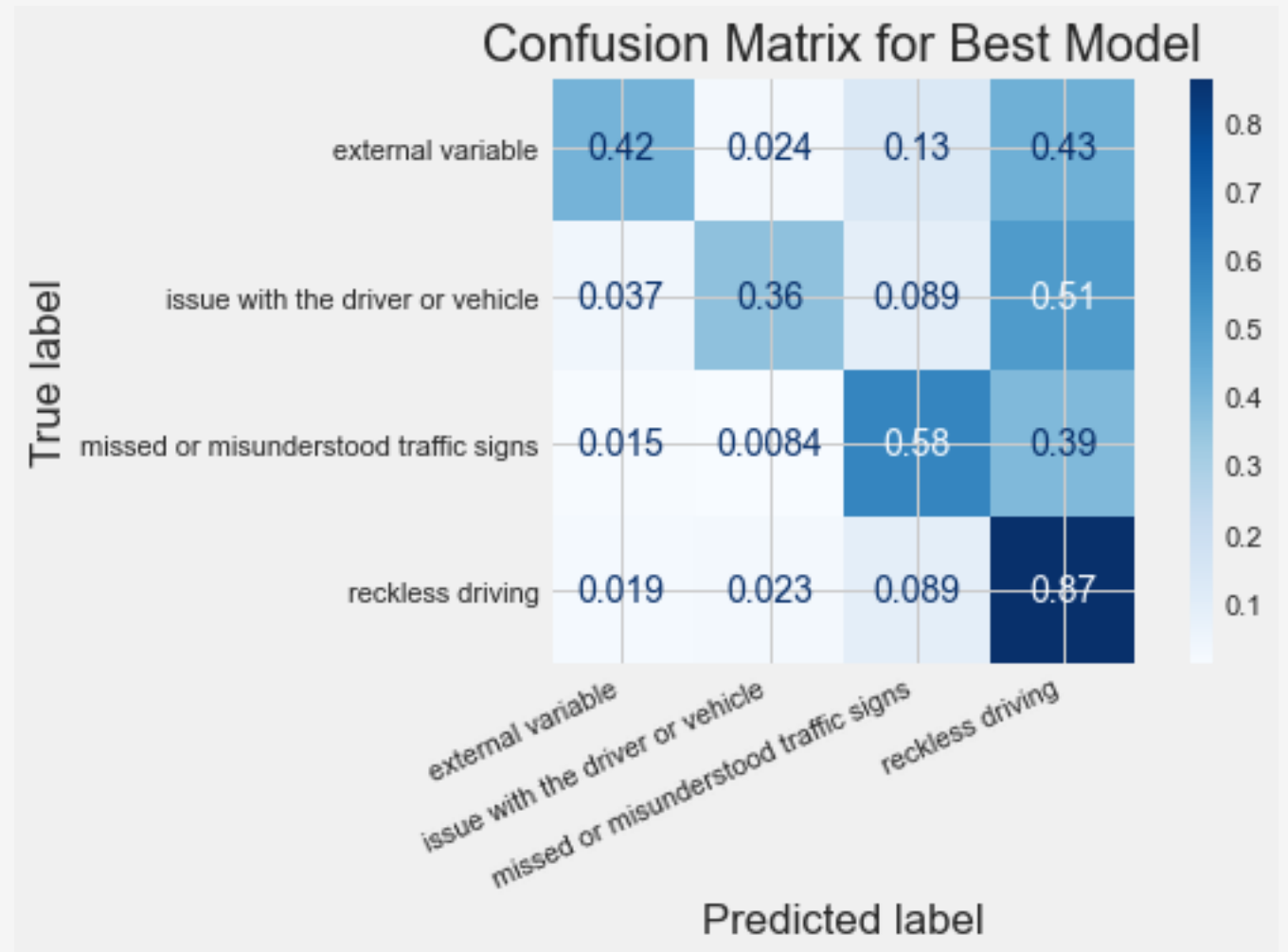
# *Examples of what falls under each category:*

- Reckless driving:
  - following too closely, improper overtaking/passing, texting, failing to reduce speed to avoid crash
- missed or misunderstood traffic signs or rules:
  - disregarding yield sign, disregarding traffic signals, disregarding stop sign, failing to yield right of way
- issue with driver or vehicle:
  - driving skills/knowledge/experience, physical condition of driver, had been drinking
- external variable:
  - weather, animal, distraction from outside vehicle, vision obscured, road construction

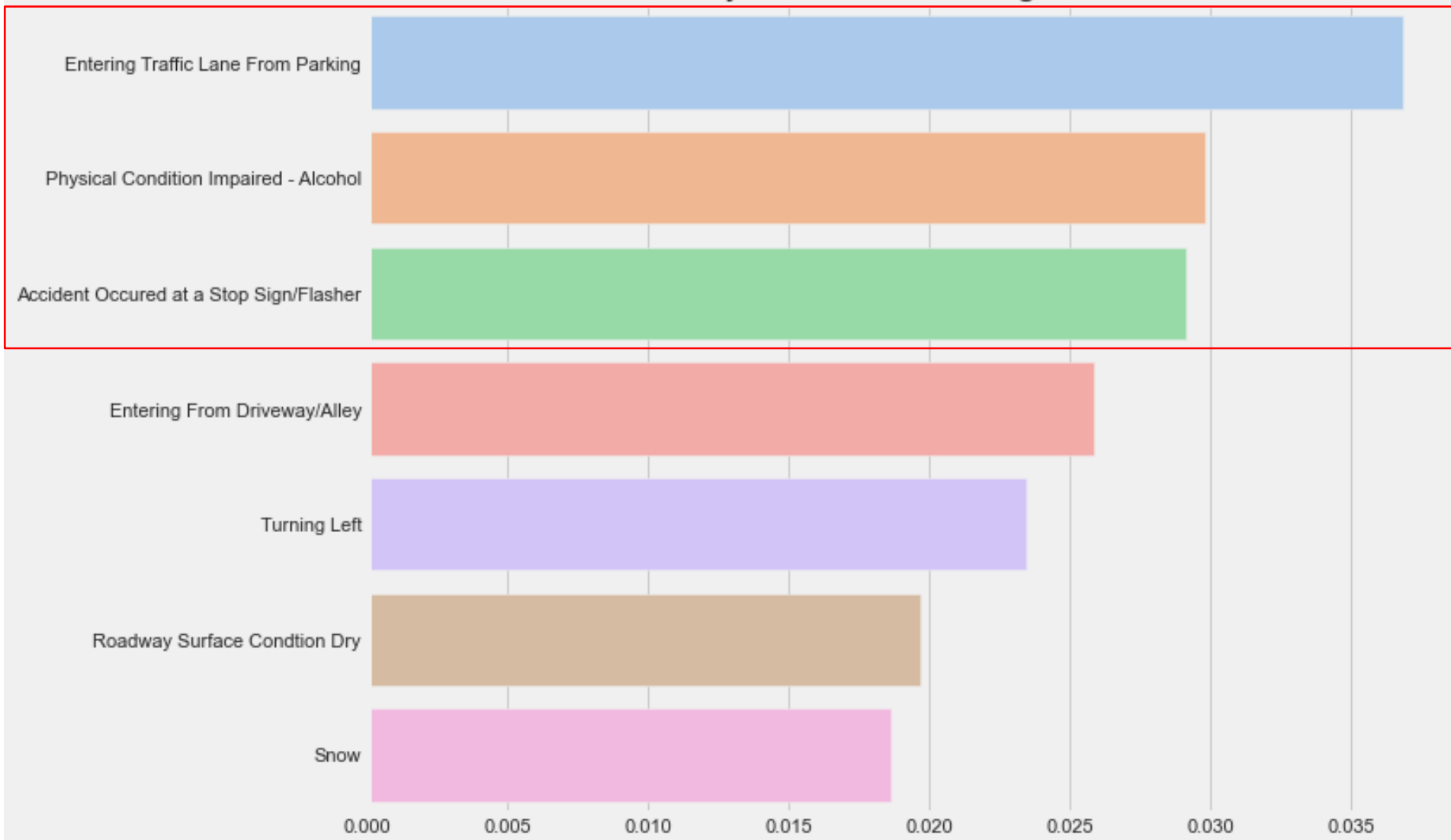


# *Confusion Matrix for the Best Model*

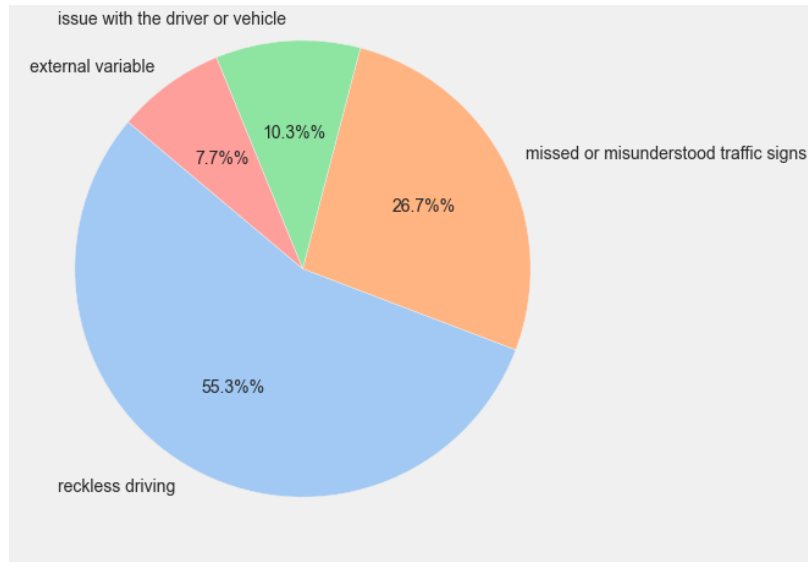
- XGBoost worked best
- ROC AUC Score:
  - 0.8315



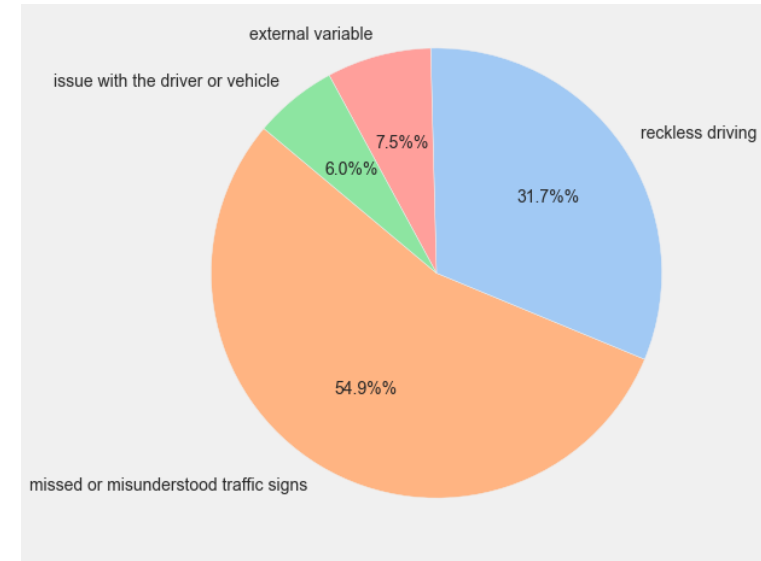
## Key Variables Affecting Model



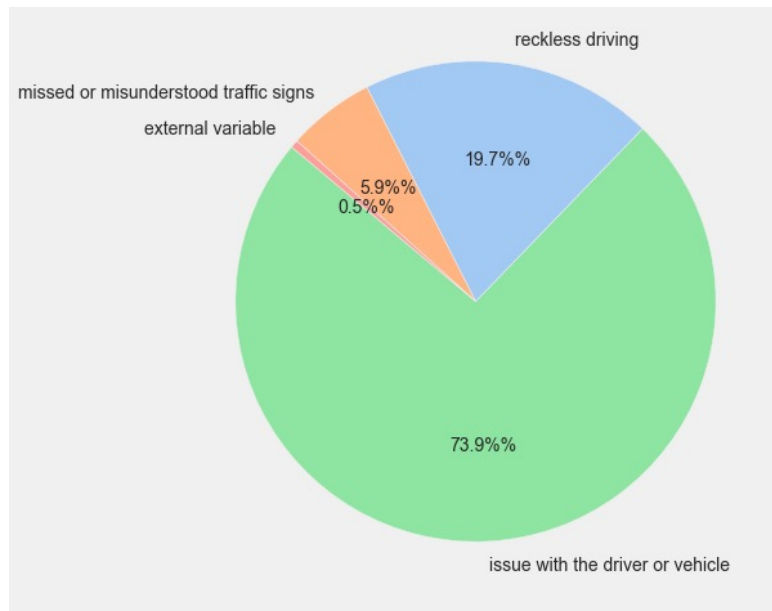
## Overall Likelihood of Accident Causes



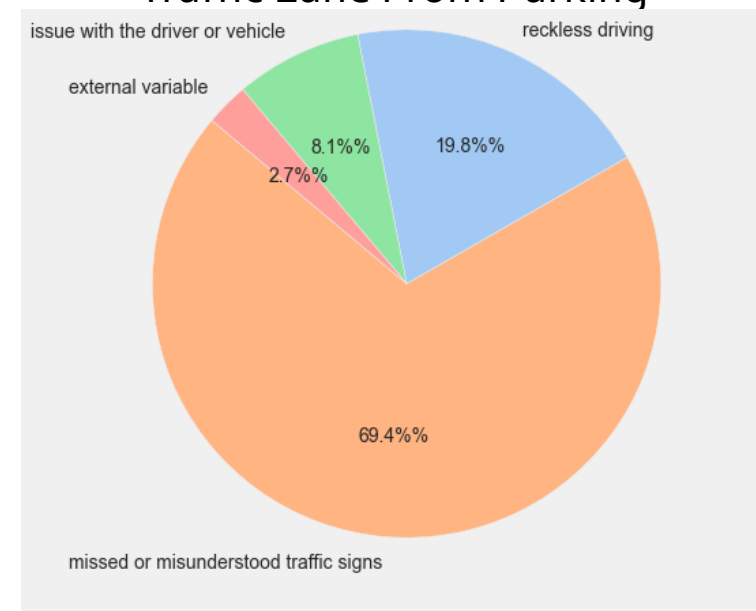
## Accident Causes for Accidents at a Stop Sign/Flasher



## Accident Causes for those Impaired by Alcohol



## Accident Causes for Entering Traffic Lane From Parking



# *In Sum*

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- Based on model, the key factors that help classify the primary cause of an accident are:
  - Entering Traffic Lane From Parking, Physical Condition Impaired – Alcohol, Accident Occurred at a Stop Sign/Flasher
- Recommendations:
  - Improve parking lot design, focus on parking lots in driver education
  - More DUI checkpoints, create programs to encourage Uber/Lyft/Taxi usage when drinking
  - Improve visibility of stop signs (maintain trees and other potential visibility blockers)

*Thank you*

