Chicago Traffic Crashes

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Agenda

- Business Goals and Understanding
- Data Understanding and Visualization
- Model Performance
- Recommendations
- Future Work

WHAT IS VISION ZERO CHICAGO ?

- End fatalities and serious injuries from traffic crashes
- Even one life lost is unacceptable
- Equitable distribution of resources

https://www.chicago.gov/city/en/depts/cdot/supp_info/vision-zero-chicago.html

Project Goals

Recommendations

From the model

From data explorations

Model improvement

In this study

Future work

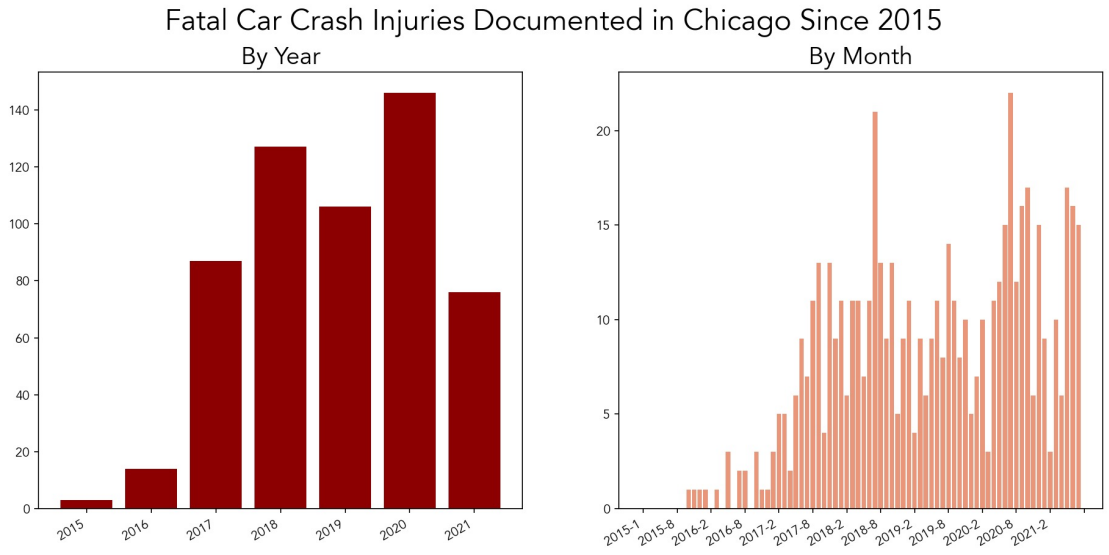
About the Data

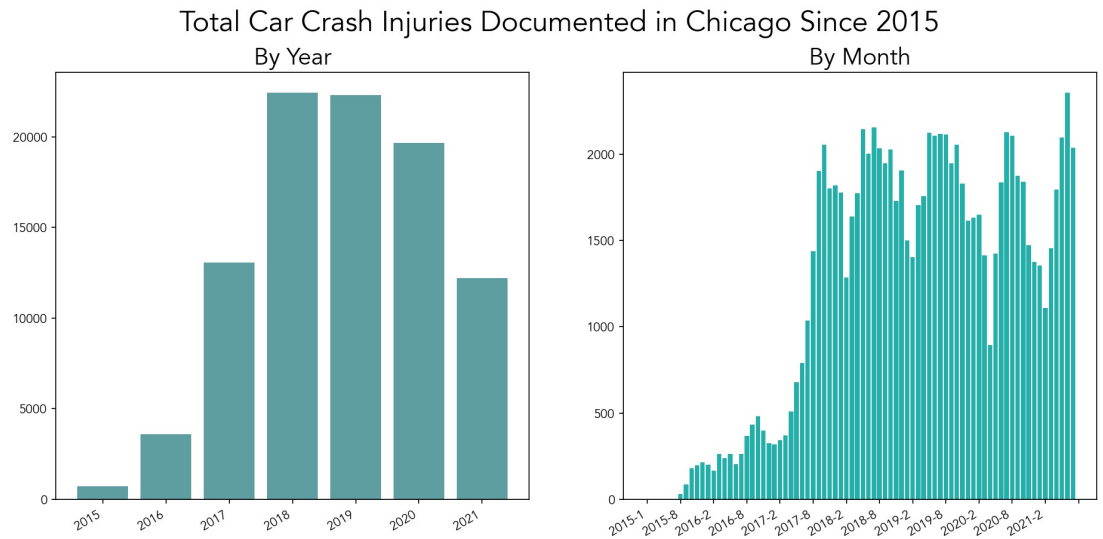
- Roughly 500,000 crashes
  - Environmental conditions
  - Injuries
  - Road/traffic signal defects
  - *Primary Contributory Cause*

Visualizing the Crashes

And their causes

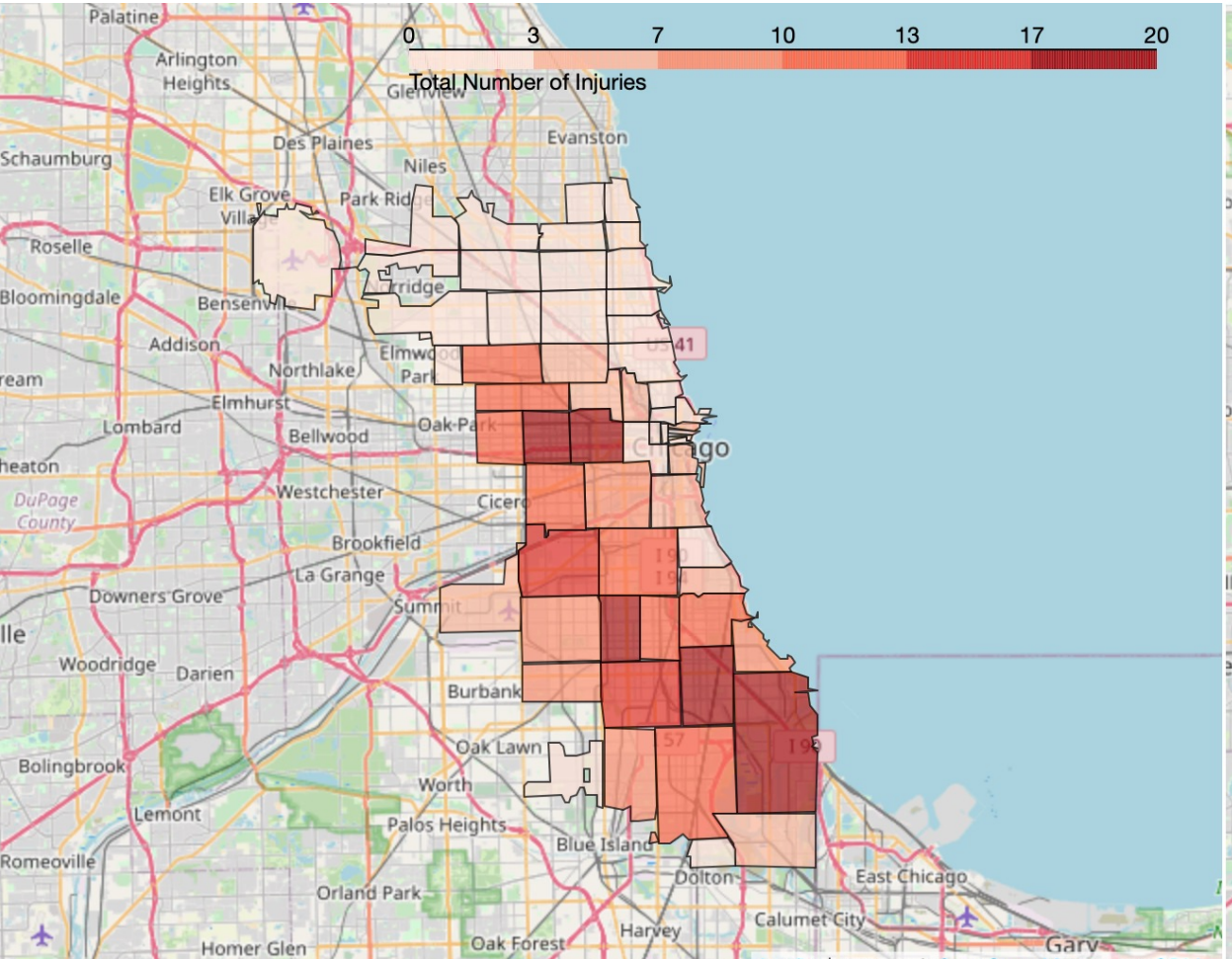
Injuries Over Time



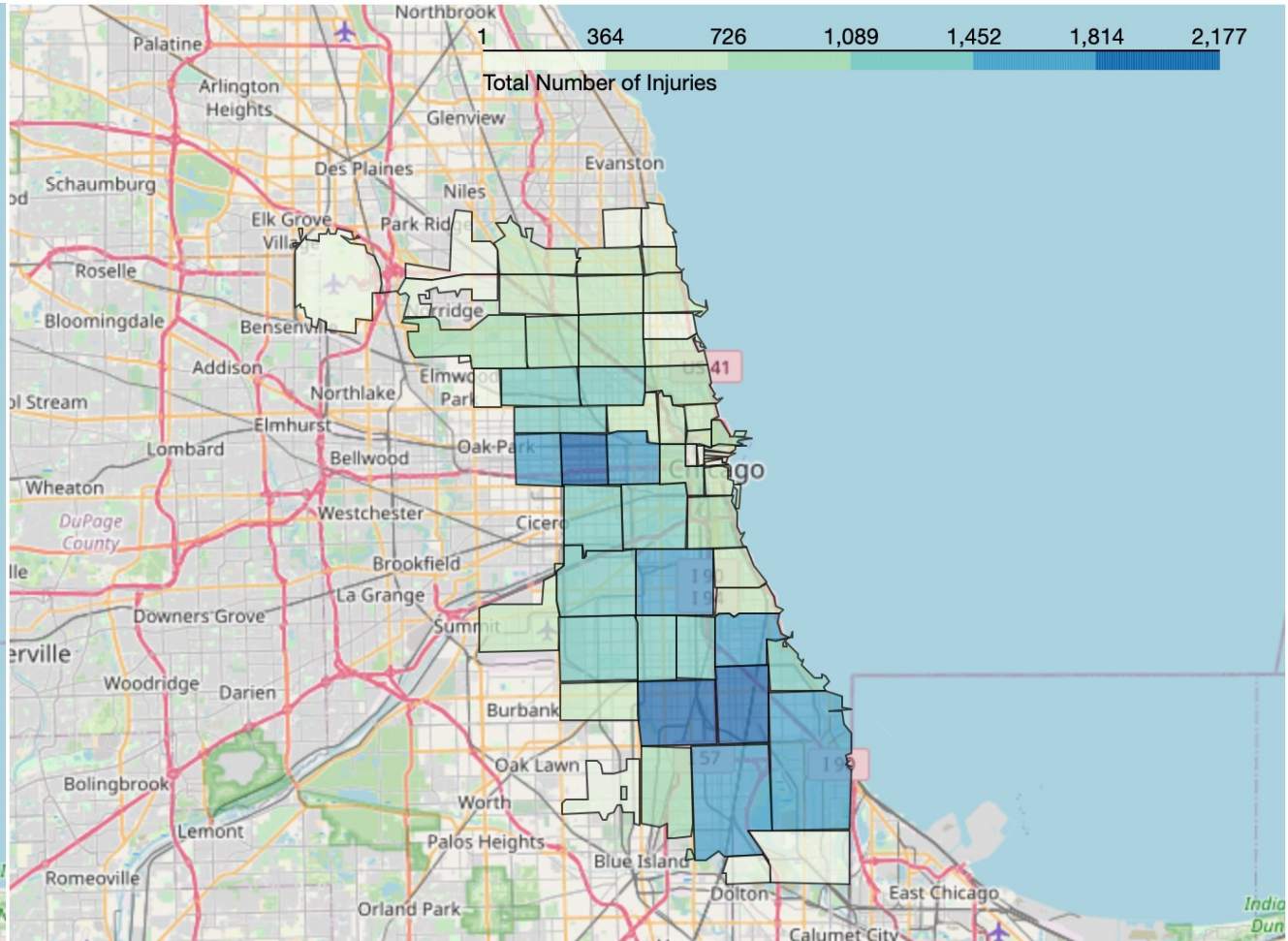


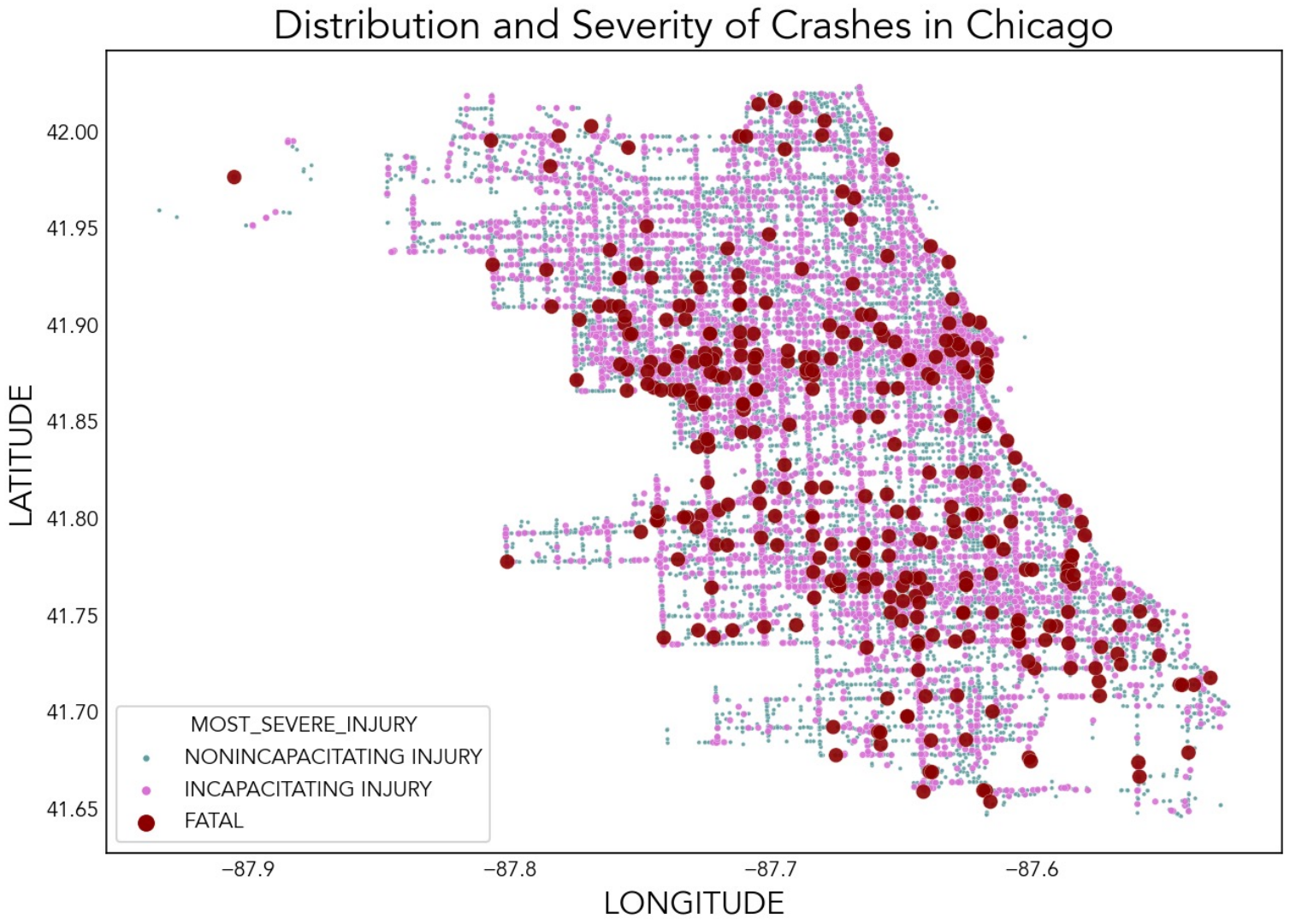
Injuries by Postal Code

Fatal Injuries



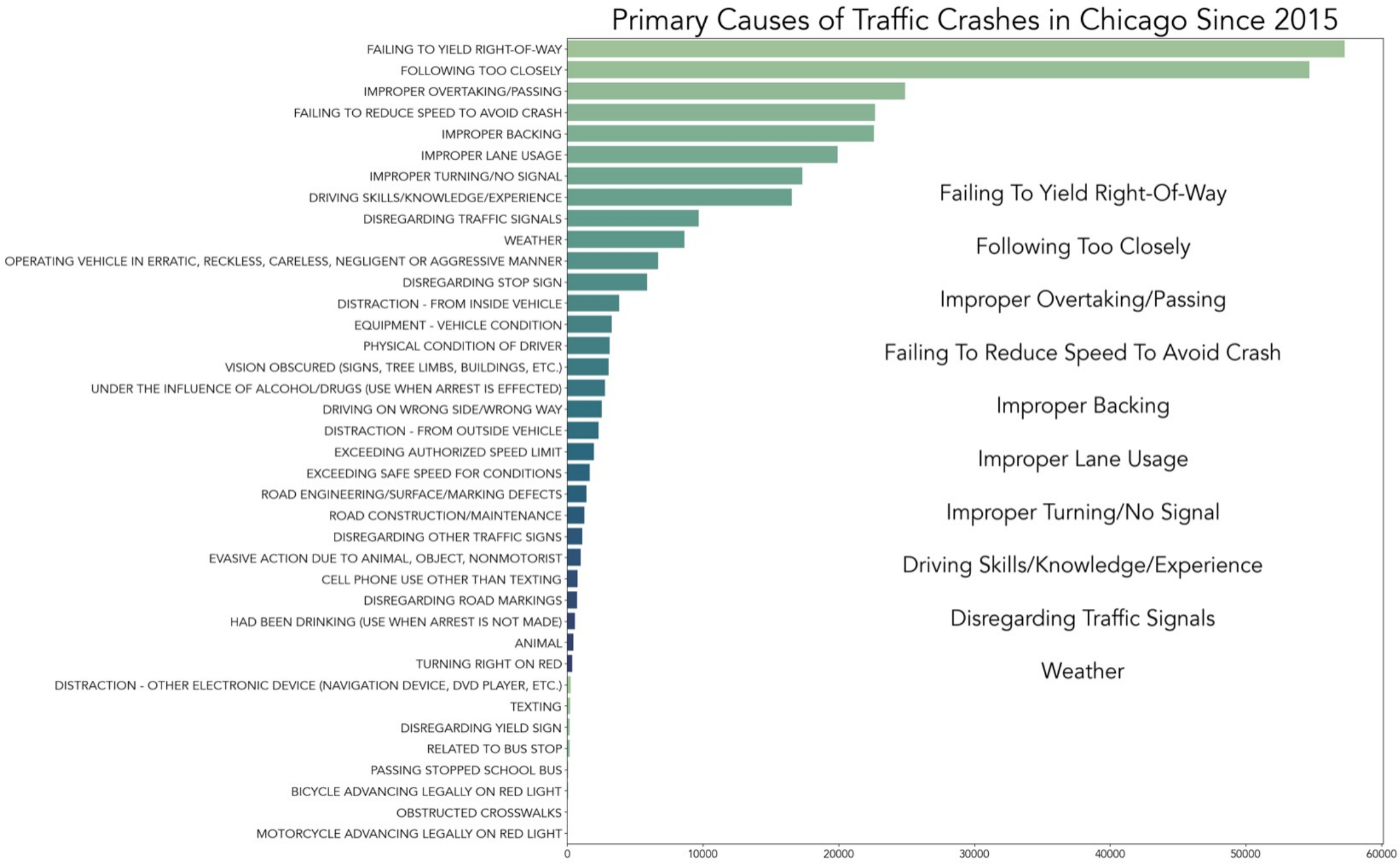
Total Injuries

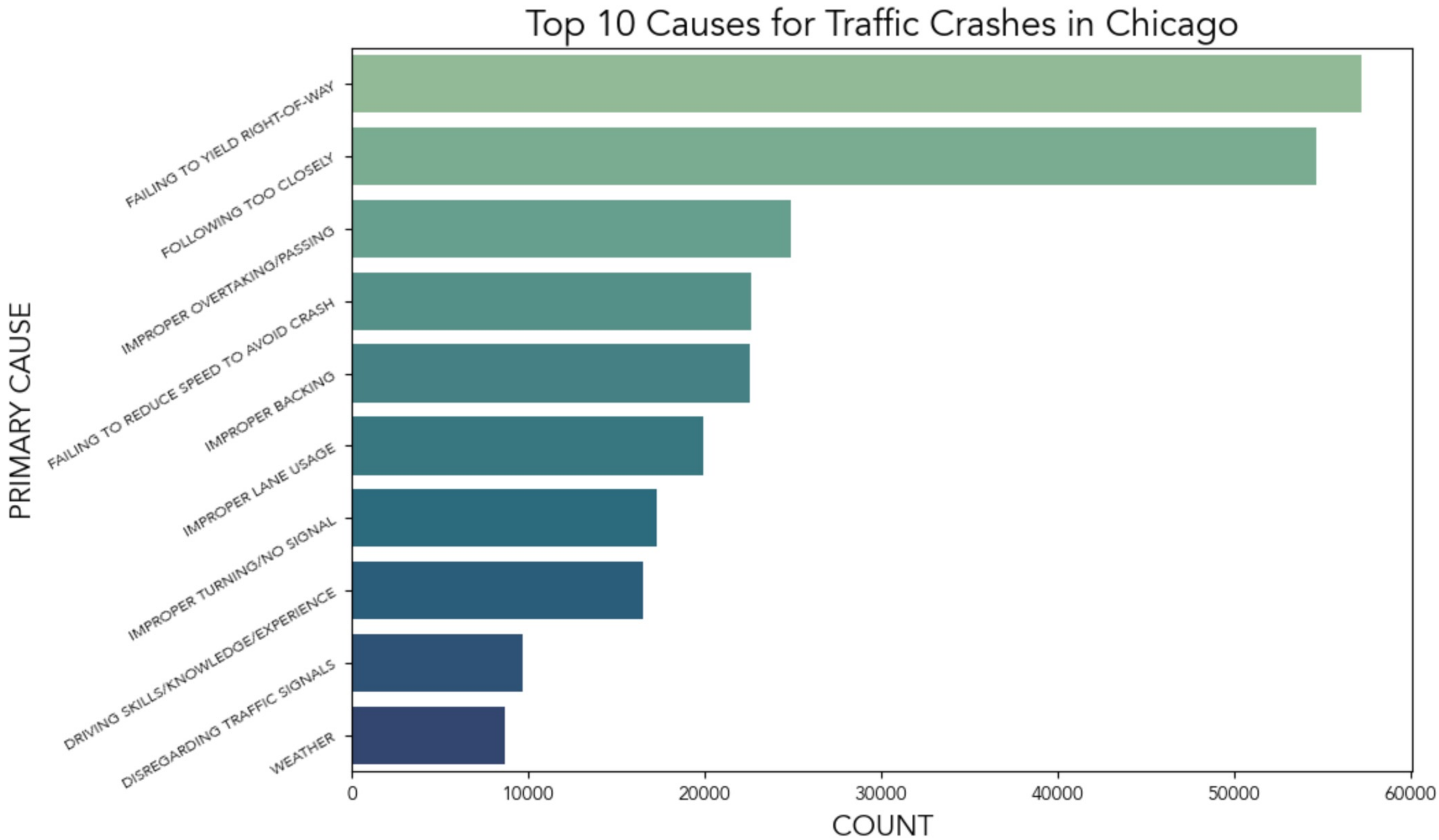



Distribution and Severity of Crashes in Chicago
LATITUDE
42.00
41.95
41.90
41.85
41.80
41.75
41.70
41.65
MOST_SEVERE_INJURY
NONINCAPACITATING INJURY
INCAPACITATING INJURY
FATAL
−87.9
−87.8
−87.7
−87.6
LONGITUDE

Primary Causes

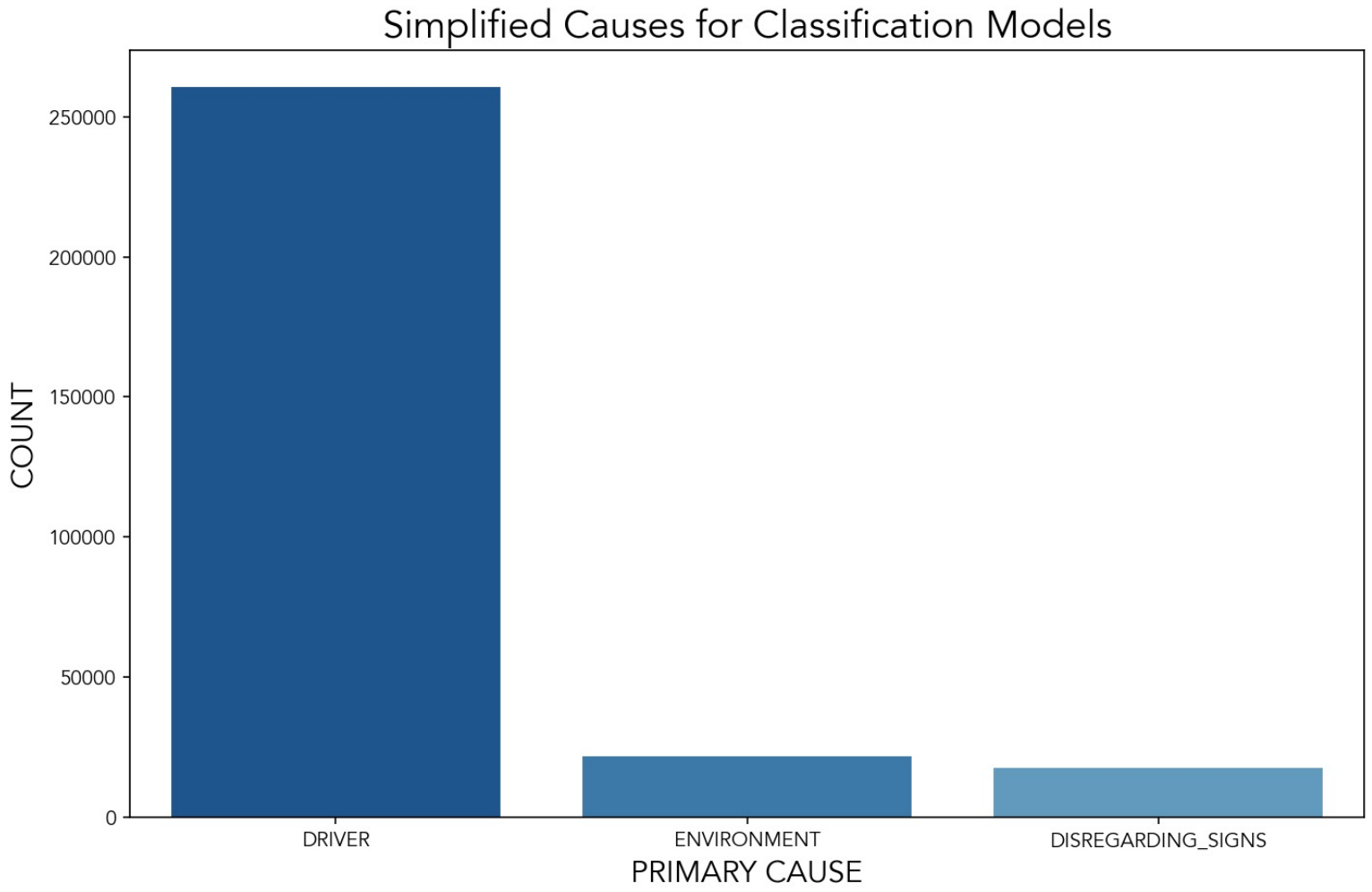
Many, many causes…




Top 10 Causes for Traffic Crashes in Chicago
PRIMARY CAUSE
FAILING TO YIELD RIGHT-OF-WAY
FOLLOWING TOO CLOSELY
IMPROPER OVERTAKING/PASSING
FAILING TO REDUCE SPEED TO AVOID CRASH
IMPROPER BACKING
IMPROPER LANE USAGE
IMPROPER TURNING/NO SIGNAL
DRIVING SKILLS/KNOWLEDGE/EXPERIENCE
DISREGARDING TRAFFIC SIGNALS
WEATHER
0
10000
20000
30000
40000
50000
60000
COUNT

Model Performance

- Examples:
  - Driver
    - Failing to yield right-of-way
    - Improper overtaking/passing
    - Failing to reduce speed to avo
  - Environment
    - Weather
    - Animal
    - Vision Obscured
  - Disregarding Signs
    - Stop Signs
    - Traffic Signals



Model results

Baseline: 76% accuracy

- High class imbalance

First Model: 88% accuracy

- Poor distinguisher

Second Model: 76%

- Better at distinguishing

Third Model: 88% accuracy

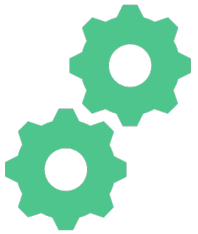
- Best at distinguishing

Conclusions and Recommendations

- Seasonal regulations
- High crash frequency locations
- Most accidents are caused by the driver, public awareness

Future Expansions

Incorporating companion datasets



More exhaustive model tuning

Utilizing unsupervised modeling methods

Data Sources

- Chicago Data Portal, Traffic Crashes, Jonathan Levy
  - Crashes - https://data.cityofchicago.org/Transportation/Traffic-Crashes-Crashes/85ca-t3if
  - Vehicles - https://data.cityofchicago.org/Transportation/Traffic-Crashes-Vehicles/68nd-jvt3
  - People - https://data.cityofchicago.org/Transportation/Traffic-Crashes-People/u6pd-qa9d

- Vision Zero Home Page
  - https://www.chicago.gov/city/en/depts/cdot/supp_info/vision-zero-chicago.html

Thank you!

Questions?

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