

Predicting Fatal Car Crashes in Chicago

A Data-Driven Approach for the Chicago Department of Transportation

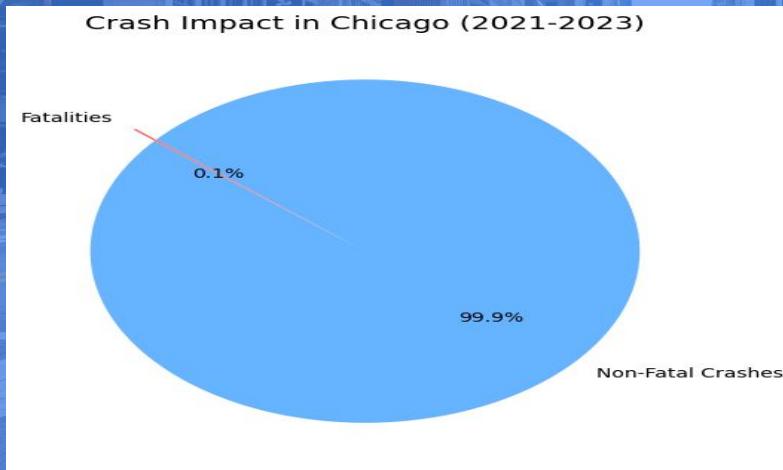
- **Author:** Washington Kungu
- **Date:** July 19, 2025

Welcome CDOT! Today we'll show how our project helps you save lives by predicting dangerous crashes and suggesting smart fixes.

Why This Matters

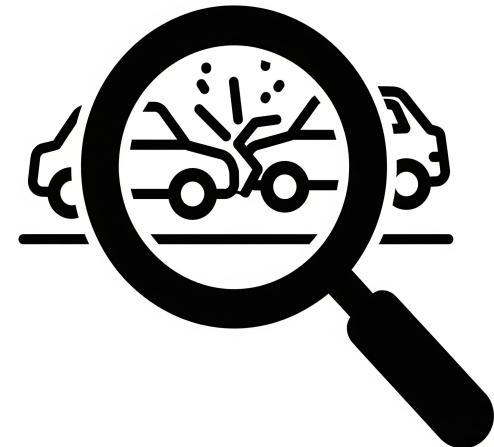
- Chicago faces over 50,000 crashes yearly, costing \$500M+ and 250+ lives
- CDOT needs to prioritize safety resources to cut fatalities 20% by 2025
- Our project predicts fatal crashes to guide better road designs and campaigns

Crashes are a huge problem for Chicago, and CDOT is under pressure to make streets safer. Our data tool helps you focus on what matters most.



What We Set Out to Do

- Predict which crashes might be fatal (yes/no)
- Find key factors causing deadly crashes
- Give CDOT clear, actionable safety recommendations





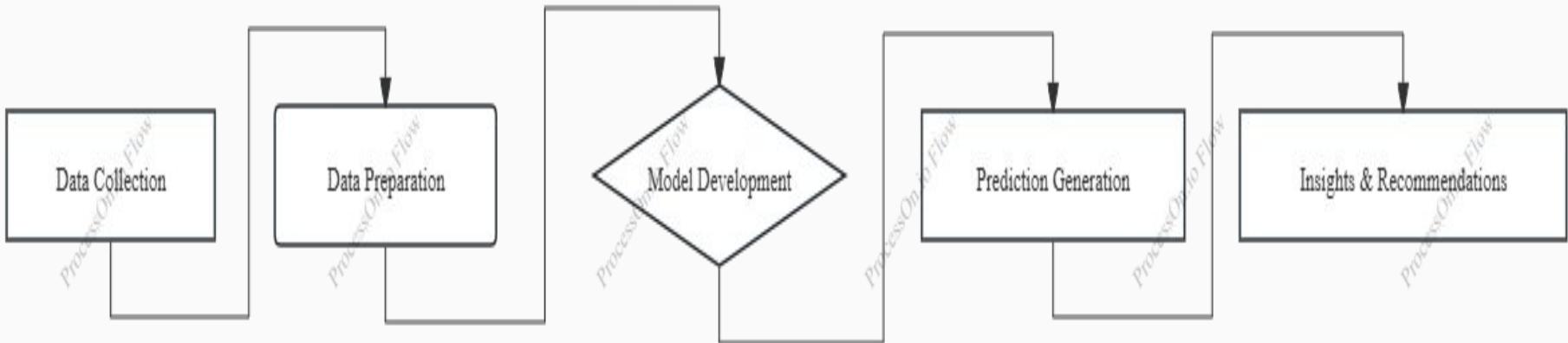
Data We Used

- Crash Data: 327,608 incidents (2021-2023) from Chicago Data Portal
- People Data: 712,248 individuals involved
- Key Factors: Speed limits, road conditions, crash time, and more

We used real Chicago crash data, covering everything from speed limits to weather, to understand what makes crashes deadly.

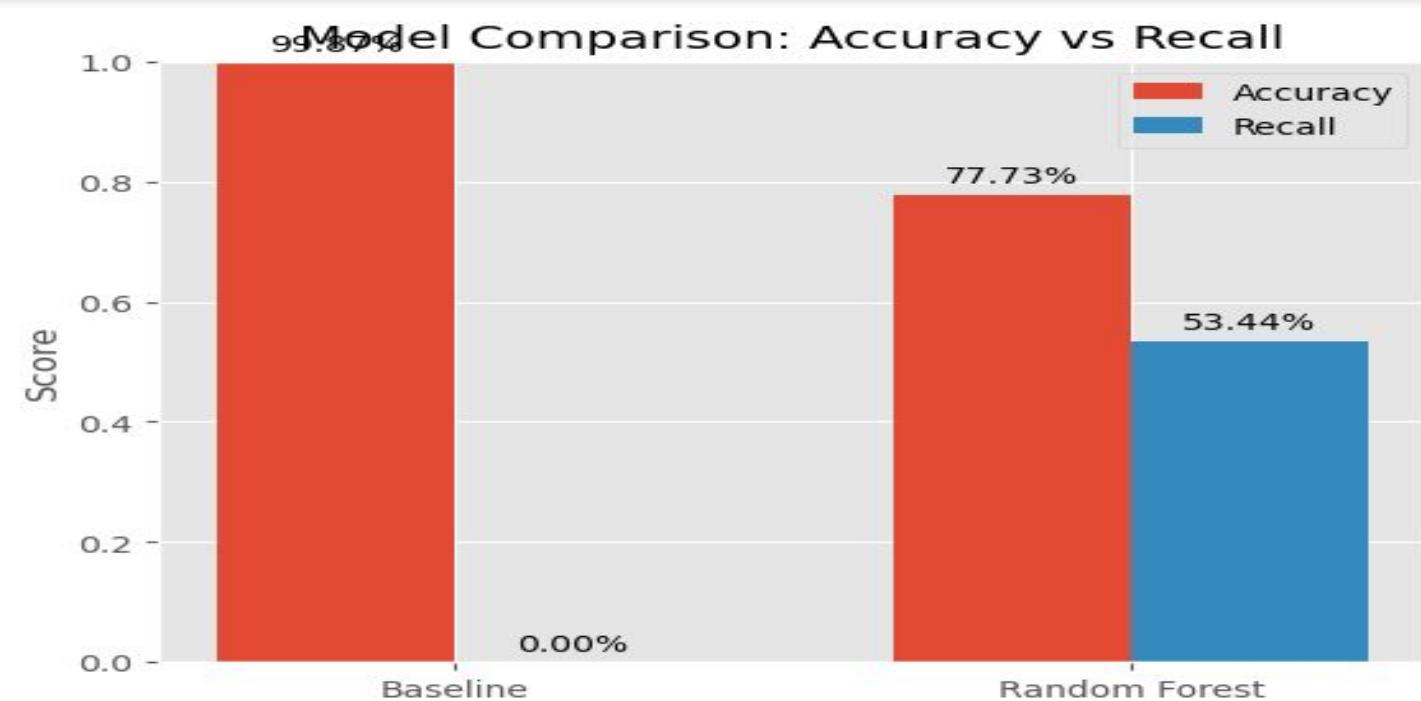
How We Prepared the Data

1. Merged crash and people data to track fatalities
2. Added features like rush hour, nighttime, and speed buckets
3. Handled missing data (e.g., filled zeros for no fatalities)

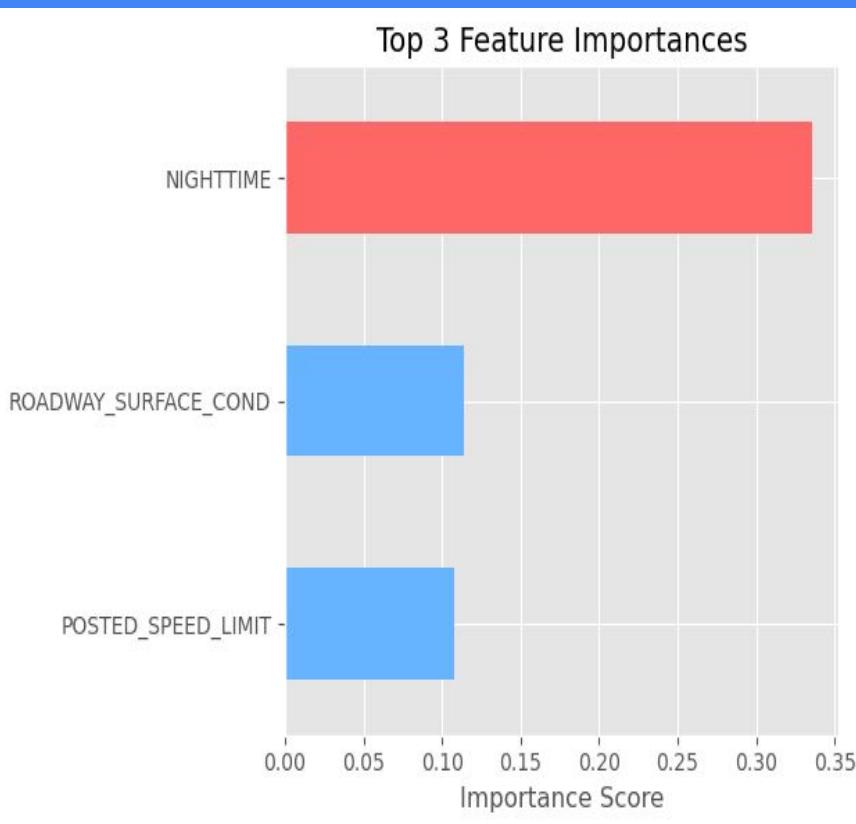


Our Modeling Approach

- Baseline: Simple model guessing “no fatalities” (99.8% accuracy, but misses fatalities)
- Logistic Regression: Basic but interpretable (poor at catching fatalities)
- Random Forest: Advanced model, catches 53% of fatal crashes



Key Results



- *Random Forest model catches 53% of fatal crashes (recall: 0.53)*
- **Top Risk Factors:**
 - *High speeds (>40 mph): 5.2x more likely to be fatal*
 - *Nighttime crashes: 3.1x higher risk*
 - *Wet roads: 80% higher fatality odds*

Our model isn't perfect but catches over half of fatal crashes. Speed, darkness, and wet roads are the biggest dangers.

How it works

This tool helps CDOT use limited resources smarter, saving lives and cutting costs by focusing on the worst risks.

1

Predict high-risk crashes
to focus safety efforts



2

Save lives by targeting key
risks (speed, night, wet roads)



3

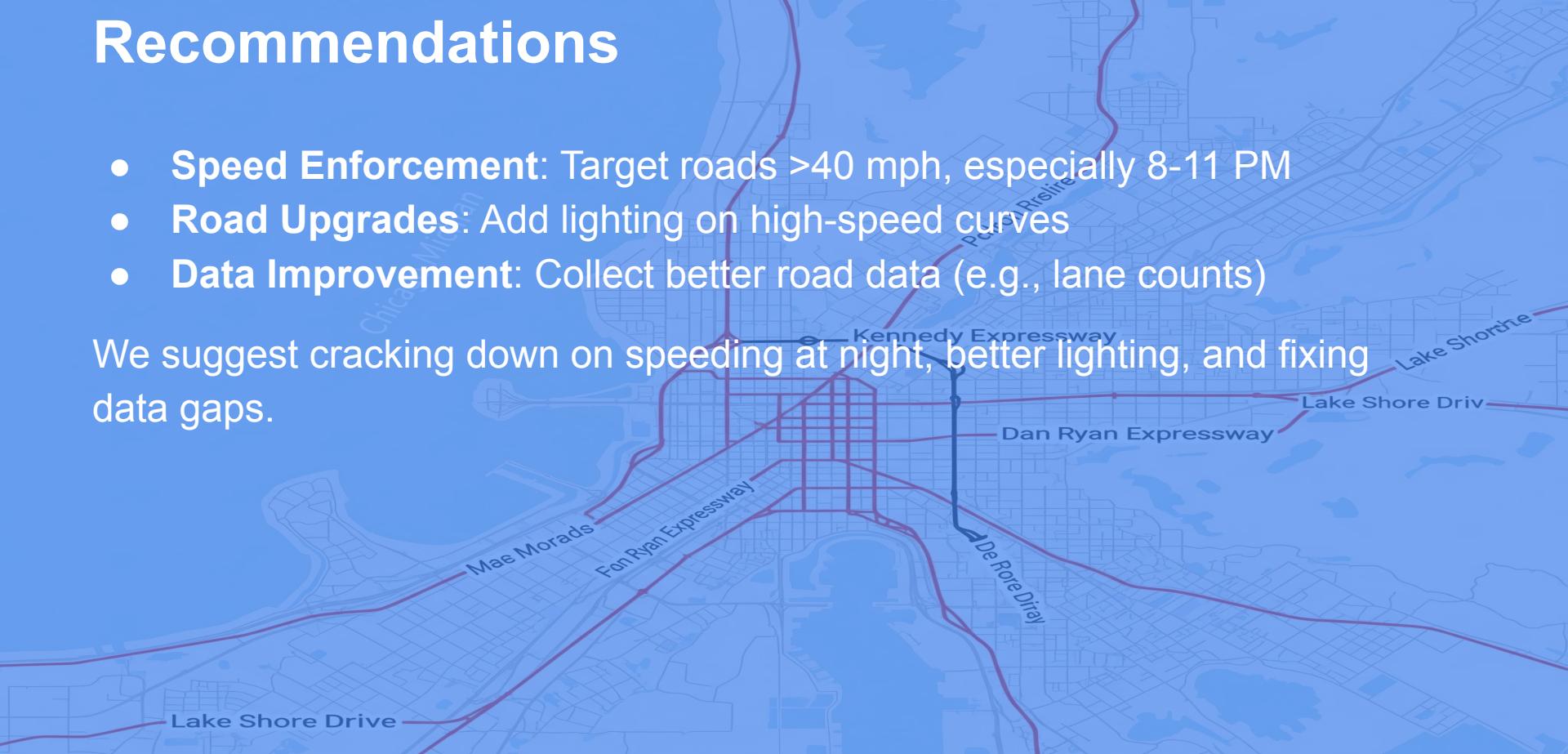
Save money: \$2M in
upgrades could prevent ~5
deaths/year



Recommendations

- **Speed Enforcement:** Target roads >40 mph, especially 8-11 PM
- **Road Upgrades:** Add lighting on high-speed curves
- **Data Improvement:** Collect better road data (e.g., lane counts)

We suggest cracking down on speeding at night, better lighting, and fixing data gaps.



CHICAGO
HIGH-SPEED

Conclusion



**Our project gives CDOT
a powerful tool to cut
fatalities. Let's work
together to make
Chicago's roads safer!**

1. Our model predicts 53% of fatal crashes,
guiding CDOT's efforts

2. Focus on speed, nighttime, and wet
roads to save lives

Next steps: Test model in real-time,
improve data collection

Questions?

- Contact: Washington Kungu
- Data Source: Chicago Data Portal
- Thank you for listening!

CDOT