Crowdsourcing and Data Analytics for Near-Miss Statistics

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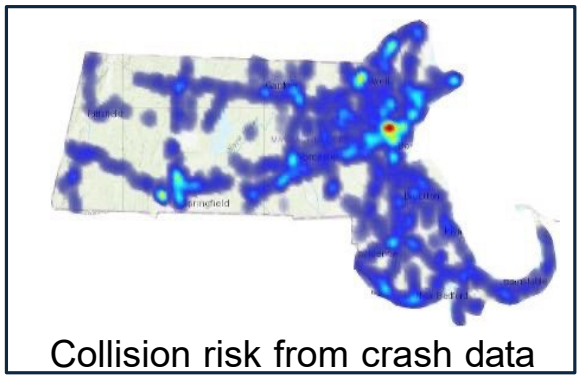
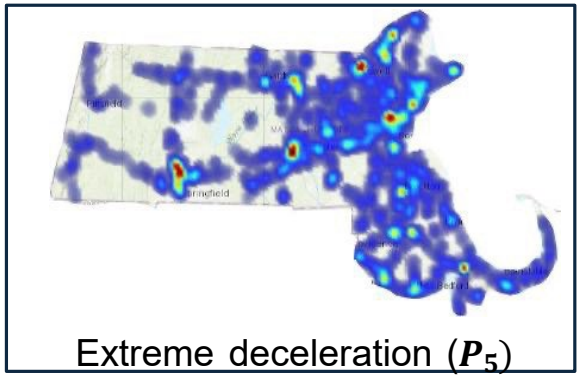
Near-miss events

- **Difficult to Capture**
  - Near-miss traffic events provide valuable information but are hard to quantify using traditional methods.
- **Extreme Statistics**
  - Cannot be captured through simple averaging procedures.
- **Crowdsourced Data Integration**
- **Extreme Deceleration**
  - Represents sudden deceleration from maximum to zero speed



Collision risk from crash data

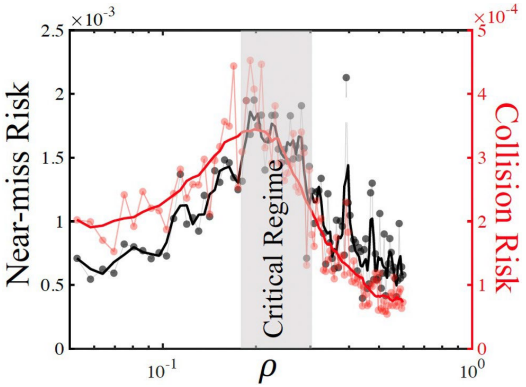


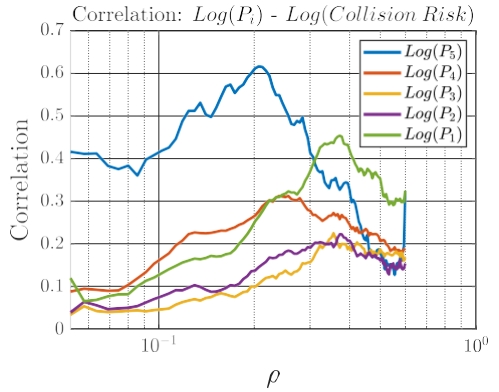
Extreme deceleration (P_5)

This project utilizes crowdsourced data combined with physics-based models to better quantify near-miss events.

Extreme Deceleration: Is It Enough?

- **Limitations of Single Metric**
  - Might not fully capture near-miss events across varying traffic conditions.
  - More deviation at high traffic density
- **Broader Deceleration Profiles Needed**
  - Higher correlation with deceleration from lower speeds
  - Should consider various deceleration levels, including the ones

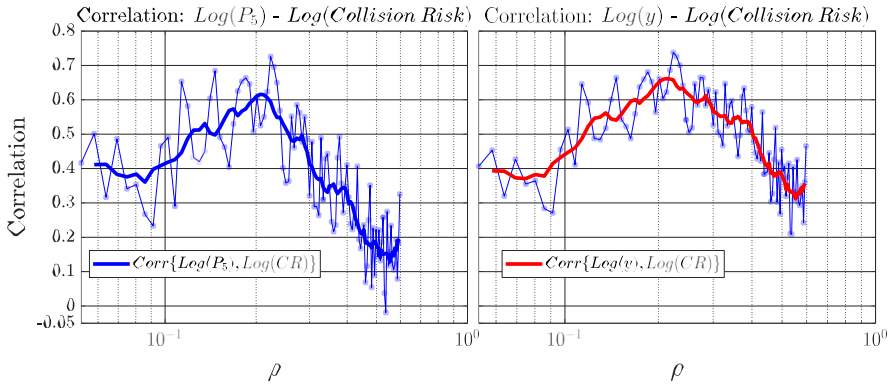




Enhanced Prediction

- **Comprehensive Near-Miss Definition**

$$y = 10^{\#_!} \times P_{\$}^{\#"} \times P_{\%}^{\#_\#} \times P_{\&}^{\#\$} \times P_{'}^{\#\%} \times P_{(}^{\#\&}$$



- **Improved Prediction in High-Density Traffic** where extreme deceleration alone is insufficient.

- **Impact**
  - Enhanced insights into driver behavior and traffic risks, allowing stakeholders to implement proactive safety measures and prevent accidents.