Turning Big Data into Useful Data

Speaker:

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799
Big Data = Volume, Variety, Velocity
(?)
Big Data =

1. Simple, Open Specification
2. Broadly Adopted
3. Saves Lives
Systemic Safety Approach: Strategies

- Improve the collection, management, and integration of **data**
- **Identify risks** that contribute to fatalities and serious injuries
- **Collaborate with stakeholders** to foster changes to the transportation ecosystem
The Problem

Fatalities and Fatality Rate per 100 Million VMT, by Year, 1976-2017

Source: FARS, 1976-2017
Safety Data Initiative (SDI)

- Launched in 2018
- Surface transportation focused
- Intended to build upon and enhance current safety efforts related to data, analysis, and policymaking

Cross-cutting, collaborative effort:

- Office of the Secretary of Transportation (OST)
  - Policy Office
  - Office of the Chief Information Officer
  - Bureau of Transportation Statistics
- Federal Highway Administration (FHWA)
- National Highway Traffic Safety Administration (NHTSA)
- Other surface operating administrations (OAs)
Focus Areas

**Integrate** existing DOT data and new “big data” sources

Use advanced data analytics to provide **predictive insights** into safety risks

Create **data visualizations** to help policymakers arrive at solutions
Pilot Projects

• Since launch, the SDI has conducted pilot projects to:
  • Identify **safety challenges**
  • Experiment with solutions that can **save lives**
  • Improve the way information is conveyed for use by **safety practitioners**
  • Leverage the latest **advancements in data science**, as well as **new and emerging data** coming from the private sector
SDI Beta Safety Tools Developed

- Pedestrian Fatality Risk Map
- Safety Applications of Waze Data
  - Highway patrol context
  - Local Vision Zero planning context
- Solving for Safety Visualization Challenge Tools
- Fatality Analysis Reporting System (FARS) Visualizations
  - Pedestrians
  - Speeding-related crashes

Visit [www.transportation.gov/SafetyDataInitiative](http://www.transportation.gov/SafetyDataInitiative) for more details
Safety Applications of Waze Data

- First phase developed a rapid indicator of police-reportable traffic crashes

- Second phase consists of two case studies to develop Waze safety applications using Waze data:
  - Tennessee State Highway Patrol
  - City of Bellevue, Washington
Safety Applications of Waze Data

• Assessed the potential of crowd-sourced Waze data for safety applications

• Findings:
  • Since it is crowd-sourced data the signal varied:
    o Stronger in urban than rural areas
    o Stronger during day vs. night
    o Stronger on higher functional classification roads (interstates) vs. local roads
  • The Waze data complemented other data sets such as weather to understand crashes over space and time

• Report from the first phase: https://rosap.ntl.bts.gov/view/dot/37256
Solving for Safety Visualization Challenge

Multistage, $350,000 competition to develop visualization-powered analytical tools to reduce serious crashes to address specific focus areas.
Lessons Learned

• There is a wealth of data outside of the federal government that are not fully leveraged

• Private sector data could help the Department understand what is happening on the nation’s roadways

• Persistent safety issues can be further illuminated through new data to contextualize safety risk
Analytic Agenda Overview

• The Department deliberated internally over four topic areas that presented opportunities to enhance our understanding of ongoing safety issues with data:
  • Pedestrian and Bicyclist Safety
  • Non-Fatal Injury Crashes
  • Intersections
  • Precursors to Crashes

• The Department convened stakeholders to help identify the most pressing and persistent safety research questions across these topics

• The input informed the SDI’s analytic agenda

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Pedestrian and Bicyclist Safety

- Fatality and serious injury locations
- Crash causes
- Modeling pedestrian and bicyclist exposure
- Risk identification
Non-Fatal Injury Crashes

• Data linkages to identify risk factors and patterns of risk

• Non-fatal injuries locations as a potential predictive indicator of fatal crashes
Intersections

- Intersection design features
- Safety conflict reduction
- Data linkages to inform countermeasures and safety insights
Precursors to Crashes

- Crash precursor risk signals
- Crash scenario characteristics and related patterns
- Understand baseline, normal-state-of-driving
- New data sources
Anticipated Opportunities

**Conducting Innovative, Applied Research to Gain New Roadway Safety Insights and Tools**

- Interested in demonstration projects that explicitly use and incorporate *new data sources to answer the SDI analytic agenda problem statements*

- Intend to assess the *utility, fitness for purpose, and limitations* of new data to address the problem statements

- **Flexibility** in addressing the problem statements

**State and Local Government Use of Roadway Safety Tools for Policy and Decision Making**

- Intend to issue a notice of a *one-time funding opportunity*

- Plan to partner with *state and local governments*, along with their supporting partners

- These partnerships may seek to *develop, refine, and implement safety tools* as use cases that address a specific roadway safety problem through funding for technical assistance and peer exchanges

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Turning Big Data Into Useful Data

- Assemble the right team
- Know what (big) problem(s) you’re trying to solve
- Know your customer
- Embrace agile thinking
- Embrace (open source) collaboration
- Foster a data-driven culture
- Pick something, get started
Feedback and Further Questions

www.transportation.gov/SafetyDataInitiative

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