National Technical University of Athens
Road Safety Observatory
www.nrso.ntua.gr

Monday
15
May
at 14:00

Workshop

in the framework of the

FOURTH UNITED NATIONS GLOBAL ROAD SAFETY WEEK
8-14 May 2017

Save Lives
#SlowDown

The future of road safety research

NTUA Zografou Campus, Athens
Railways Amphitheatre of the
Department of Transportation Planning and Engineering

Predicting road accidents with real time data
WeatherSafe

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Together with:
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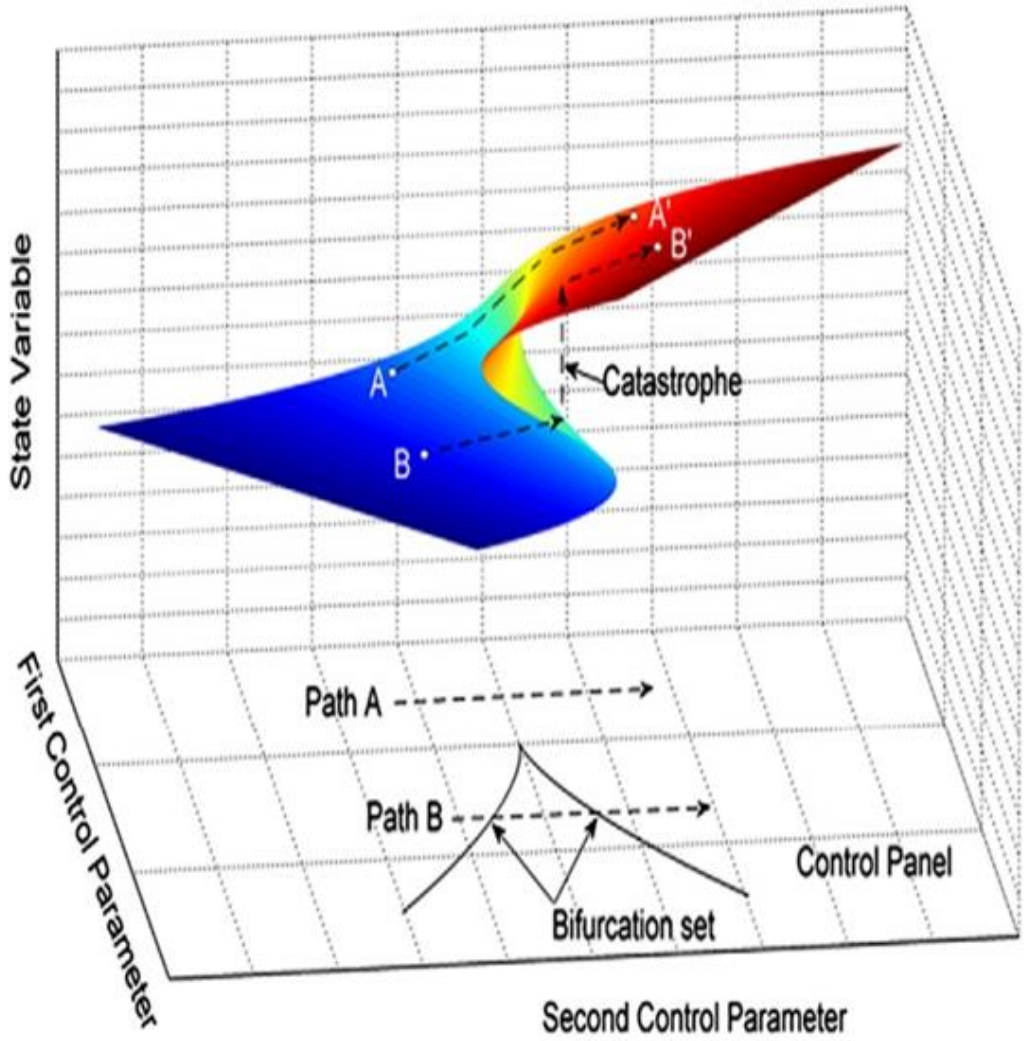
Predicting road accidents with real time data

Save Lives #SlowDown

Correlation of road accidents with high resolution traffic and weather data

Post Doctoral Research
2017-2019

Funding:
Hellenic State Scholarship Foundation



Overview of the problem

- The exploitation of **real-time traffic and weather data** to understand crash mechanism (crash risk, crash frequency, crash severity)
- Data mainly come from **loop detectors** and meteorological stations
- Identify **crash precursors**
- **Proactive safety management** on freeways and major urban arterials

Some core findings-What we know so far

- Main **risk factors**: speed variation, speed difference, average traffic flow, variations in occupancy

- Average **speed** is associated with lower risk!

- For 1 unit increase in speed, **crash risk** decreases by about 5%!

- **Weather** effects: inconsistent findings (e.g. USA vs Mediterranean countries)

Open issues

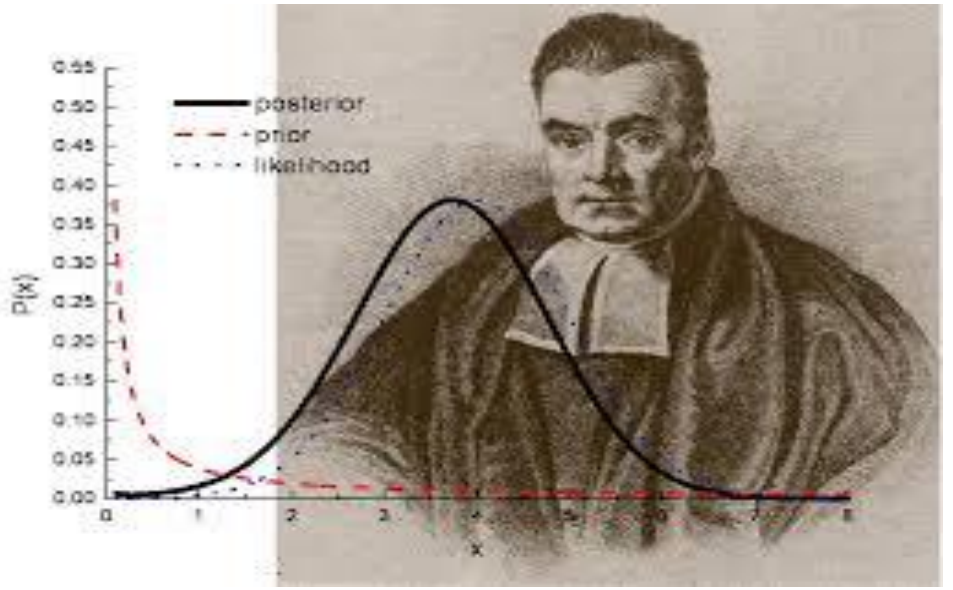
- **Data** sources, quality and aggregation
- Temporal and spatial **precision**
- Crash and non-crash cases **ratio**
- Urban arterials, rural areas need further **exploration**
- **Extreme weather** events-climate change

Methodological challenges

- Overcome **aggregation bias**
- How to select the most appropriate **control-case ratio**?
- Explore all **non-crash cases**? What methods are appropriate?
- Overcome **correlation** among variables
- How to explore **time-series** of data
- Exploit **chaos** attributes of speed (fractals)

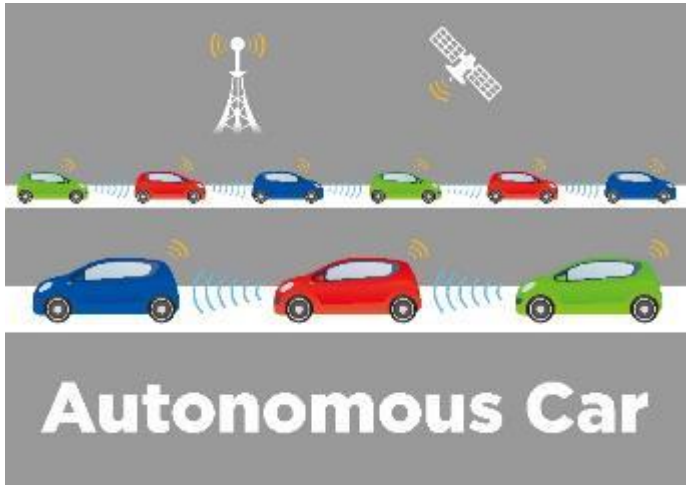
Solutions to implement

- **Alternative data sources** (drones, video cameras)→identify manoeuvres, traffic composition
- Develop non-aggregation approach (e.g. **Bayes theorem**
- **Map-matching** algorithms
- **Alternative models** (firth logistic, exact logistic, bias correction methods etc.)
- **Machine learning**



Future steps and emerging challenges

- **Black box** in vehicles (manoeuvres, difference between vehicle speed and average speed) or mobile app
- Detailed **spatio-temporal** information on crashes (GPS-police officers)
- **Autonomous vehicles**. How could this change real-time safety evaluation?
- **Big data** - Exploit mass information. More dynamic safety screening



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