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THE POTENTIAL FOR BIG DATA AND OCCURRENCE REPORTING FOR BETTER SAFETY MANAGEMENT

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EUROPEAN
UNION
**AGENCY
FOR RAILWAYS**

European Union Agency for Railways

- ► Established in 2004
- ► Technical and legal framework for the Single European Railway Area
  - • Harmonised approach to safety
  - • Removing technical barriers
  - • Advancing the single European Train Control and Communication System (ERTMS)
  - • Simplified Access for Customers
- ► 2019 / 2020: issue safety certificates, rail vehicle authorisations and approval for ERTMS infrastructure

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Guaranteeing a high level of safety

- ▶ Strategic Objective: Europe the world leader in railway safety
- ▶ Safety Culture and Occurrence Reporting
- ▶ Safety Alerts – more later
- ▶ Safety Management Data
  - • Safety Performance in all EU Member States at current EU average
  - • Improved Management of catastrophic accidents
- ▶ More and better data, that is shared, to support each actor in their roles
- ▶ How can Big Data help?

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A joke….
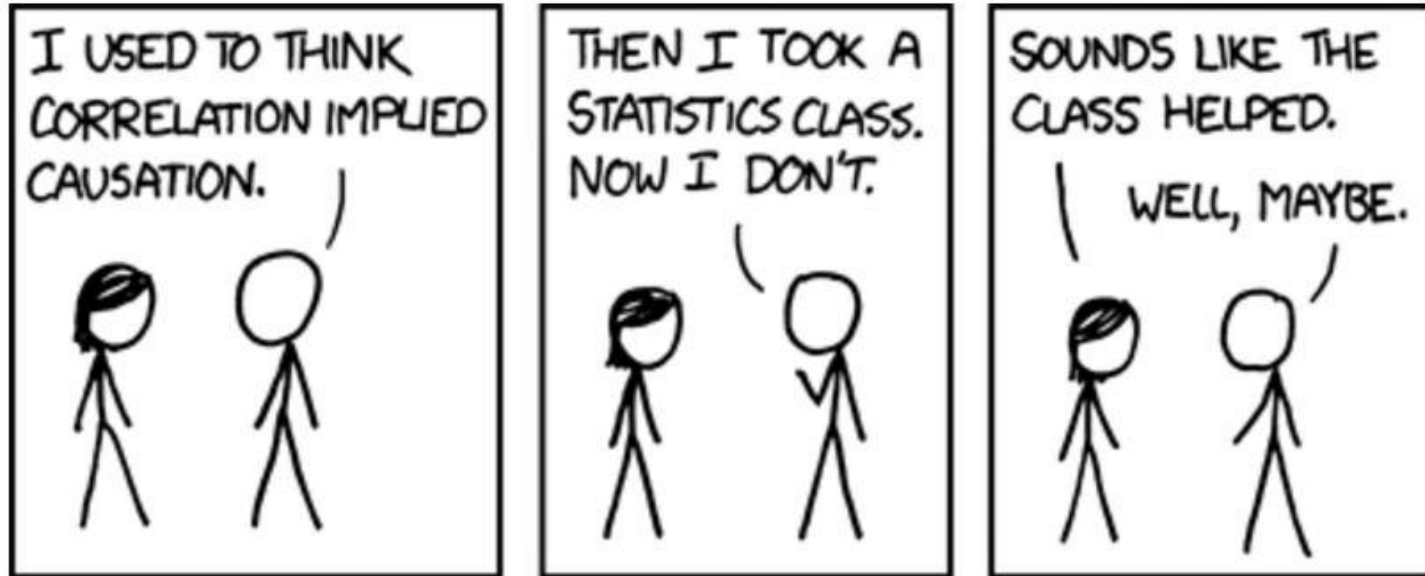
What is Big Data?

- ► Today, more *things* are connected to the internet than there are people…
- ► High volume, high variety, high velocity data
- ► Google, Facebook, Amazon…
- ► Data from: machines, people, business (contracts, procurement, prices, HR), social media, weather, health trackers, smartphones, credit cards, CCTV, timetables etc.
- ► Algorithms and machine learning – bridging gaps
- ► Visual presentation and useful information
- ► What's happening? What's going to happen next? What should we do about it?

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Problem we are trying to fix?

► The cost of data systems – reporting and analyzing
► More sharing means bigger datasets
► Predicting high consequence, low frequency events
► Hidden causes and unknown correlations
► Safety II, weak signals, positive human contribution
► Anything else?

Man Vs. Machine

Integrating and maximizing traditional and new methods

► Collection of data:

- Machines are systematic, consistent, reliable.
- Machines can unlock weak signals, from messy data – handwriting, language(s), free text, non-dedicated sources
- Humans are expensive and physically limited
- Humans are intelligent and able to understand complex goals

► Analysis of data:

- Machines: Volume, variety, velocity and gaps
- Context and expertise – not all correlations mean something, or at least, what the machine thinks it means

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Current and new applications

- ▶ Google Maps, Waze, public transport planning apps…
- ▶ Remote condition monitoring and predictive maintenance
- ▶ Managing performance (delays)
- ▶ Real time safety operations
- ▶ Can we get more from the huge investment in this technology for rail safety management?
- ▶ Aviation – US and EU

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Reporting culture and sharing

► Data protection:

- Open, transparent, just cultures – organisations, authorities, judiciary
- Competitors – real or imagined? Do the benefits outweigh the costs?
- Cyber security – greater connectivity and reliance creates new risks

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What are we doing and how can you help?

- ► Agency feasibility study 2017:
- What is currently collected and what could be available and / or relevant?
- How much data does your organisation collect?
- Take part in the study!
- Are you getting all the possible value and use out of your data?

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Conclusions

▶ Rail needs to innovate to stay competitive
▶ Accidents and incidents are expensive, but so are reporting systems and safety analysis
▶ Can we get more from the technology we are investing in?
▶ Humans will always be at the center of rail operations

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Agency Safety Alerts

The safety alerts tool is a web application, accessible from computers and mobile devices using the address:

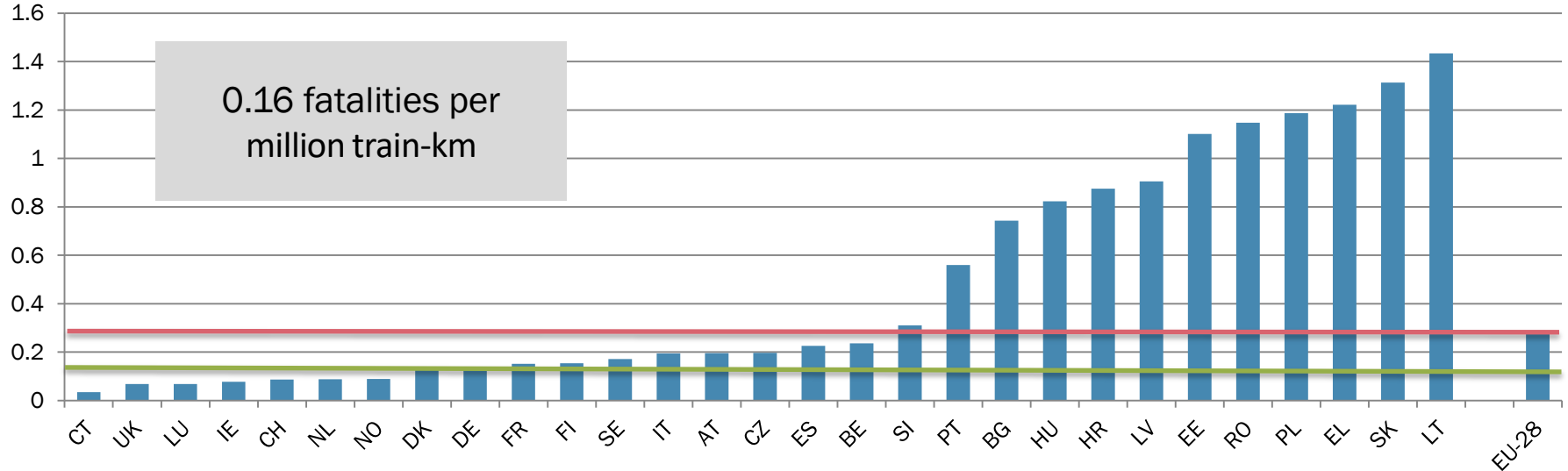https://safetyalerts.era.europa.eu/safetyalerts

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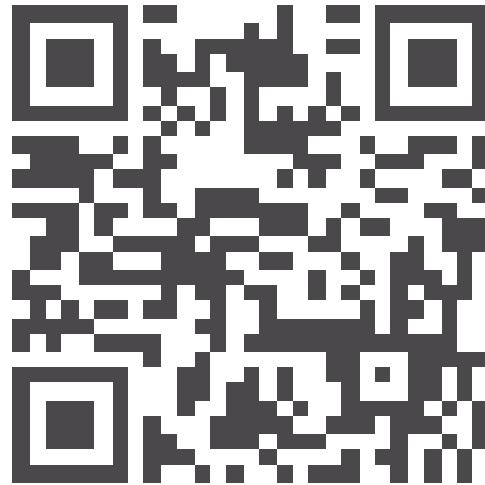
Thank you!!!

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EU average

0.16 fatalities per million train-km

Railway fatalities per million train-km (2010-2014)