Drawing safety insights and foresight from free-text reports in aviation

Combining mathematical and safety expertise

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The aviation industry: Web of actors and key themes

Economy

Countries

Manufacturers

Clients

SAFETY

Airlines

Environment

Diplomacy/Politics

Institutions

SAFETY

The case of the BOEING 737 MAX

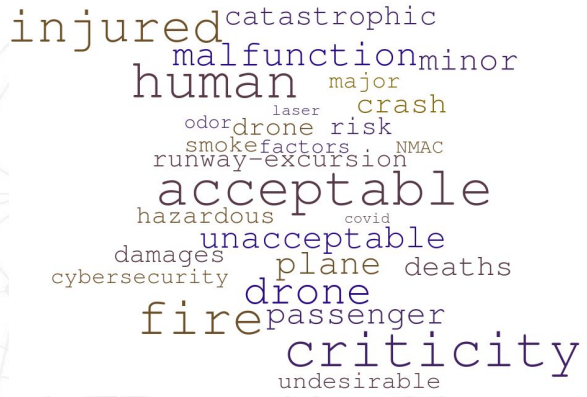
- 9,2 billion dollars lost
- 346 people died

Capturing different facets of risk: reports

Human factors:
Tired pilot

Environmental problem:
Weather, birds,….

Technical problem:
Faulty equipment



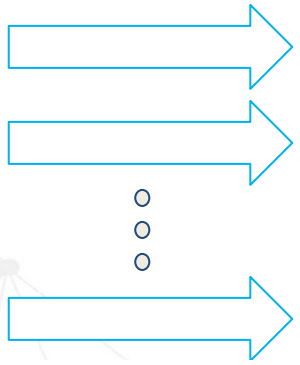
INCIDENT REPORT:

"We had approximately XXX passengers in coach. Many of the passengers were traveling in large groups/families. **All came on with masks; but during boarding; masks started to come off and many were worn under the nose**.
[….] "

Classification of incident reports using ML

INCIDENT REPORT

CLASSIFICATION ALGORITHM



METADATA	VALUE
Anomaly ATC:	No
Human Factors:	Fatigue, Distraction
Primary Problem:	Aircraft

"Never send a human to do a machine's job."

- Agent Smith to the other agents, 'The Matrix', 1999.

THE RISE OF THE TRANSFORMER MODEL (2018)

Rank	Name	Model
1	Zirui Wang	T5 + Meena, Single Model (Meena Team - Google Brain)
2	DeBERTa Team - Microsoft	DeBERTa / TuringNLRv4
3	SuperGLUE Human Baselines	SuperGLUE Human Baselines
4	T5 Team - Google	T5

Exploring how recent NLP progress can help in Aviation Safety

Previous publication:

- Applying distilled BERT for question answering on ASRS reports, S **Kierszbaum**, L Lapasset - 2020 New Trends in Civil Aviation …, 2020
- Transformer-based model on aviation incident reports, T Klein, L Lapasset, S **Kierszbaum** - CORIA 2021, 2021

Current work:

- Comparison of **RoBERTa** and its **compact version** on ASRS incident classification
- **NER** project with AIRBUS

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