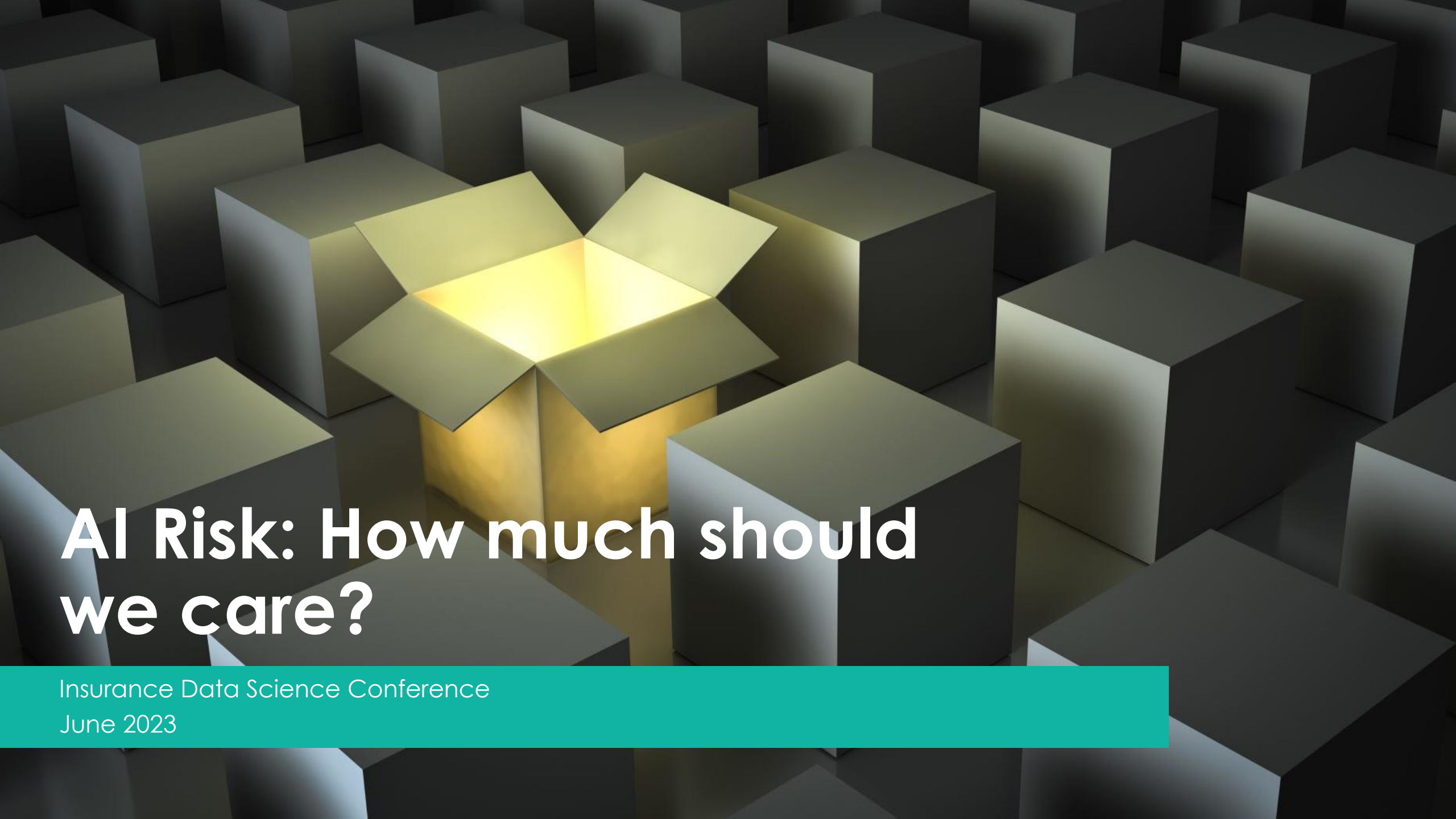


AI Risk: How much should we care?

Insurance Data Science Conference
June 2023

Presenters

- Valerie du Preez
- Paul King

We explore some of the risks related to Artificial Intelligence (AI) from an actuarial perspective based on research from **a transregional and interdisciplinary industry focus group** (see slide 9). The group considered potential issues and challenges of using AI, related specific themes covered in this deck.

The purpose of this research is to provide observations that could help inform industry and professional guidelines or discussion; or to support industry practitioners. It is not intended to replace current regulation, actuarial standards or guidelines.

The accompanying paper will be made available at www.actuartech.com/assets.

Agenda

Introduction

- Current AI landscape

Findings

- Themes in AI risk management and regulation
- Indicative example: Fairness

Conclusion

- Questions and comments

Current AI landscape

AI should be 'a global priority on par with pandemics and nuclear war': Dozens of academics - including the creator of ChatGPT - sign new letter calling for tech to be regulated

'Godfather of A.I.' leaves Google after a decade to warn society of technology he's touted

In A.I. Race, Microsoft and Google Choose Speed Over Caution

Regulation 'critical' to curb risk posed by AI, boss of ChatGPT tells Congress

Meta: Facebook owner fined €1.2bn for mishandling data

But there is development regarding regulation:

European Parliament Advances Groundbreaking AI Regulation: The European AI Act

UK Government Adopts a "Pro-Innovation" Approach to AI Regulation

G7 calls for developing global technical standards for AI

Current AI landscape

Despite the progress made in AI regulation, there are still **key areas** that require attention in the i**nsurance industry**:

- Lindholm et al. (2023):

  "**Indirect discrimination** and **fairness are major concerns** in algorithmic models. This is particularly true in insurance, where protected policyholder attributes are not allowed to be used for insurance pricing."

- Bank of England (2022):

  "There is a risk that the use of **AI** could be associated with **discriminatory decisions**. **Bias** related to protected characteristics such as race or sex, could arise inadvertently during model development."

  "There are a number of **challenges and risks** related to the use of AI, which may **amplify prudential risks** (credit, liquidity, market, operational, reputational, etc) and have implications for the safety and soundness of firms."

- Actuaries Institute and Australian Human Rights Commission (2022) - "Actuaries highlight need for ethical use of AI in insurance" with release of guidance resource on AI and discrimination in insurance in pricing and underwriting: **"While artificial intelligence (AI), promises faster and smarter decision making, safeguards are needed to prevent potential discrimination".**

Themes in AI risk management and regulation

Indicative example: Fairness

When developing and implementing AI, regulation and guidance requires of the actuary to **minimise bias** and to ensure **fairness** and that there is **no unethical discrimination**, but how does the actuary do this in a manner that also balances **accuracy?**

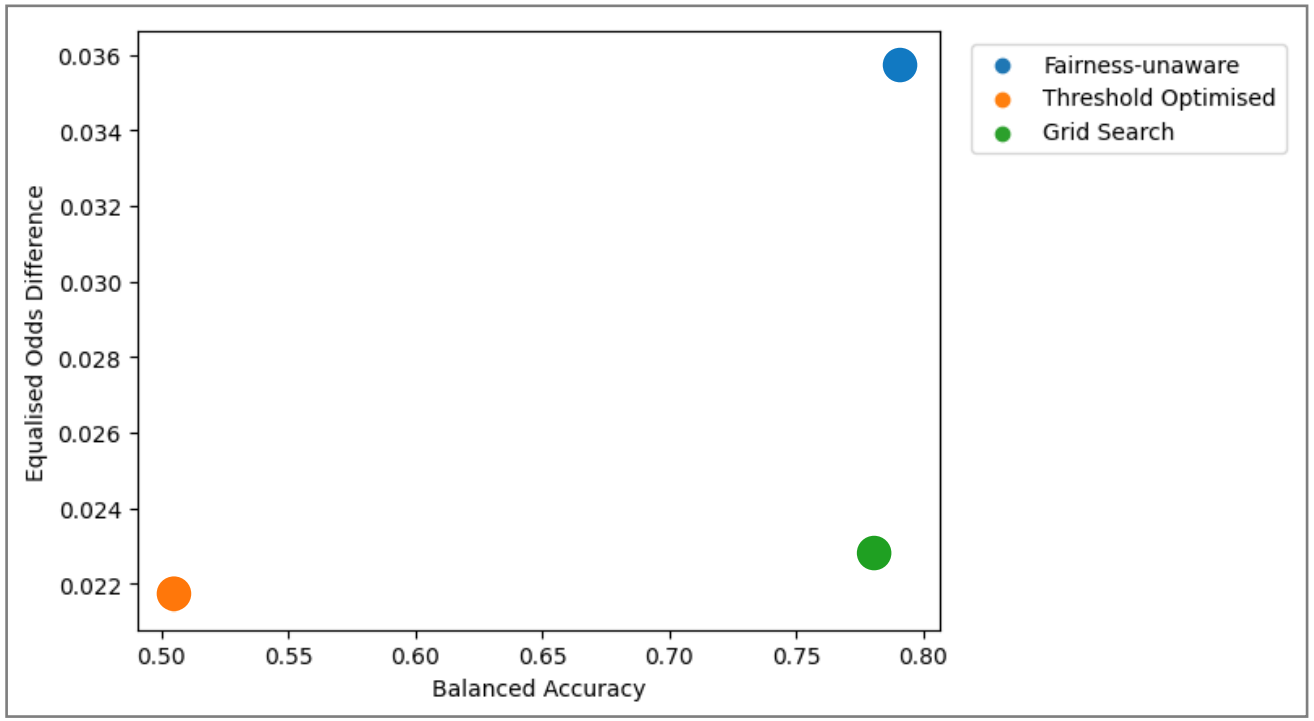


*Figure 1: Graph showing the accuracy and a fairness measure (equalised odds difference) of a GBM model with three different training approaches: **maximised accuracy** (fairness-unaware), **maximised fairness** (using the threshold optimisation method), and **balanced fairness-accuracy** (using the grid search method).*

Issue:

Unfairness can creep in in various areas in our modelling process, from sampling bias, to proxy discrimination, to unintentionally unfair outcomes for protected classes.

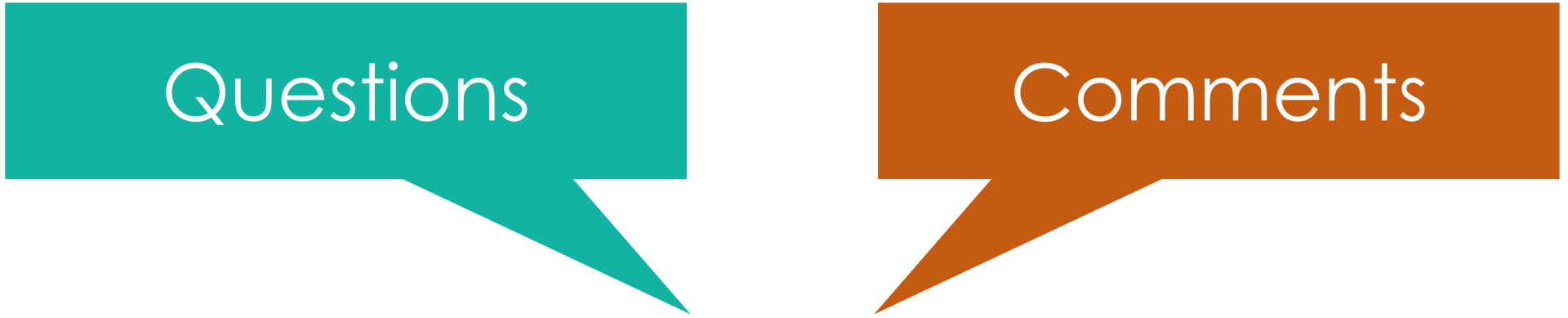
In the indicative example, we predicted whether individuals would claim using a synthetic driver telematics data. Gender is the protected feature for which we aim to manage outcomes, and was excluded as a training feature.

Best practice recommendations:

- Decide on an appropriate **definition of fairness** and suitable **fairness measures** to include, e.g. academic notions incl. demographic parity, **equalised odds**, or self-defined notions such as impact on premiums
  - Equalised odds difference (see Fig. 1) is the difference between model performance for subgroups of protected features e.g. the difference between false negatives for two subgroups (male and female) (Bird et al. 2020).
- Modify the training process to balance fairness and accuracy i.e. include **further optimisation constraints**
- Design **fair classifiers** using specific fairness notions

How do you define an acceptable level of bias?

Conclusion



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