TDDE56: Human-Centered Trustworthy AI

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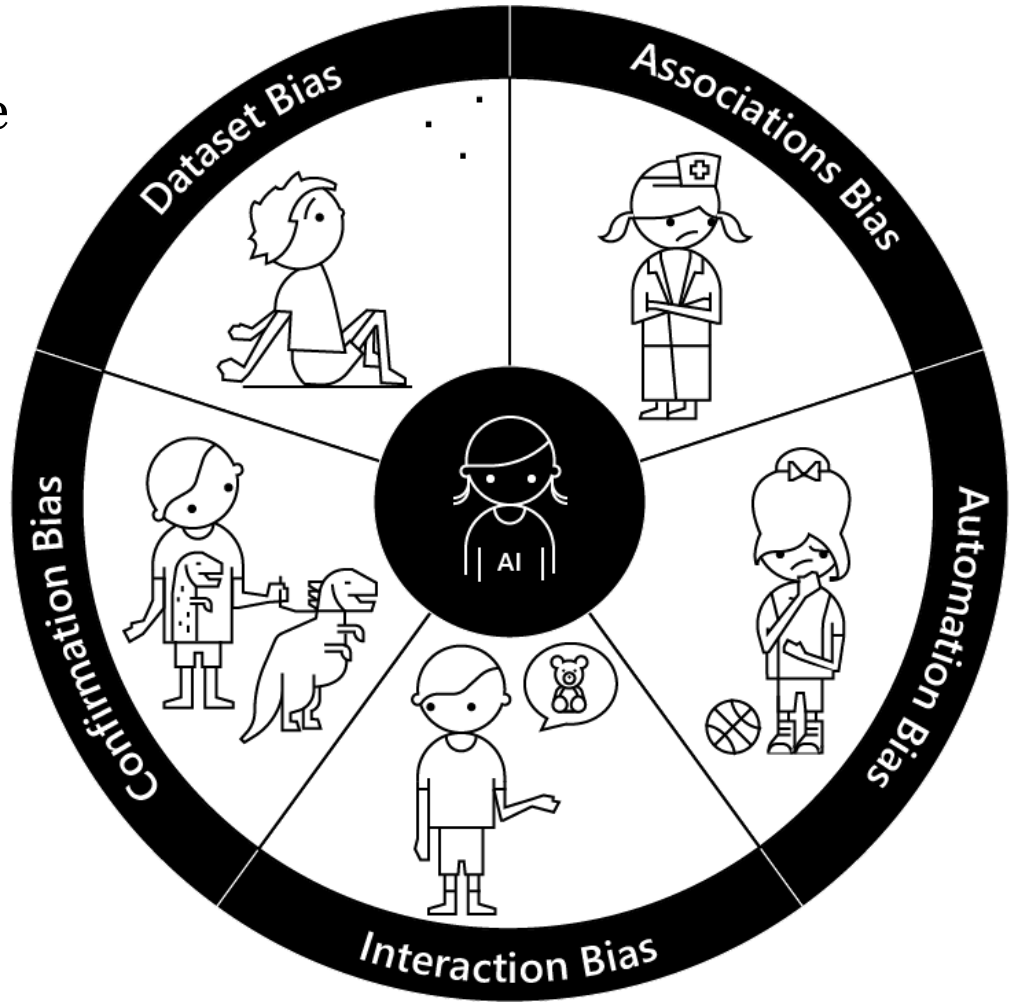
https://www.thispersondoesnotexist.com/

Bias

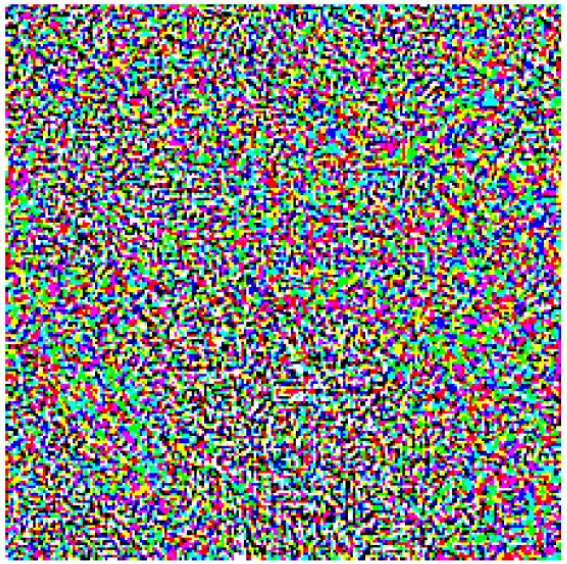
- **Dataset bias** – When the data used to train machine learning models doesn't represent the diversity of the customer base.
- **Association bias** – When the data used to train a model reinforces and multiplies a cultural bias.
- **Automation bias** – When automated decisions override social and cultural considerations.
- **Interaction bias** – When humans tamper with AI and create biased results.
- **Confirmation bias** – When oversimplified personalization makes biased assumptions for a group or an individual.



https://medium.com/microsoft-design/how-to-recognize-exclusion-in-ai-ec2d6d89f850

Machine learning is still brittle…

$+ .007 \times$



$=$

$\boldsymbol{x}$

"panda"
57.7% confidence

$\text{sign}(\nabla_{\boldsymbol{x}} J(\boldsymbol{\theta}, \boldsymbol{x}, y))$

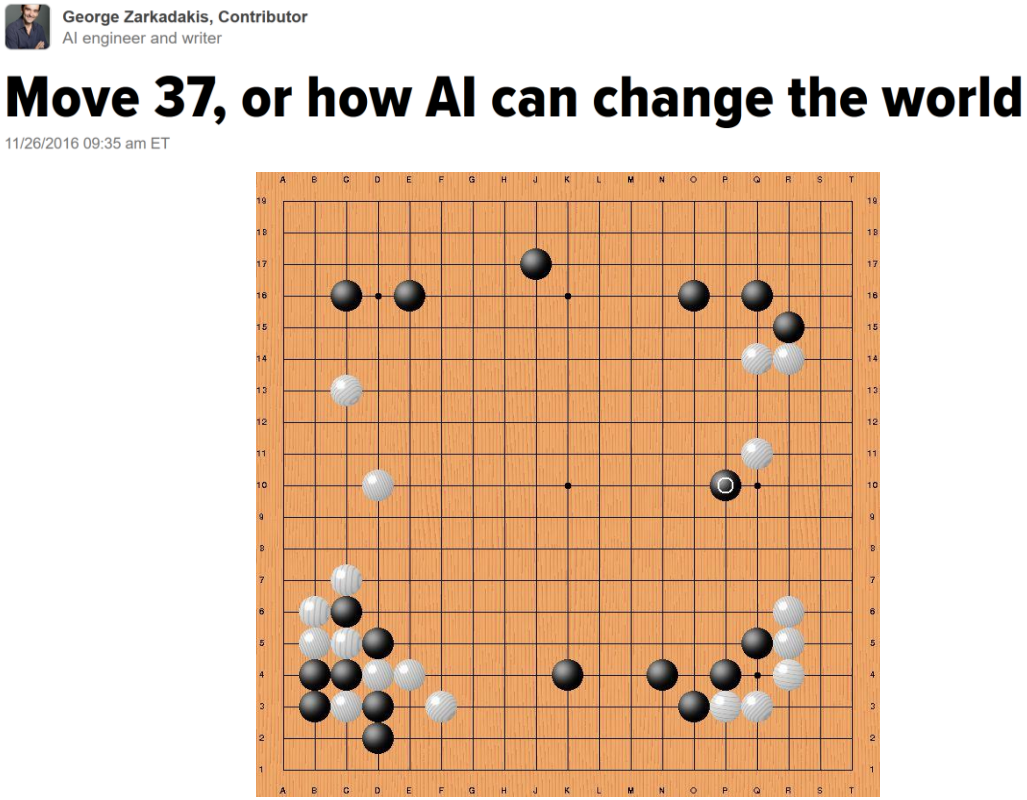
"nematode"
8.2% confidence

$\boldsymbol{x} + \epsilon\text{sign}(\nabla_{\boldsymbol{x}} J(\boldsymbol{\theta}, \boldsymbol{x}, y))$

"gibbon"
99.3 % confidence

Ian J. Goodfellow, Jonathon Shlens, Christian Szegedy. Explaining and Harnessing Adversarial Examples. ICLR 2015
https://arxiv.org/abs/1412.6572

How to Evaluate AI Systems?



https://www.huffpost.com/entry/move-37-or-how-ai-can-change-the-world_b_58399703e4b0a79f7433b675

Ethics Guidelines for Trustworthy AI – Overview

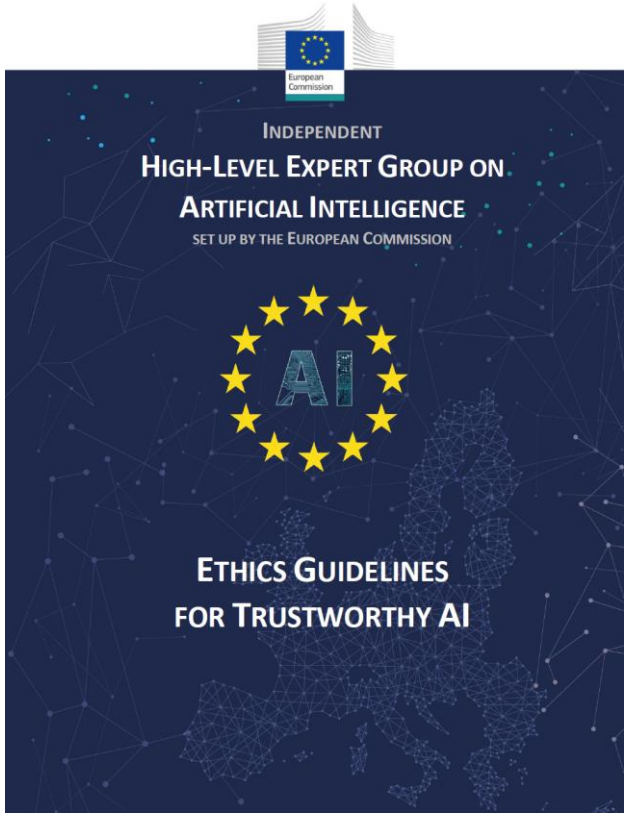
Human-centric approach: AI as a means, not an end

Trustworthy AI as our foundational ambition, with three components

- Lawful AI
- Ethical AI
- Robust AI

Three levels of abstraction

- from principles (Chapter I)
- to requirements (Chapter II)
- to assessment list (Chapter III)



https://ec.europa.eu/digital-single-market/en/news/ethics-guidelines-trustworthy-ai

Ethics Guidelines for Trustworthy AI – Principles

4 Ethical Principles based on fundamental rights

Respect for human autonomy

Augment, complement and empower humans

Prevention of harm

Safe and secure. Protect physical and mental integrity.

Fairness

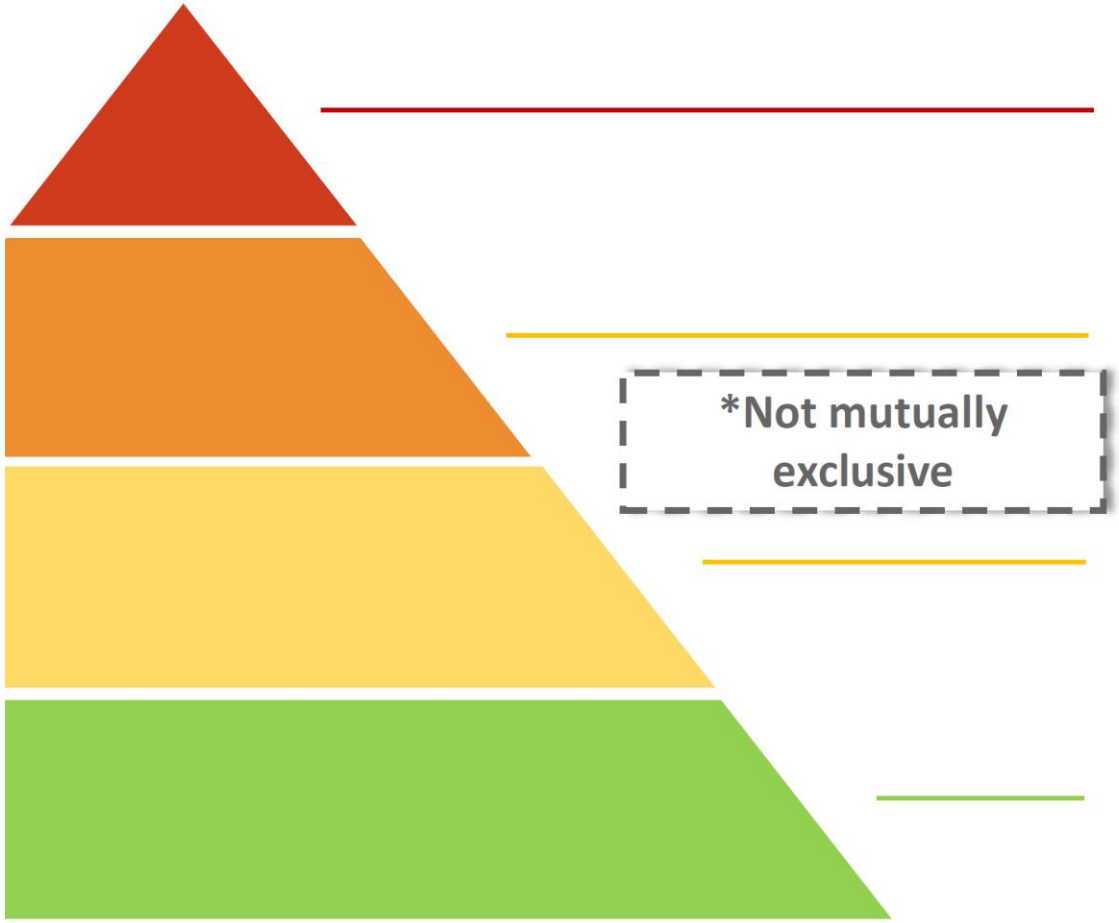
Equal and just distribution of benefits and costs.

Explicability

Transparent, open with capabilities and purposes, explanations

https://ec.europa.eu/digital-single-market/en/news/ethics-guidelines-trustworthy-ai

A risk-based approach



Unacceptable risk
e.g. social scoring

Prohibited

High risk
e.g. recruitment, medical devices

Permitted subject to compliance with AI requirements and ex-ante conformity assessment

*Not mutually exclusive

'Transparency' risk
'Impersonation' (bots)

Permitted but subject to information/transparency obligations

Minimal or no risk

Permitted with no restrictions

European Commission

Requirements for high-risk AI systems (Title III, Chapter 2)

Establish and implement **risk management system**

&

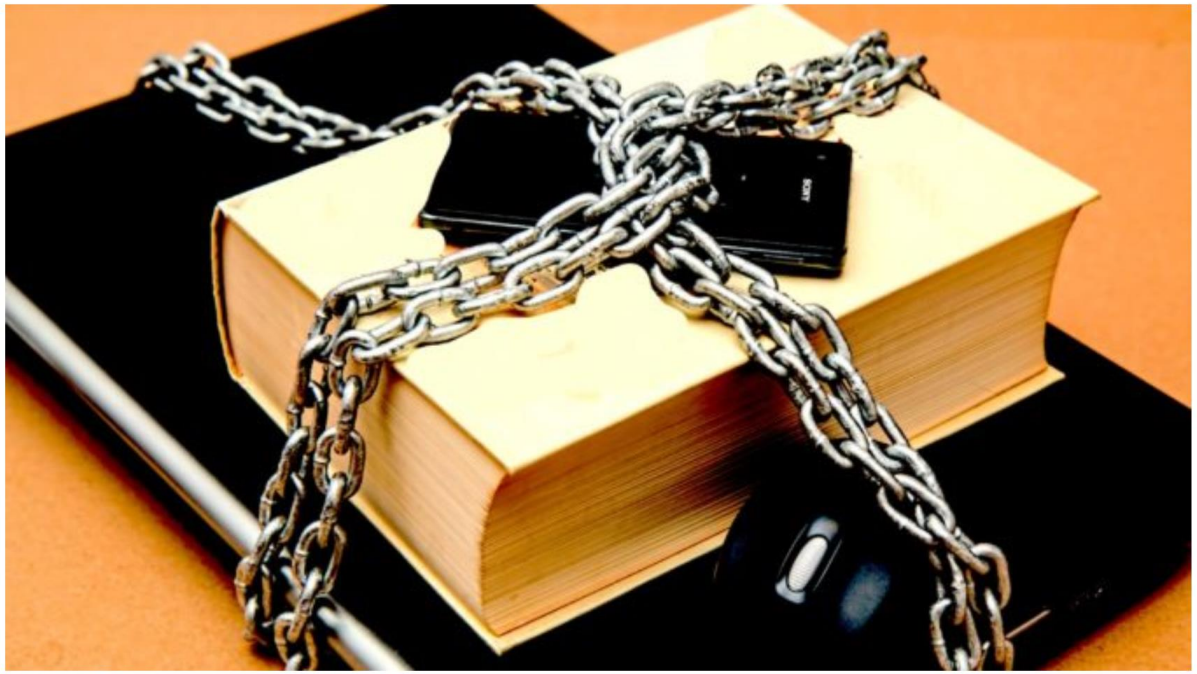
in light of the **intended purpose** of the AI system

- Use high-quality **training, validation and testing data** (relevant, representative etc.)
- Draw up **technical documentation** & set up **logging capabilities** (traceability & auditability)
- Ensure appropriate degree of **transparency** and provide users with **information** on capabilities and limitations of the system & how to use it
- Ensure **human oversight** (measures built into the system and/or to be implemented by users)
- Ensure **robustness**, **accuracy** and **cybersecurity**

External Analysis of Human Decision Making

France Bans Judge Analytics, 5 Years In Prison For Rule Breakers

4th June 2019 artificiallawyer Litigation Prediction 52



https://www.artificiallawyer.com/2019/06/04/france-bans-judge-analytics-5-years-in-prison-for-rule-breakers/