May the *data* be with you!

Digital Ethicist - Future-proof competencies for responsible AI.

Robin Decoster

25.01.2022 - Date-Date

Odisee
DE CO-HOGESCHOOL

The Future

In the future political and other decisions will be based completely on opinion polls.

From ‘In the Future’ by David Byrne
1985

Digital Citizenship

Digital citizenship empowers children to **actively and responsibly take part in society**. OECD

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Who am I ?

- Robin Decoster
- Innovation Orchestrator @ ZInn
  - Research group.
  - Focus on implementation and competence forecasting.
  - Connect organisations, policymakers, industry, users, … or people. :)
  - Create a climate and organisation for durable innovation

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Who is Joy ?

Joy Buolamwini

Computer Scientist. Poet of Code. MIT

Algorithmic Justice League

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Who is Joy ?

Algorithmic Bias

Not represented in dataset

The battle for civil rights in 21st century

Who is in the black box?

- The black box
  - The algorithm itself?
  - The data used to train the algorithm?
    - The data contained in datasets. Complex.
    - Dangling between structured, semi-structured and unstructured

Who is in the black box?

- Application of data for ‘narrow intelligence’
  - Health care
  - Intelligence in support
  - Operational level: organisation, forecasting of needed capacity, …
  - Clinical level: decision support, outcome prediction, …

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Who is in the black box?

- Data Readiness.
  - Accessibility (Level C): Anonymised (aggregation)? Ethical clearance? Access controlled?
  - Faithfulness & representation (Level B): Is the data correct? Missing? Format? Structured; Visualisable: Quality controlled
  - Appropriateness (Level A): Useful to sole a particular task? Context, Annotated, Powered (stat)

Harvey et al, 2018. A standardised Approach for Preparing Imaging Data for Machine Learning Tasks in Radiology

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Who is in the black box?

- Coding Bias : exclusion of “people”, “patients”, …
  - Model trained on data = represent reality
  - Model might reflect existing biases in human society
  - (No) Representation in the training dataset
  - To understand how AI model was trained + reflection in the output
  - Inclusive coding

  - Who is the government, the society in the metaverse?

Probability

The Fourth Paradigm. Data-intensive Scientific Discovery. No Theory. No Model. No experience. Driven by data. The quest for signal. Probabilistic interpretation of the world.

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Evolution from science to data ?

- Medicine is fundamentally driven by data
- Collection and analysis is different
- Human in control - Human Oversight
  - Health care workers trained to understand the dataset
  - Transparency, representation, bias, …

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Evolution from science to data ?

- Data used in AI training
  - What with the ‘not covered discovery’ ?
  - Should we inform patient about findings?

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Evolution from science to data ?

- Clinical implications
  - Human Oversight
  - Can a patient refuse? And use the result of the model?
  - Do we need to apply AI to deliver the best care possible?

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Evolution from science to data ?

To optimize the health of the population within the limits of the available resources, and within an ethical framework built on equity and solidarity principles.

EU Council of Ministers of Health, 2010

Ingenuity

The quality of being clever, original, and inventive

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In data we trust …

- Acceptable level of performance during training and testing?
- Research
  - AI methodologies
  - Outcomes ! : performance, speed, accuracy
  - Trust ? : acceptance by end users: employee, patients, …
  - Legal and ethical implications and missing frameworks

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In data we trust …

- Trustworthy
  - Technical, social and psychological challenges
  - Best practices for trustability by experts
    - Engineering & medical sciences
    - In proportion to their true capabilities
    - Fairness, Accountability, Transparency

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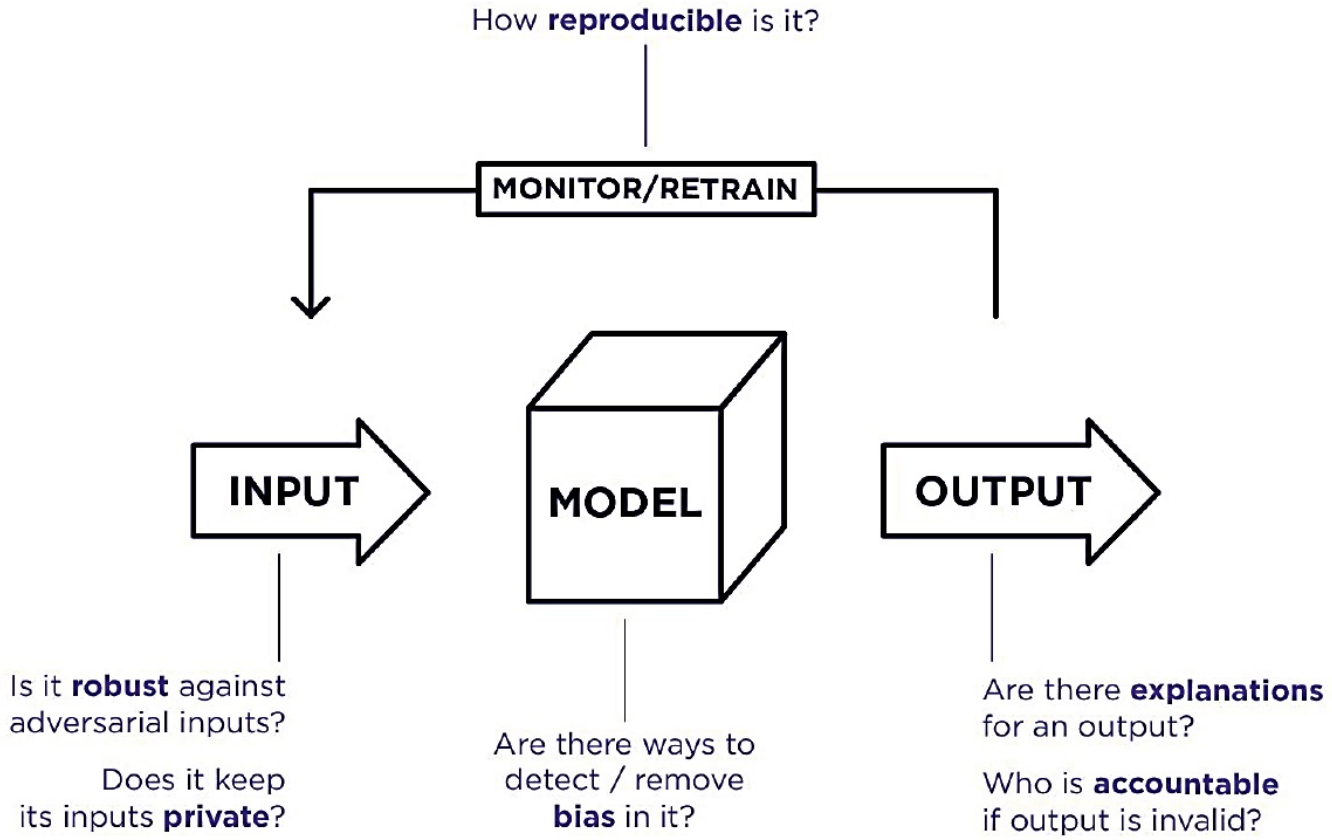
In data we trust …



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Robustness

- Defense: adversarial attacks, trick models to produce wrong outputs, manipulations. Block-chain like approach?
- Unintentional adversarial examples
- Cases not represented in the training data
- Communication of limits

CT-GAN: Malicious Tampering of 3D Medical Imagery using Deep Learning

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Privacy

- “No data are anonymous, just more expensive to reidentify”
  - Sensitive personal information
  - Quasi-identifiers : statistically rare attributes in individual data
  - Pseudo-anonymisation

Why?

Workers and employers are directly affected by the design and use of AI systems in the workplace. The involvement of social partners will be a crucial factor in ensuring a human-centered approach to AI.

Feedback on EC White Paper On AI, June 2020

Thank you