Healthcare, Artificial Intelligence and Ethics

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SUMMARY

1) Some definitions

2) Data ethics in healthcare – main issues

3) AI ethics in healthcare – main issues

4) Governance of responsible AI

QUEBEC'S AI ETHICS RESEARCH ECOSYSTEM

R5 Ethics, EDI and Indigenous Engagement

https://ivado.ca/

Ethics, Governance and Democracy Sustainable Health

www.obvia.ca

Trustworthy AI

www.confianceia.ca

Definitions

Ethics is a **reflection** on our **preferences**, our **choices and decisions**, and our **behavior**, which aims at the **common good**.

It is a branch of philosophy, but more recently it has also been informed by research in the fields of sociology, psychology, and neuroscience.

DATA & AI ETHICS

- The lack of a regulatory framework, the rapid development of technologies, the significant risks and high return potential of AI, and the uncertainty surrounding its evolution make ethical reflections on AI development necessary.

- Data ethics : A branch of ethics that seeks to evaluate ethical issues brought about by data practices (collecting, analyzing, etc.)

- The ethics of artificial intelligence (AI ethics): A reflection on the risks, benefits and issues brought about by AI (a branch of cyberethics)

- Both are <u>applied ethics</u> (like business ethics, bioethics, clinical ethics, etc.) i.e. they seek to define concrete principles to develop and deploy responsible data and AI practices, and to find practical solutions to these risks, challenges and issues.

Example of a research question in AI ethics: How can we prevent and reduce risks without compromising the development and benefits of AI?
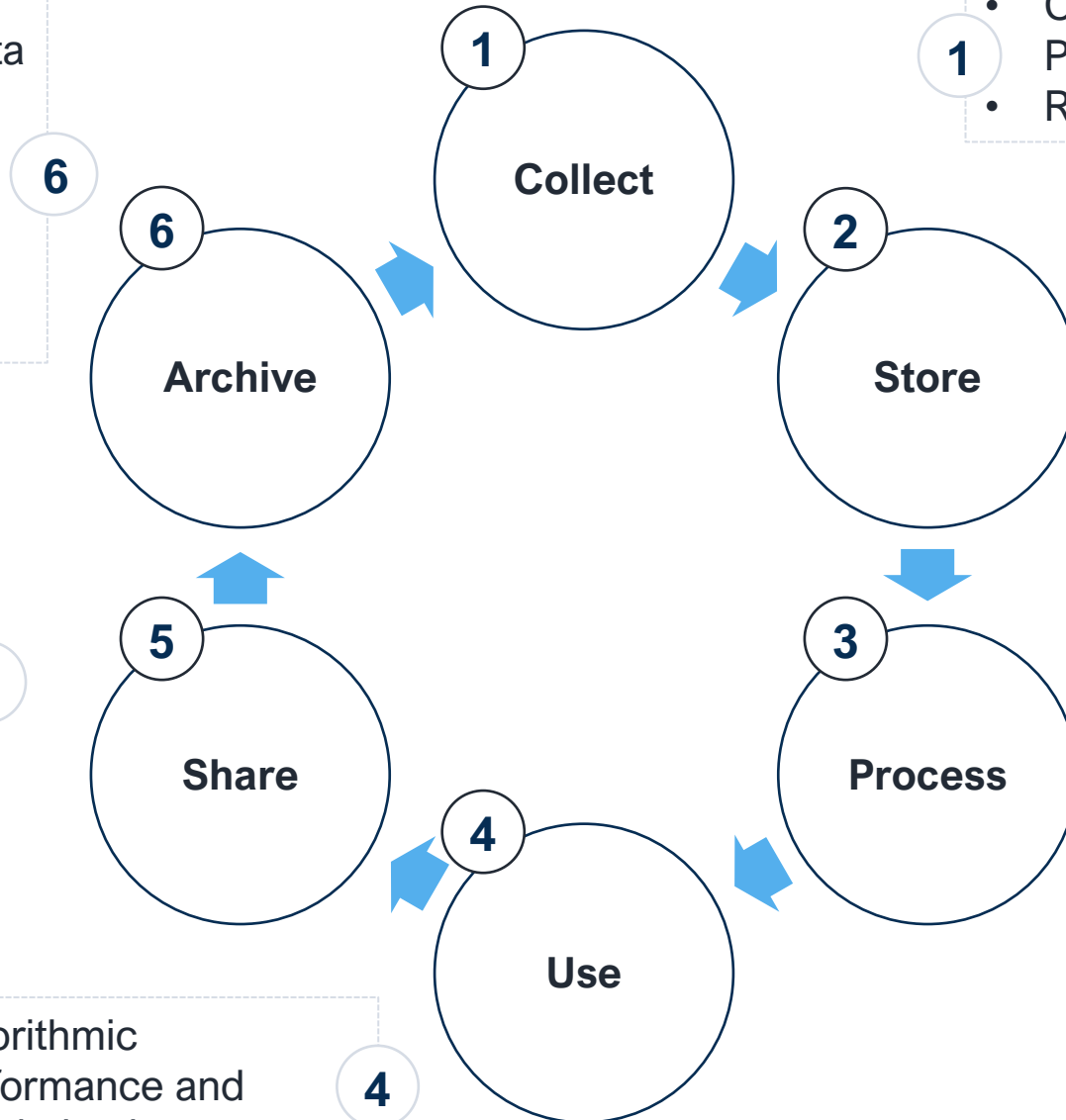
Data ethics

Key ethical issues associated with data life cycle

DATA ETHICS: ETHICAL ISSUES RELATED TO THE DATA LIFE CYCLE

Collect (1)
- Transparency
- Consent
- Privacy
- Representativeness

Store (2)
- Use for unknown, unauthorized purposes
- Data security

Process (3)
- Quality, reliability and representativeness of data

Use (4)
- Algorithmic performance and discrimination

Share (5)
- Transparency
- Consent
- Private interests
- Privacy
- Loss of control over data

Archive (6)
- Preservation of anonymized data
- Data security
- Reuse of data for unauthorized purposes
- Loss of control/right to be forgotten

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CONSENT TO DATA COLLECTION AND SHARING

- Personal (health) data : a wider definition than people think
- Collected by private and public organizations (health files, but also connected devices)
- Usage is not always clear (ex.: reselling of data to third parties)
- Consent : consent is not always free and informed, and it is sometimes obtained fallaciously (checking a box)
- Lack of transparency

- Undermining of the autonomy of individuals

CONFIDENTIALITY AND PRIVACY

- Maintaining confidentiality and protecting privacy is not always done or prioritized

- Privacy: protection of areas beyond the view of others, as well as limiting and controlling access to information about individuals

- Organizations collect way more data than what they might need

- Potential lack of (or loss of) control on personal data

- Anonymization, and the possibility of re-identification

RELIABILITY, QUALITY AND REPRESENTATIVESS OF DATA

- Algorithms used in artificial intelligence systems (AIS) are trained on data sets that must meet certain standards in terms of quality, reliability, and representativeness

- Otherwise, the algorithms developed on these data may be biased and cause significant harm to the individuals, groups, and communities involved.

- Importance of the validation phase

DATA STORAGE, SECURITY AND FUTURE USES

- Anonymisation and the lack of consent for future uses

- Revoking of consent

- How data define our lives

- The right to be forgotten (RTBF)

AI ETHICS

Main ethical concerns associated with AI development and implementation

UNETHICAL USES OF AI

- The scientific validity and effectiveness of an AIS are not sufficient to justify the deployment of a technology and qualify it as "desirable" or ethical

  - Example :Killer robots and the weaponization of AI is a threat to human life

- Dual use of AI technologies in health
  - Covid-19 : Tracking of cellphones, for understanding people's mobility… or for control?

EXPLICABILITY OF AI

- AIS in healthcare are still for the most part expert systems (predictive algorithms). AIS do not « decide » by themselves the course of treatment, or the drug prescribed to a patient, but they make suggestions.

- Machine learning, deep learning… and the « black box » phenomenon

- The absence or limited explicability of AIS may contribute to decreased interpretability, acceptability, and adoption of the technology by professionals and patients, and raises several important issues.

ALGORITHMIC BIASES AND DISCRIMINATION

- Machine learning algorithms learn from the data they are trained on, but they also learn from the human decisions made during their development

- They can therefore reproduce and amplify biases and perform to the disadvantage of certain marginalized groups

Image : The New York Times

BIAISES AND DISCRIMINATION

FAMOUS CASES

100% RECOMMENDED: https://www.propublica.org/article/how-we-analyzed-the-compas-recidivism-algorithm

BIAISES AND DISCRIMINATION

FAMOUS CASES

BUSINESS NEWS   OCTOBER 9, 2018 / 11:12 PM / 4 MONTHS AGO

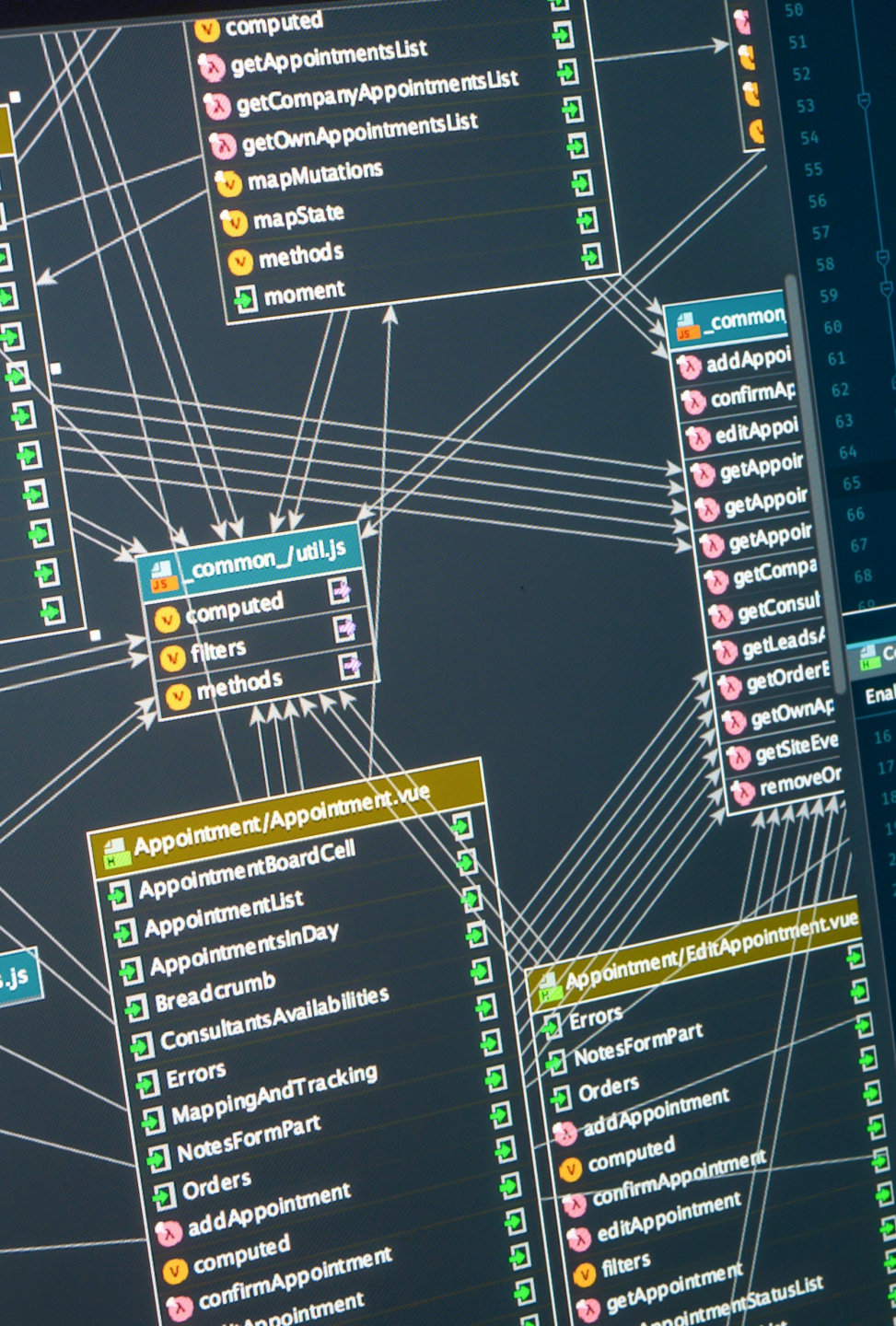# Amazon scraps secret AI recruiting tool that showed bias against women

Jeffrey Dastin   8 MIN READ

SAN FRANCISCO (Reuters) - Amazon.com Inc's (AMZN.O) machine-learning specialists uncovered a big problem: their new recruiting engine did not like women.

DECISIONAL RESPONSIBILITY OF AIS

- The distribution of responsibility between the different actors involved in the development and commercialization of AI systems, as well as those involved in their deployment in a hospital, is complex.

- Who would be responsible for a « bad decision » made by or with AI? (especially if the system is poorly explainable)

DEVELOPING ARTIFICIAL MORAL AGENTS

- What moral do we put in moral agents? Which normative framework?

- Are we ready to delegate complete decisional (and moral) responsibility to machines?

- Examples:
    - Can we eventually completely replace health professionals' judgment by AI?
    - Companion robots, and their responsibility towards humans

THE ALIGNMENT PROBLEM

- How can we make sure AI decisions and actions are aligned with human values and objectives, and won't derive from them?

- Could we loose control over machines?

THE FUTURE OF WORK

- Many ethical questions are linked to the disruption of the labour market generated by the integration of artificial intelligence in the health care environment (and in other environments)
  - Loss of jobs, transformation of jobs and roles, transformation of professional identity (ex. health professionals, accountants, etc.)

- Are these changes desirable and acceptable?

- How do we deal with the transition of work?

THE DIGITAL DIVIDE

- Access to artificial intelligence technologies is often limited to individuals and organizations from wealthy countries or high socio-economic backgrounds

- These inequities in access and use around the world reinforce existing social disparities and significantly affect the quality and representativeness of the data available to create, develop, and deploy AISs that are representative and inclusive.
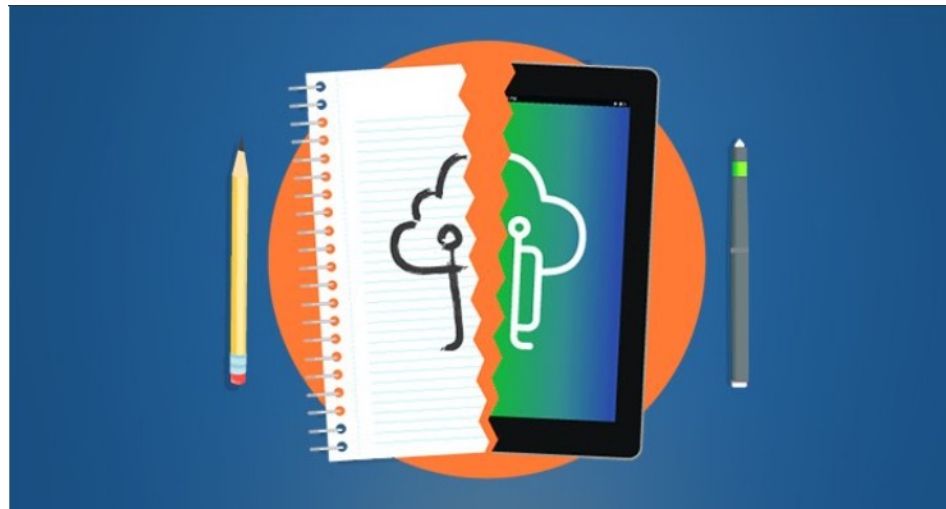
DIGITAL DIVIDE – UN RESOLUTION

- March 22, 2024: The United Nations adopts a resolution on secure, trustworthy, and public-interest-centered AI.

  - Ref : https://apnews.com/article/united-nations-artificial-intelligence-safety-resolution-vote-8079fe83111cced0f0717fdecefffb4d

  - « <u>The resolution aims to close the digital divide between rich developed countries and poorer developing countries</u> and make sure they are all at the table in discussions on AI.

  - « The resolution encourages all countries, regional and international organizations, tech communities, civil society, the media, academia, research institutions and individuals "to develop and support regulatory and governance approaches and frameworks" for safe AI systems.

  - It warns against "improper or malicious design, development, deployment and use of artificial intelligence systems, such as without adequate safeguards or in a manner inconsistent with international law." »

ENVIRONMENTAL IMPACTS OF AI DEVELOPMENT

- New area of research

- The amount of energy used to train machine learning algorithms, as well as the infrastructure needed to support algorithm development and data storage is massive

- This adds significantly to the energy debt of artificial intelligence technologies

GOVERNANCE OF AI

INITIATIVES TO FRAME, FORMALIZE AND INSTITUTIONALIZE AI ETHICS

QUESTIONS?

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