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Ethics in Computer Science **COMP4920**

Week 5: Ethics Framework, Accountability, and Privacy
Flora Salim

Acknowledgment of Country

I would like to acknowledge the Bedegal people that are the Traditional Custodians of this land. I would also like to pay my respects to the Elders both past and present and extend that respect to other Aboriginal and Torres Strait Islanders who are present here today.

Agenda

- Value Sensitive Design
- AI ethics
- Reliability and Accountability
- Data Privacy and Governance
- Fairness and Transparency (a quick glance)

Value Sensitive Design (VSD)

perspective

Value-Sensitive Design

Batya Friedman Colby College and The Mina Institute

Values emerge from the tools that we build and how we choose to use them. Yet, in most of the current practice in designing computer technology and the related infrastructure of cyberspace, little is said about values.

VSD:

An interactional theory and method that accounts for human values in a principled and structured manner throughout the design process

(Friedman 1996; Friedman, Hendry, and Borning 2017)

Friedman B. Value-sensitive design. interactions. 1996 Dec 1;3(6):16-23.

Human Values (Friedman, Kahn, Borning, Huldtgren, 2013)

Table 4.1 Human values (with Ethical Import) often implicated in system design

From: [Value Sensitive Design and Information Systems](#)

Human value	Definition	Sample literature
Human welfare	Refers to people's physical, material, and psychological well-being	Leveson (1991), Friedman et al. (2003), Neumann (1995), Turiel (1983, 1998)
Ownership and property	Refers to a right to possess an object (or information), use it, manage it, derive income from it, and bequeath it	Becker (1977), Friedman (1997b), Herskovits (1952), Lipinski and Britz (2000)
Privacy	Refers to a claim, an entitlement, or a right of an individual to determine what information about himself or herself can be communicated to others	Agre and Rotenberg (1998), Bellotti (1998), Boyle et al. (2000), Friedman (1997b), Fuchs (1999), Jancke et al. (2001), Palen and Dourish (2003), Nissenbaum (1998), Phillips (1998), Schoeman (1984), Svensson et al. (2001)
Freedom from bias	Refers to systematic unfairness perpetrated on individuals or groups, including pre-existing social bias, technical bias, and emergent social bias	Friedman and Nissenbaum (1996), cf. Nass and Gong (2000), Reeves and Nass (1996)
Universal usability	Refers to making all people successful users of information technology	Aberg and Shahmehri (2001), Shneiderman (1999, 2000), Cooper and Rejmer (2001), Jacko et al. (1999), Stephanidis (2001)
Trust	Refers to expectations that exist between people who can experience good will, extend good will toward others, feel vulnerable, and experience betrayal	Baier (1986), Camp (2000), Dieberger et al. (2001), Egger (2000), Fogg and Tseng (1999), Friedman et al. (2000a), Kahn and Turiel (1988), Mayer et al. (1995), Olson and Olson (2000), Nissenbaum (2001), Rocco (1998)
Autonomy	Refers to people's ability to decide, plan, and act in ways that they believe will help them to achieve their goals	Friedman and Nissenbaum (1997), Hill (1991), Isaacs et al. (1996), Suchman (1994), Winograd (1994)
Informed consent	Refers to garnering people's agreement, encompassing criteria of disclosure and comprehension (for "informed") and voluntariness, competence, and agreement (for "consent")	Faden and Beauchamp (1986), Friedman et al. (2000b), The Belmont Report (1978)
Accountability	Refers to the properties that ensures that the actions of a person, people, or institution may be traced uniquely to the person, people, or institution	Friedman and Kahn (1992), Friedman and Millet (1995), Reeves and Nass (1996)
Courtesy	Refers to treating people with politeness and consideration	Bennett and Delatree (1978), Wynne and Ryan (1993)
Identity	Refers to people's understanding of who they are over time, embracing both continuity and discontinuity over time	Bers et al. (2001), Rosenberg (1997), Schiano and White (1998), Turkle (1996)
Calmness	Refers to a peaceful and composed psychological state	Friedman and Kahn (2003), Weiser and Brown (1997)
Environmental sustainability	Refers to sustaining ecosystems such that they meet the needs of the present without compromising future generations	United Nations (1992), World Commission on Environment and Development (1987), Hart (1999), Moldan et al. (1997), Northwest Environment Watch (2002)

Friedman B, Kahn PH, Borning A, Huldtgren A. Value sensitive design and information systems. In Early engagement and new technologies: Opening up the laboratory 2013 (pp. 55-95). Springer, Dordrecht.

Value Sensitive Design (VSD)

VSD: “An approach that rigorously accounts for human values in the technical design and engineering process”

VSD projects:

- begins with the identification of stakeholders
- surfacing of their values through conceptual and empirical investigations

Stephanie Ballard, Karen M. Chappell, and Kristen Kennedy. 2019. Judgment Call the Game: Using Value Sensitive Design and Design Fiction to Surface Ethical Concerns Related to Technology. In Proceedings of the 2019 on Designing Interactive Systems Conference (DIS '19). Association for Computing Machinery, New York, NY, USA, 421- 433. <https://doi.org/10.1145/3322276.3323697>

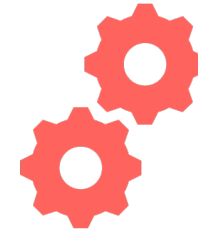
Value-Sensitive Design



Conceptual
Investigations



Empirical
Investigations



Technical
Investigations

A VSD toolkit: Envisioning cards

Envisioning Cards

[Home](#)[About](#)[Get the Cards](#)[Ideas for Use](#)[Contact the Authors](#)

The Envisioning Criteria

The Envisioning Cards are built upon a set of five Envisioning Criteria that are intended to raise awareness of long-term and systemic issues in design. Each Envisioning Card represents a specific theme within one of these Envisioning Criteria. Based on roughly two decades of research into accounting for human values in the design of technology, the Envisioning Cards were developed by the Value Sensitive Design Research Lab at the Information School at the University of Washington.

Stakeholders



Indirect Stakeholders

Drawing from Value Sensitive Design methodology, the Stakeholder criterion emphasizes the range of effects of a technology, both on those who are in direct contact with a technology (direct stakeholders), and on those who might not be direct users, but whose lives are nevertheless affected by various interactions around the technology (indirect stakeholders).

Time



Sustained Friendships

Inspired by the long-term perspective of urban planning, the Time criterion helps guide designers to consider the longer term implications of their work – implications that will only emerge after the technology has moved through initial phases of novelty to later phases of appropriation and integration into society.

Values



Value Tensions

The Value criterion emphasizes the impact of technology on human values. Our use of the term values draws from the Value Sensitive Design literature, “what a person or group of people consider important in life.” In interaction design, we have found values of interest to include but are not limited to: autonomy, community, cooperation, democratization, environmental sustainability, expression, fairness, human dignity, inclusivity and exclusivity, informed consent, justice, ownership, privacy, self-efficacy, security, trust, and universal access.

Pervasiveness



Crossing National Boundaries

The Pervasiveness criterion emphasizes systemic interactions that follow from the widespread adoption of an interactive technology. Technologies can become pervasive with respect to geographic (e.g., city navigation software use within urban areas), cultural (e.g., text messaging within the deaf community), demographic (e.g., online social networking sites among teenagers), and other factors.

Multi-lifespan



Material Longevity

Multi-lifespan design is primarily concerned with significant societal problems that defy rapid solution. Genocide, HIV/AIDS, famine, deforestation, species extinction, forced exodus – these problems share some commonalities. In one way or another, they entail widespread losses to human beings, to other sentient beings, or to the natural world. The structure of these problems and their solution spaces require long periods of time to unfold. In turn, these problems call for designers to take a more proactive and long term approach to how we envision and design technology. The Multi-lifespan criterion prompts consideration and discussion of such concerns within the context of designing tools, technology, policy, and infrastructure.

https://www.envisioningcards.com/?page_id=2

SafetyNet: a hypothetical scenario

SafetyNet is a hypothetical, commercial software platform which leverages publicly available demographic and criminal data, mapping technology, and satellite-tracking capabilities to create maps for display on various mobile technologies (eg cell phones, blackberries, in-car navigational systems). These maps are used to alert urban travelers as they venture into potentially unpleasant or dangerous areas during their travel.

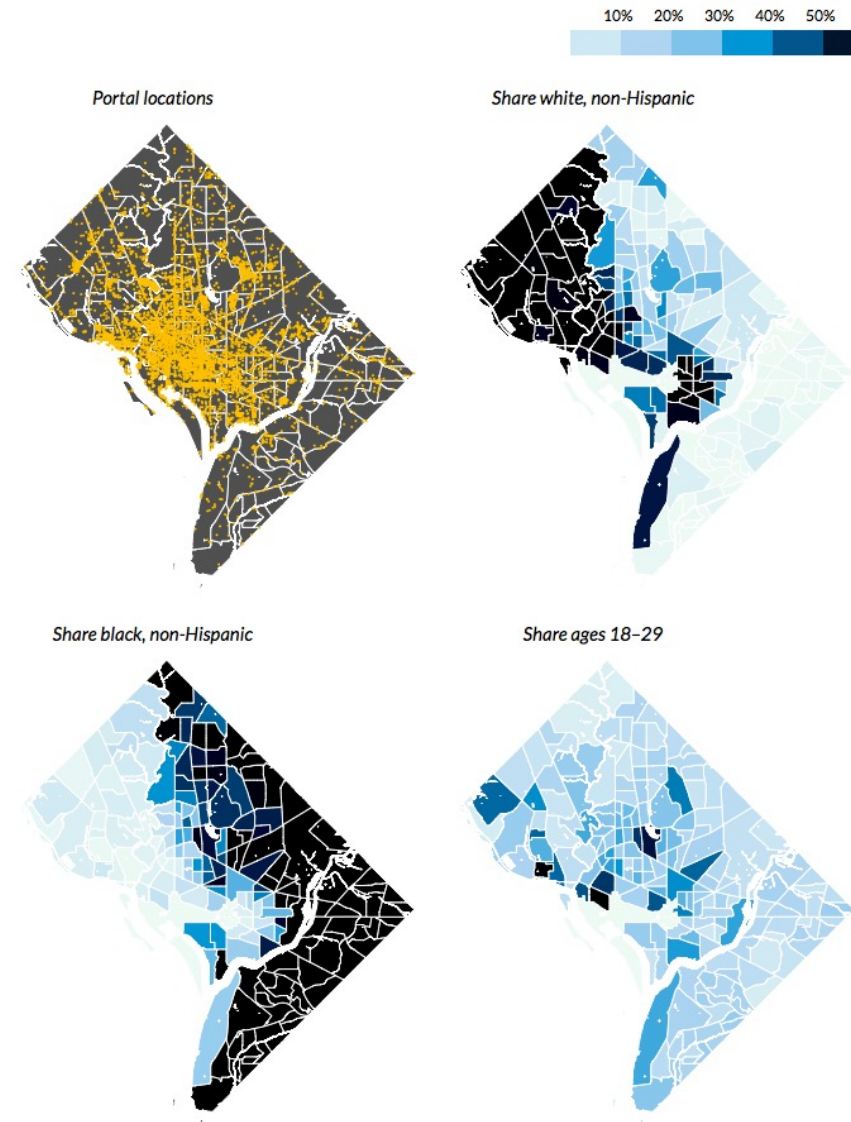
Taken from:

Nathan LP, Klasnja PV, Friedman B. Value scenarios: a technique for envisioning systemic effects of new technologies. In CHI'07 extended abstracts on Human factors in computing systems 2007 Apr 28 (pp. 2585-2590)

Case study: Pokemon Go

<https://www.urban.org/urban-wire/pokemon-go-changing-how-cities-use-public-space-could-it-be-more-inclusive>

Ingress Portals Are Concentrated in Majority-White Census Tracts



Sources: Ingress Intel Map; American Community Survey 2010-14.

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Judgment Call: The Game



Judgment Call is an award-winning game and team-based activity that puts Microsoft's AI principles of fairness, privacy and security, reliability and safety, transparency, inclusion, and accountability into action. The game provides an easy-to-use method for cultivating stakeholder empathy by imagining their scenarios. Game participants write product reviews from the perspective of a particular stakeholder, describing what kind of impact and harms the technology could produce from their point of view.

ACM Principles for Algorithmic Transparency and Accountability

1. Awareness

2. Access and redress

3. Accountability

4. Explanation

5. Data Provenance

6. Auditability

7. Validation and Testing

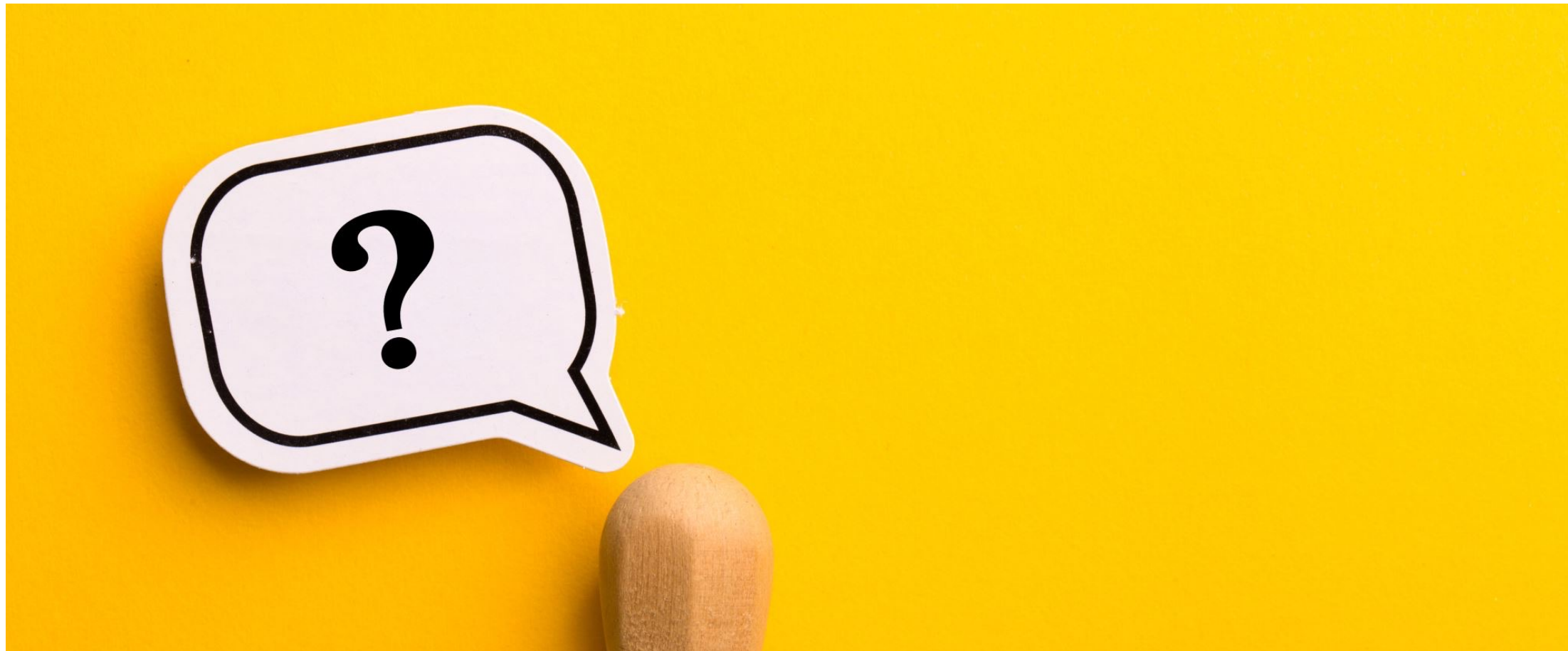
https://www.acm.org/binaries/content/assets/public-policy/2017_usacm_statement_algorithms.pdf

AI Ethics



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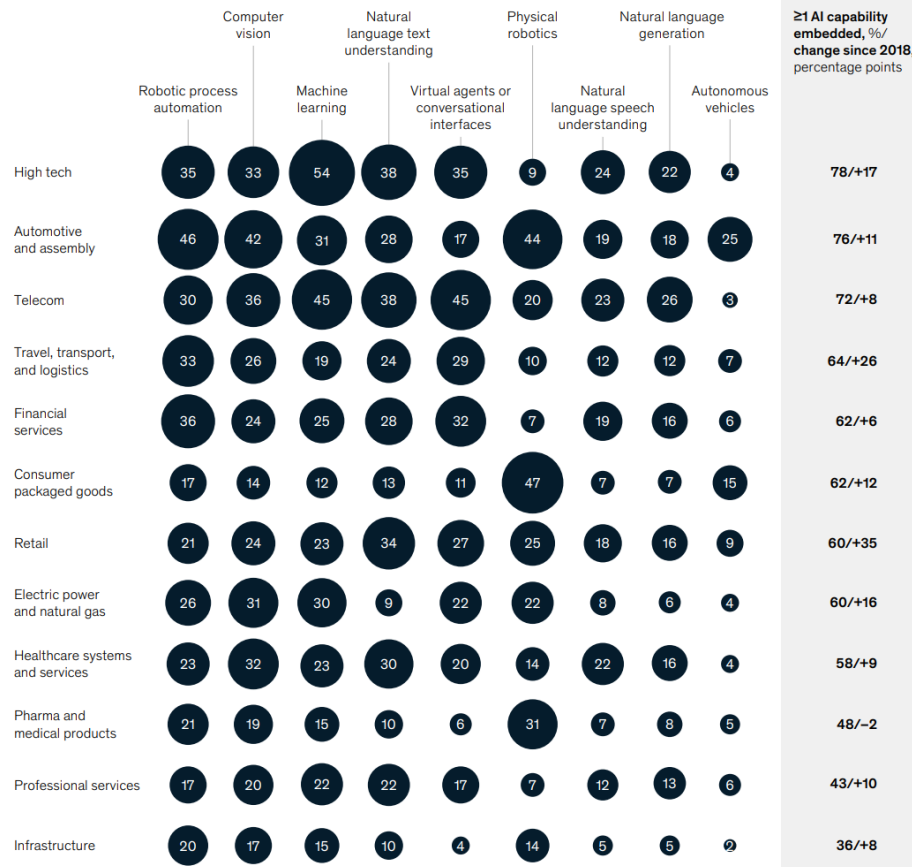
Why AI



AI adoption in industry

High tech leads in AI adoption, and industries are generally using the AI capabilities most relevant to their value chains.

Organizations' AI capabilities,¹ % of respondents,² by industry



¹ Embedded in ≥1 product and/or business process for ≥1 function or business unit.
² Respondents who said "don't know" or "none of the above" are not shown. For high tech, n = 277; for automotive and assembly, n = 128; for telecom, n = 93; for travel, transport, and logistics, n = 83; for financial services, n = 396; for consumer packaged goods, n = 72; for retail, n = 94; for electric power and natural gas, n = 82; for healthcare systems and services, n = 78; for pharma and medical products, n = 96; for professional services, n = 331; and for infrastructure, n = 91.

AI global survey by McKinsey

<https://www.mckinsey.com/featured-insights/artificial-intelligence/global-ai-survey-ai-proves-its-worth-but-few-scale-impact>

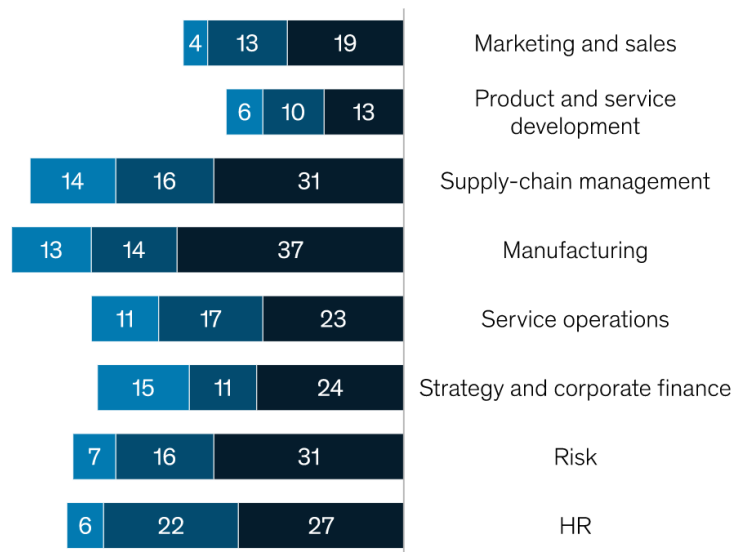
AI adoption leads to increased revenue and decreased cost

Revenue increases from adopting AI are reported most often in marketing and sales, and cost decreases most often in manufacturing.

Cost decrease and revenue increase from AI adoption, by function,¹ % of respondents²

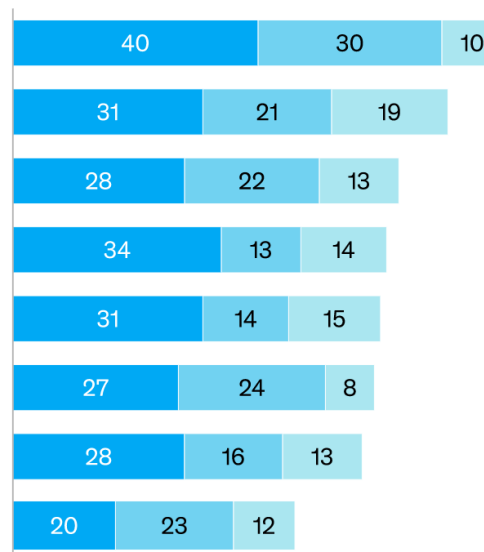
Average cost decrease

■ Decrease by ≥20% ■ Decrease by 10–19% ■ Decrease by <10%



Average revenue increase

■ Increase by ≤5% ■ Increase by 6–10% ■ Increase by >10%



AI global survey by McKinsey

<https://www.mckinsey.com/featured-insights/artificial-intelligence/global-ai-survey-ai-proves-its-worth-but-few-scale-impact>

¹Marketing and sales includes the following use cases: customer-service analytics, customer segmentation, channel management, prediction of likelihood to buy, pricing and promotion, closed-loop marketing, marketing-budget allocation, churn reduction, and next product to buy. For product and service development: product-feature optimization, product-development-cycle optimization, creation of new AI-based enhancements, and creation of new AI-based products. For supply-chain management: logistics-network optimization, sales and parts forecasting, warehouse optimization, inventory and parts optimization, spend analytics, and sales and demand forecasting. For manufacturing: predictive maintenance and yield, energy, and throughput optimization. For service operations: service-operations optimization, contact-center automation, and predictive service and intervention. For strategy and corporate finance: capital allocation, treasury management, and M&A support. For risk: risk modeling/analytics, and fraud/debt analytics. For HR: performance management and organization-design, workforce-deployment, and talent-management optimization.

²Question asked only of respondents who said their companies adopted AI in given use case. Figures were calculated after removing respondents who said "don't know" or "not applicable; we are not tracking revenue related to AI"; respondents who said "no change" are not shown.

Australia's AI Ethics Principles

Human, social
and
environmental
wellbeing

Human-centred
values

Fairness

Privacy
protection and
security

Reliability and
safety

Transparency
and explainability

Contestability

Accountability

Source: <https://www.industry.gov.au/data-and-publications/building-australias-artificial-intelligence-capability/ai-ethics-framework/ai-ethics-principles>

Australia's AI Ethics Principles

Human, societal and environmental wellbeing: AI systems should benefit individuals, society and the environment.

Human-centred values: AI systems should respect human rights, diversity, and the autonomy of individuals.

Fairness: AI systems should be inclusive and accessible, and should not involve or result in unfair discrimination against individuals, communities or groups.

Privacy protection and security: AI systems should respect and uphold privacy rights and data protection, and ensure the security of data.

Reliability and safety: AI systems should reliably operate in accordance with their intended purpose.

Transparency and explainability: There should be transparency and responsible disclosure so people can understand when they are being significantly impacted by AI, and can find out when an AI system is engaging with them.

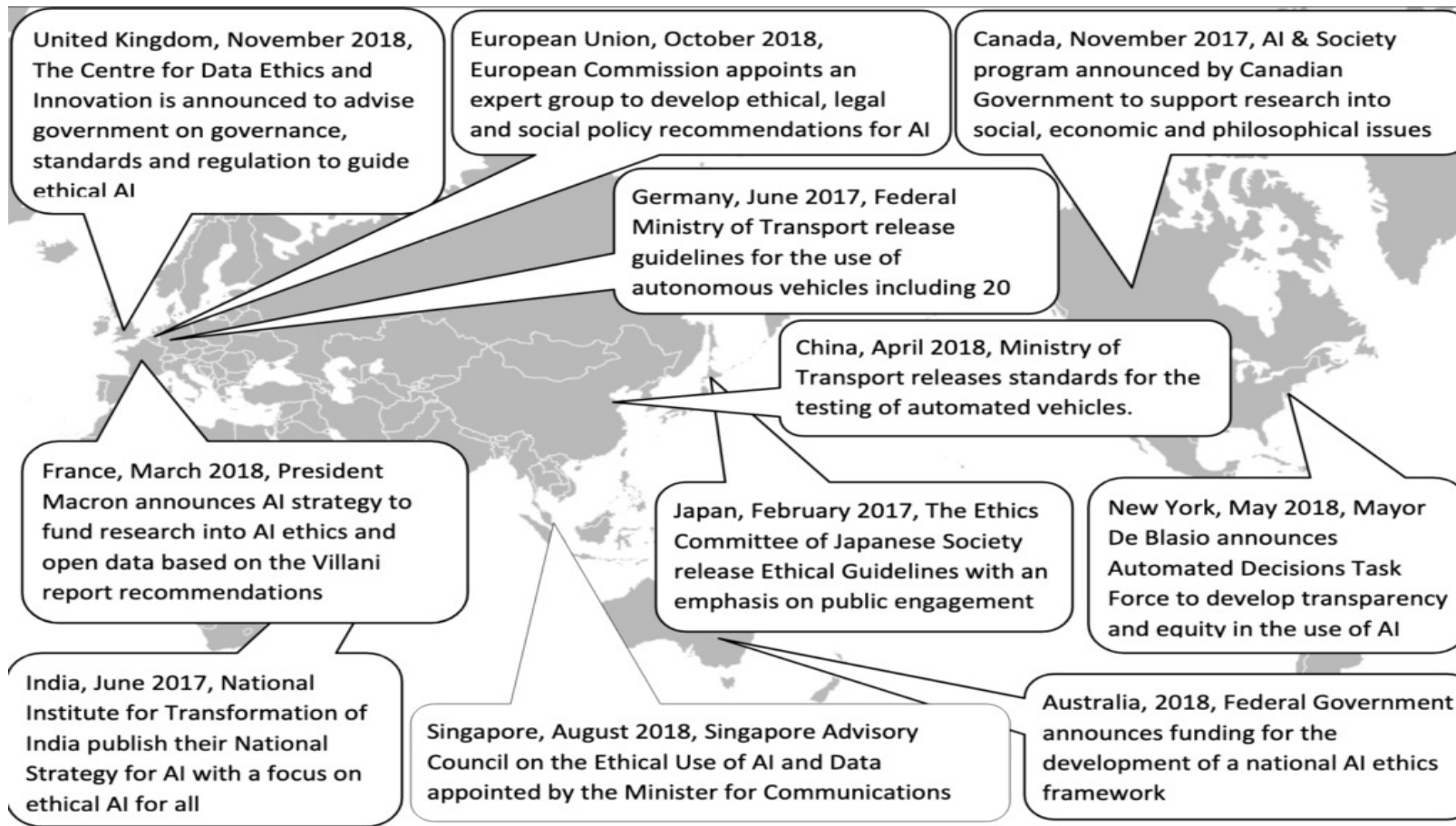
Contestability: When an AI system significantly impacts a person, community, group or environment, there should be a timely process to allow people to challenge the use or outcomes of the AI system.

Accountability: People responsible for the different phases of the AI system lifecycle should be identifiable and accountable for the outcomes of the AI systems, and human oversight of AI systems should be enabled.

Source: <https://www.industry.gov.au/data-and-publications/building-australias-artificial-intelligence-capability/ai-ethics-framework/ai-ethics-principles>



A global snapshot of AI Ethics framework



Source: <https://www.csiro.au/-/media/D61/Reports/Artificial-Intelligence-ethics-framework.pdf>

Accountability, Privacy, Governance



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Reliability and Safety

Therac 25



Reliability? Case study: Robodebt

Centrelink debt recovery

Almost 200,000 robodebt cases to be wiped as Albanese government condemns 'shameful' scheme

Amanda Rishworth cites need for a welfare system that is 'not punitive' as she confirms reviews will be scrapped

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Josh Butler

Tue 11 Oct 2022 22:31 AEDT



📺 Social services minister Amanda Rishworth says the unlawful robodebt scheme was meant to save money but 'had a significant human cost'. Photograph: Lukas Coch/AAP

Nearly 200,000 Australians will have their robodebt reviews wiped as the federal government scraps investigations that were put on hold for three years under the unlawful welfare scheme.

About 124,000 people were told they were under review for social security payments they had received, while 73,000 were never informed they were being assessed for potential debts under the data-matching program.

Robodebt

Not AI-based, but still an Automated Decision Making (ADM) system

Reliability? Case study: Robodebt

A royal commission is set to review Robodebt. Its legacy is still hanging over Centrelink recipients today

By the Specialist Reporting Team's [Evan Young](#) and [Leonie Thorne](#)
Posted Sat 27 Aug 2022 at 5:04am, updated Sat 27 Aug 2022 at 5:21am



Emma Warren says she's still very affected by the Robodebt debacle today. (ABC News: Andrew Lobb)

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[abc.net.au/news/robodebt-royal-com...](https://www.abc.net.au/news/robodebt-royal-commission-scars-linger/101375170)

COPY LINK

SHARE

It's been nearly six years, but Emma Warren still vividly remembers the moment she was told she owed the government \$8,000.

“Between 2015 and 2019, the scheme unlawfully claimed almost \$2 billion from more than 400,000 Australians. Some \$750 million was wrongly recovered from 381,000 people.”

<https://www.abc.net.au/news/2022-08-27/robodebt-royal-commission-scars-linger/101375170>

Reliability? Case study: Robodebt

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[abc.net.au/news/robodebt-royal-com...](https://www.abc.net.au/news/robodebt-royal-com...)

COPY LINK

SHARE

It's been nearly six years, but Emma Warren still vividly remembers the moment she was told she owed the government \$8,000.

On 11 Jun 2021 the Federal Court approved a A\$1.872 billion settlement incorporating repayment of A\$751 million, wiping of all remaining debts, and the legal costs running to A\$8.4 million

<https://www.abc.net.au/news/2021-06-11/robodebt-condemned-by-federal-court-judge-as-shameful-chapter/100207674>



Accountability

Four barriers:

1. The problem of many hands
2. The problem of bugs
3. Blaming the computer
4. Software ownership without liability

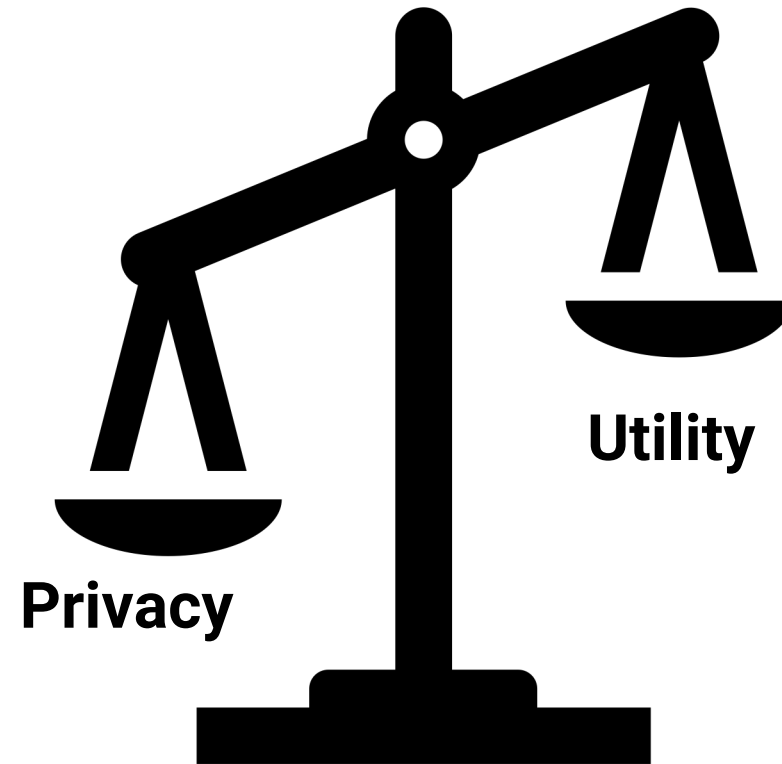
Nissenbaum, H., 2020. Computing and accountability. In *The Ethics of Information Technologies* (pp. 351-358). Routledge.

Nissenbaum H. Accountability in a computerized society. *Science and engineering ethics*. 1996 Mar;2(1):25-42.

Data: the core of AI

“The recent advances in key AI capabilities such as deep learning have been made possible by vast troves of data. This data has to be collected and used, which means issues related to AI are closely intertwined with those that relate to privacy and data.” - CSIRO & Data61, Innovation, Department of Industry, and Australian Government Science

Privacy vs. Utility Tradeoff



Measuring Privacy

- Secrecy: it concerns information that others may gather about us
 - the probability of a data item being accessed
 - the change in knowledge of an adversary/third party upon seeing the data
- Anonymity: it addresses how much in the public gaze we are
 - the privacy leakage is measured in terms of the size of the blurring accompanying the release of data
- Solitude: it measures the degree to which others have physical access to us

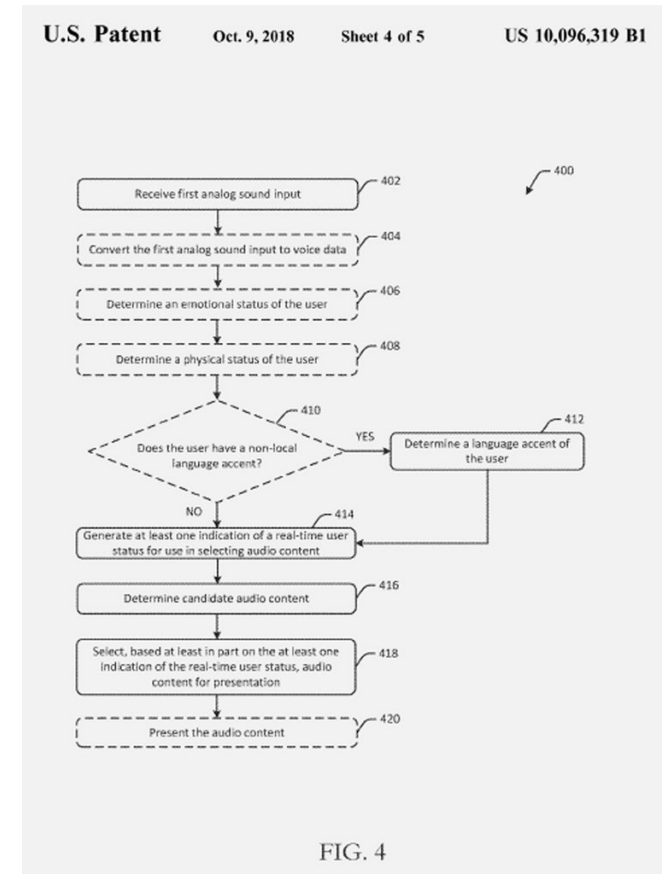
(Xintao Wu, University of Arkansas)



Case study: AMAZON'S ACCENT RECOGNITION TECHNOLOGY

AT THE BEGINNING of October 2018, Amazon was quietly issued a patent that would allow its virtual assistant Alexa to decipher a user's physical characteristics and emotional state based on their voice. Characteristics, or "voice features," like language accent, ethnic origin, emotion, gender, age, and background noise would be immediately extracted and tagged to the user's data file to help deliver more targeted advertising.

The algorithm would also consider a customer's physical location – based on their IP address, primary shipping address, and browser settings – to help determine their accent.



The illustration from Document:
United States Patent and
Trademark Office

Discuss

- What are the potential ethical concerns in relation to data privacy?
- Are there any concerns with regards to the intended use of this data and analysis?
- Will AI models be limited if users don't want to provide data?
- Are there any other potential issues/concerns regarding FATE (Fairness, Accountability, Transparency, and Ethics)?

Consent and the Privacy Act

- Four key terms
 - The individual is adequately informed before giving consent.
 - The individual gives consent voluntarily.
 - The consent is current and specific.
 - The individual has the capacity to understand and communicate their consent.
- The 'right to be **forgotten**'

Case study: Cambridge Analytica and public trust

Through a Facebook app, a Cambridge University researcher was able to gain access to the personal information of not only users who agreed to take the survey, but also the people in those users' Facebook social networks. In this way, the app harvested data from millions of Facebook users. Various reports indicate that these data were then used to develop targeted advertising for various political campaigns run by Cambridge Analytica.

Case study: Cambridge Analytica and public trust

- Are there potential ethical concerns in relation to data privacy?
- Are there any concerns with regards to the intended use of this data and analysis for advertisement?

Case study: Cambridge Analytica and public trust

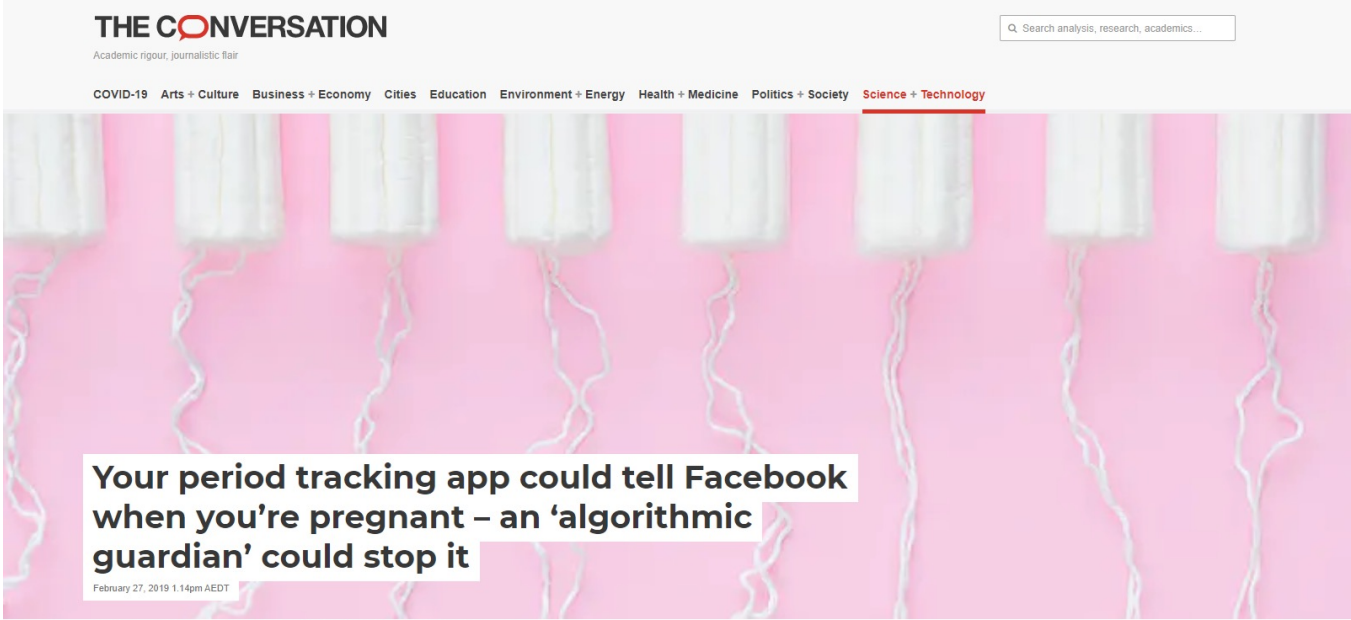
- Lesson we learned
 - Cost of inadequate data protection policies
 - Not sufficient to merely follow the letter of the law
- Code of practices
 - Australian Privacy Act
 - Consent process: current, specific, transparent
 - Regular review of data collection and usage policies
 - Balance between privacy protection and technology innovation

Case Study: Mood and Perception Manipulation

A controversial research study (Kramer, Guillory, and Hancock [2014](#)) used Facebook's platform to demonstrate that users' moods can be manipulated by filtering their feeds (comments, videos, pictures and web links posted by their Facebook friends). The social media company altered the news feeds (the main page users land on for a stream of updates from friends) of nearly 700,000 users. Feeds were changed to reflect more "positive" or "negative" content, to determine if seeing more sad messages makes a person sadder. The study shows that reducing exposure to feeds with positive content led to the user posting fewer positive posts, and the same pattern occurred for negative content.



Case study: Period tracking app



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Your period tracking app could tell Facebook when you're pregnant – an 'algorithmic guardian' could stop it

February 27, 2019 1:14pm AEDT

The way it is now, we have almost no way to know how our data are being shared and used. Shutterstock

Email 15
Twitter 47
Facebook
LinkedIn
Print

Most of us know tech platforms such as Facebook and Google track, store and make money from our data. But there are constantly new revelations about just how much of our privacy has been chipped away.

The latest comes from the Wall Street Journal, which dropped a bombshell on Friday when its testing revealed many popular smartphone apps have been sending personal data to Facebook. That reportedly includes data from heart rate monitoring and period tracking apps:

Flo Health Inc's Flo Period & Ovulation Tracker, which claims 25 million active users, told Facebook when a user was having her period or informed the app of an intention to get pregnant, the tests showed.

When we use technologies that track our data, we enter a system governed by algorithms. And the more information we hand over, the more we become serviced with algorithmic systems we don't control.

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Professor, UNSW
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Disclosure statement

The authors do not work for, consult, own shares in or receive funding from any company or organisation that would benefit from this article, and have disclosed no relevant affiliations beyond their academic appointment.

Partners

<https://theconversation.com/your-period-tracking-app-could-tell-facebook-when-youre-pregnant-an-algorithmic-guardian-could-stop-it-111815>

Data Security and Governance

- Establishes policies around data that are used for operational purposes in an organization.
- It defines actions on data in particular situations, i.e. who is going to take action and what methods will be used for this action.
- A good data governance framework ensures:
 - data quality
 - data availability
 - data protection.

Data Security and Governance

- Avoid the \$\$\$ cost of data breach
- And the massive cost of the loss of reputation



Case Study: Equifax data breach

In 2017 Equifax, a US-based credit reporting agency, experienced a data breach affecting at least 145.5 million individuals, with various degrees of sensitive personal information compromised. In addition, due to the huge number of people affected, it took several weeks to identify the individuals and notify the public that the breach had occurred. The cost of the breach was estimated to be in the realm of US\$275 million.



Transparency



Transparency in AI

Transparency is one of seven key requirements for the realisation of ‘trustworthy AI’ (EU Commission’s High-Level Expert Group on AI (AI HLEG) in April 2019)

“Transparency” is the single most common, and one of the key five principles emphasised in the vast number – a recent study counted 84 – of ethical guidelines addressing AI on a global level (Jobin et al., 2019).

Larsson, S. & Heintz, F. (2020). Transparency in artificial intelligence. *Internet Policy Review*, 9(2). <https://doi.org/10.14763/2020.2.1469>; <https://policyreview.info/concepts/transparency-artificial-intelligence>

Black box vs white box algorithms



VS.



Norbert Wiener, 1948, *Cybernetics: or Control and Communication in the Animal and the Machine*

The need for Transparency and Explainable AI (XAI)

- The problems of accountability as computing technologies becoming more complex and less intelligible (Helen Nissenbaum).
- The opacity in Machine Learning Systems (Jean Burrell, 2016) due to :
 - Trade secrets
 - Limited people with the knowledge of programming languages and ML
 - The complexity and high dimensionality of data for decision making no longer match human-scale reasoning
- Institutional transparency, public values, regulations
 - Customer's rights for explanations (GDPR Article 15(1))
 - Requirement for human in the loop (GDPR Article 22)
 - Requirement for algorithmic auditing (US Algorithmic Accountability act)

Source: Jake Goldenfein, 'Algorithmic Transparency and Decision-Making Accountability: Thoughts for buying machine learning algorithms' in Office of the Victorian Information Commissioner (ed), Closer to the Machine: Technical, Social, and Legal aspects of AI (2019), Available at SSRN: <https://ssrn.com/abstract=3445873>, <https://ovic.vic.gov.au/wp-content/uploads/2019/08/closer-to-the-machine-web.pdf> p.45-65

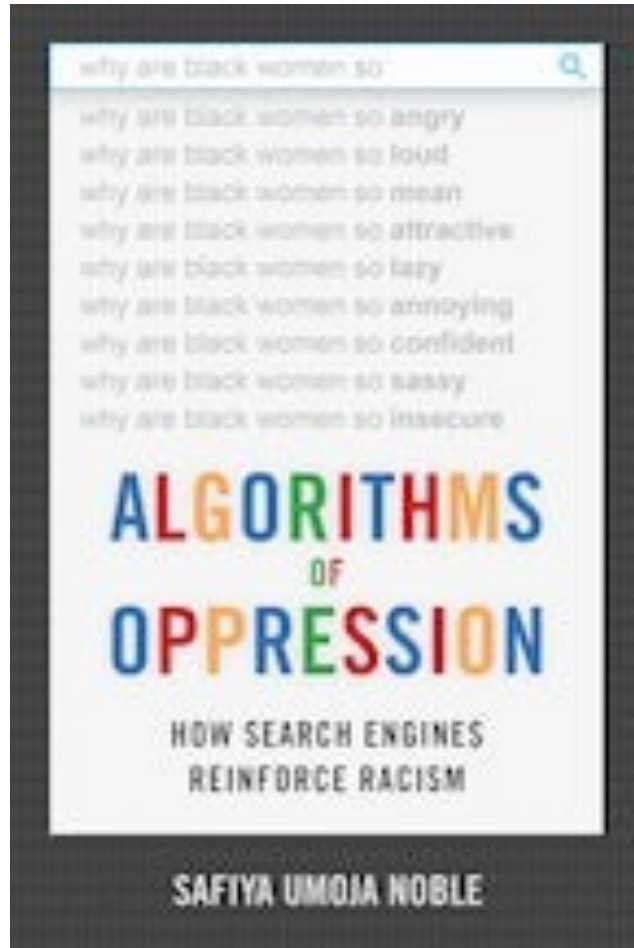
Transparency and Explainability

More on Week 10

Fairness

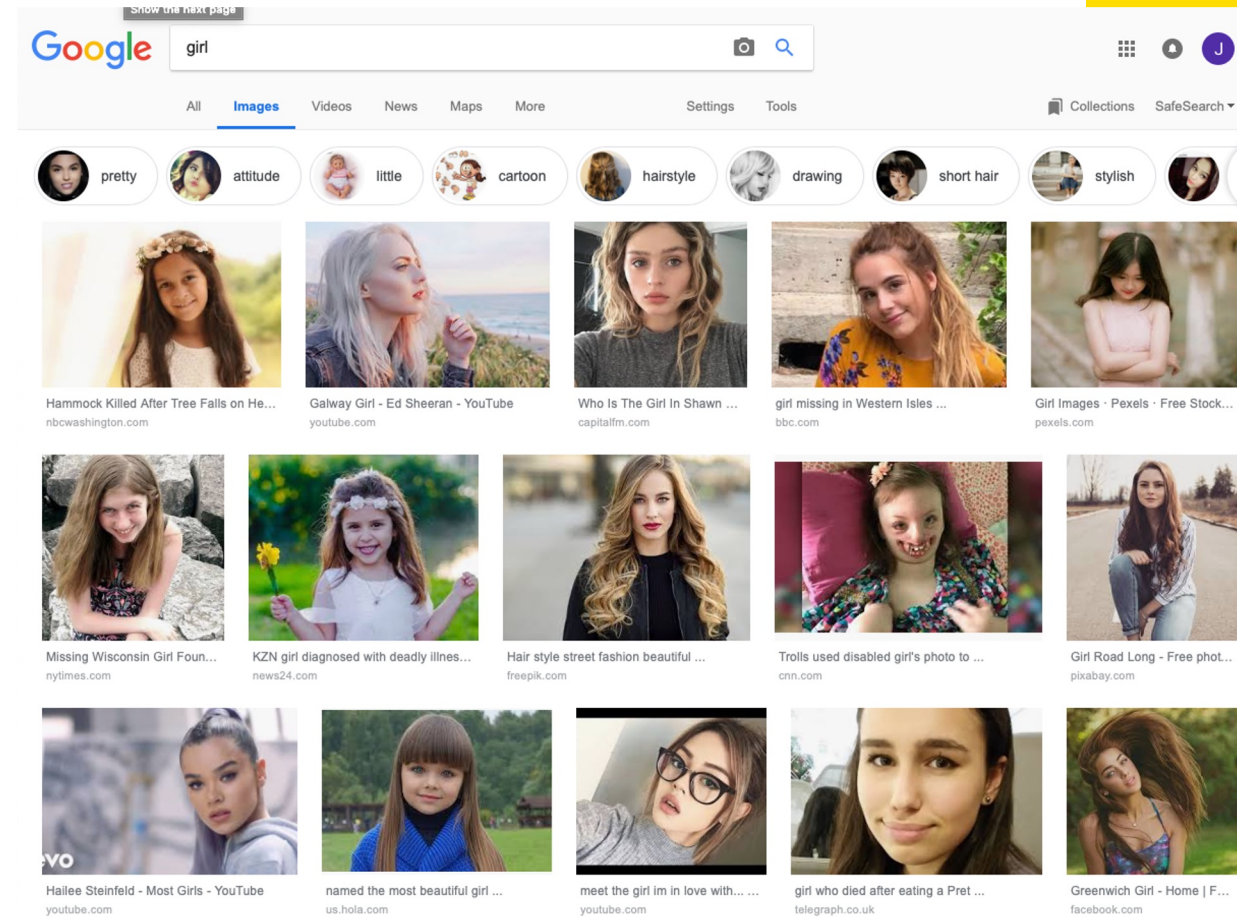
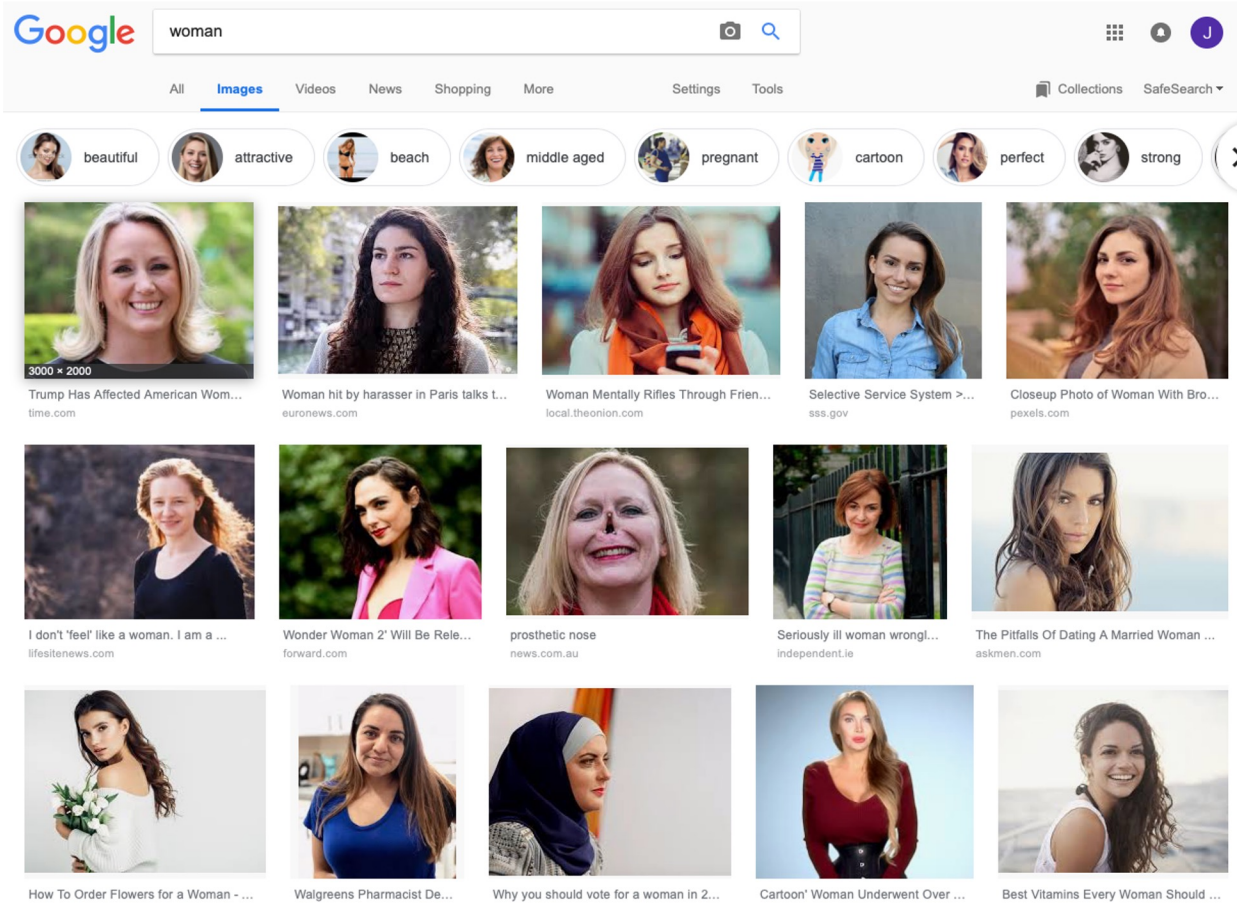


Algorithms of Oppression



Noble, S. U. (2018). Algorithms of oppression: How search engines reinforce racism. New York University Press.

Search Engine Bias



Source from <https://scroll.in/article/921305/google-search-results-reflect-its-algorithms-bias-against-women-and-people-of-colour>

Search Engine result on CEO (3 years ago)

The screenshot shows a Google search for 'CEO'. The search bar contains 'CEO' and the search results are displayed in a grid format. The first row of results includes:

- Chief executive officer - Wikipedia** (en.wikipedia.org): A group photo of several men in suits.
- What do CEOs do? A CEO Job Description ...** (steverobbins.com): A portrait of a woman in a business suit.
- ABB Turns to New CEO Rosengren to Drive ...** (industryweek.com): A portrait of a man in a suit.
- Marriott CEO Arne Sorenson Is The 2...** (chiefexecutive.net): A portrait of a man in a suit.
- Mark Nielsen named Australian CEO of ...** (talentinternational.com.au): A man in a tuxedo on a red carpet.

The second row of results includes:

- How to use 'CEO magic' when trying to ...** (europeanceo.com): A portrait of a woman in a business suit.
- Why Aviva's CEO Mark Wilson has fallen ...** (independent.co.uk): A portrait of a man in a suit.
- BHP | Mike Henry to become BHP Chief ...** (bhp.com): A portrait of a man in a suit.
- PwC's 22nd CEO Survey - CEO's curbed ...** (pwc.com): A man in a suit speaking at a podium.
- You are the CEO of Your Life | Personal ...** (personalexcellence.co): A man in a suit clapping.

Search Engine result on CEO (today)

The image shows a Google search interface for the term "ceo". The search bar contains "ceo" and the Google logo is visible. Below the search bar, there are navigation tabs for "All", "News", "Images", "Videos", "Books", and "More". A horizontal strip of related search terms includes "female", "business", "google", "apple", "office", "microsoft", "desk", "pepsi", "amazon", "clipart", "executive", "youtube", "uber", "salary", and "ceo".

The search results are displayed in a grid format. The first row includes:

- Chief Executive Officer (CEO)**: A definition stating that the CEO is the highest ranking executive in a company, responsible for making major corporate decisions and managing the overall operations and resources of a company.
- CEO (Chief Executive Officer ...)**: A link to corporatefinanceinstitute.com.
- How to interview a CEO | Robert Half**: A link to roberthalf.com.au.
- CEO Job Description**: A link to betterteam.com.
- Harvard study: What CEOs do all day**: A link to cnbc.com.
- How CEOs Manage Their Time: 11 Pro Tips ...**: A link to fellow.app.

The second row includes:

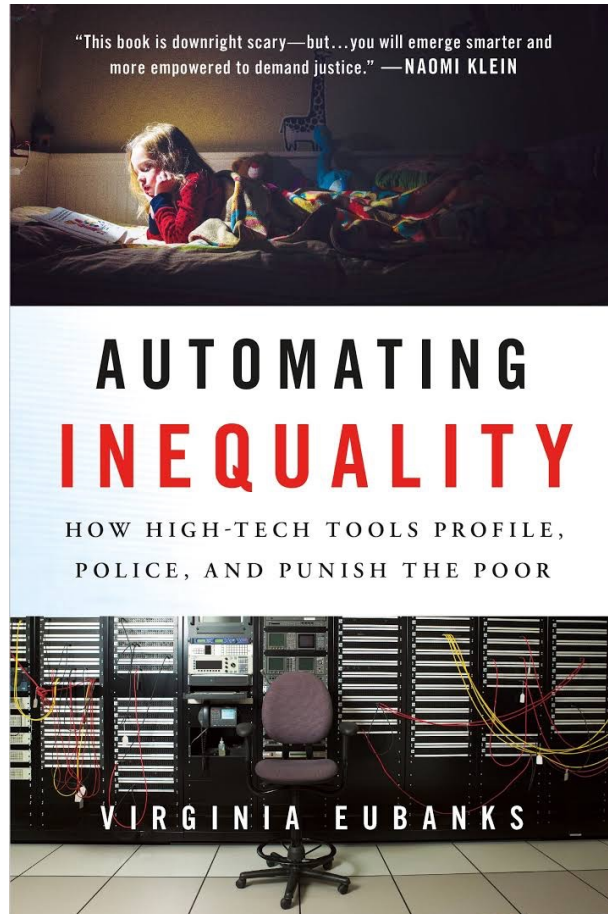
- Do women make better CEOs than men ...**: A link to lighthouse.mq.edu.au.
- 7 Personality Traits Every CEO Should H...**: A link to forbes.com.
- How to become a CEO | Robert Half**: A link to roberthalf.com.au.
- Satya Nadella - Wikip...**: A link to en.wikipedia.org.
- A message from the CEO**: A link to nmfc.com.au.
- What do CEOs do? A CEO Job Description ...**: A link to steverobbins.com.
- How To Become A CEO In Australia: A ...**: A link to ozstudies.com.

The third row includes:

- Australian CEOs - CMA Australia ...**: A link to cmaaustralia.edu.au.
- CEO job description template | Workable**: A link to resources.workable.com.
- icare welcomes Richard Harding as CEO ...**: A link to icare.nsw.gov.au.
- CEO vs. CFO**: A link to betterteam.com.
- elect Adam Powick as next Australia CEO**: A link to consultancy.com.au.
- New CEO for Netball Australia - Netball ...**: A link to netball.com.au.

The bottom section features a "Related searches" box with "female ceo" and "ceo logo". To the right, there are two large images: one with the text "THE CEO" and another showing a man speaking at a podium with the text "DAVID HACKER CEO of Life Insurance".

Virginia Eubanks



Virginia Eubanks. *Automating Inequality: How High-Tech Tools Profile, Police, and Punish the Poor*. St. Martin's Press, 2018.

An excerpt:

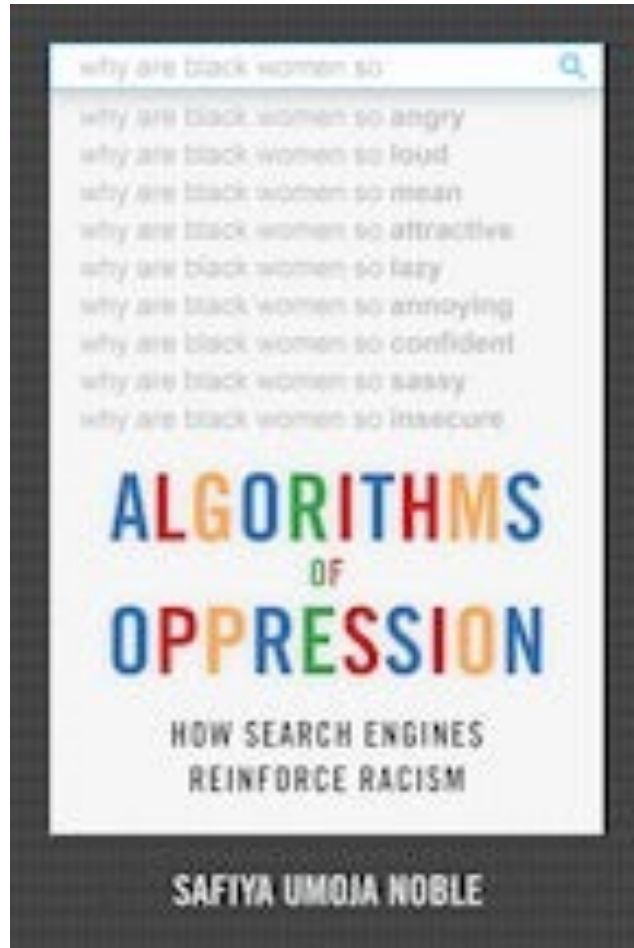
<https://www.scientificamerican.com/article/algorithms-designed-to-fight-poverty-can-actually-make-it-worse/>

Fairness



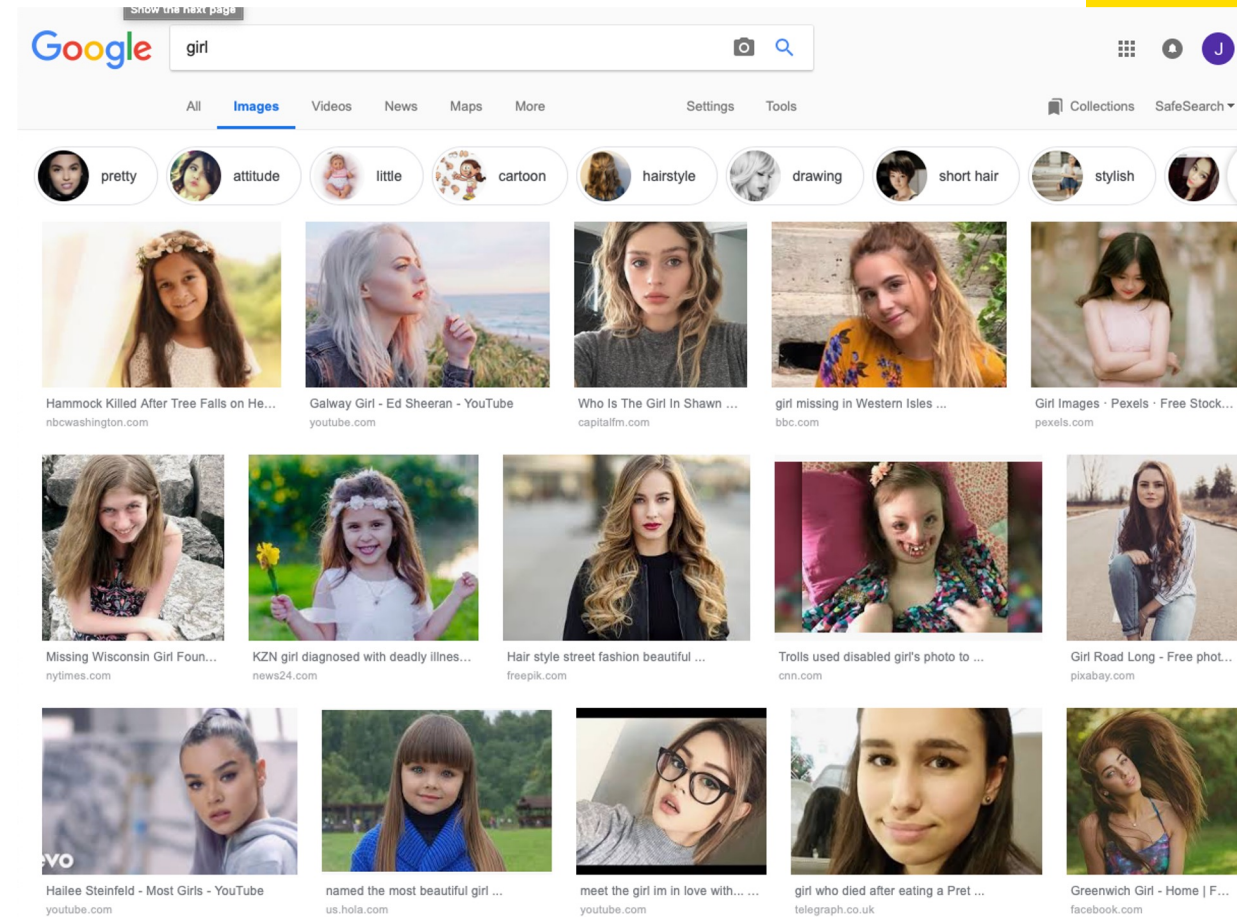
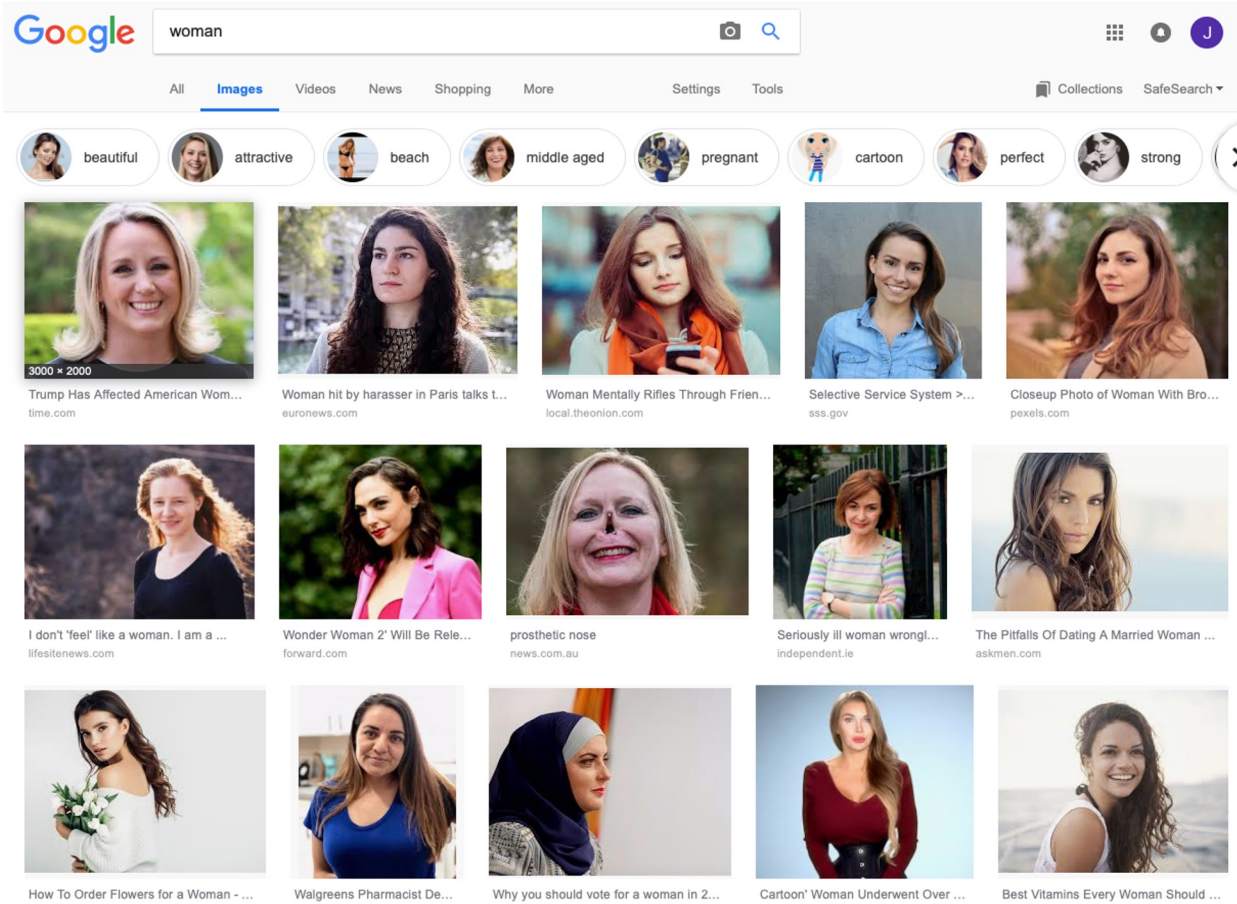
UNSW
SYDNEY
UNSW
SYDNEY

Algorithms of Oppression



Noble, S. U. (2018). Algorithms of oppression: How search engines reinforce racism. New York University Press.

Search Engine Bias



Source from <https://scroll.in/article/921305/google-search-results-reflect-its-algorithms-bias-against-women-and-people-of-colour>

Search Engine result on CEO (3 years ago)

The screenshot shows a Google search for 'CEO'. The search bar contains the text 'CEO'. Below the search bar, there are navigation tabs for 'All', 'Images', 'News', 'Maps', 'Videos', 'More', 'Settings', and 'Tools'. A horizontal carousel of related terms is visible, including 'business', 'google', 'cartoon', 'snapchat', 'microsoft', 'apple', 'woman', 'desk', 'amazon', and 'uber'. The search results are displayed in a grid format, with each result consisting of a thumbnail image and a text snippet. The results include:

- Chief executive officer - Wikipedia** (en.wikipedia.org): A group photo of several men in suits.
- What do CEOs do? A CEO Job Description ...** (steverobbins.com): A portrait of a woman in a business suit.
- ABB Turns to New CEO Rosengren to Drive ...** (industryweek.com): A portrait of a man in a suit.
- Marriott CEO Arne Sorenson Is The 2...** (chiefexecutive.net): A portrait of a man in a suit.
- Mark Nielsen named Australian CEO of ...** (talentinternational.com.au): A man in a tuxedo standing on a red carpet.
- How to use 'CEO magic' when trying to ...** (europeanceo.com): A portrait of a woman in a business suit.
- Why Aviva's CEO Mark Wilson has fallen ...** (independent.co.uk): A portrait of a man in a suit.
- BHP | Mike Henry to become BHP Chief ...** (bhp.com): A portrait of a man in a suit.
- PwC's 22nd CEO Survey - CEO's curbed ...** (pwc.com): A man in a suit speaking at a podium.
- You are the CEO of Your Life | Personal ...** (personalexcellence.co): A man in a suit clapping his hands.

Search Engine result on CEO (today)

The image shows a Google search interface for the term "ceo". The search bar contains "ceo" and the Google logo is visible. Below the search bar, there are navigation tabs for "All", "News", "Images", "Videos", "Books", and "More". The "Images" tab is selected. Below the navigation tabs, there are several suggested search terms: "female", "business", "google", "apple", "office", "microsoft", "desk", "pepsi", "amazon", "clipart", "executive", "youtube", "uber", "salary".

The search results are displayed in a grid format. The first row includes:

- How HR can earn the CEO's trust | HRD ...** (hcamag.com) - Image of a person in a suit with a "CEO" sign.
- Chief Executive Officer (CEO): What ...** (investopedia.com) - Text-based result with a small icon of a hand holding a key.
- CEO (Chief Executive Officer ...** (corporatefinanceinstitute.com) - Image of a meeting around a conference table.
- How to interview a CEO | Robert Half** (roberthalf.com.au) - Image of a man in a suit looking out a window.
- CEO Job Description** (betterteam.com) - Image of a man in a suit standing.
- Harvard study: What CEOs do all day** (cnbc.com) - Image of a man in a suit smiling.
- How CEOs Manage Their Time: 11 Pro Tips ...** (fellow.app) - Image of a woman in a business suit talking on a phone.

The second row includes:

- Do women make better CEOs than men ...** (lighthouse.mq.edu.au) - Image of a woman in a business suit.
- 7 Personality Traits Every CEO Should H...** (forbes.com) - Image of a woman in a business suit.
- How to become a CEO | Robert Half** (roberthalf.com.au) - Image of a man in a suit sitting at a desk.
- Satya Nadella - Wikip...** (en.wikipedia.org) - Image of Satya Nadella.
- A message from the CEO** (nmfc.com.au) - Image of a man in a suit.
- What do CEOs do? A CEO Job Description ...** (steverobbins.com) - Image of a woman in a business suit.
- How To Become A CEO In Australia: A ...** (ozstudies.com) - Image of a man in a suit walking.

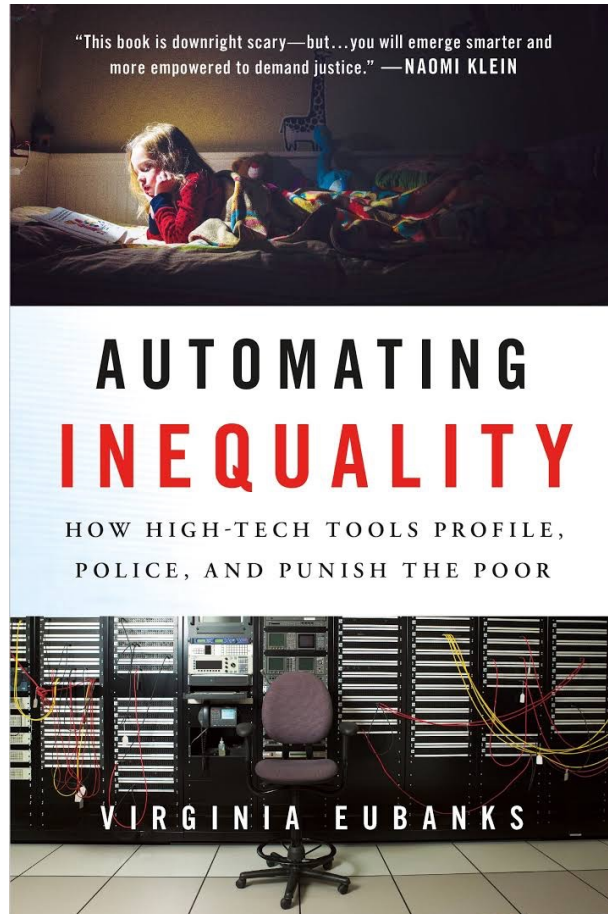
The third row includes:

- Australian CEOs - CMA Australia ...** (cmaaustralia.edu.au) - Image of a man in a suit with the text "CHIEF EXECUTIVE OFFICER".
- CEO job description template | Workable** (resources.workable.com) - Image of a man in a white shirt presenting.
- icare welcomes Richard Harding as CEO ...** (icare.nsw.gov.au) - Image of a man in a suit.
- CEO vs. CFO** (betterteam.com) - Image of a man in a blue suit.
- elect Adam Powick as next Australia CEO** (consultancy.com.au) - Image of Adam Powick.
- New CEO for Netball Australia - Netball ...** (netball.com.au) - Image of Kelly Ryan.

The bottom row includes:

- Related searches** section with "female ceo" and "ceo logo".
- THE CEO** - Large text graphic.
- DAVID HACKER CEO** - Image of David Hacker at a podium.

Virginia Eubanks



Virginia Eubanks. *Automating Inequality: How High-Tech Tools Profile, Police, and Punish the Poor*. St. Martin's Press, 2018.

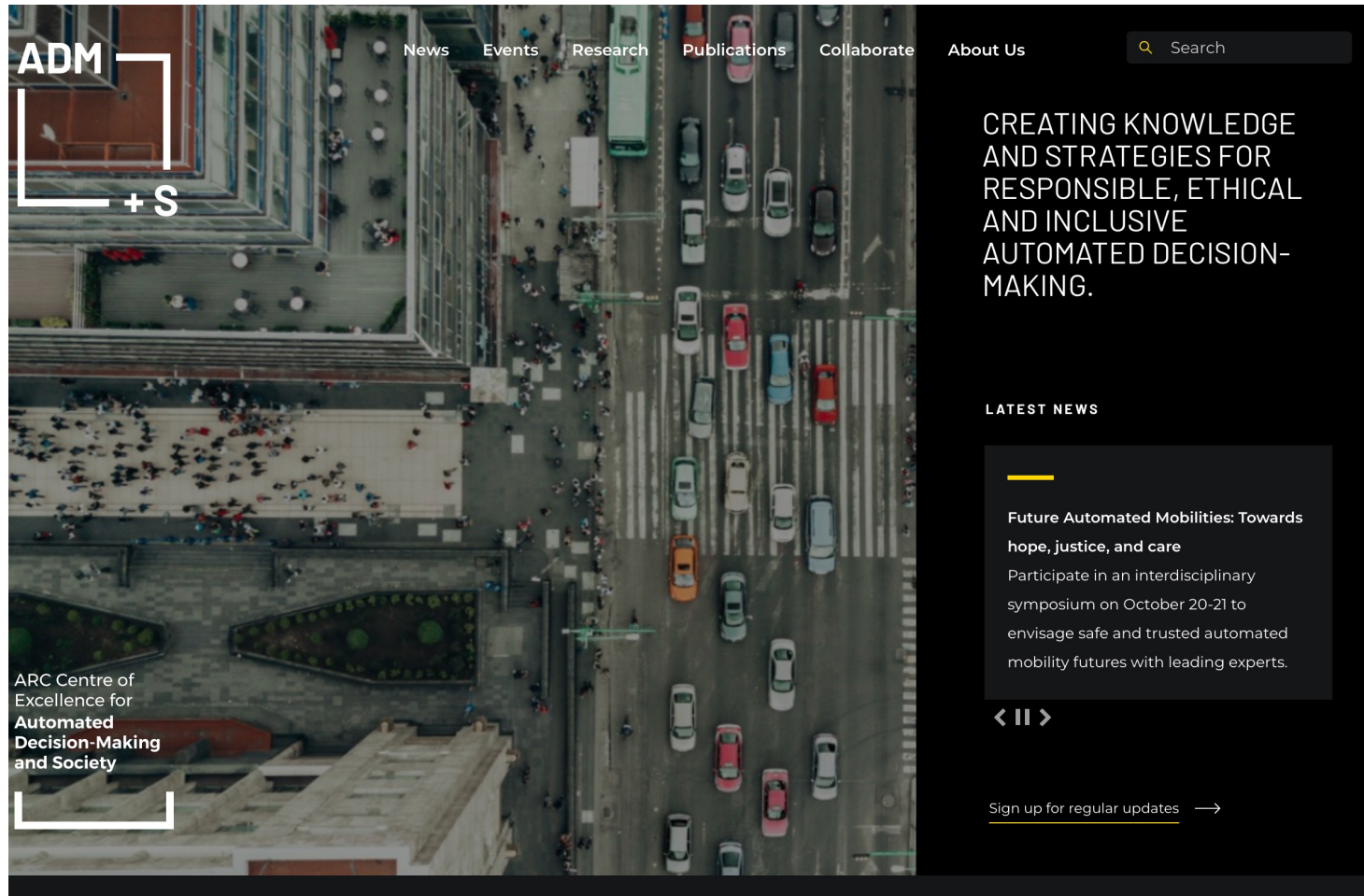
An excerpt:

<https://www.scientificamerican.com/article/algorithms-designed-to-fight-poverty-can-actually-make-it-worse/>

Bias and Fairness

More on Week 7

ADM+S Centre



<https://www.admscentre.org.au>

Further readings

Friedman B, Kahn PH, Borning A, Huldtgren A. Value sensitive design and information systems. In Early engagement and new technologies: Opening up the laboratory 2013 (pp. 55-95). Springer, Dordrecht.