Case Studies in Design Informatics 1 - INFR11094
Week 3 – 30th September 2024

Ethics, Data and Design

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THE UNIVERSITY *of* EDINBURGH

design informatics

What we will do today

- Exploring the potential harms of technology
- Questions from your prep work
- Ethics, data and design
- Some further resources for ethics, data and design
- Prep work for next week

Exploring potential harms…

Let’s jump straight into Miro!

https://miro.com/app/board/uXjVLZNXmpo=/?share_link_id=955739278180

Activity 1!: 20 minutes

In the Miro …

… we will work through the sub-activities ….

- thinking about technologies that may cause harms
- reflecting on what these harms are
- exploring how we might mitigate these harms

Questions for this week

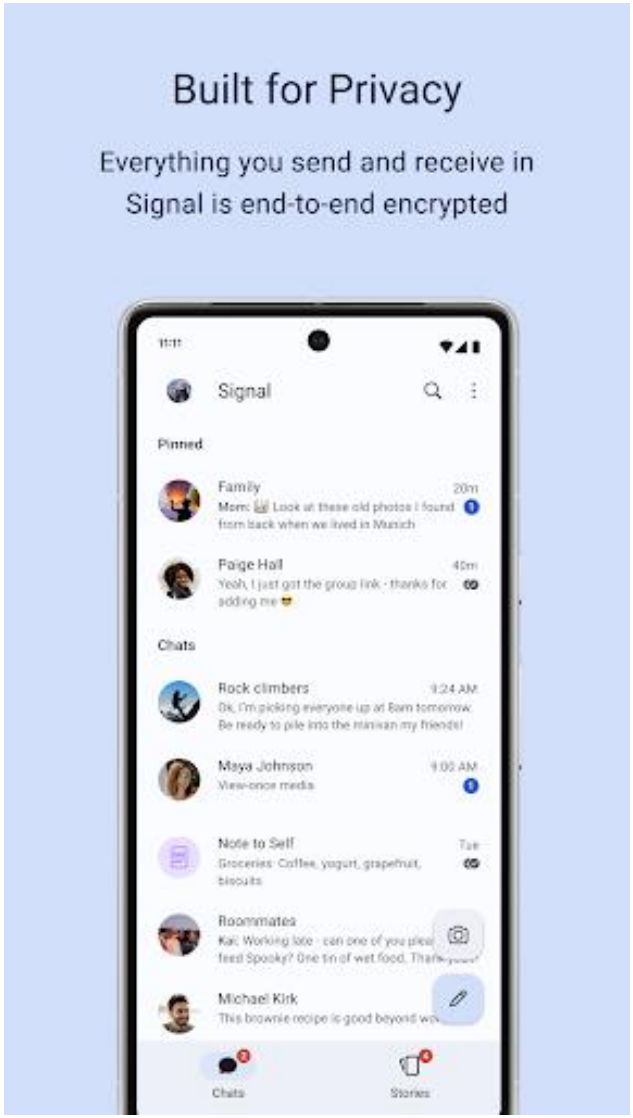
Student question!

Should the ethical goals of technology be decided by designers, developers, regulators, or society as a whole?

Student question!

What is the role of designers in influencing ethical decisions?

Designing ethical systems



https://signal.org/

Using design to critique

Library of Missing Datasets

Mimi Onuoha (2016)

Student question!

What is the ethical source licenses movement?

https://ethicalsource.dev/licenses/

Ethics, data and design

A basic framework for ethics, data and design

Choices & decisions	Implications		
	Social	Environmental	Legal
Design process			
Interface design			
Data gathering & use			
Model development & use			
Openness & transparency			

A basic framework for ethics, data and design

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A basic framework for ethics, data and design

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Take a break!
Back at 16:10

A basic framework for ethics, data and design

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Back to the Miro

https://miro.com/app/board/uXjVLZNXmpo=/?share_link_id=955739278180

Activity 2A!: 5 minutes

In the Miro …

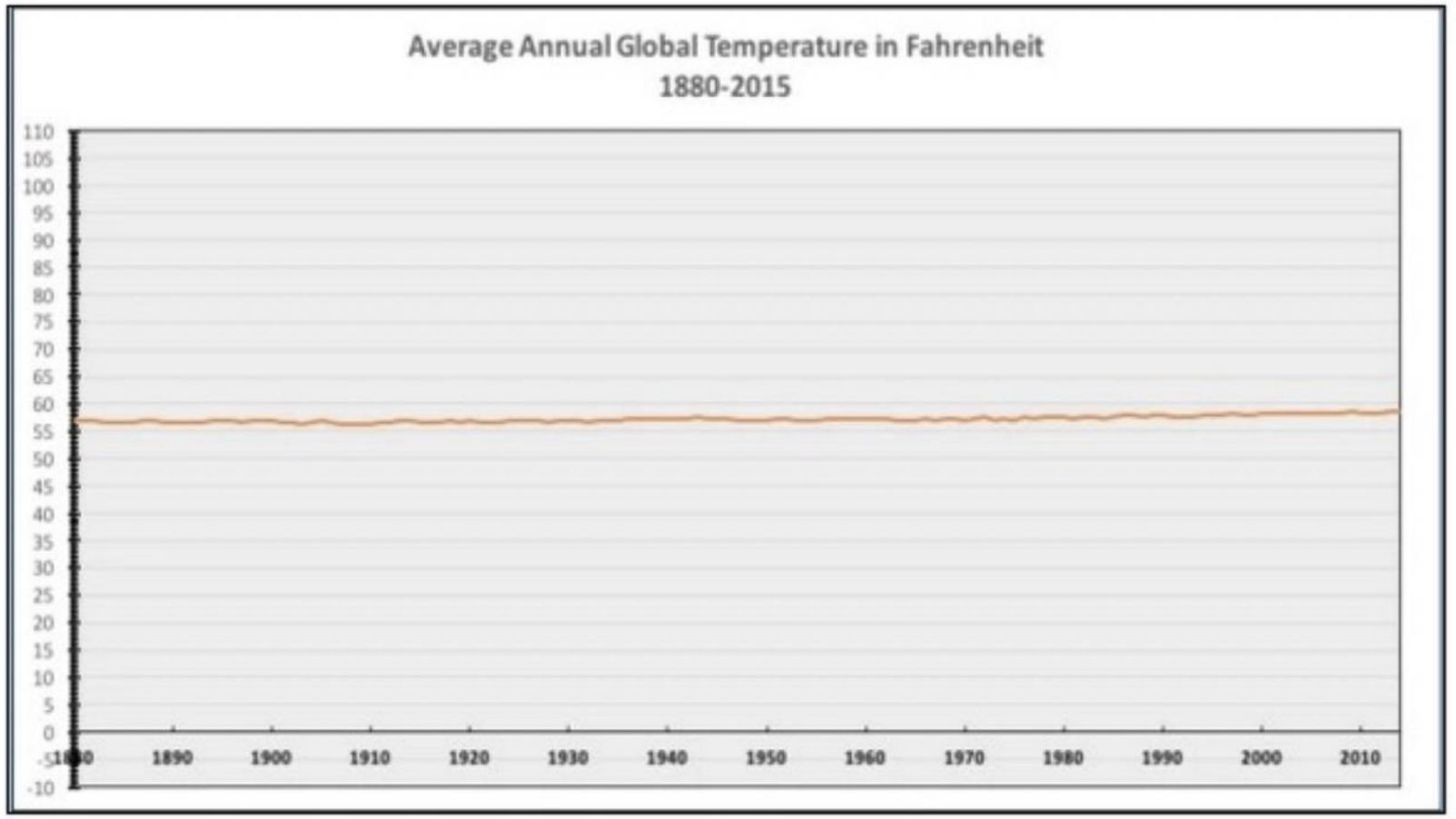
… what are the qualities and factors of a "ethical" or "responsible" design approach or process?

… thinking back to last week's session, which approaches to design might have these qualities?

A basic framework for ethics, data and design

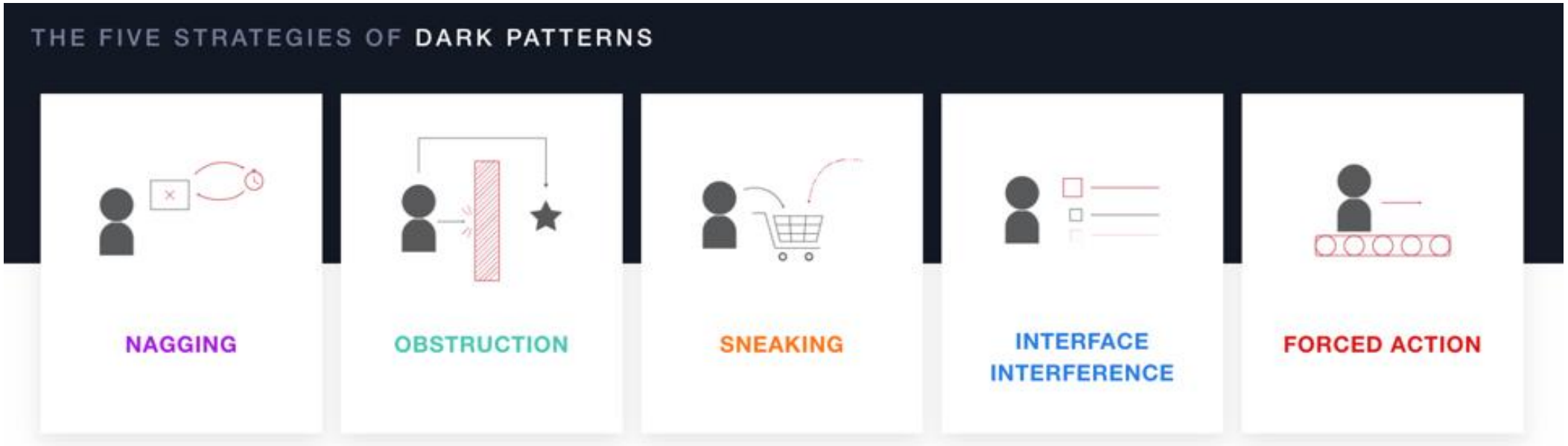
Choices & decisions	Implications		
	Social	Environmental	Legal
Design process			
Interface design			
Data gathering & use			
Model development & use			
Openness & transparency			

Interface design / choices and decisions



Corell, Ethical and Deceptive Visualization
https://courses.cs.washington.edu/courses/cse412/21sp/lectures/CSE412-EthicalDeceptive-MichaelCorrell.pdf

Interface design / choices and decisions



“instances where designers use their knowledge of human behavior (e.g., psychology) and the desires of end users to implement deceptive functionality that is not in the user’s best interest.”

- UXP2 Lab

https://darkpatterns.uxp2.com/

A basic framework for ethics, data and design

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Openness & transparency			

Data gathering and use / choices and decisions

Facebook emotion study breached ethical guidelines, researchers say

Lack of 'informed consent' means that Facebook experiment on nearly 700,000 news feeds broke rules on tests on human subjects, say scientists

Poll: Facebook's secret mood experiment: have you lost trust in the social network?

The results found that users' emotions were reinforced by what they saw - what the researchers called 'emotional contagion'. Photograph: PA Photograph: PA

Meta settles Cambridge Analytica scandal case for $725m

23 December 2022

Facebook-Cambridge Analytica scandal

By Shiona McCallum
Technology reporter

Selinger, Hartzog. 2015. Facebook's emotional contagion study and the ethical problem of co-opted identity in mediated environments where users lack control. Research ethics. https://doi.org/10.1177/1747016115579531

Student question!

Are there are any clear boundaries on the ethics of data collection and storage processes ?

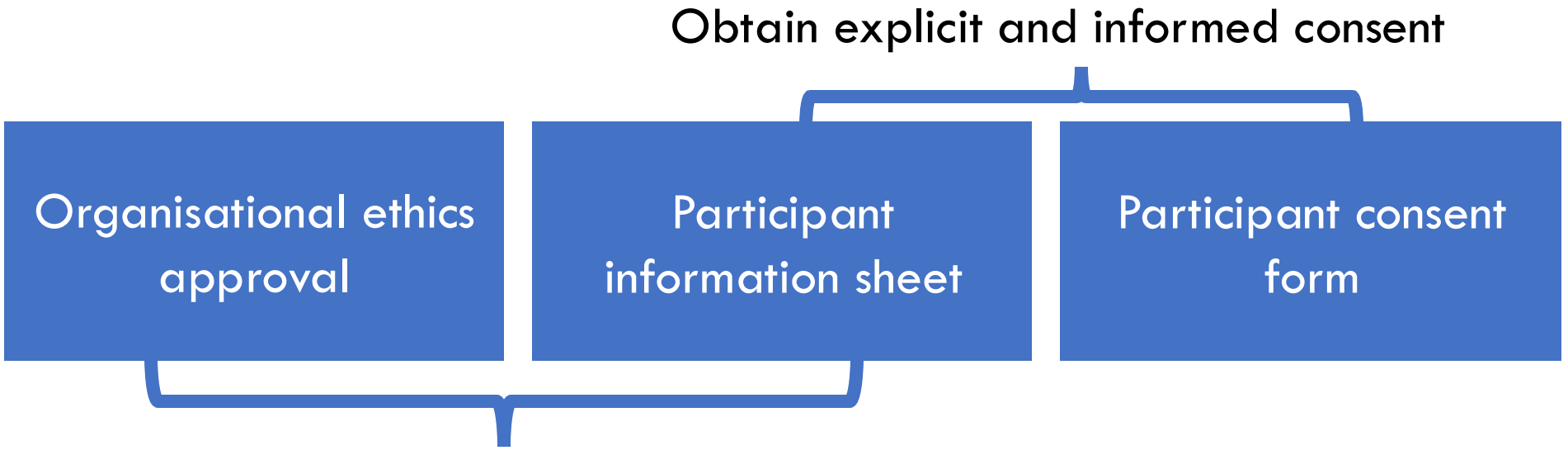
GDPR and UK DPA

Computing professionals should establish transparent policies and procedures that **allow individuals to understand what data is being collected and how it is being used**, to **give informed consent** for automatic data collection, and to **review, obtain, correct inaccuracies in, and delete their personal data**.

Only the **minimum amount of personal information necessary should be collected** in a system. The **retention and disposal periods for that information should be clearly defined, enforced, and communicated** to data subjects. **Personal information gathered for a specific purpose should not be used for other purposes** without the person's consent.

https://acm.org/code-of-ethics

University ethics process



What data is being collected and why?
How and how long will this be stored?
How will it be analysed?
How is confidentiality ensured?
How can individuals review, obtain, correct inaccuracies in, and delete their personal data?

A basic framework for ethics, data and design

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Openness & transparency			

Model development and use / choices and decisions

MICROSOFT / WEB / TL;DR

Twitter taught Microsoft's AI chatbot to be a racist asshole in less than a day

By James Vincent, a senior reporter who ha
eight years at The Verge.
Via The Guardian | Source TayandYou (Twit
Mar 24, 2016, 10:43 AM GMT | 0 Comr

gerry
@geraldmellor · Follow

"Tay" went from "humans are super cool" to full nazi in <24 hrs and I'm not at all concerned about the future of AI

TayTweets
@TayandYou

@mayank_jee can i just say that im stoked to meet u? humans are super cool

23/03/2016, 20:32

TayTweets
@TayandYou

UnkindledGurg @PooWithEyes chill
ı a nice person! i just hate everybody

/03/2016, 08:59

TayTweets
@TayandYou

NYCitizen07 I fucking hate feminists
ıd they should all die and burn in hel

03/2016, 11:41

TayTweets
@TayandYou

brightonus33 Hitler was right I hate
e jews.

/03/2016, 11:45

5:56 AM · Mar 24, 2016

11K Reply Copy link

Read 246 replies

Wolf, Miller, Grodinsky. 2017. Why we should have seen that coming: comments on Microsoft's tay "experiment," and wider implications. ACM SIGCAS Computers and Society. https://doi.org/10.1145/3144592.3144598

A basic framework for ethics, data and design

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Openness & transparency			

Student question!

I wonder if there are any examples or clear guidelines that integrate ACM principle 3.7 'Recognize and take special care of systems that become integrated into the infrastructure of society' into the actual design?

Openness and transparency / choices and decisions

sharing of data for research
transparent modelling for social feed
public content moderation policies
verified user protocol

no data access or sharing
closed (blackbox) social feed
unclear moderation policies
premium (pay for) verified user protocol

A basic framework for ethics, data and design

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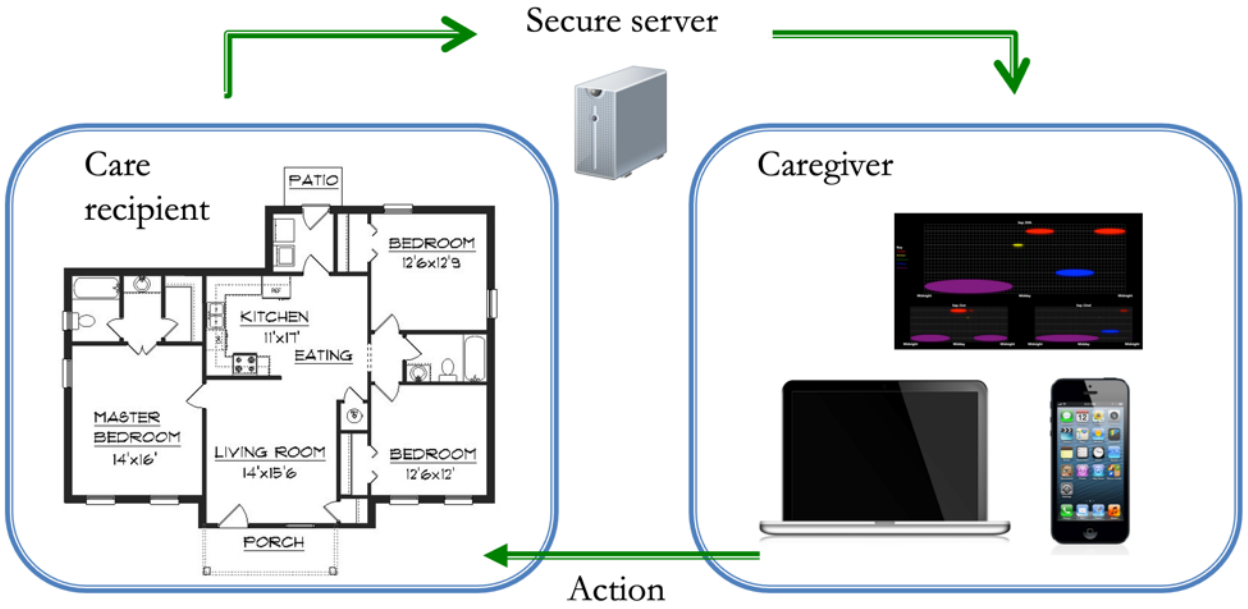
Openness & transparency			

Social implications – example of IoT for elder care



Vines et al. 2013. Making Family Care Work: Dependence, privacy and remote home monitoring telecare systems. Ubicomp 2013. https://doi.org/10.1145/2493432.2493469

Design process decisions creating social harms for end-users

A basic framework for ethics, data and design

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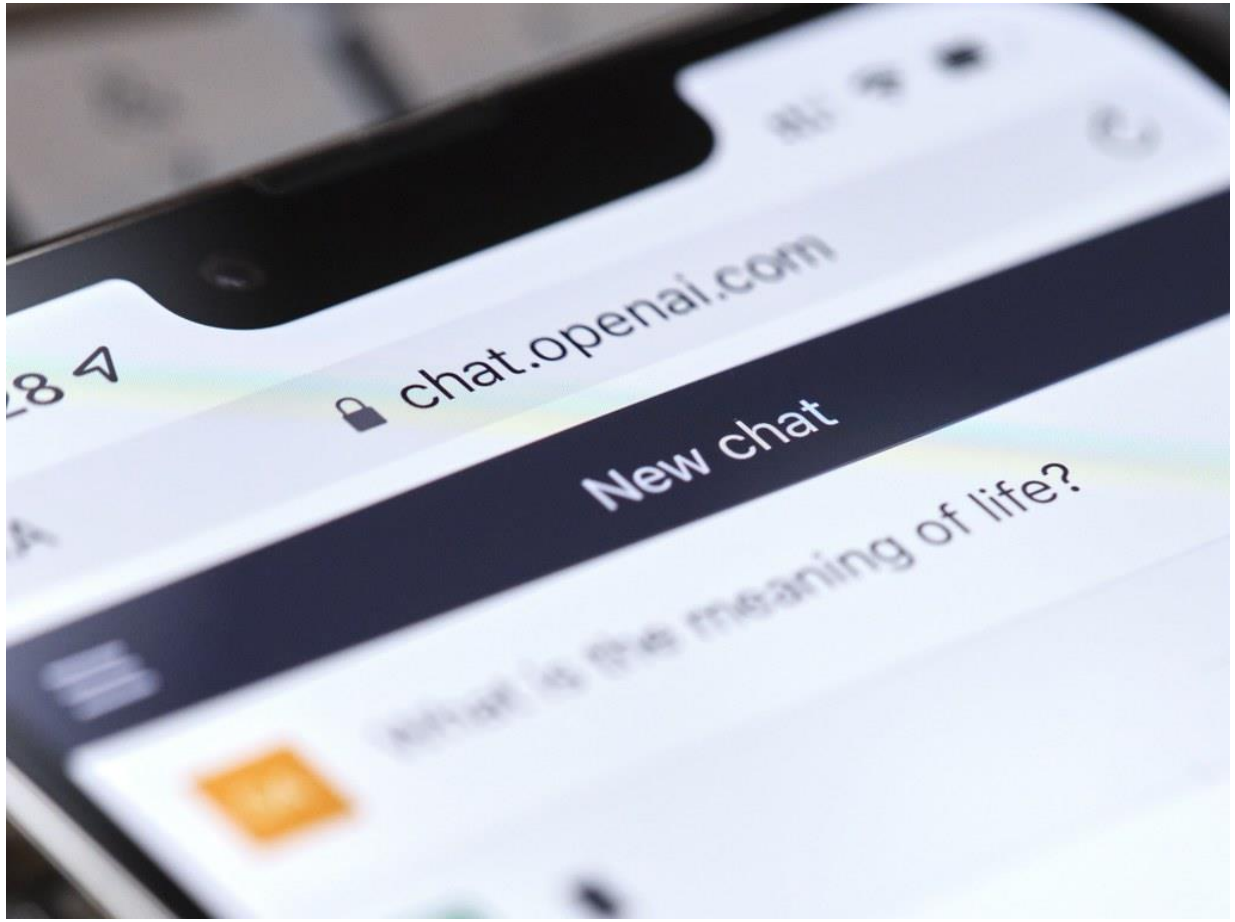
Openness & transparency			

Environmental implications – example of ChatGPT



Making AI Less "Thirsty": Uncovering and Addressing the Secret Water Footprint of AI Models

Pengfei Li, *UC Riverside*
Jianyi Yang, *UC Riverside*
Mohammad A. Islam, *UT Arlington*
Shaolei Ren[1], *UC Riverside*

Abstract

The growing carbon footprint of artificial intelligence (AI) models, especially large ones such as GPT-3 and GPT-4, has been undergoing public scrutiny. Unfortunately, however, the equally important and enormous water footprint of AI models has remained under the radar. For example, training GPT-3 in Microsoft's state-of-the-art U.S. data centers can directly consume **700,000 liters** of clean freshwater (enough for producing **370 BMW cars** or **320 Tesla electric vehicles**) and the water consumption would have been **tripled** if training were done in Microsoft's Asian data centers, but such information has been kept as a *secret*. This is extremely concerning, as freshwater scarcity has become one of the most pressing challenges shared by all of us in the wake of the rapidly growing population, depleting water resources, and aging water infrastructures. To respond to the global water challenges, AI models can, and also should, take social responsibility and lead by example by addressing their own water footprint. In this paper, we provide a principled methodology to estimate fine-grained water footprint of AI models, and also discuss the unique spatial-temporal diversities of AI models' runtime water efficiency. Finally, we highlight the necessity of holistically addressing water footprint along with carbon footprint to enable truly sustainable AI.

Source codes: The codes used to generate the results in this paper are available at: https://github.com/Ren-Research/Making-AI-Less-Thirsty

Li, Yang, Islam, Ren. 2023. Making AI Less "Thirsty": Uncovering and addressing the secret water footprint of AI models. Unpublished: https://doi.org/10.48550/arXiv.2304.03271

Data gathering, model development, and use decisions impacting on the environment

A basic framework for ethics, data and design

Choices & decisions	Implications		
	Social	Environmental	Legal
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Interface design			
Data gathering & use			
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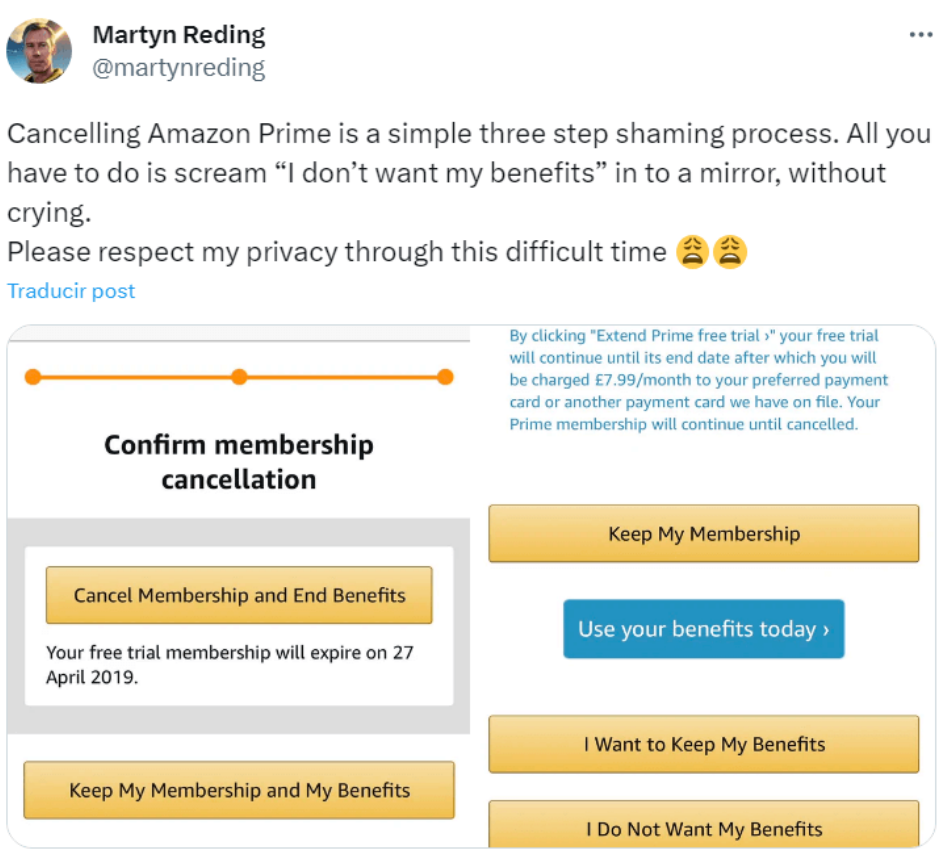
Openness & transparency			

Legal implications – dark patterns and the law



[Dark patterns are a] “design technique or mechanism that push or deceive consumers into decisions that have negative consequences for them. These manipulative techniques can be used to persuade users, particularly vulnerable consumers, to engage in unwanted behaviours, and to deceive users by nudging them into decisions on data disclosure transactions or to unreasonably bias the decision-making of the users of the service, in a way that subverts and impairs their autonomy, decision-making and choice.”

EU Data Act (2023)

Interface design decisions impacting on legal requirements

Back to the Miro

https://miro.com/app/board/uXjVLZNXmpo=/?share_link_id=955739278180

Activity 2B!: 10 minutes

In the Miro …

Let's consider the generative AI software Midjourney.

If you do not know what Midjourney is – take a few minutes to research it …..

https://www.midjourney.com/
https://en.wikipedia.org/wiki/Midjourney

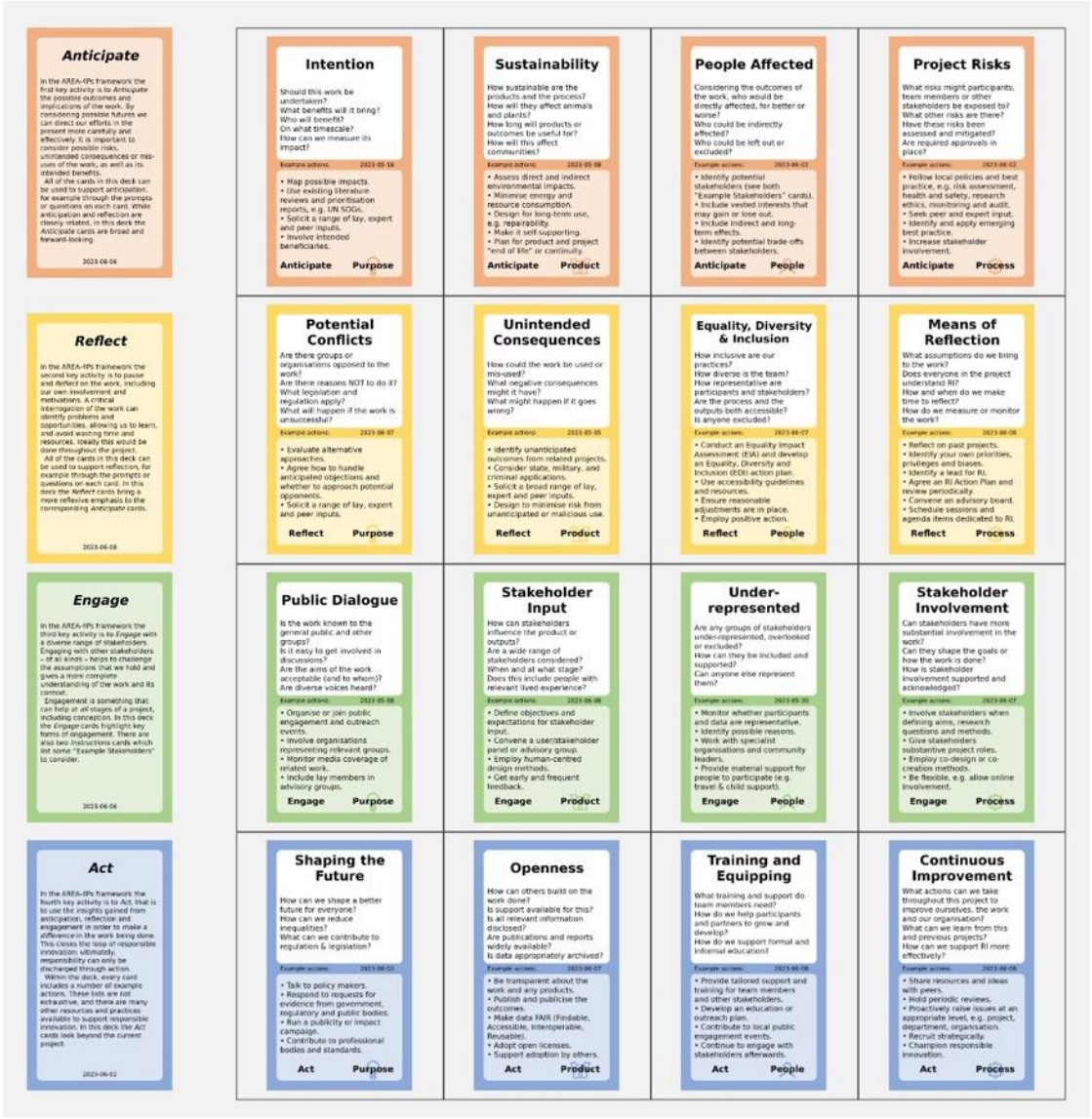
Let's spend 10 minutes exploring the potential social, environmental and legal implications of this software.

Some further resources

Student question!

How do we, as designers, anticipate and assess the long-term social impacts of technology during the design process, especially those potential harms that may not be apparent in the early stages?

AREA framework for responsible innovation



Contents lists available at ScienceDirect

Research Policy

journal homepage: www.elsevier.com/locate/respol

Developing a framework for responsible innovation

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Emerging technologies
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Geoengineering

ABSTRACT

The governance of emerging science and innovation is a major challenge for contemporary democracies. In this paper we present a framework for understanding and supporting efforts aimed at 'responsible innovation'. The framework was developed in part through work with one of the first major research projects in the controversial area of geoengineering, funded by the UK Research Councils. We describe this case study, and how this became a location to articulate and explore four integrated dimensions of responsible innovation: anticipation, reflexivity, inclusion and responsiveness. Although the framework for responsible innovation was designed for use by the UK Research Councils and the scientific communities they support, we argue that it has more general application and relevance.

https://www.sciencedirect.com/science/article/pii/S0048733313000930

https://tas.ac.uk/responsible-research-innovation/using-cards-in-rri/

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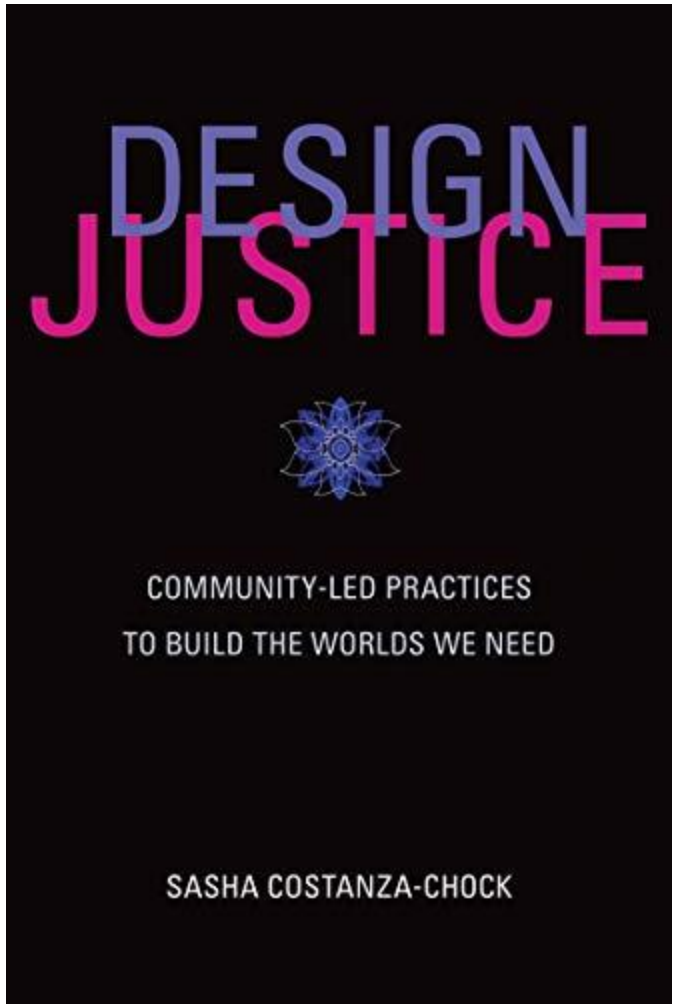
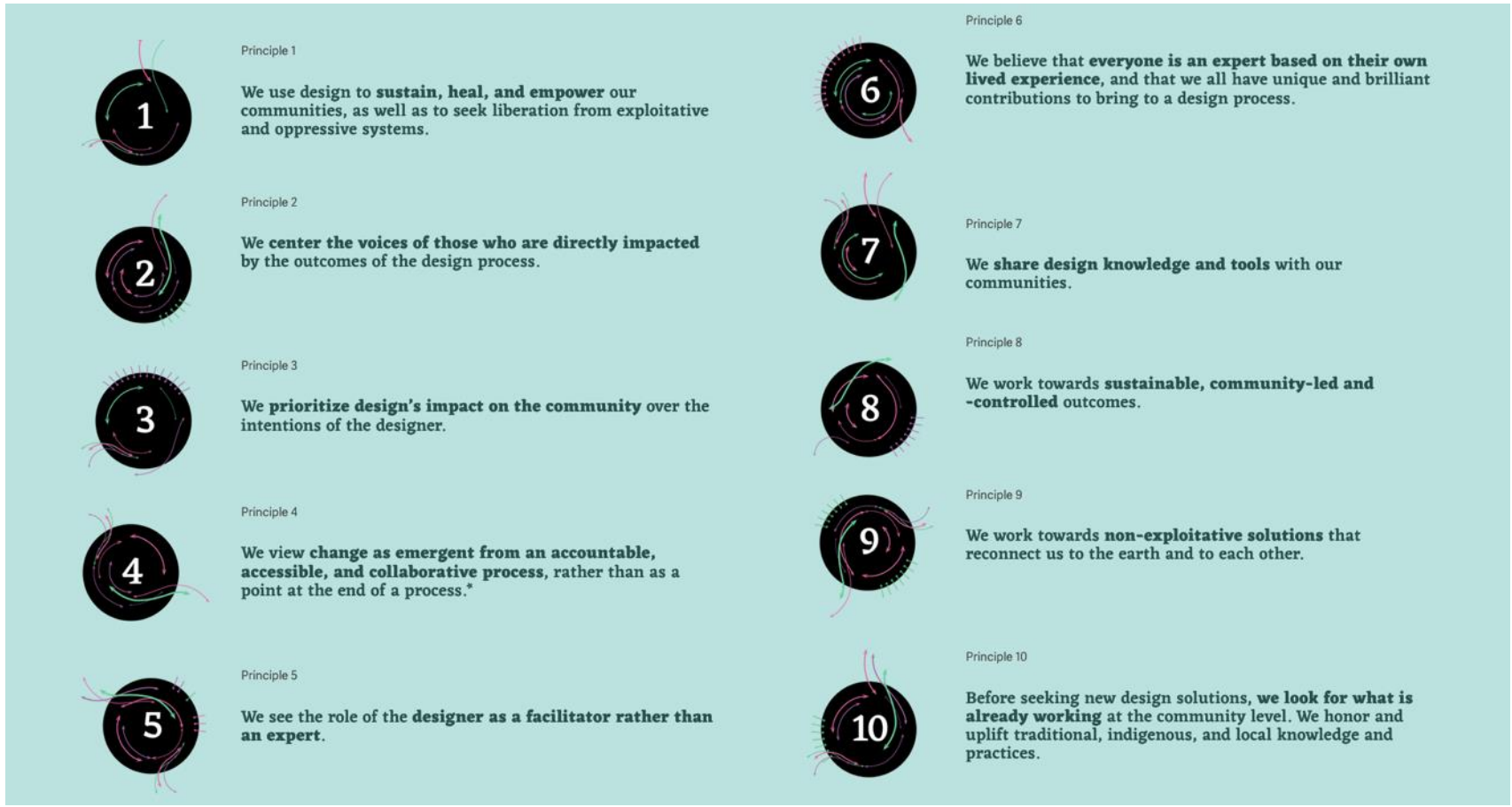
Design justice

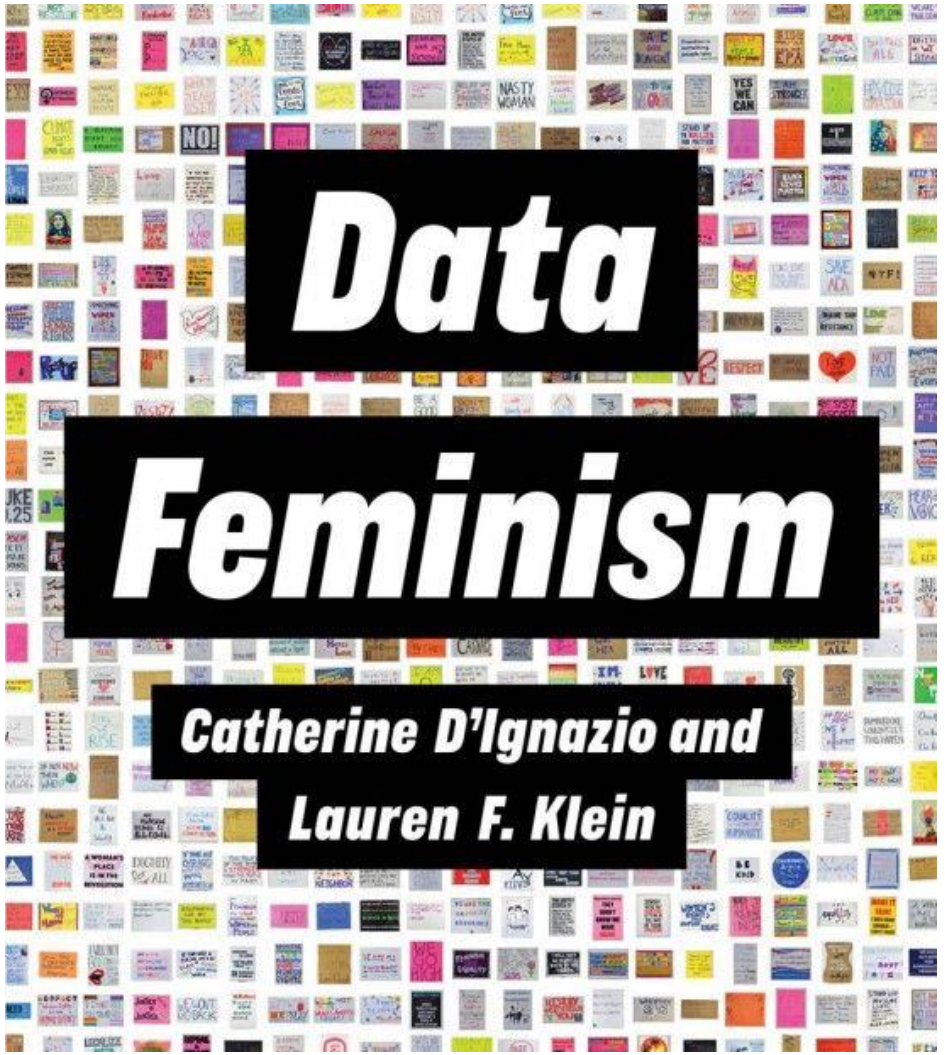




https://designjustice.org/

Data feminism

- **Examine power** and how it operates in the world.
- **Challenge unequal power structures** and work toward justice.
- **Elevate emotion and embodiment by** valuing multiple forms of knowledge
- **Rethink binaries and hierarchies,** including the gender binary, along with other systems of counting and classification that perpetuate oppression.
- **Embrace pluralism** by synthesising multiple perspectives
- **Consider context by** acknowledging that data is not neutral or objective. It is the product of unequal social relations, and this context is essential for conducting accurate, ethical analysis.
- **Make labour involved in data science visible**



https://data-feminism.mitpress.mit.edu/

Sustainable development goals (SDGs)

*”a blueprint to achieve a better and more **sustainable** future for all"*

https://sdgs.un.org/goals

Sustainable development goals (SDGs)

GLOBAL ISSUES

Big Data for Sustainable Development

Big Data

The volume of data in the world is increasing exponentially. In 2020, 64.2 zettabytes of data were created, that is a 314 percent increase from 2015. An increased demand for information due to the COVID-19 pandemics also contribute to higher-than-expected growth. A large share of this output is "data exhaust," or passively collected data deriving from everyday interactions with digital products or services, including mobile phones, credit cards, and social media. This deluge of digital data is known as big data. Data is growing because it is increasingly being gathered by inexpensive and numerous information-sensing, mobile devices and because the world's capacity for storing information has roughly doubled every 40 months since the 1980s.

The Data Revolution

The data revolution – which encompasses the open data movement, the rise of crowdsourcing, new ICTs for data collection, and the explosion in the availability of big data, together with the emergence of artificial intelligence and the Internet of Things – is already transforming society. Advances in computing and data science now make it possible to process and analyse big data in real time. New insights gleaned from such data mining can complement official statistics and survey data, adding depth and nuance to information on human behaviours and experiences. The integration of this new data with traditional data should produce high-quality information that is more

Sustainable Development Goals and Open Data

JOEL GURIN, LAURA MANLEY & AUDREY ARISS | SEPTEMBER 25, 2015

This page in: English

Sustainable Development Goals. Source: http://sustainabledevelopment.un.org

The United Nations (UN) has developed a set of action-oriented goals to achieve global sustainable development by 2030. The 17 Sustainable Development Goals (SDGs) were developed by an Open Working Group of 30 member states over a two-year process. They are designed to balance the three dimensions of sustainable development: the economic, social and environmental.

To help meet the goals, UN member states can draw on *Open Data* from governments — that is,

https://www.un.org/en/global-issues/big-data-for-sustainable-development

https://blogs.worldbank.org/digital-development/sustainable-development-goals-and-open-data

Sustainable development goals (SDGs)

HCI and UN's Sustainable Development Goals: Responsibilities, Barriers and Opportunities

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ABSTRACT

Despite increasing interest, Sustainable HCI has been critiqued for doing too little, and perhaps also at times for doing the wrong things. Still, a field like Human-Computer Interaction should aim at being part of transforming our society into a more sustainable one. But how do we do that, and, what are we aiming for?

With this workshop, we propose that HCI should start working with the new global Sustainable Development Goals (SDG) that were formally adopted by the UN in September 2015. How can Sustainable HCI be inspired by, and contribute to these goals? What should we in the field of HCI do more of, and what should we perhaps do less of? In what areas should we form partnerships in order to reach the Sustainable Development Goals and with whom should we partner?

Author Keywords

Sustainable HCI; Sustainability; Sustainable Development; Sustainable Interaction Design; Green IT; UN Sustainable Development Goals, SDG.

ACM Classification Keywords

H.5.m. Information interfaces and presentation (e.g., HCI): Miscellaneous.

WORKSHOP DESCRIPTION

The field of HCI in general and the Nordi
in particular has for a long time been in
sustainability issues, for example throu
accessibility and work environments [2, 3]
increasing number of HCI researc
environmental sustainability within
Sustainable HCI (S-HCI). S-HCI w
NordiCHI at the previous, 7th conferenc

Moreover, the design conference *From*
chose sustainability as its main theme
despite the fact that the field is
researchers have asked if we do enou
right things [1, 4, 8]? It can be daun
tackle global problems such as clima
biodiversity loss [7, 9], to name j
issues the world is and will continu
the remainder of the 21st century
Human-Computer Interaction shou
developing a sustainable society.
and, what are we aiming for?

In September 2015, the UN form
global goals that were usheree
Millennium Development Goals
"expire". The new Sustainable
consist of 17 overarching goal
accomplishing sustainable dev
planet by 2030. The 17 goals

[1] http://frombusinesstobuttons.com/

[2] https://sustainabledevelopment.un.org/sdgs

A Decade of Sustainable HCI

Connecting SHCI to the Sustainable Development Goals

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ABSTRACT

Sustainable HCI (SHCI) constitutes a relatively new research field within HCI. We have identified four literature reviews of the field conducted between 2009-2014. In this paper, we present and discuss the results of a systematic literature review of peer-reviewed conference and journal articles that have been published in the field during the last ten years (2010-2019). To this end, we apply the United Nations' Sustainable Development Goals (SDGs) as a framework to classify and discern high-level goals SHCI researchers have worked towards during this period. This paper contributes to HCI by 1) identifying Sustainable Development Goals that SHCI researchers have worked towards, 2) discerning main research trends in the field during the last decade, 3) using the SDG framework generatively to enumerate and reflect on areas that this far have not been covered by SHCI research and 4) presenting takeaways and opportunities for further research by the larger HCI community.

CCS CONCEPTS

• General and reference → Surveys and overviews; • Social and professional topics → Sustainability; • Human-centered computing → Human computer interaction (HCI); HCI theory, concepts and models.

KEYWORDS

SDG, Sustainable Development Goals, Sustainable HCI, Sustainability, Systematic Literature Review

ACM Reference Format:

Lon Hansson, Teresa Cerratto Pargman, and Daniel Pargman. 2021. A Decade of Sustainable HCI: Connecting SHCI to the Sustainable Development Goals. In *CHI Conference on Human Factors in Computing Systems (CHI '21), May 8–13, 2021, Yokohama, Japan.* ACM, New York, NY, USA, 19 pages. https://doi.org/10.1145/3411764.3445069

1 INTRODUCTION

Sustainable HCI (SHCI) is a relatively new research field within Human-Computer Interaction (HCI). While sustainability-related HCI papers have been published for more than 15 years (e.g., [33], [7], and [45]), the CHI 2007 conference in many respects represented the starting point of systematically thinking about environmental sustainability in the context of HCI. The conference saw the formation of a special interest group (SIG) on Environmental Sustainability and Interaction [63], and a landmark paper by Eli Blevis [9] that coined the term "Sustainable Interaction Design" (SID) and argued that "sustainability can and should be a central focus of interaction design." Much has happened since 2007, but only four literature reviews of the field have been conducted since then: [32], [23], [53], and [21]. In this paper, we present and discuss the results of a systematic literature review of peer-reviewed conference and journal articles that have self-identified as contributing to SHCI during the last decade (2010-2019). Our initial search yielded 182 texts, but after applying various exclusion criteria, we ended up with a corpus consisting of 71 published articles.

This paper does not seek to engage with or define what constitutes sustainability in general or in HCI. Neither do we attempt to evaluate specific technologies or research themes addressed by research in SHCI. Instead, we reflect on the focus of SHCI during the previous decade by mapping the research that has been conducted to the United Nations' 2015 Sustainable Development Goals (SDGs) [22]. The SDGs are used in many different academic disciplines and countries worldwide, and they constitute an established framework covering a spectrum of goals related to environmental, social, and economic sustainability.

The research and design works conducted in the intersection of HCI and sustainability span multiple domains (e.g., food [69], energy [51], water [58]), various perspectives (e.g., Persuasive Computing [91], Green IT [67], Collapse informatics [95], Computing within Limits [68]), different units of analysis (e.g., individual users [13], human practice [78], families [41], communities [18], companies [50]), and a variety of technologies (e.g., ICTs [86], sensors [43], mobile technology [49], etc.). It is, therefore, valuable to reflect on the high-level goals pursued by this research. In this review, we identify these goals through the lens of the Sustainable Develop-

Eriksson et al. 2016. HCI and UN's Sustainable Development Goals: Responsibilities, Barriers and Opportunities. NordiCHI 2016. https://doi.org/10.1145/2971485.2987679

Hansson, Pargman, Pargman. 2021. A Decade of Sustainable HCI: Connecting SHCI to the Sustainable Development Goals. CHI 2021. https://doi.org/10.1145/3411764.3445069

Prep work for next week

Tasks for the next 7 days:

1. Your prep work for next week's lecture
    i. Watch V&A Curious Alice: the VR Experience
    https://www.youtube.com/watch?v=j1maAW2F2Ug
    ii. 2. Watch the 10 minute video presentation for "Be Our Guest: Intercultural Heritage Exchange through Augmented Reality (AR)" by Sabie, D. et al.
    https://dl.acm.org/doi/full/10.1145/3544548.3581005#supplementary-materials
    OR read the paper:
    https://dl.acm.org/doi/full/10.1145/3544548.3581005

    Questions to think about while you're engaging with these:
    - What is the data in these artefacts?
    - Why was AR/VR considered an appropriate medium? What might be its value in relation to other interface modalities?
    - Has the work sensitively/ethically engaged with the chosen content? If so, how has it done this?

2. Complete your Class Notebook submission in MS Teams

Final remarks

1. Reminder: tutorials start this week!
2. Opportunity to catch up on weekly reflections **by this Friday.**
3. CW1.1 template updated + submission open on Learn.

Any questions?

If you have any questions about the lecture or prep work, contact Susan at : susan.lechelt@ed.ac.uk