Social Computing in Society

CS 347
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Announcements

Based on the vote, we’ll do the split option: poster session during the last class session, and final paper due during finals.

Project abstract due next Tuesday; Quiz 3 is on next Thursday.
Last time

Collaboration is hard: **distance matters**.

Tools can try to mitigate the effects of distance, but we are limited by the **socio-technical gap**.

Aiming to go beyond being there, **crowdsourcing** gives up on tight teamwork in favor of structured contributions through open call and at massive scale.
“I’m just an engineer.”
Langdon Winner [1980], “Do Artifacts Have Politics?”
Today

The breakdowns of user-centered design at societal scale
Design as impact
Algorithms in society
The shortcomings of user-centered design

HCI says, “care about people!”

Today we begin opening up the question of, “which people?”

This was initially a problem because traditional user-centered design does not have any explicit theory of power.

What could go wrong?
How it started:

Social Media Sparked, Accelerated Egypt's Revolutionary Fire

If three decades of violent repression and despotic rule were kindling for the Egyptian revolution, social media was both a spark and an accelerant for the movement. Did social media like Facebook and Twitter cause the revolution? No. But these tools did speed up the process by helping to organize the revolutionaries, transmit their message [...]
The Computer for the 21st Century

Specialized elements of hardware and software, connected by wires, radio waves and infrared, will be so ubiquitous that no one will notice their presence.

by Mark Weiser

The most profound technologies are those that disappear. They weave themselves into the fabric of everyday life until they are indistinguishable from it.

Consider writing, perhaps the first information technology. The ability to represent spoken language symbolically for long-term storage freed information from the limits of individual memory. Today this technology is ubiquitous in industrialized countries. Not only do books, magazines and newspapers convey written information, but so do street signs, billboards, shop signs and even graffiti. Candy wrappers are covered in writing. The constant background presence of these products of "literacy technology" does not require active attention, but the information to be transmitted is easy, or at least visible. It is difficult to imagine modern life otherwise.

Silicon-based information technology, in contrast, is far from having become part of the environment. More than 300 million personal computers have been sold, and the computer nonetheless remains largely in a world of its own. It is approachable only through complex jargon that has nothing to do with the tasks for which people use computers.

The state of the art is perhaps analogous to the period when heroes had to know as much about making ink or baking clay as they did about writing.

The arcane aura that surrounds personal computers is not just a "user interface" problem. My colleagues and I at the Xerox Palo Alto Research Center think that the idea of a "personal" computer itself is misplaced and that the vision of laptop machines, dumbbooks and "knowledge navigators" is only a transitional step toward achieving the real potential of information technology. Such machines cannot truly make computing an integral, visible part of people's lives. We are therefore trying to conceive a new way of thinking about computers, one that takes into account the human world and allows the computers themselves to vanish into the background.

Such a disappearance is a fundamental consequence of technology: how of human psychology. Whenever people learn something sufficiently well, they cease to be aware of it. When you look at a street sign, for example, you absorb its information without consciously performing the act of reading. Computer scientists, economist Herbert A. Simon calls this phenomenon "complacency," philosopher Michael Polanyi calls it the "Tacit Dimension," psychologist

The idea of integrating computers seamlessly into the world at large runs counter to a number of present-day trends. "Ubiquitous computing" in this context does not mean just computers that can be carried to the beach, jungle or airport. Even the most powerful notebook computer, with access to a worldwide information network, still focuses attention on a single book. By analogy with writing, carrying a superlaptop is like owning just one very important book. Customizing this book, even writing millions of other books, does not begin to capture the real power of literacy.

Furthermore, although ubiquitous computers may use sound and video in addition to text and graphics, that does not make them "multimedia computers." True multimedia machine makes the computer screen into a dazzling focus of attention rather than allowing it to fade into the background. Perhaps most diametrically opposed to our vision is the notion of virtual reality, which attempts to make a world inside the computer. Users don special goggles that project an artificial scene onto their eyes, they wear gloves or even body suits that sense their motions and gestures so that they can move about and manipulate virtual objects. Although it may have its purpose in allowing people to explore realms otherwise inaccessible—the inside of cells, the surfaces of distant planets, the information web of data bases—virtual reality is only a map, not a territo-
How it started:

Couple Who Met on Facebook in 2007 Just Got Engaged - at Facebook Headquarters

Nafis Joon said they would never have met if not for Facebook.

By YAZHOU SUN
July 3, 2014, 1:34 PM

A Surprise Proposal for the Social Media Age
Steven Kawaiit enlisted the help of Facebook in asking for Nafis Joon's hand in marriage.

How it's going:

How domestic abusers use smartphones to spy on their partners

There's more creepy spyware out there than you think — and regulating it is a legal and technological challenge.

By Nicki Diil, Karen Levy, Damon McCoy, and Thomas Ristenpart | May 21, 2018, 8:40am EDT

[Freed et al. 2018]
How it started:

Delivery Start-Ups Are Back Like It’s 1999

How it’s going:

My Frantic Life as a Cab-Dodging, Tip-Chasing Food App Deliveryman

By Andy Newman

July 21, 2019
The Tightrope of Design and Societal Impact

A case study in the gig economy
On the plus side...

The gig economy could offer upward economic mobility for marginalized communities [Dillahunt and Malone 2015]

Could it activate trust and social capital within communities, empowering means to connect each other to work?

Could design help mitigate low trust in the technology?
On the minus side...

Workers can be under the thumb of algorithmic management, which can make illogical or inhumane decisions if not carefully designed and monitored [Lee et al. 2015]

Drivers’ (and professors’?) livelihood depends on five-star ratings

Marketplaces can create opaque and confusing rules (e.g., surge pricing)

There is little clear career ladder [Kittur et al. 2012]

Marketplaces are often designed for consumers, rendering workers and their concerns invisible [Irani and Silberman 2013; Gray and Suri 2019]
HCI has historically:

Acted as canary in the coal mine: raised empirical and conceptual critiques before the technology is widespread.

Offered guidance on how to guide the technology toward pro-social outcomes.
Integrating policy and design [Jackson, Gillespie, and Payette 2014]

We don’t have to be stuck designing systems — policy is also something that gets designed.

Michael’s take: going forward, as technologists, we need to think about the codesign of technology and policy together.

(But how do we even do that rigorously?)
Design as Impact

“Build the future that you want to live in.”
–Stu Card
What ought we do?

How might we reconsider our design processes, technological interventions, and goals to better navigate these issues?

When is, and isn’t, design an appropriate tool for impact in reducing these harms and disparities?
Design as lever

We need not just sit and point out the problems: **design provides a tool for imagining alternative futures.**

Can we...

Pair with communities and allow them to lead the problems that we solve? [Hayes 2011]

Use design to directly challenge structural inequalities? [Constanza-Chock 2020; Dumbrowski, Harmon, and Fox 2016]
Feminist HCI [Bardzell 2010]

HCI often draws on theories from other fields to inform its progress. In this case, feminist theory.

Theories often provide a conceptual function that we can apply to a situation to provide some insight: \( f(x) \rightarrow y \)

So, we should ask, what function \( f(x) \) does feminist theory give us? What insights does that function help us see?
Feminist HCI [Bardzell 2010]

On one level, feminist theory prompts us to examine how we may be making assumptions about gender or gender roles.

We ought to view supposedly-genderless constructs (e.g., “the user”) as implicitly gendered.

f(ubiquitous computing) → what are we assuming about what sensors people would be willing to wear, or about what kind of sensing and tracking is desirable, that may not apply to non-males?
Feminist HCI  [Bardzell 2010]

On another level, feminist theory **refocuses our attention from the default “user” to the marginalized**

f(social media) → whose communities are we trying to amplify? can we shift attention away from overall usage metrics, to focus on metrics amongst marginalized groups?

Bardzell’s argument: feminist theory isn’t just about pointing out problems after the fact — it’s about binding attention to these issues as we design
Modern frontiers grappling with these issues

Intersectional HCI [Schlesinger et al. 2017]

HCI tends to focus on one aspect of identity at a time when designing, rather than dealing with design challenges arising from overlapping identity attributes.

Race and racism [Ogbonnaya-Ogburu 2020]

Racism is ordinary and baked into our designs — and HCI targeting web-scale populations typically assumes a SV default.
Algorithms, people, and society
Remember this?

How does social media impact...

Our emotions? [Kramer, Guillory, and Hancock 2014]

“These results indicate that emotions expressed by others on Facebook influence our own emotions, constituting experimental evidence for massive-scale contagion via social networks. This work also suggests that, in contrast to prevailing assumptions in-person interaction and nonverbal cues are not strictly necessary for emotional contagion, and that the observation of others’ positive experiences constitutes a positive experience for people.”
There were some reactions.
What’s going on here?

“Surprisingly, more than half of the participants (62.5%) were not aware of the News Feed curation algorithm's existence at all.” [Eslami et al. 2015]
Mental model to folk theory

When we cannot form mental models, we instead form folk theories.

**Mental model**
- Functional, causal understanding of the behavior of a system

**Folk theory**
- Informal, intuitive (non-functional) theory of the behavior of a system

Popular folk theories of Facebook’s feed algorithm:

- Transparent platform (4.4 out of 7 on a Likert scale)
- Unwanted observer (4.4 out of 7)
- Corporate black box (3.6 out of 7)
- Rational assistant (2.9 out of 7)
Our trust isn’t calibrated

**Algorithm aversion:** we prefer human decision-making to AIs, even if the algorithm is better at the task [Dietvorst, Simmons, and Massey 2015]

...and especially after seeing the algorithm make an error

What if the algorithm just suggests the answer to you?

We often get influenced by the AI’s suggestion and rely on it when we shouldn’t [Buçinca, Malaya, and Gajos 2021]

But surely if the algorithm explains its reasoning?

Doesn’t help, unless the explanation takes almost no effort to verify [Vasconcelos et al. 2023]
Errors create harm

Examples:

- Wage theft on gig work platforms [McInnis et al. 2016], algorithmic misgendering [Keyes 2018; Hamidi, Scheuerman, and Branham 2018]
- Denial of bail [Angwin et al. 2016], removal of marginalized communities’ language from online platforms [Gillespie 2018]

We can view these algorithms as stepping into the roles that were traditionally played by bureaucrats—judges, DMV, job foremen—but without the bureaucrats’ ability to recognize and intervene on absurd outcomes [Alkhatib and Bernstein 2019]
Algorithm audits make these problems visible

Algorithm audit: systematically querying an algorithm and observing its outputs to draw inferences about its opaque inner workings [Sandvig et al. 2014; Metaxa et al. 2021]
Audit examples

Google ads for Black names are 25% more likely to suggest arrest records [Sweeney 2013]

Algorithmic risk scores for a bail-setting algorithm were higher for Black defendants than (otherwise equivalent) White defendants [Angwin et al. 2016]

Algorithmic health risk scores will assign the same level of risk to a sicker Black patient than a White patient [Obermeyer et al. 2019]

Why? Often because the algorithm conflates signals. E.g., health cost as a proxy for health needs—but less money is spent on Black patients!
Industry teams struggle to address these challenges

Ideally, we engage with stakeholders early [Zhu et al. 2018]

But, in practice in industry… [Holstein et al. 2019]

Data collection is unprincipled (“almost like the wild west”) — so if an audit turns up a problem, go collect more training data

Checklists are difficult, because biases differ by product. Instead, fatalism: “You’ll know if there’s fairness issues if someone raises hell online.”

Audits require individual-level demographics, but few teams have access to such data
Can we design alternative metaphors? [Gordon et al. 2022]

Algorithmic decision as a jury decision. Specify a jury of, say, 12 members, and articulate what proportion of the jury should represent each group and intersectional identity

“For this jury of 50% men and 50% women, which is split evenly between White, Hispanic, AAPI, Black, and Native American jurors, 56% agree the comment is toxic.”
Jury learning

“1. People still eat at Pizza Hut? Gross. 2. It is shameful how this country [...]”

Input

AI predicts each juror’s response

not toxic not toxic toxic not toxic toxic toxic not toxic toxic toxic toxic toxic

7 to 5: toxic
Compose a jury by selecting from characteristics in the dataset

Juror Selection

Juror Sheet A

Seats: 5

Juror Sheet B

Seats: 3

Your input example

Place a comment here that you would like to test

→ View Jury Outcome
Compose a jury by selecting from characteristics in the dataset
System selects matching annotators from the dataset as jurors
System selects matching annotators from the dataset as jurors
System selects matching annotators from the dataset as jurors
AI predicts how each juror would vote

AI predicts each juror’s response

3 to 1: not toxic
HCI’s role

Identify cognitive, social, and technical issues that are influencing the impact of algorithms on society

Envision alternative processes, technical approaches, policies, and designs that mitigate these issues
Summary

Artifacts have politics: the systems we create influence groups and societies, often with undesirable outcomes

Example: gig economy — potential of upward mobility and community social capital, but not currently implemented in a way that unlocks those possibilities

Design approaches focused on marginalized groups, such as feminist HCI, center these communities’ needs in the design process

Algorithmic systems, not just designed systems, similarly have impact. People struggle to reason about them, and industry struggles to avoid mistakes.
References


References


