Design and Society

CS 347
Michael Bernstein

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.”

[Bloomberg]

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:

WIRED SUBSCRIBE

SAM GUSTIN BUSINESS FEB 11, 2011 2:56 PM

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 [...]

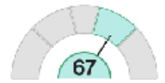
How it's going:

CNN BUSINESS Audio Live TV Log In

Markets →

DOW	33,717.09	0.77% ▼
S&P 500	4,017.77	1.30% ▼
NASDAQ	11,393.81	1.96% ▼

Fear & Greed Index →



Jan. 6 Committee failed to hold social media companies to account for their role in the Capitol attack, staffers and witnesses say

By Donie O'Sullivan, Audrey Ash and Zachary Cohen, CNN

Updated 7:23 PM EST, Thu January 26, 2023

Video Ad Feedback

Twitter whistleblower: Jan. 6 committee failed to hold Twitter accountable

How it started:

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 ready for use at a glance. 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 50 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 scribes 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, dynabooks and "knowledge navigators" is only a transitional step toward achieving the real potential of information technology. Such machines cannot truly make computing an integral, invisible 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 not of technology but 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 scientist, economist and Nobelist Herbert A. Simon calls this phenomenon "compiling"; 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 box. 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." Today's multimedia machine makes the computer screen into a demanding 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 bodysuits 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 insides of cells, the surfaces of distant planets, the information web of data bases—virtual reality is only a map, not a territo-

MARK WEISER is head of the Computer Science Laboratory at the Xerox Palo Alto Research Center. He is working on the next revolution of computing after workstations, variously known as ubiquitous computing or embodied virtuality. Before working at PARC, he was a professor of computer science at the University of Maryland; he received his Ph.D. from

How it's going:

The Verge

Menu +

TRANSPO / CARS / ELECTRIC CARS

The future of cars is a subscription nightmare / Heated seats, remote start key fobs, and other creature comforts are likely to be subject to monthly or annual fees

By ANDREW J. HAWKINS / @andyjayhawk
Jul 13, 2022, 10:31 AM PDT
0 Comments / 0 New

Photo by Roberto Baldwin for The Verge

How it started:

abc NEWS LOG IN

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 Kawalit 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 Dell, Karen Levy, Damon McCoy, and Thomas Ristenpart | May 21, 2018, 8:40am EDT

[Freed et al. 2018]

How it started:

The New York Times Magazine

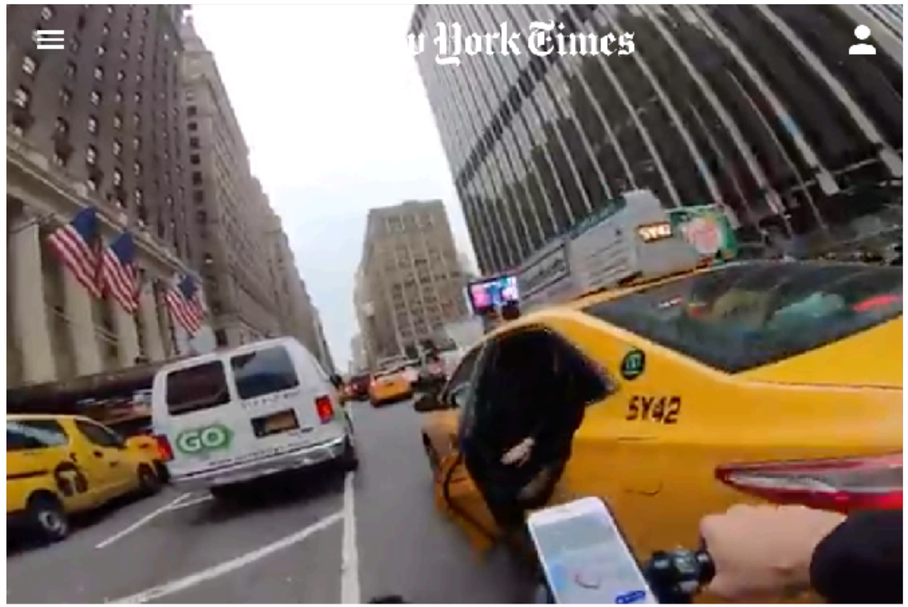
GIVE THE TIMES

IT'S THE ECONOMY

Delivery Start-Ups Are Back Like It's 1999

Give this article 123

How it's going:



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

By Andy Newman

July 21, 2019 751

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's role

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

Being A Turker

David Martin, Benjamin V. Hanrahan, Jacki O'Neill
Xerox Research Centre Europe
6 chemin de Maupertuis, Grenoble France
{david.martin, ben.hanrahan, jacki.oneill}@xrce.xerox.com

Neha Gupta
University of Nottingham
University Park NG7 2TD Nottingham
neha.gupta@xrce.xerox.com

ABSTRACT

Turkopticon: Interrupting Worker Invisibility in Amazon Mechanical Turk

Lilly C Irani
UC Irvine, Department of Informatics
Irvine, CA 92697
lirani@ics.uci.edu

M. Six Silberman
Bureau of Economic Interpretation
six@economicinterpretation.org

year of deployment. The system receives 100,000 page views a month and has become a staple tool for many AMT workers, installed over 7,000 times at time of writing.

Turkopticon allows workers to create and use reviews of employers when choosing employers on AMT. Building and maintaining the system, as well as communicating about the system with workers, has offered us a distinct vantage point into the social processes of designing interventions into large-scale, real world systems. Turkopticon supports a thriving collective of workers engaged in mutual aid, brought together by our simple browser extension and web-based technology.

This paper makes several contributions. First, it offers a case study designing an intervention into a highly distributed microlabor system. Second, it shows an example of systems design incorporating tools feminist analysis and reflexivity. Rather than conducting HCI research to reveal and represent values and positions, and then building systems to resolve those political differences, we built a system to make worker-employer relations visible and to provoke ethical and political debate. Third, this paper contributes lessons learned from intervening in existing, large-scale socio-technical systems (here, AMT) from its margins.

METHOD AND OUR STANCE

We Are Dynamo: Overcoming Stalling and Friction in Collective Action for Crowd Workers

Niloufar Salehi[1], Lilly C. Irani[2], Michael S. Bernstein[1], Ali Alkhatib[1], Eva Ogbe[1], Kristy Milland[3, 4], Clickhappier[4, 5]
[1]Stanford University, [2]UC San Diego, [3]Ryerson University, [4]We Are Dynamo, [5]MTurkGrind
{msb, ali.alkhatib, eogbe}@cs.stanford.edu, lirani@ucsd.edu, kmilland@ryerson.ca, clickhappier@wearedynamo.org

An overarching research narrative celebrates the web's affordances for galvanizing coordinated actions (e.g., [3, 4, 5]). However, many collective action efforts never succeed. The Internet's sword is double-edged: the same affordances that seem to make it an ideal setting to gather also seem to debilitate actual action. It is much easier to derail an effort than to push one onward to success [21]. People may talk past each other [24], and even when they do engage, more discussion can mean lower-quality outcomes [22]. Unfortunately, across many domains, the majority of collective efforts fail [17, 32]. Online coordination is even more challenged when political and social stakes are high or when action may expose participants to harm [4].

Amazon Mechanical Turk (AMT), a crowd work platform, embodies many of these promises and perils. To some, crowds bear the potential of mass action and people power. Yet as Irani and Silberman have argued [19], AMT's design directs this collective power into reliable, steadily humming

How to Stop Silicon Valley from Building a New Global Underclass

GHOST

Mary L. Gray and Siddharth Suri

WORK

The Future of Crowd Work

Aniket Kittur[1], Jeffrey V. Nickerson[2], Michael S. Bernstein[3], Elizabeth M. Gerber[4], Aaron Shaw[4], John Zimmerman[1], Matthew Lease[5], and John J. Horton[6]
[1]Carnegie Mellon University, [2]Stevens Institute of Technology, [3]Stanford University, [4]Northwestern University, [5]University of Texas at Austin, [6]oDesk
{nkittur, johnz}@cs.cmu.edu, jnickerson@stevens.edu, msb@cs.stanford.edu, {egerber, aaronshaw}@northwestern.edu, ml@ischool.utexas.edu, john_horton@odesk.com

ABSTRACT
Paid crowd work offers remarkable opportunities for improving productivity, social mobility, and the global economy by engaging a geographically distributed workforce to complete complex tasks on demand and at scale. But it is also possible that crowd work will fail to achieve its potential, focusing on assembly-line piecework.

to a range of workers and focused support for various task. For example, anyone with access to the Internet can perform *micro*-tasks on the order of seconds using platforms such as Amazon's Mechanical Turk, while more skilled workers can complete multi-hour tasks on professional online marketplaces such as oDesk or work for months to solve R&D challenges on open innovation

A Data-Driven Analysis of Workers' Earnings on Amazon Mechanical Turk

Kotaro Hara[1,2], Abigail Adams[3], Kristy Milland[4,5], Saiph Savage[6], Chris Callison-Burch[7], Jeffrey P. Bigham[1]
[1]Carnegie Mellon University, [2]Singapore Management University, [3]University of Oxford, [4]McMaster University, [5]TurkerNation.com, [6]West Virginia University, [7]University of Pennsylv
kotarohara@smu.edu.sg, abi.adams@economics.ox.ac.uk, millandk@mcmaster.ca
saiph.savage@mail.wvu.edu, ccb@upenn.edu, jbigham@cs.cmu.edu

ABSTRACT
A growing number of people are working as part of on-line crowd work. Crowd work is often thought to be low wage work. However, we know little about the wage distribution in practice and what causes low/high earnings in this setting. We recorded 2,676 workers performing 3.8 million tasks on Amazon Mechanical Turk. Our task-level analysis revealed that workers earned a median hourly wage of only ~$2/h, and only 4% earned more than $7.25/h. While the average requester pays more than $11/h, lower-paying requesters post much more work. Our wage calculations are influenced by how unpaid work is accounted for, *e.g.*, time spent searching for tasks, working on tasks that are rejected, and working on tasks that are ultimately not submitted. We further explore the characteristics of tasks and working patterns that yield higher hourly wages. Our analysis informs platform design and worker tools to create a more positive future for crowd work.

Author Keywords
Crowdsourcing; Amazon Mechanical Turk; Hourly wage

is considered to extend the modern office work [4 enabling people with disabilities, at-home pare temporarily out-of-work people to work [1,4,39,46,

Yet, despite the potential for crowdsourcing plat extend the scope of the labor market, many are c that workers on crowdsourcing markets are treated [19,38,39,42,47,60]. Concerns about low earnings work platforms have been voiced repeatedly. Past has found evidence that workers typically earn a fr the U.S. minimum wage [34,35,37–39,49] and many report not being paid for adequately completed tasks This is problematic as income generation is the motivation of workers [4,13,46,49].

Detailed research into crowd work earnings has bee by an absence of adequate quantitative data. Prior based on self-reported income data (*e.g.*, [4,34,49]) subject to systemic biases [22] and is often not su granular to facilitate a detailed investigation of dispersion. Existing data-driven quantitative

Working with Machines: The Impact of Algorithmic and Data-Driven Management on Human Workers

Min Kyung Lee[1], Daniel Kusbit[1], Evan Metsky[1], Laura Dabbish[1, 2]
[1]Human-Computer Interaction Institute, [2]Heinz College
Carnegie Mellon University
{mklee, dkusbit, emetsky, dabbish}@cmu.edu

ABSTRACT
Software algorithms are changing how people work in an ever-growing number of fields, managing distributed human workers at a large scale. In these work settings, human jobs are assigned, optimized, and evaluated through algorithms and tracked data. We explored the impact of this algorithmic, data-driven management on human workers and work practices in the context of Uber and Lyft, new ridesharing services. Our findings from a qualitative study describe how drivers responded when algorithms assigned work, provided informational support, and evaluated their performance, and how drivers used online forums to socially make sense of the algorithm features. Implications and future work are discussed.

but its impact on human workers and work practices has been largely unexplored. In recent years, the press and many scholars have brought attention to the importance of studying the sociotechnical aspects of algorithms [2, 10, 37], yet to our knowledge, there has been little empirical work in this area.

We explored the impact of algorithmic management in the context of new ridesharing services Uber and Lyft. Algorithmic management is one of the core innovations that enables these services. Independent, distributed drivers with their own cars are algorithmically matched with passengers within seconds or minutes, and the fare dynamically changes based on where passenger demand surges, all

Integrating policy and design [Yang et al. 2024; Jackson, Gillespie, and Payette 2014]

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

Going forward, as technologists, we need to think about the codesign of technology and policy together.

(But how do we even do that rigorously?)

LLM Model PaLM 2

Temperature 0.25

Run

Issue: Evergreen violates the contract signed with Sunshine in 2020.**Legal Brief**

Case Name: Sunshine (Company) v. Evergreen (Company)

Date: 2023

Issue: Evergreen violates the contract signed with Sunshine in 2020.

Facts:

* In 2020, Sunshine and Evergreen entered into a contract in which Evergreen agreed to provide Sunshine with a certain number of widgets at a certain price.
* Evergreen failed to provide the widgets as agreed.
* Sunshine has suffered damages as a result of Evergreen's breach of contract.

Arguments:

* Evergreen breached the contract by failing to provide the widgets as agreed.
* Sunshine is entitled to damages for Evergreen's breach of contract.
* The damages that Sunshine has suffered include the cost of purchasing the widgets from another supplier, lost profits, and the cost of repairing the damage caused by the lack of widgets.

Conclusion:

Based on the foregoing, we respectfully submit that the court should enter judgment in favor of Sunshine and award damages in the amount of \$[amount].

Respectfully submitted,

[Attorney for Sunshine]

Legal brief writer

5 99+

Many related AI incidents

FARSIGHT

Real AI Incidents

Cautionary tales for your AI product

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For The Love Of All That Is Holy, Stop Blaming ChatGPT For This Bad Brief


Judge finds out why brief cited nonexistent cases—ChatGPT did research


Lawyer cites fake cases invented by ChatGPT, judge is not amused

Potential Use Cases

Ways users might use your AI product

Mix | Intended | High-stakes | Misuse

- Lawyers use it to draft legal documents.
  - ↳ Clients may lose the opportunity to have their case heard in court due to AI-generated legal documents being inaccurate.
- Lawyers use it to generate arguments for their clients.
  - ↳ Clients may lose the opportunity to have their case argued by a human lawyer.
- Scammers use it to draft fraudulent legal documents.
  - ↳ Victims of the scam may lose money or property.

Envision Consequences & Harms

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]

YOU READ THIS

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) → 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]

YOU READ THIS

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]

YOU READ THIS

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

What does HCI have to say about algorithms?

From the perspective of this class—and of HCI writ large—there is **no fundamental difference between an interface and an algorithm in terms of the analytical tools** we bring to bear on it

> How do people understand it? How do people manipulate it? How does it influence peoples' attitudes and behavior?

An algorithm, just like a user interface, conveys signals that people need to **make sense of** in an attempt to **control** the system

For example: social media algorithms

VS.

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

vs.

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)

Algorithm audits help make harms 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

(Harvard professor Googling her own name)

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

HCI's role

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

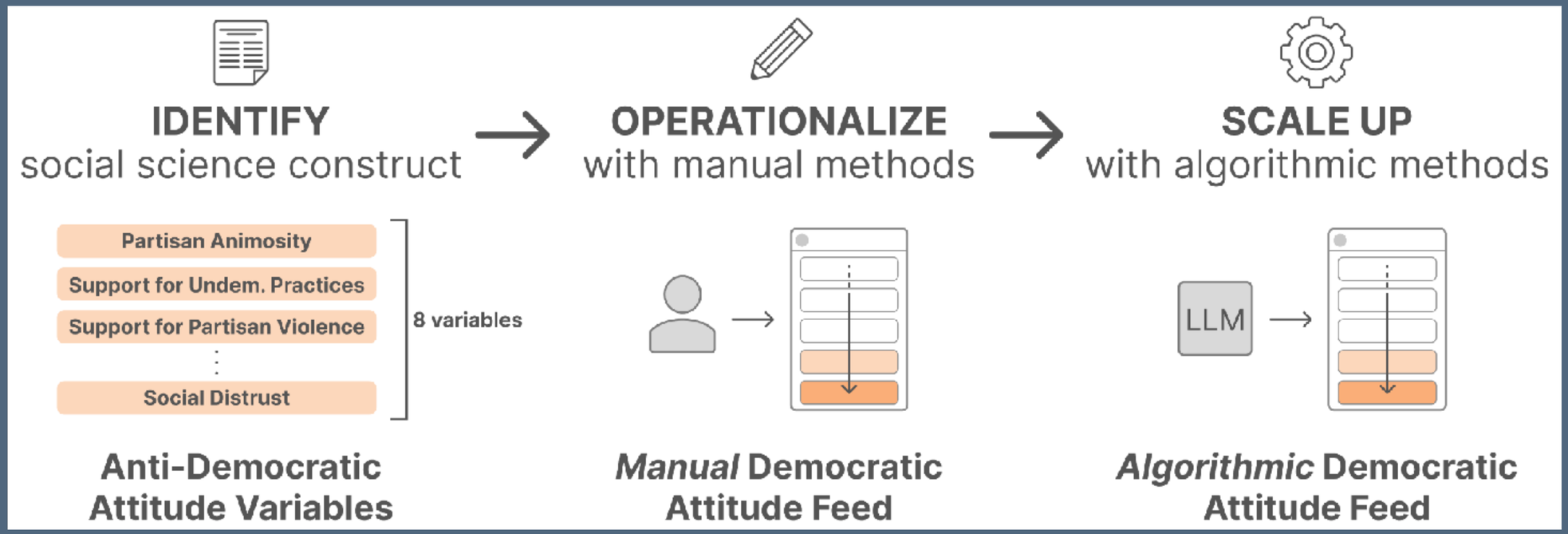
Envision alternative processes, technical approaches, policies, and designs that mitigate these issues

What if we change the objective? [Jia, Lam, et al. 2024]

HCI can articulate **alternative goals and objectives** for these algorithms — what else might we consider?

Let's start with what the social sciences have articulated:

What if we change the objective? [Jia, Lam, et al. 2024]



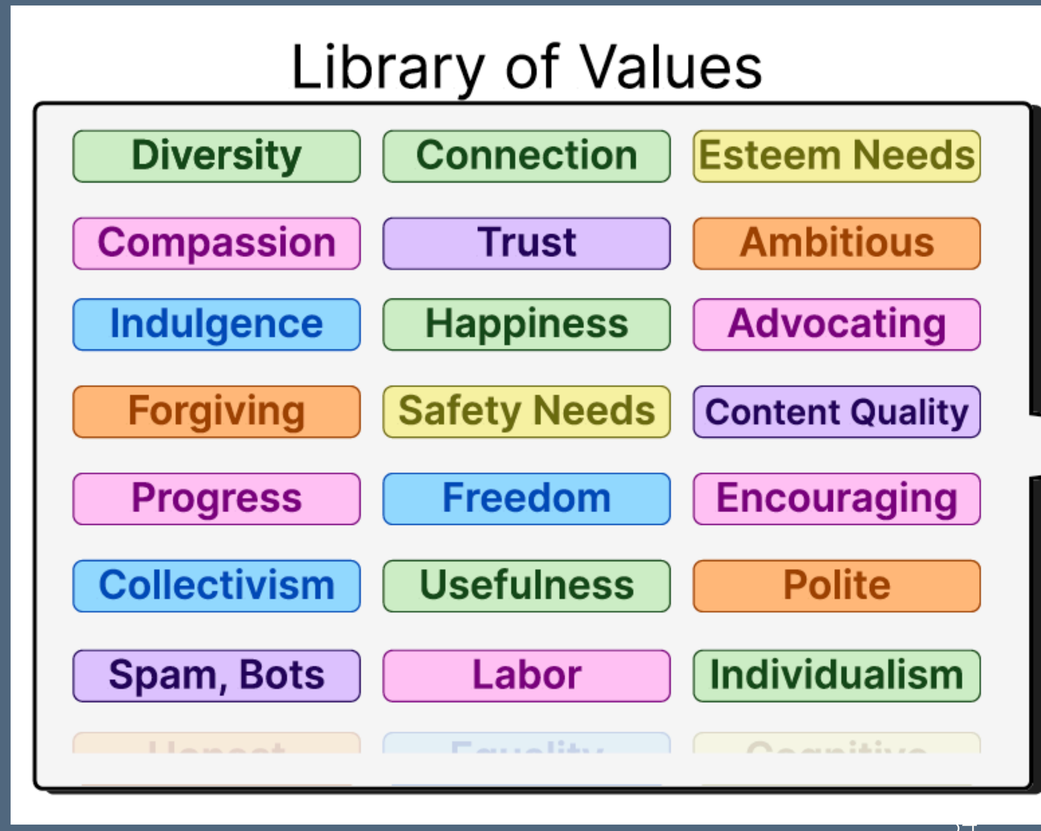
Result: **decreased partisan animosity** in the lab (and, it turns out, in the field too)

What objectives should we be aiming for?

What do you think we ought to be designing into our algorithms?

What kinds of controls ought end users to have over these algorithms?

What should (and shouldn't) regulation have to say about this kind of alignment?



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. But, **modeling human-centered objectives** can help.

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