Have you been working or hiring people through an app during this pandemic? How? (Instacart, &etc.)
Last time

Non-human participants are becoming more realistic and more prevalent in social systems

Our human psychological hardware causes us to react to them like we would as if they were other humans, even if we know that they’re not.

The more realistic they get, the more they feel “slightly off”.

We are happy to see content created by AIs; it’s when the AIs mix in environments with real people that people get critical.
And even earlier...

We talked about one aspect of the future of work—well, the present of work—remote collaboration.

(The least realistic aspect of this scene in my experience: the baby sitting there quietly while you work)
1.6 million workers are in the United States’ on-demand economy [Bureau of Labor Statistics 2018]

Eventually, up to 20% of US jobs [Blinder 2006], or 45,000,000 workers [Horton 2013]
Today: computationally mediated work

How are social computing systems influencing our jobs and careers?

What are the open problems in how to do this well?

What are design, tech, and policy solutions that we know about?

What might work look like if we carry this trend to its logical conclusion?
Paid crowd work and the gig economy
Experts in a click

Online platforms connect people who want work done with people interested in doing the work.
Experts in a click

AI training data: “ghost work” [Gray and Suri 2019]
Experts in a click

Pay money for short tasks. Amazon Mechanical Turk: millions of tasks completed each year

- Label an image
  - Reward: $0.20
- Transcribe audio clip
  - Reward: $5.00

AI training data: “ghost work” [Gray and Suri 2019]
Experts in a click

[Image via Brand Fabrik]

Driving, delivering: the gig economy
Experts in a click

What becomes possible when nearly any expertise is available?

programmer, writer, designer, video editor, musician, &etc.
Platforms

The platforms are responsible for connecting people who want work done (a.k.a. requesters, clients, or buyers) with people who are willing to do the work (a.k.a. workers or sellers). In this lecture we are most interested in work done on-demand, not a storefront.

Examples:

Amazon Mechanical Turk  
Lyft, Uber, Sidecar  
Upwork, Gigster  
Taskrabbit  

Airbnb  
Instacart, Amazon Prime Now  
Others?
Platforms

Platforms are responsible for producing signals that facilitate the matching between work and worker. Let’s look at what we know.
Reputation

Who is good? How good are they? What are they good at?

100% Job Success

Private Studio Cottage Near Downtown Palo Alto

Mehdi G.

5.0 (16 reviews)
35 Delivery jobs

$29.41/hr

I’ve worked in the food delivery industry for many years. Trustworthy, honest and reliable. Also, goo...
See profile

Lin 4.8★

TOYOTA PRIUS

4.88 (8) · Menlo Park, California, United States
Reputation inflation
[Filippas, Horton, and Golden 2020]
There is social pressure to give high ratings, and few costs.
Reputation inflation
[Filippas, Horton, and Golden 2020]

Most of the pressure is on giving five-star reviews.
The result

There's no equivalent of “I went to Stanford” or “I work for Apple” Instead we get:

Alexei L.
Senior PHP/HTML5/Magento/Wordpress/Joomla/Drupal Developer

🌟🌟🌟 Don't miss chance to work with me! 24/7, RAPID DEVELOPMENT, HIGHEST QUALITY, EXACT DEADLINE Support 🌟🌟🌟 The Hourly rate would be

David A.  📺 Agency Contractor

eCommerce Architect, Oxwall & Web Rockstar

I'm well-experienced and highly qualified in standard and cross-browser
Reputation signals

Ratings from people I’ve interacted with (who themselves have ratings)

Descriptions of the tasks I completed in order to earn those ratings

Tests and exams I might pass (that quickly leak onto the internet)
Cold start galore

These marketplaces are full of people that the platform knows nearly nothing about:

Let's say I start driving for Lyft. I have given no rides. What rating should I have? What if I did one ride and got 5 stars?

Let's say I start doing programming tasks for Upwork. What rating should I have? Should I be ranked above established known quantities so that I'm given a chance? Or should they go on top of me to give the client a sure bet?

What should the platform’s policy (algorithm) be? [2min]
Task matching

Who should get what work? By what criteria?

Often another application of machine learning: learn to predict the outcome ratings when matching a person of skill type X with task type Y
Payment and appeals

What's the minimum wage? And by what locality should that minimum wage be set? Should it differ by type of work? [Silberman et al. 2018]

Should the requester have the power to deny payment to the worker? What route does the worker have for appeals?

How are disagreements resolved?
Current best practices
For Mechanical Turk and their ilk

Pay minimum wage at your location based on worker reports of how long your task takes [Silberman et al. 2018; Whiting et al. 2019]

Iterate and pilot your task multiple times to catch usability issues before launching for real.

Don’t reject work or ban workers unless there is substantial evidence they are not just mistaken but actually ill-intentioned, since the punishments from the platform for this are often very severe.

Instead, if someone’s not a good fit, pay them but don’t invite them to future tasks you have.
Crowds of experts

Crowd workers
- microtask worker
- microtask worker
- microtask worker
- microtask worker

Experts
- programmer
- designer
- video editor
- musician
- statistician
Flash Teams

[Retelny et al., UIST ’14]

Computationally-guided teams of crowd experts supported by lightweight team structures.
Input: high-level script outline
Output: ~15 second animated movie
Our example: 44.40 hours, $2381.32
Creation by request

What if you wanted something that no previous team had created?
Creation by request

Synthetic team created from compatible blocks from previous teams
Creation by request

Synthetic team created from compatible blocks from previous teams
Flash Organizations
[Valentine et al., CHI '17]

Rapidly assembled and reconfigurable organizations composed of online collaborators
Computational organizational structures

Roles: parametrize required expertise

Teams: groups of workers with shared goal

Hierarchy: nested roles that determine decision rights
EMS trauma report

Medical resident, no experience managing or building software

Task timeline
EMS trauma report

Task timeline
EMS trauma report

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Task timeline

<table>
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<th>Duration</th>
<th>Status</th>
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<tbody>
<tr>
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<tr>
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<td>Completed</td>
</tr>
<tr>
<td>Task C</td>
<td>3 weeks</td>
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</tr>
</tbody>
</table>

Android Development
User Interface Design
Front End Development
Back End Development
User Testing
HIPAA
Video
Market Research
Marketing Website
Pitch Deck and User Documentation
Application Name
Quality Assurance
EMS trauma report
EMS trauma report
But.

Would you be happy if your own child joined this workforce? [Kittur et al. 2012]
The future of work and workers
Los Angeles Uber drivers join cities across the U.S. in strike ahead of much-anticipated IPO

Academic work including:
[Alkhatib et al. 2017]
[Dillahunt 2017]
[Irani and Silberman 2013]
[Gray et al. 2016]
[Hara et al. 2018]
[Martin et al. 2014]
[McInnis et al. 2016]
Stanford CASBS Future of Work and Workers Project
Challenges of algorithmic management

Workers navigate around algorithmic constraints

- Toggling availability on and off to manage their driving distance window [Lee et al. 2015]

- Delegitimizing the algorithm and burying it among other signals [Christin 2017]

- Avoiding risky work that could hurt their reputation [McInnis et al. 2016]

No foreman “on the street” to help navigate incorrect algorithmic decisions [Alkhatib and Bernstein 2019]
The Future of Crowd Work

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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. Can we foresee a future crowd workplace in which we would want our children to participate? This paper frames the major challenges that stand in the way of the crowd workplace to complete complex tasks on demand and at scale. 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 platforms (e.g. Innocentive). Incentives and work structures also vary tremendously, ranging from crowdsourcing to a range of workers and focused support for various task.

Can we foresee a future crowd workplace in which we would want our children to participate? 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 platforms (e.g. Innocentive). Incentives and work structures also vary tremendously, ranging from crowdsourcing to a range of workers and focused support for various task.
We Are Dynamo: socio-technical infrastructure for collective action amongst crowd workers [Salehi et al. 2015]

Worker collective action

Amazon's Mechanical Turk workers protest: 'I am a human being, not an algorithm'

A Christmas email campaign is asking Amazon's CEO Jeff Bezos to improve terms for workers providing cheap digital labour
Worker collective action

The campaign started in the fall of 2014. Several MTurk discussion forum leaders, working with graduate students and faculty at Stanford and the University of California at San Diego, were already building a virtual union hall of sorts for MTurk’s international worker base. The goal was to make it easier for workers to anonymously share stories about their experience and discuss possible actions that they could take. The site, nicknamed “Dynamo,” was part of a larger research project meant to explore how to “build systems that support collective action online.”14 One of its most successful actions was the drafting of their ways. That was followed by Dynamo, which its founders saw as a virtual union hall. “I want to help ordinary workers create a collective voice that has to be heard,” said Lilly Irani, one of Dynamo’s founders. Another Dynamo founder, Michael Bernstein, a Stanford University professor of computer science, added, “It’s easy to come together online, act upset, and blow smoke. We wanted to take it to the next level: What does it take to come together to transform that energy into decisions and the pursuit of common goals?”
Futures of online work

Micro-internships [Suzuki et al. 2016]

Guild-style collective accreditation [Whiting et al. 2017]
Futures of online work

**FAIR WORK**

Add one line of code, and Fair Work will ensure that your Mechanical Turk workers are paid at least minimum wage. To start, get the code snippet for your Mechanical Turk account.

Tools to ensure piecework is paid minimum wage [Whiting, Hugh, Bernstein 2019]

Portable benefits [NDWA, early collaboration with Alkhatib]
Policy and code

Code can demonstrate alternative futures, but there’s no stopping someone from not using that code, and writing their own version that doesn’t embody your values.

This is where policy and regulation come in.
Current policy frontiers

California Bill AB5 put into effect January 1, 2020: requires that “the service must be performed outside the usual course of business for the employer”

This requires apps such as Lyft and Uber to classify drivers as employees, granting them minimum wage coverage, sick leave, and insurance

Noam Scheiber, labor and workplace reporter for the New York Times, 7/13/2017

More broadly, what do you think we should we do? [2min]
MSB’s take

Workers need to feel comfortable taking risks to join a computationally-mediated future of work.

We need to create opportunities that are vastly preferred to equivalent traditional work, instead of platforms that workers turn to when their traditional jobs fall through.

We must recognize that this is not exciting because it’s access to cheap labor: it’s exciting because it affords the ability for computation to support collaboration between diverse participants through networks.
Summary

Social computing systems are increasingly connecting us to on-demand labor.

Upside: what if I could connect with the world's expert on the topic in just a click?

Downside: what if this disaggregates work from many of the important social and economic guarantees that it previously had?

Technical solutions (e.g., reputation) and policy solutions will both be required to chart our course here.
Social Computing
CS 278 | Stanford University | Michael Bernstein

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