A BRIEF GLOSSARY OF STUFF

1>returnable<1>1>returnable

 Crowd work: digitally mediated information work (for example, work done on Amazon Mechanical Turk, UpWork, or 99designs) [10]

A BRIEF GLOSSARY OF STUFF

2>returnable<2>

- Crowd work: digitally mediated information work (for example, work done on Amazon Mechanical Turk, UpWork, or 99designs) [10]
- Gig work: digitally mediated (but often physically embodied)
 one-off jobs, such as driving, courier services, and
 administrative support [4, 17]



Tasks

- Complexity

Suzuki et al. [21], Kim and Monroy-Hernández [9], Yuan et al. [24], Yu, Kittur, and Kraut [23], Nebeling et al. [15], and Hahn et al. [6]



Complexity



Tasks

Complexity

Suzuki et al. [21], Kim and Monroy-Hernández [9], Yuan et al. [24], Yu, Kittur, and Kraut [23], Nebeling et al [15], and Hahn et al. [6]



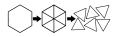
Complexity



Tasks

- Decomposition

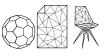
Celis et al. [2], Lykourentzou et al. [13], Law et al. [11], Chang, Kittur, and Hahn [3], and Newell and Ruths [16]



Decomposition

- Complexity

Suzuki et al. [21], Kim and Monroy-Hernández [9], Yuan et al. [24], Yu, Kittur, and Kraut [23], Nebeling et al. [15], and Hahn et al. [6]



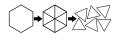
Complexity



Tasks

Decomposition

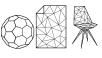
Celis et al. [2], Lykourentzou et al. [13], Law et al. [11], Chang, Kittur, and Hahn [3], and Newell and Ruths [16]



Decomposition

Complexity

Suzuki et al. [21], Kim and Monroy-Hernández [9], Yuan et al. [24], Yu, Kittur, and Kraut [23], Nebeling et al [15], and Hahn et al. [6]



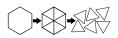
Complexity



Tasks

Decomposition

Celis et al. [2], Lykourentzou et al. [13], Law et al. [11], Chang, Kittur, and Hahn [3], and Newell and Ruths [16]



Decomposition

- Relationships

Irani and Silberman [8, 7], Gray et al. [5], McInnis et al. [14], Salehi et al. [20], and Lee et al. [12]





WHAT IS THE FUTURE OF WORK?

How will **technology** affect the **complexity** of the work that on–demand workers do?

What are the **limits** of complexity in on-demand work?

How can we **reach** those limits?

A BRIEF GLOSSARY OF STUFF

3>returnable<3>

- Crowd work: digitally mediated information work (for example, work done on Amazon Mechanical Turk, UpWork, or 99designs) [10]
- Gig work: digitally mediated (but often physically embodied)
 one-off jobs, such as driving, courier services, and
 administrative support [4, 17]
- Piecework: Payment for output rather than for time

INTRODUCTION

We hope to provide:

- A useful ontological lens for making sense of crowdsourcing and gig work (which we collectively call "on-demand work") as a resurgence of piecework.
- A method for making sense of contemporary phenomena through historical analysis.

A CASE FOR COMPARATIVE HISTORICAL ANALYSIS

- Historical analysis isn't new
 - In general Rosenberg [18, 19]
 - In HCI
 Wyche, Sengers, and Grinter [22] and Bødker [1]
- Still, it's an underutilized method
 - Provide some basic framing for ostensibly new phenomena
 - Theoretically ground ourselves
 - Flesh out differences and their implications

REFERENCES

- Susanne Bødker. "Historical analysis and conflicting perspectives—contextualizing HCI". In: *Human-Computer Interaction* (1993), pp. 1–10.
- L. Elisa Celis et al. "Assignment Techniques for Crowdsourcing Sensitive Tasks". In: Proceedings of the 19th ACM Conference on Computer–Supported Cooperative Work & Social Computing. CSCW '16. ACM, 2016, pp. 836–847. ISBN: 978–1-4503–3592–8. DOI: 10.1145/2818048.2835202. URL:

http://doi.acm.org/10.1145/2818048.2835202.

Joseph Chee Chang, Aniket Kittur, and Nathan Hahn. "Alloy: Clustering with Crowds and Computation". In: *Proceedings of the 2016 CHI Conference on Human Factors in Computing Systems*. CHI '16. ACM, 2016, pp. 3180–3191. ISBN: 978–1-4503–3362–7. DOI: 10.1145/2858036.2858411.

URL:

http://doi.acm.org/10.1145/2858036.2858411.

- Gerald Friedman. "Workers without employers: shadow corporations and the rise of the gig economy". In: *Review of Keynesian Economics* 2 (2014), pp. 171–188.
- Mary L. Gray et al. "The Crowd is a Collaborative Network". In: Proceedings of the 19th ACM Conference on Computer-Supported Cooperative Work & Social Computing. CSCW '16. ACM, 2016, pp. 134–147. ISBN: 978–1-4503–3592–8. DOI: 10.1145/2818048.2819942. URL: http://doi.acm.org/10.1145/2818048.2819942.
- Nathan Hahn et al. "The Knowledge Accelerator: Big Picture Thinking in Small Pieces". In: *Proceedings of the 2016 CHI Conference on Human Factors in Computing Systems*. CHI '16. ACM, 2016, pp. 2258–2270. ISBN: 978–1-4503–3362–7. DOI:

10.1145/2858036.2858364. URL: http://doi.acm.org/10.1145/2858036.2858364.

Lilly C. Irani and M. Six Silberman. "Stories We Tell About Labor: Turkopticon and the Trouble with "Design"". In: Proceedings of the 2016 CHI Conference on Human Factors in Computing Systems. CHI '16. ACM, 2016, pp. 4573–4586. ISBN: 978–1-4503–3362–7. DOI: 10.1145/2858036.2858592. URL:

http://doi.acm.org/10.1145/2858036.2858592.

Lilly C. Irani and M. Six Silberman. "Turkopticon: Interrupting Worker Invisibility in Amazon Mechanical Turk". In: Proceedings of the SIGCHI Conference on Human Factors in Computing Systems. CHI '13. ACM, 2013, pp. 611–620. ISBN: 978–1-4503–1899–0. DOI: 10.1145/2470654.2470742.

URL:

http://doi.acm.org/10.1145/2470654.2470742.



Joy Kim and Andrés Monroy-Hernández. "Storia:
Summarizing Social Media Content Based on Narrative
Theory Using Crowdsourcing". In: Proceedings of the 19th
ACM Conference on Computer-Supported Cooperative Work &
Social Computing. CSCW '16. ACM, 2016, pp. 1018–1027. ISBN:
978–1-4503–3592–8. DOI: 10.1145/2818048.2820072.
URL:

http://doi.acm.org/10.1145/2818048.2820072.



Aniket Kittur et al. "The Future of Crowd Work". In: Proceedings of the 2013 Conference on Computer Supported Cooperative Work. CSCW '13. ACM, 2013, pp. 1301–1318. ISBN: 978–1-4503–1331–5. DOI: 10.1145/2441776.2441923. URL:

http://doi.acm.org/10.1145/2441776.2441923.

Edith Law et al. "Curiosity Killed the Cat, but Makes Crowdwork Better". In: Proceedings of the 2016 CHI Conference on Human Factors in Computing Systems. CHI '16. ACM, 2016, pp. 4098–4110. ISBN: 978–1-4503–3362–7. DOI: 10.1145/2858036.2858144. URL:

http://doi.acm.org/10.1145/2858036.2858144.

Min Kyung Lee et al. "Working with Machines: The Impact of Algorithmic and Data–Driven Management on Human Workers". In: *Proceedings of the 33rd Annual ACM Conference on Human Factors in Computing Systems*. CHI '15. ACM, 2015, pp. 1603–1612. ISBN: 978–1-4503–3145–6. DOI: 10.1145/2702123.2702548. URL:

http://doi.acm.org/10.1145/2702123.2702548.

Ioanna Lykourentzou et al. "Personality Matters: Balancing for Personality Types Leads to Better Outcomes for Crowd Teams". In: *Proceedings of the 19th ACM Conference on Computer–Supported Cooperative Work & Social Computing*. CSCW '16. ACM, 2016, pp. 260–273. ISBN: 978–1-4503–3592–8.

DOI: 10.1145/2818048.2819979. URL:

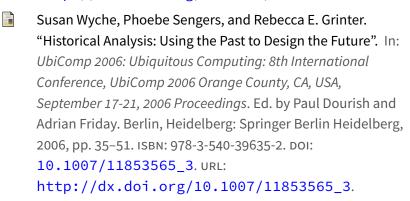
http://doi.acm.org/10.1145/2818048.2819979.

Brian McInnis et al. "Taking a HIT: Designing Around Rejection, Mistrust, Risk, and Workers' Experiences in Amazon Mechanical Turk". In: *Proceedings of the 2016 CHI Conference on Human Factors in Computing Systems*. CHI '16. ACM, 2016, pp. 2271–2282. ISBN: 978–1-4503–3362–7. DOI: 10.1145/2858036.2858539. URL: http://doi.acm.org/10.1145/2858036.2858539.

- Michael Nebeling et al. "WearWrite: Crowd-Assisted Writing from Smartwatches". In: Proceedings of the 2016 CHI Conference on Human Factors in Computing Systems. CHI '16. ACM, 2016, pp. 3834–3846. ISBN: 978–1-4503–3362–7. DOI: 10.1145/2858036.2858169. URL: http://doi.acm.org/10.1145/2858036.2858169.
- Edward Newell and Derek Ruths. "How One Microtask Affects Another". In: Proceedings of the 2016 CHI Conference on Human Factors in Computing Systems. CHI '16. ACM, 2016, pp. 3155–3166. ISBN: 978–1-4503–3362–7. DOI: 10.1145/2858036.2858490. URL: http://doi.acm.org/10.1145/2858036.2858490.
- Paolo Parigi and Xiao Ma. "The Gig Economy". In: XRDS 23.2 (Dec. 2016), pp. 38–41. ISSN: 1528-4972. DOI:

- 10.1145/3013496.URL: http://doi.acm.org/10.1145/3013496.
- Nathan Rosenberg. Exploring the black box: Technology, economics, and history. Cambridge University Press, 1994.
- Nathan Rosenberg. *Inside the black box: technology and economics*. Cambridge University Press, 1982.
- Niloufar Salehi et al. "We Are Dynamo: Overcoming Stalling and Friction in Collective Action for Crowd Workers". In: Proceedings of the 33rd Annual ACM Conference on Human Factors in Computing Systems. CHI '15. ACM, 2015, pp. 1621–1630. ISBN: 978–1-4503–3145–6. DOI: 10.1145/2702123.2702508. URL: http://doi.acm.org/10.1145/2702123.2702508.
- Ryo Suzuki et al. "Atelier: Repurposing Expert Crowdsourcing Tasks As Micro-internships". In: *Proceedings of the 2016 CHI*

Conference on Human Factors in Computing Systems. CHI '16. ACM, 2016, pp. 2645–2656. ISBN: 978–1-4503–3362–7. DOI: 10.1145/2858036.2858121. URL: http://doi.acm.org/10.1145/2858036.2858121.



Lixiu Yu, Aniket Kittur, and Robert E. Kraut. "Encouraging "Outside- The- Box" Thinking in Crowd Innovation Through

Identifying Domains of Expertise". In: Proceedings of the 19th ACM Conference on Computer-Supported Cooperative Work & Social Computing. CSCW '16. San Francisco, California, USA: ACM, 2016, pp. 1214–1222. ISBN: 978-1-4503-3592-8. DOI: 10.1145/2818048.2820025. URL: http://doi.acm.org/10.1145/2818048.2820025.



Alvin Yuan et al. "Almost an Expert: The Effects of Rubrics and Expertise on Perceived Value of Crowdsourced Design Critiques". In: Proceedings of the 19th ACM Conference on Computer–Supported Cooperative Work & Social Computing. CSCW '16. ACM, 2016, pp. 1005–1017. ISBN: 978–1-4503–3592–8. DOI: 10.1145/2818048.2819953.

http://doi.acm.org/10.1145/2818048.2819953.