

EXAMINING CROWD WORK AND GIG WORK THROUGH THE HISTORICAL LENS OF PIECEWORK

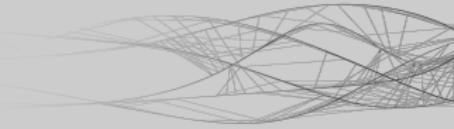
Ali Alkhatib, Michael Bernstein, Margaret Levi

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May 5, 2017

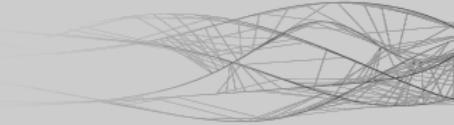
Stanford University

A BRIEF GLOSSARY



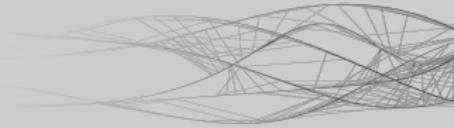
- *Crowd work*: digitally mediated **information work** (for example, work done on Amazon Mechanical Turk, UpWork, or 99designs) [20]

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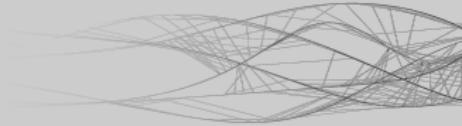
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- *Gig work*: digitally mediated (but often **physically embodied**) one-off jobs, such as *driving*, *courier services*, and *administrative support* [7, 31]

OPEN PROBLEMS IN ON-DEMAND WORK



Tasks

OPEN PROBLEMS IN ON-DEMAND WORK



- Complexity

Suzuki et al. [40], Kim and Monroy-Hernández [16], Yuan et al. [45], Yu, Kittur, and Kraut [44], Nebeling et al. [29], and Hahn et al. [11]

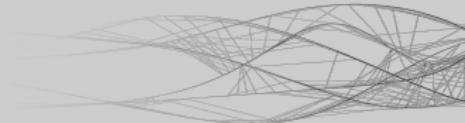


Complexity



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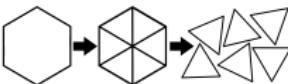
Complexity

- Decomposition

Celis et al. [3], Lykourentzou et al. [27], Law et al. [24], Chang, Kittur, and Hahn [4], and Newell and Ruths [30]



Tasks

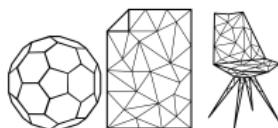


Decomposition

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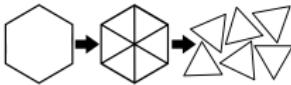
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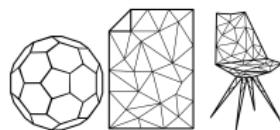


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Tasks

- Relationships

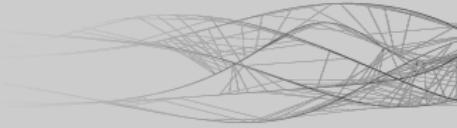
Irani and Silberman [14, 13], Gray et al. [9], McInnis et al. [28], Salehi et al. [36], and Lee et al. [25]



Decomposition

WHAT IS THE FUTURE OF WORK?

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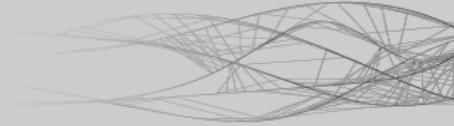


How will **technology** affect the **complexity** of the work that on-demand workers do?

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

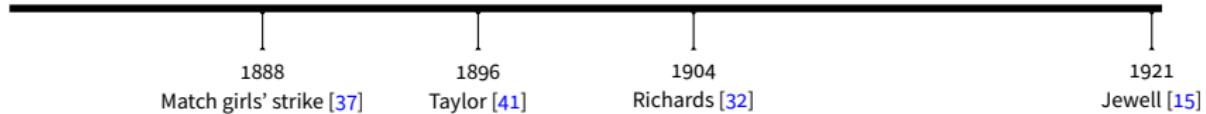
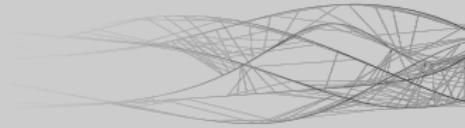
How can we **reach** those limits?

A BRIEF GLOSSARY

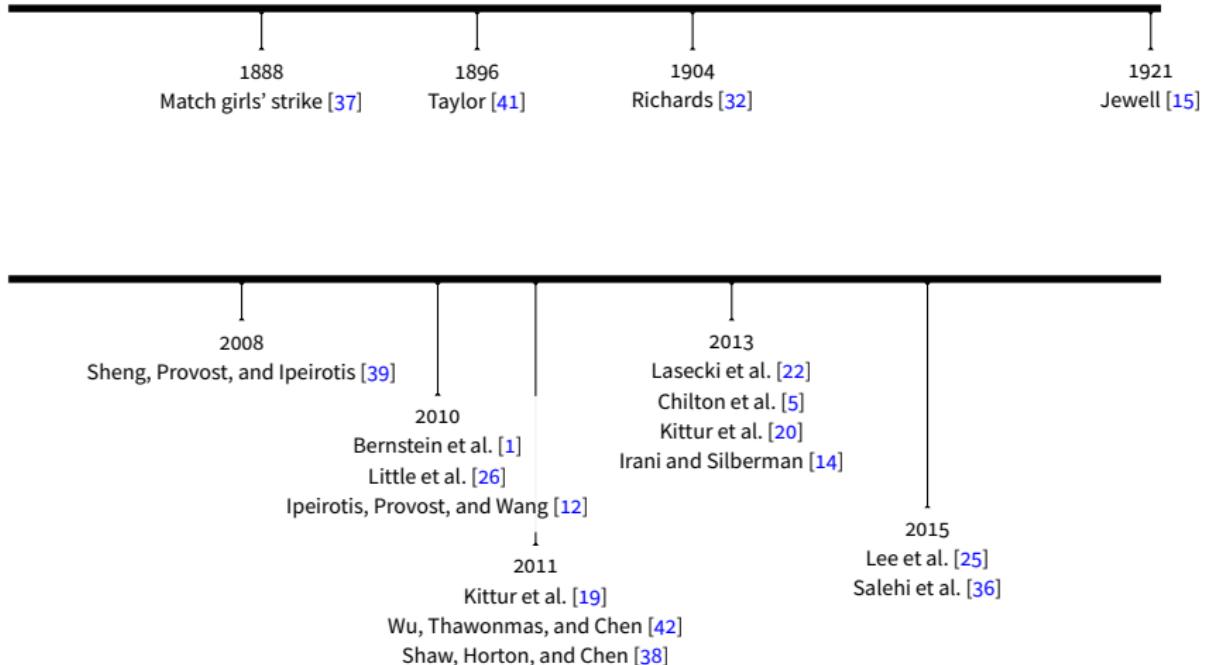


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- *Gig work*: digitally mediated (but often **physically embodied**) one-off jobs, such as *driving*, *courier services*, and *administrative support* [7, 31]
- *Piecework*: Payment for *output* rather than for *time*

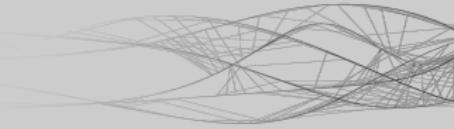
A TIMELINE OF PIECEWORK



A TIMELINE OF ~~PIECEWORK~~ ON-DEMAND WORK



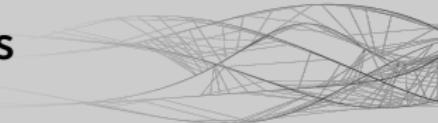
INTRODUCTION



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*.

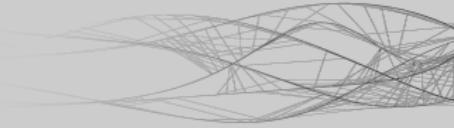
A CASE FOR COMPARATIVE HISTORICAL ANALYSIS



- Historical analysis isn't new
 - In general
Rosenberg [33, 34]
 - In HCI
Wyche, Sengers, and Grinter [43] and Bødker [2]
- Still, it's an underutilized method
 - Provide some basic framing for ostensibly new phenomena
 - Theoretically ground ourselves
 - Flesh out *differences* and their implications

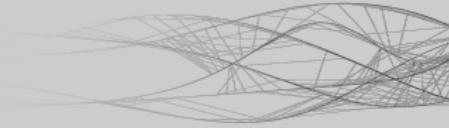
COMPLEXITY

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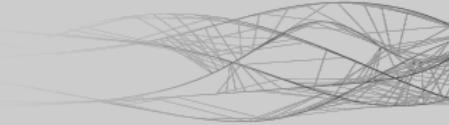
What kinds of problems do we mean when we talk about complexity?

- Can crowds help you write something?
Bernstein et al. [1], Kim et al. [18], and Nebeling et al. [29]



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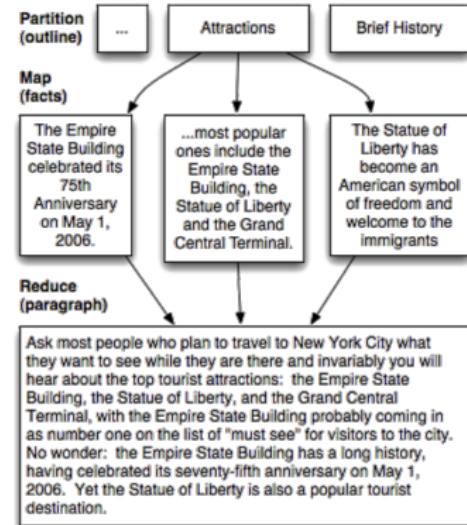
- Can crowds create things from whole cloth?

Kim and Monroy-Hernández [16], Kim et al. [17], Hahn et al. [11], and Lasecki, Kushalnagar, and Bigham [21]

WHAT DOES THE CROWDSOURCING LITERATURE SAY?

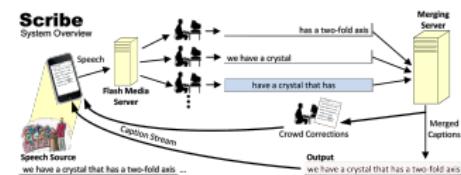
- Build complexity into the process
 - Apply CS methods to people

Kittur et al. [19]



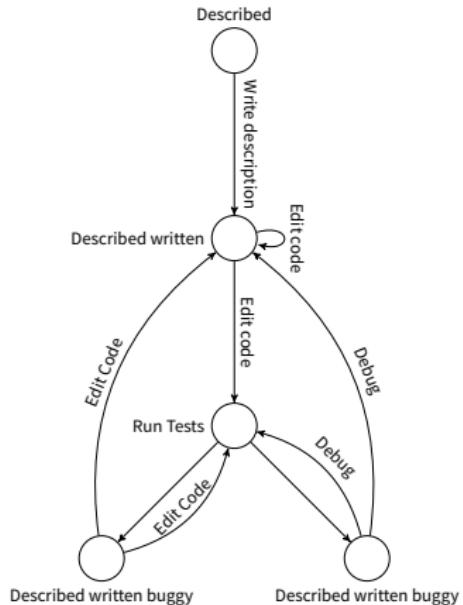
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 - Crowdsourcing workflows as function state machines
LaToza et al. [23]



WHAT DOES THE PIECEWORK LITERATURE SAY?

George Airy (astronomer) used a very similar approach [10]



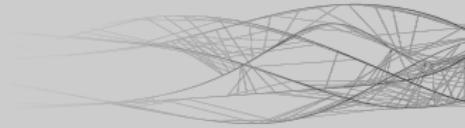
- Employed computers
- 13–20 years old
- Overworked
- Underpaid
- Could be fired at will

GEORGE AIRY — WHIZ KID

Airy built complexity into the process, assigning *human computers* to compute, verify, and correct the right ascension and declination of stars.

No. of Swings.	Approximate Time (Astronomical Reckoning).	Number of Signals.	Mean of Times by SHELTON.	Mean of Times by EARNSHAW.	Interval by SHELTON.	Interval by EARNSHAW.	Rate EARNSHAW / SHELTON	Logarithm of EARNSHAW / SHELTON	Corrected Logarithm of EARNSHAW / SHELTON
1	Oct. h 1. 23	22	3 19 36-505	21 23 28-764	h m s	h m s	1-0010831	0-00047012	
2 2. 3	21	7 19 59-605	1 24 7-486	4 0 23-100	4 0 38-722	0-00047793	
3 2. 7	21	11 18 21-257	5 22 44-886	3 58 21-652	3 58 37-400	1-0011011	
4 2. 11	29	16 3 49-086	10 8 31-307	4 45 27-829	4 45 46-421	1-0010855	0-00047117
5 2. 16	17	20 20 55-618	14 25 54-541	4 17 6-532	4 17 23-234	1-0010827	0-00046995
6 2. 19	25	23 34 17-516	17 39 29-336	3 13 21-898	3 13 34-795	1-0011116	0-00048249
7 2. 23	31	3 24 0-019	21 29 26-990	3 49 42-503	3 49 57-654	1-0010994	0-00047720
8 3. 3	21	7 19 2-090	1 24 44-423	3 55 2-071	3 55 17-433	1-0010893	0-00047282
9 3. 7	25	11 21 43-600	5 27 41-868	4 2 41-510	4 2 57-445	1-0010944	0-00047503
10 3. 11	22	15 52 49-386	9 59 5-459	4 31 5-786	4 31 23-591	1-0010947	0-00047516
11 3. 15	24	19 20 39-133	13 27 8-783	3 27 49-747	3 28 3-324	1-0010888	0-00047260
12 3. 19	24	23 20 26-425	17 27 11-971	3 59 47-292	4 0 3-188	1-0011049	0-00047959
					4 3 30-416	4 3 46-620	1-0010686	0-00046384	0-00047194

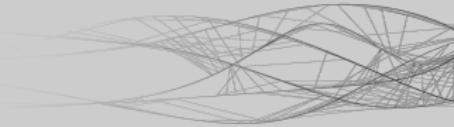
COTTAGE INDUSTRY



Farms



COTTAGE INDUSTRY



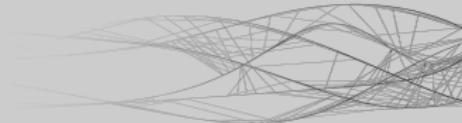
Farms



Textiles



COTTAGE INDUSTRY



Farms



Textiles

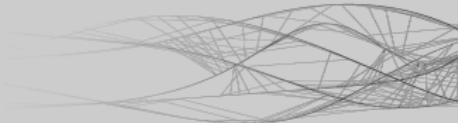


Matchsticks



PLANES, TRAINS, AND AUTOMOBILES

... NOT IN THAT ORDER



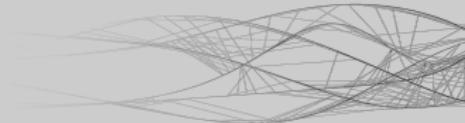
Trains



- “Efficiency experts” measured how long it would take to do various jobs [6]
- These measurements would be used to assign values for each specific task [15]
- Train engineers instituted “The Fix” to correct perceived unfairness [35]

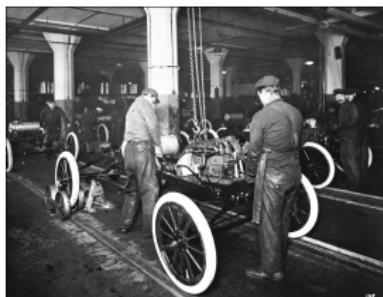
PLANES, TRAINS, AND AUTOMOBILES

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Automobiles

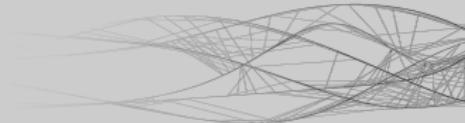
- Fordism,
Taylorism, and
Scientific
Management in
full force



- *Manufacturing*
proved
amenable to
assembly line
processes.

PLANES, TRAINS, AND AUTOMOBILES

... NOT IN THAT ORDER

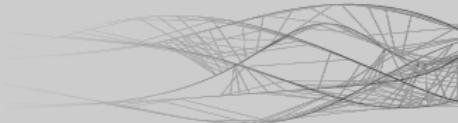


Planes



PLANES, TRAINS, AND AUTOMOBILES

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Trains



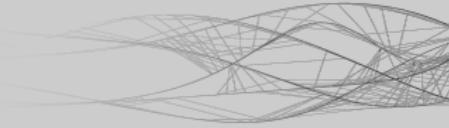
Automobiles



Planes

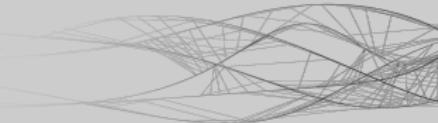


COMPARISONS

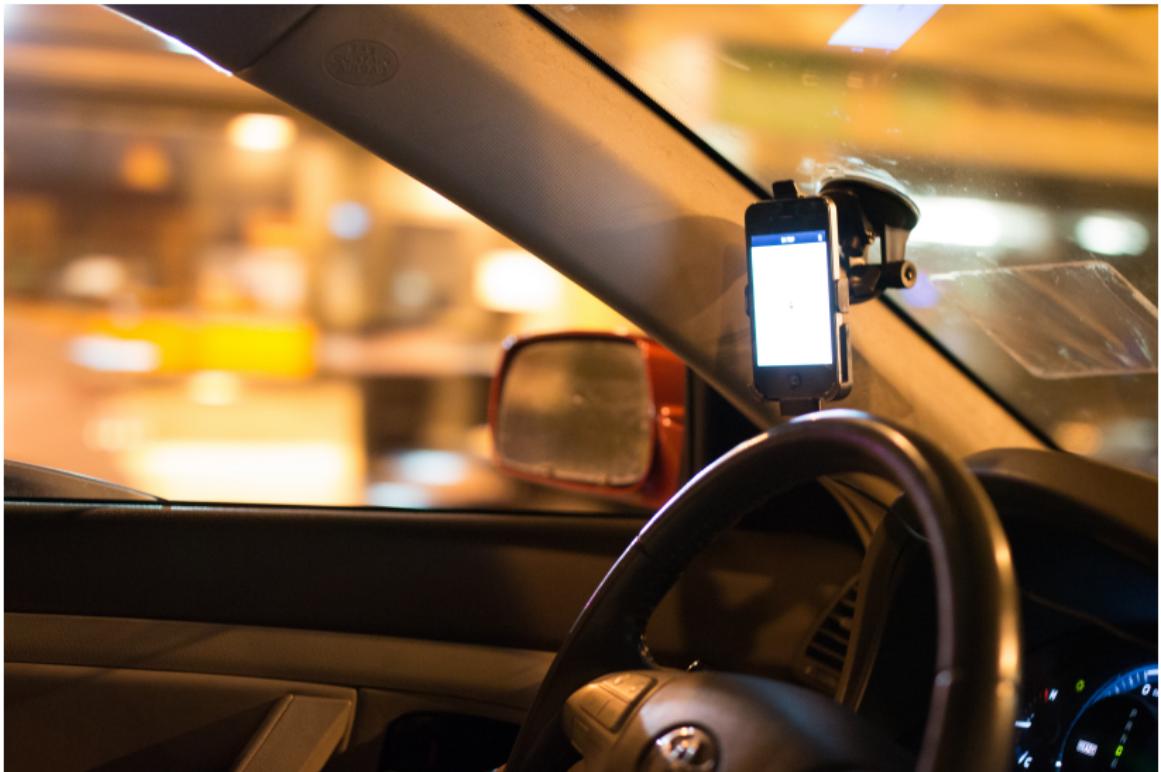


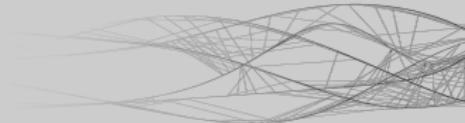
- Limited array of tasks versus arbitrarily complex work
 - *Building* planes versus *fixing* trains
- Has technology changed this?
 - Technology makes complex tasks relatively trivial
 - Measuring workers is easier than ever

COMPLEXITY CAB DRIVERS



COMPLEXITY CAB DRIVERS

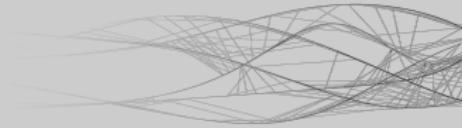




notes

- I'm thinking of pointing to UpWork's screen recording tool as a way to measure workers
- also maybe google analytics and other ways of tracking web-based workers

IMPLICATIONS



- We make stronger assumptions about workers' abilities thanks to technology
- Evaluation remains difficult, but we're trying to find stopgap solutions through decomposition
- We're still not solving the problems of inherently subjectively judged work

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