Examining Crowd Work and Gig Work Through The Historical Lens of Piecework

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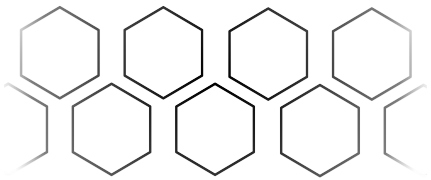
Open problems in crowdsourcing



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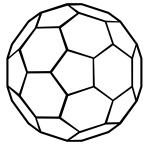

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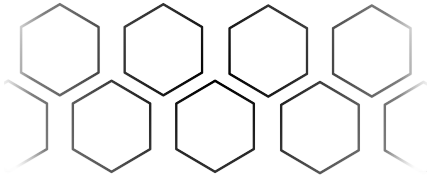

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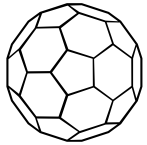

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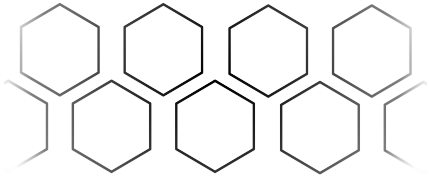

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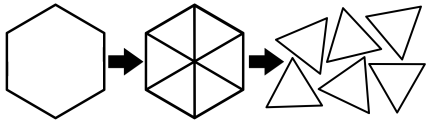

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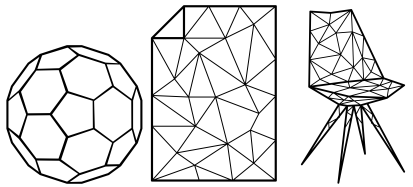

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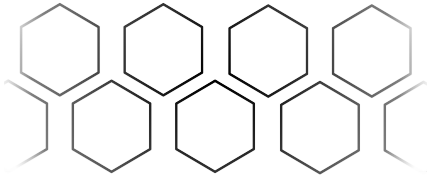

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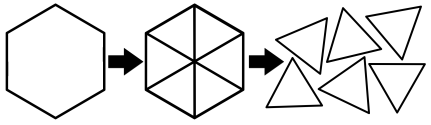

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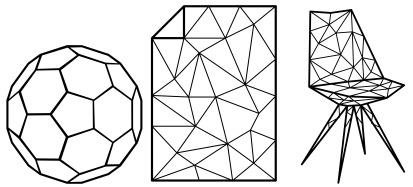

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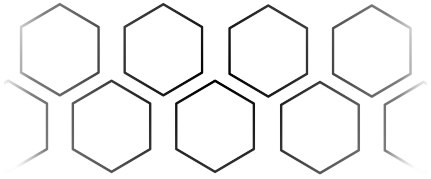

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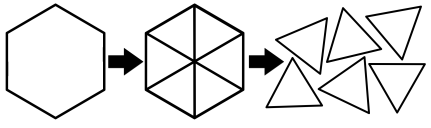

Decomposition

- **Relationships**
  Irani and Silberman [13, 12], Gray et al. [8], McInnis et al. [27], Salehi et al. [34], and Lee et al. [24]

What is the future of work?

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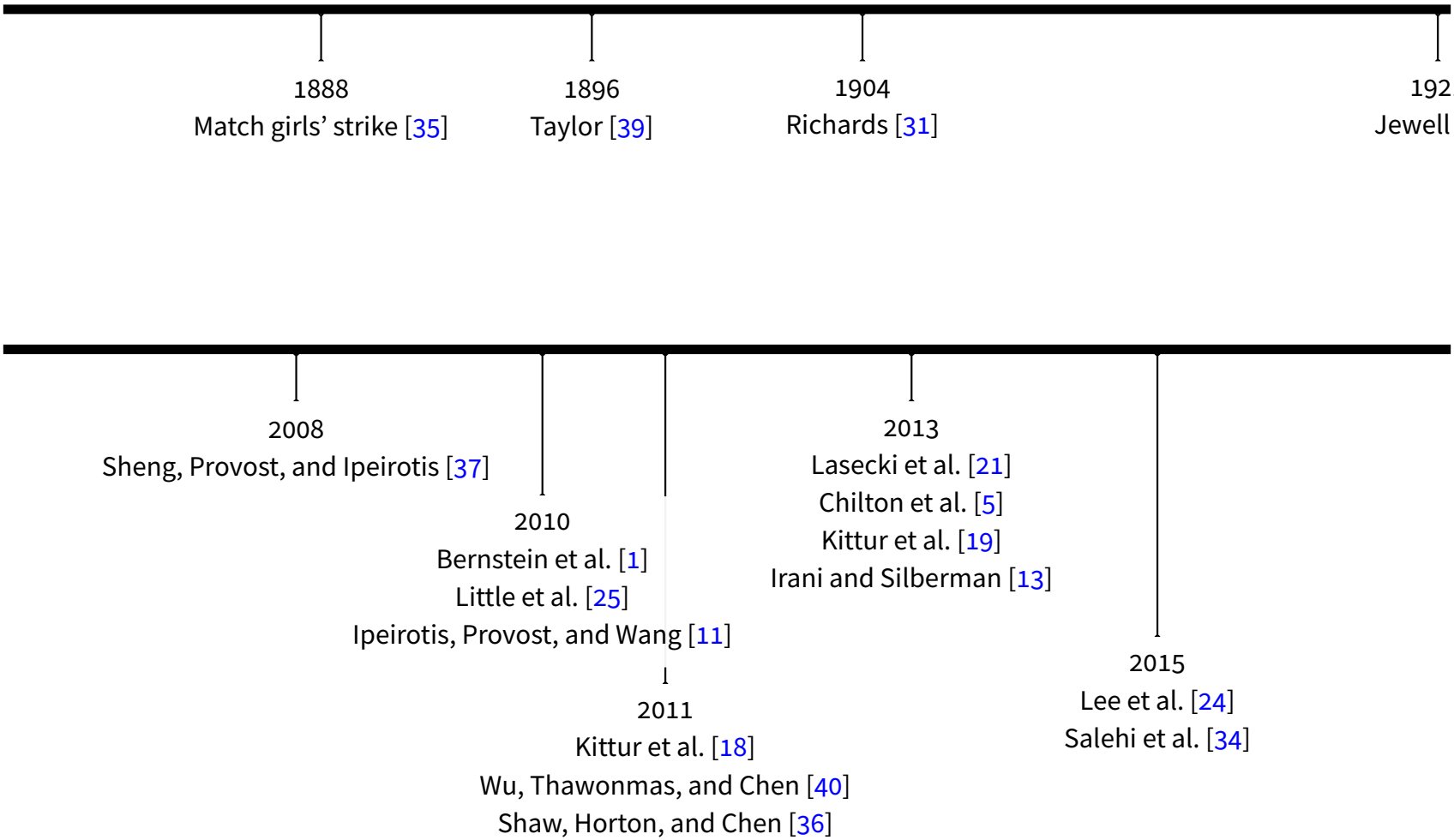
How will **technology** affect the **complexity** of the work that on–demand workers do?

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

How can we **reach** those limits?

A 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 [32, 33]
  - In HCI
    Wyche, Sengers, and Grinter [41] and Bødker [2]

A BRIEF GLOSSARY

- Crowd work: digitally mediated **information work** — for example, work done on Amazon Mechanical Turk [19]
- Gig work: digitally mediated — but often **physically embodied** — one–off jobs, such as *driving*, *courier services*, and *administrative support* [6, 30]

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  Bernstein et al. [1], Kim et al. [17], and Nebeling et al. [28]

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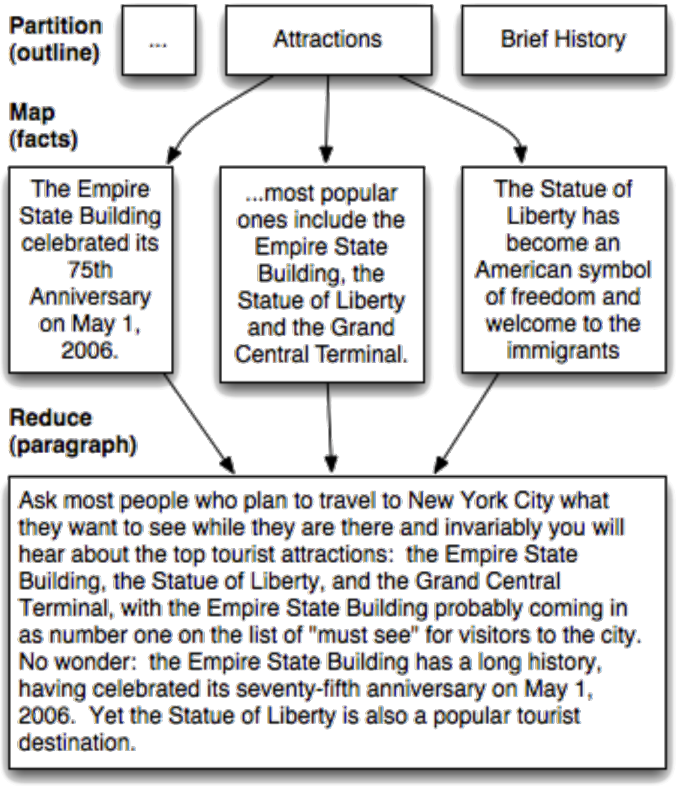
- Can crowds create things from whole cloth?

  Kim and Monroy-Hernández [15], Kim et al. [16], Hahn et al. [10], and Lasecki, Kushalnagar, and Bigham [20]

What does the crowdsourcing literature say?

- Build complexity into the process
  - **Apply CS methods to people**
    Kittur et al. [18]



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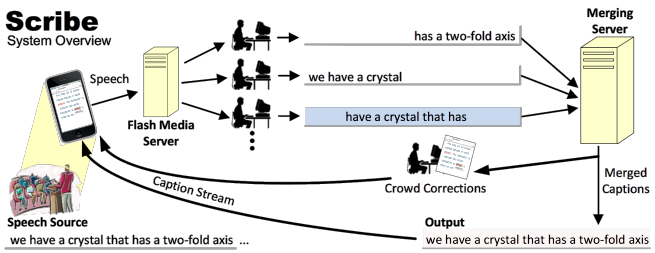

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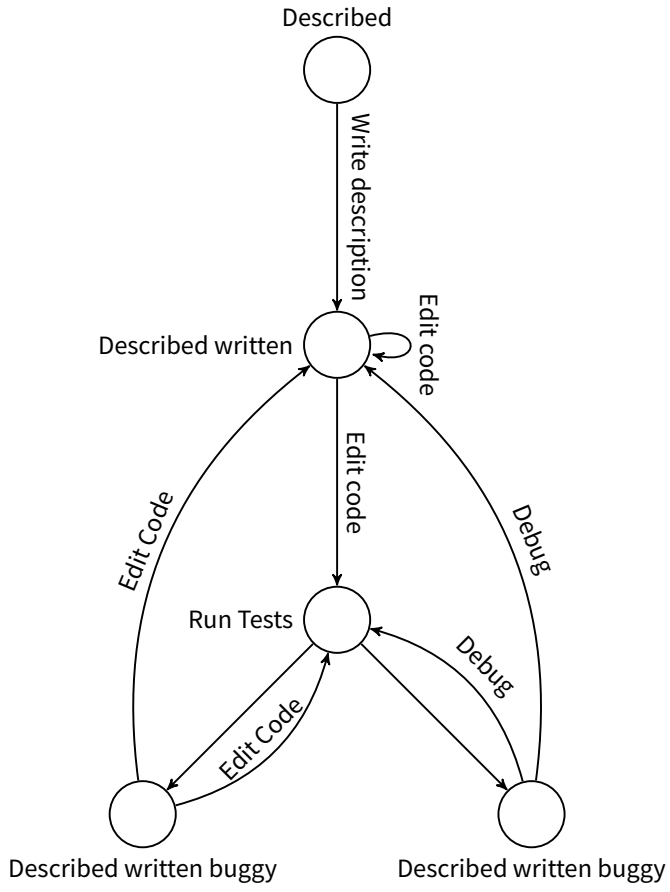
  - **Crowdsourcing workflows as function state machines**
    LaToza et al. [22]



What does the piecework literature say?

George Airy (astronomer) used a very similar approach [9]

- 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 Swing.	Approximate Time (Astronomical Reckoning).		Number of Signals.	Mean of Times by Shelton.	Mean of Times by Earnshaw.	Interval by Shelton.	Interval by Earnshaw.	Rate $\frac{\text{Earnshaw}}{\text{Shelton}}$	Logarithm of Rate $\frac{\text{Earnshaw}}{\text{Shelton}}$	Corrected Logarithm of Rate $\frac{\text{Earnshaw}}{\text{Shelton}}$
	Oct.	h		h m s	h m s	h m s	h m s			
1	1.	23	22	3 19 36·505	21 23 28·764	4 0 23·100	4 0 38·722	1·0010831	0·00047012	
2	2.	3	21	7 19 59·605	1 24 7·486	3 58 21·652	3 58 37·400	1·0011011	0·00047793	
3	2.	7	21	11 18 21·257	5 22 44·886	4 45 27·829	4 45 46·421	1·0010855	0·00047117	0·00047387
4	2.	11	29	16 3 49·086	10 8 31·307	4 17 6·532	4 17 23·234	1·0010827	0·00046995	
5	2.	16	17	20 20 55·618	14 25 54·541	3 13 21·898	3 13 34·795	1·0011116	0·00048249	
6	2.	19	25	23 34 17·516	17 39 29·336	3 49 42·503	3 49 57·654	1·0010994	0·00047720	0·00047990
7	2.	23	31	3 24 0·019	21 29 26·990	3 55 2·071	3 55 17·433	1·0010893	0·00047282	
8	3.	3	21	7 19 2·090	1 24 44·423	4 2 41·510	4 2 57·445	1·0010944	0·00047503	
9	3.	7	25	11 21 43·600	5 27 41·868	4 31 5·786	4 31 23·591	1·0010947	0·00047516	0·00046316
10	3.	11	22	15 52 49·386	9 59 5·459	3 27 49·747	3 28 3·324	1·0010888	0·00047260	
11	3.	15	24	19 20 39·133	13 27 8·783	3 59 47·292	4 0 3·188	1·0011049	0·00047959	
12	3.	19	24	23 20 26·425	17 27 11·971	4 3 30·416	4 3 46·029	1·0010686	0·00046384	0·00047194

Cottage Industry

First appearances of piecework:

Cottage Industry

First appearances of piecework: farms

Cottage Industry

First appearances of piecework: farms, textiles

Cottage Industry

First appearances of piecework: farms, textiles, and matchsticks.

Planes, trains, and automobiles

... not in that order

Trains

- "Efficiency experts" measured how long it would take to do various jobs
- These measurements would be used to assign values for each specific task
- Train engineers performed work more slowly when inspectors were around

Planes, trains, and automobiles

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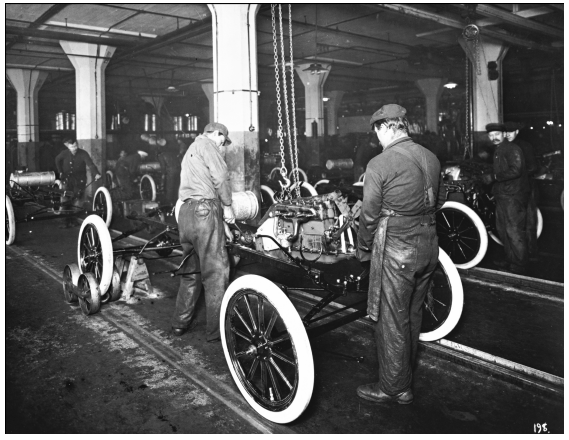
Automobiles

- Fordism, Taylorism, and Scientific Management in full force



- *Manufacturing* proved amenable to assembly line processes.

Planes, trains, and automobiles

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Planes

Planes, trains, and automobiles

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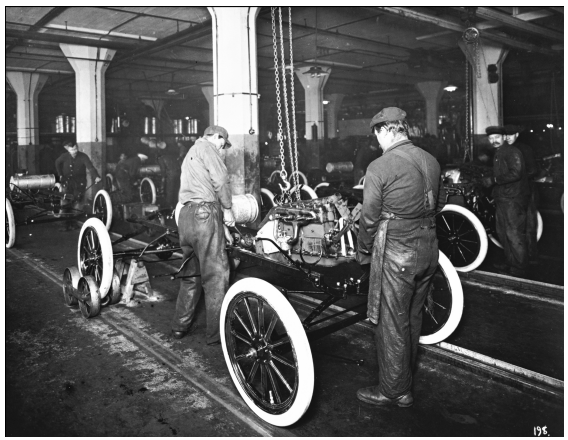
Trains

Automobiles



Planes

Comparisons

- Limited range of tasks > arbitrary changes (building planes is easier than fixing trains)
- Has technology changed this? Yes
  - 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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