Ongoing Threads in Crowdsourcing Research

1>threads<1>1>threads

Complexity

Hahn et al. (2016), Kim and Monroy-Hernández (2016), Kittur et al. (2011), Nebeling et al. (2016), Suzuki et al. (2016), Yu, Kittur, and Kraut (2016), and Yuan et al. (2016)

Workers

Gray et al. (2016), Irani and Silberman (2016, 2013), Lee et al. (2015), McInnis et al. (2016), and Salehi et al. (2015)

Decomposition

Celis et al. (2016), Chang, Kittur, and Hahn (2016), Law et al. (2016), Lykourentzou et al. (2016), and Newell and Ruths (2016)

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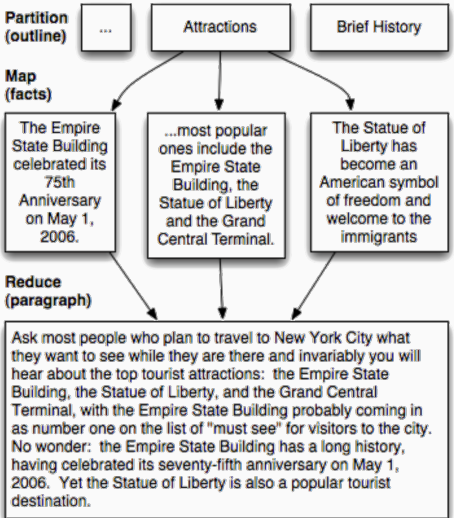
What Does On–Demand Work Say?

Build complexity into the process

- Apply CS methods to people
  Kittur et al. (2011)



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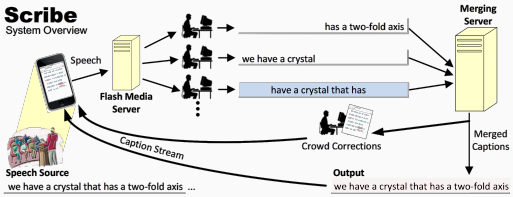

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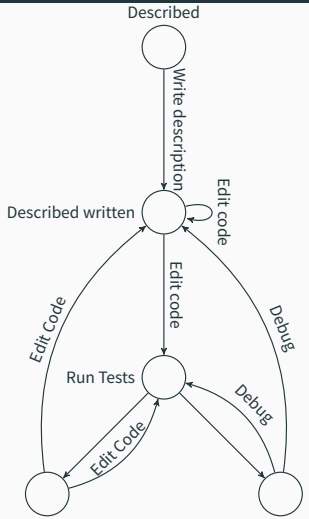
- Crowdsourcing workflows as function state machines
  LaToza et al. (2014)



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What we'll find

- Building complexity into the processes
- Incremental advances until managers *tracked* and *standardized* workers and work
- Insights into task specialization

What Does Piecework Say?

George Airy (astronomer) used a very similar approach

Grier (2013)

- Employed computers
- 13–20 years old
- no particularly strong background in mathematics
- A basic understanding of logarithms, algebra, etc…

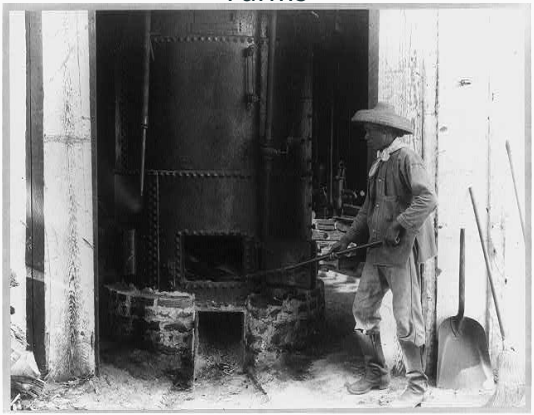
George Airy

Airy built complexity into the process, assigning *human computers* to calculate & verify 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

Low Complexity

Farms



- Formalization of piecework: *payment for results*
  Chadwick (1865)
- Dynamic piece rates

Low Complexity

Textiles

- Distributed workers
- Assuming common skills

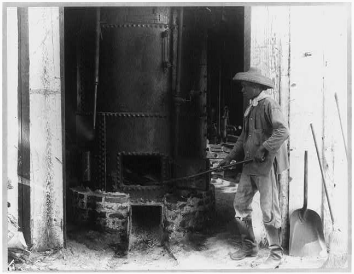
Low Complexity

- Strict management
- Formalizing work methods

Matchstick Girls

Low Complexity

Farms



Textiles

Matchstick Girls

Planes, Trains, and Automobiles

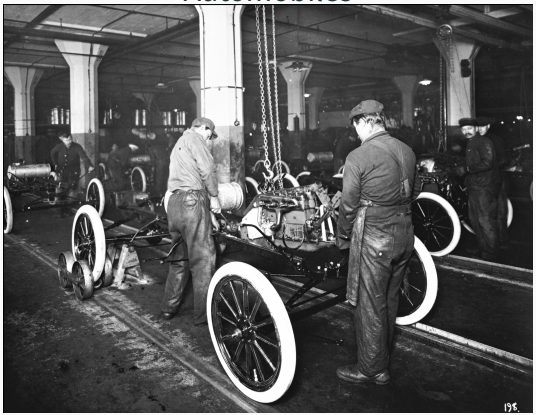
Trains

- “Efficiency experts” measured how long it would take to do various jobs
  Cunningham (1911)
- These measurements would be used to assign values for each specific task
  Jewell (1921)

Planes, Trains, and Automobiles

- Consolidating and training workers (*Fordism*)
  Schoenberger (1988) and Tolliday and Zeitlin (1986)

Automobiles



- Measuring and evaluating workers by very carefully defined instructions (*Taylorism*)
  Taylor (1911)

Planes, Trains, and Automobiles

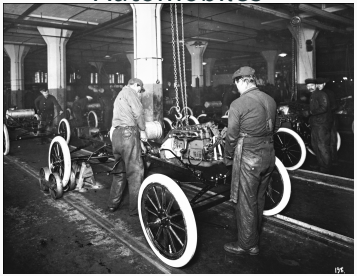
- Men drafted during World War II
- Factories turned to a new workforce who had neither conventional training nor experience
- **Specialized training and assignment**

Planes

Planes, Trains, and Automobiles

Trains

Automobiles



Planes

Comparisons

- Building complexity into the processes
- Challenges dealing with flexibility
    - *Building* planes versus *fixing* trains

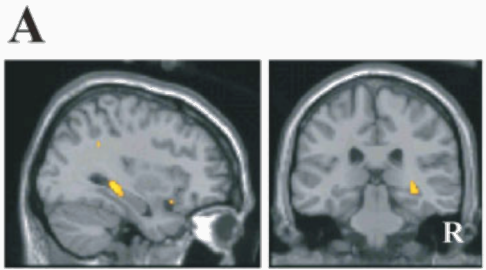
Implications for On–Demand Work

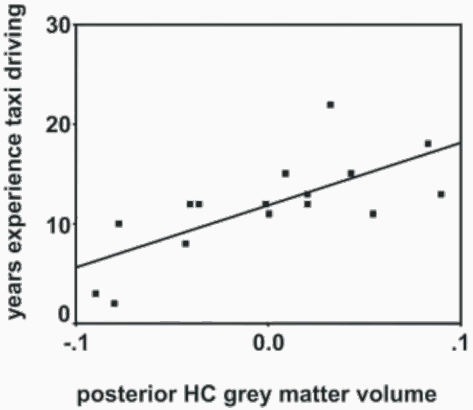
Has technology shifted on–demand work?

- Technology makes *some* complex tasks relatively trivial
- Measuring workers is easier than ever

Enhanced Cognition

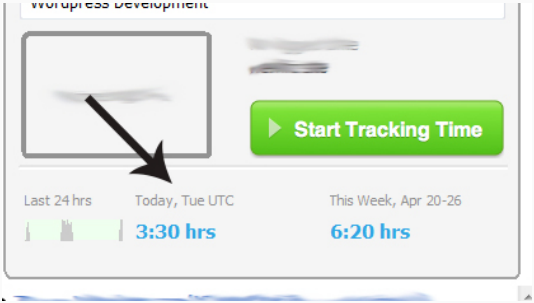
Enhanced Cognition





Enhanced Cognition

Tracking Work and Workers



Upwork has turned to logging workers' keystrokes and taking screenshots automatically every 10 minutes

Takeaways

- 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