



Purdue Fall 2018

CS59000-CSC: Crowdsourcing and Social Computing

<http://mingyin.org/CS590/Fall2018/index.html>

Class 3: Crowd Workers

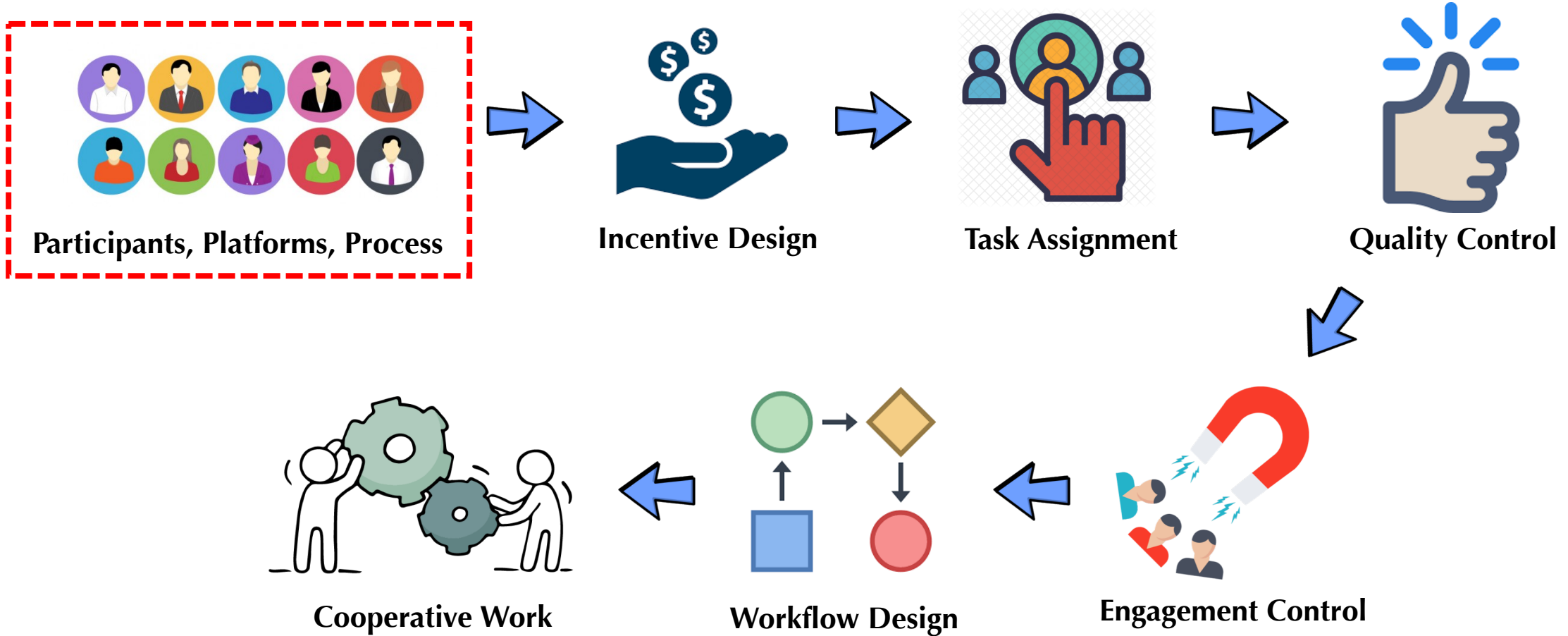
2018.8.27

Ming Yin

Administrative Notes

- Pick presentation topics:
<https://doodle.com/poll/qmbfnp8e2pnr5dw8>
 - Please indicate 2 topics you are interested in presenting
 - Topics will be assigned in a first-come, first-served manner (so sign up to topics that you are interested in presenting as early as possible!)
- Sign up as a requester on Amazon Mechanical Turk! (will come back to this)
- Late policy
 - You can have 2 chances of submitting reading response/assignment after the due time (but you still need to submit!)
 - All project-related due dates are **hard deadlines!**

Where are we in the course?



So, who are those workers?

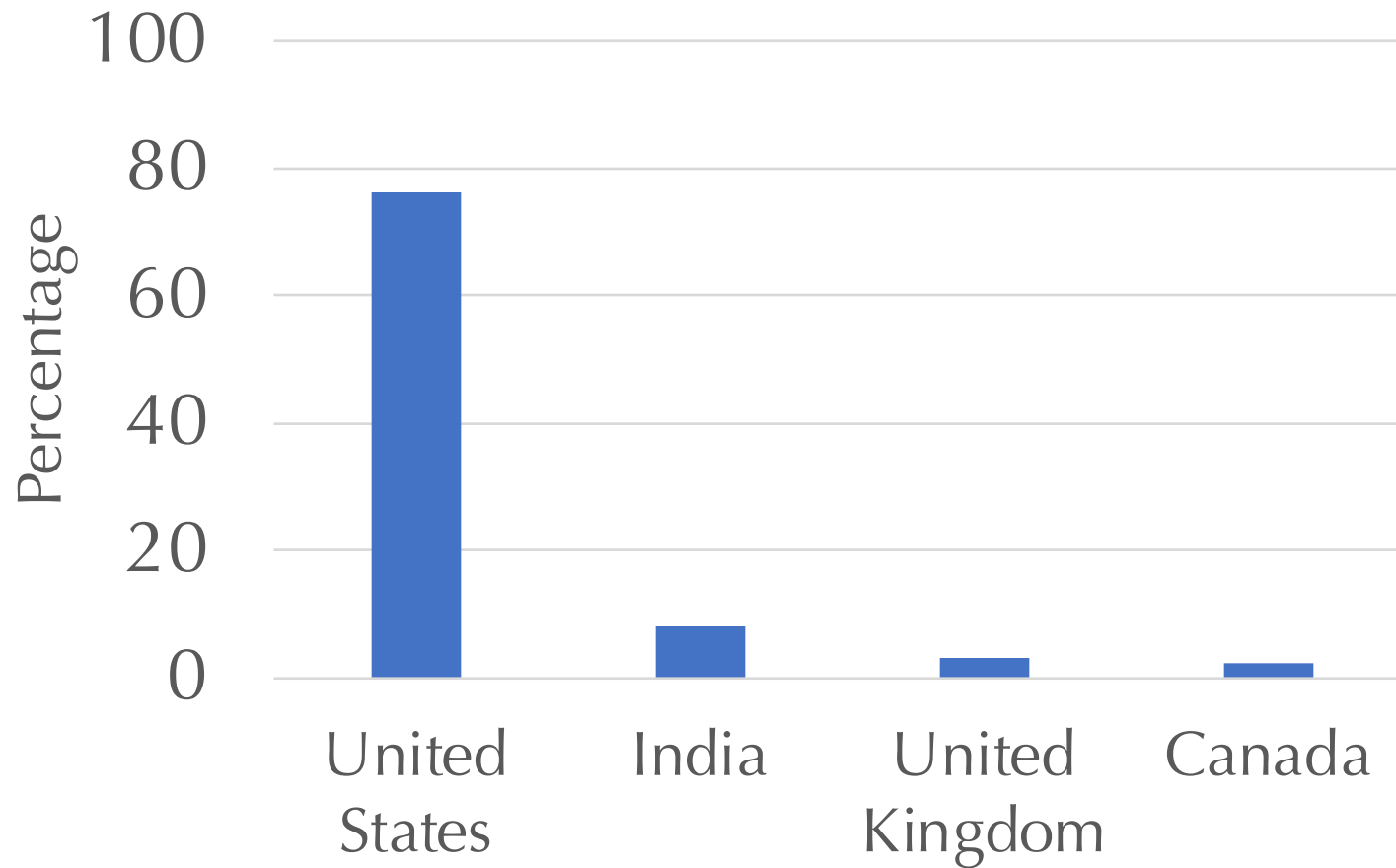
- Demographics information
- How is the composition of the crowd changing over time?
- Why do they choose to do crowd work?
- How many workers are there?
- How do they get the work done?



Difficult Questions to Answer!

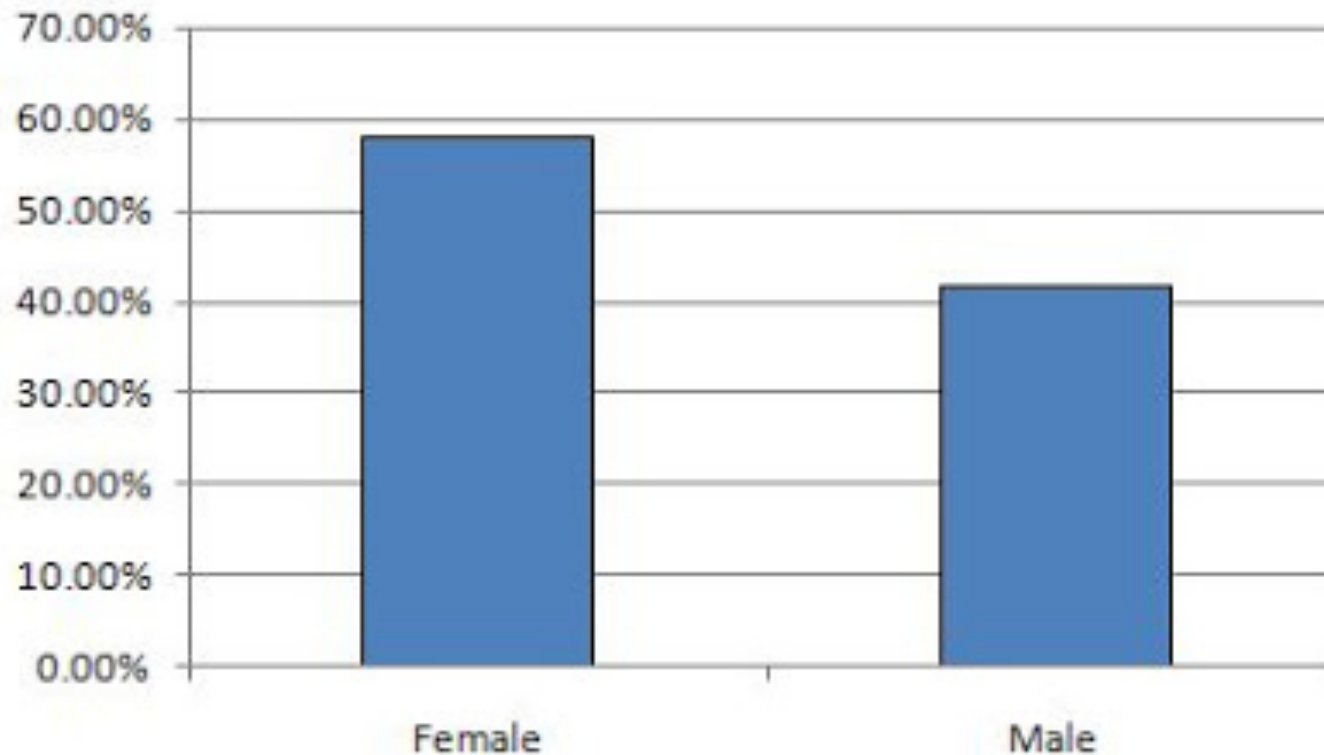
- No official census data about crowd workers are available
- In fact, crowd workers are more or less perceived as “anonymous” and “interchangeable”
- Researchers are physically apart from the globally-distributed workers, making it hard to “observe” their work life
- Solution: self-reported surveys + ethnographic analysis of digital trace

MTurk Worker Demographics (2008): Country



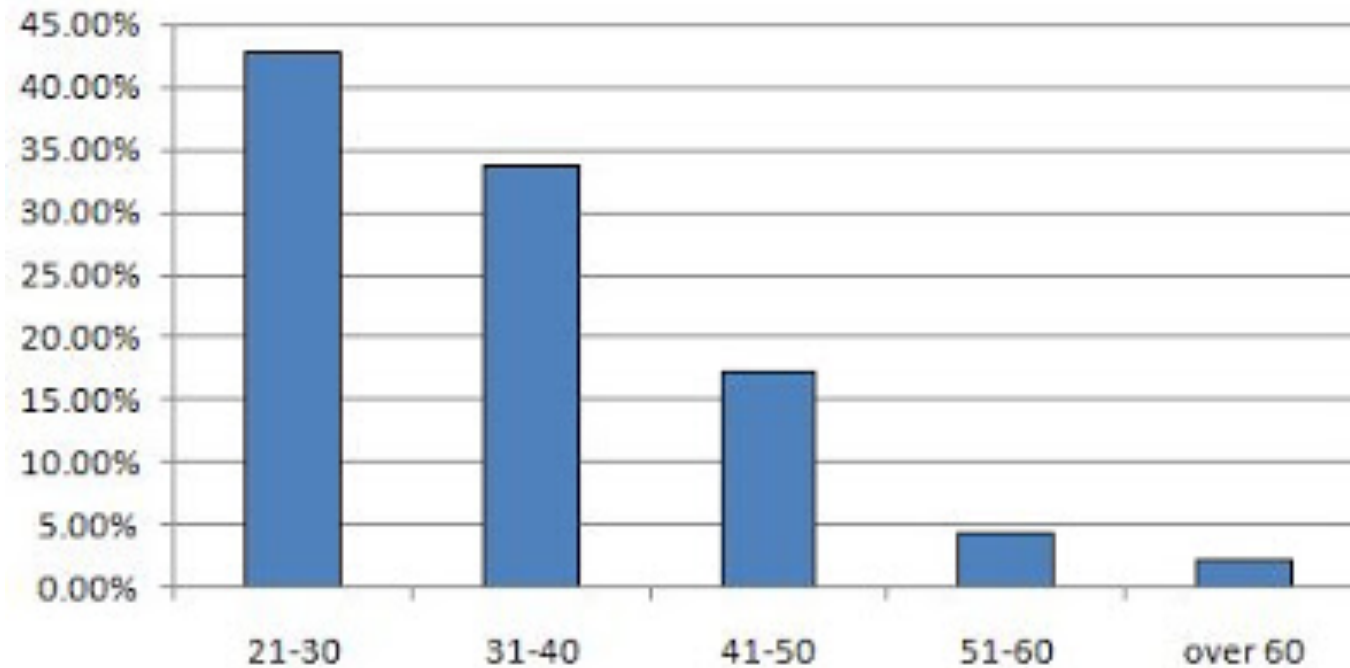
The majority of crowd workers on MTurk come from US!

MTurk Worker Demographics (2008): Gender



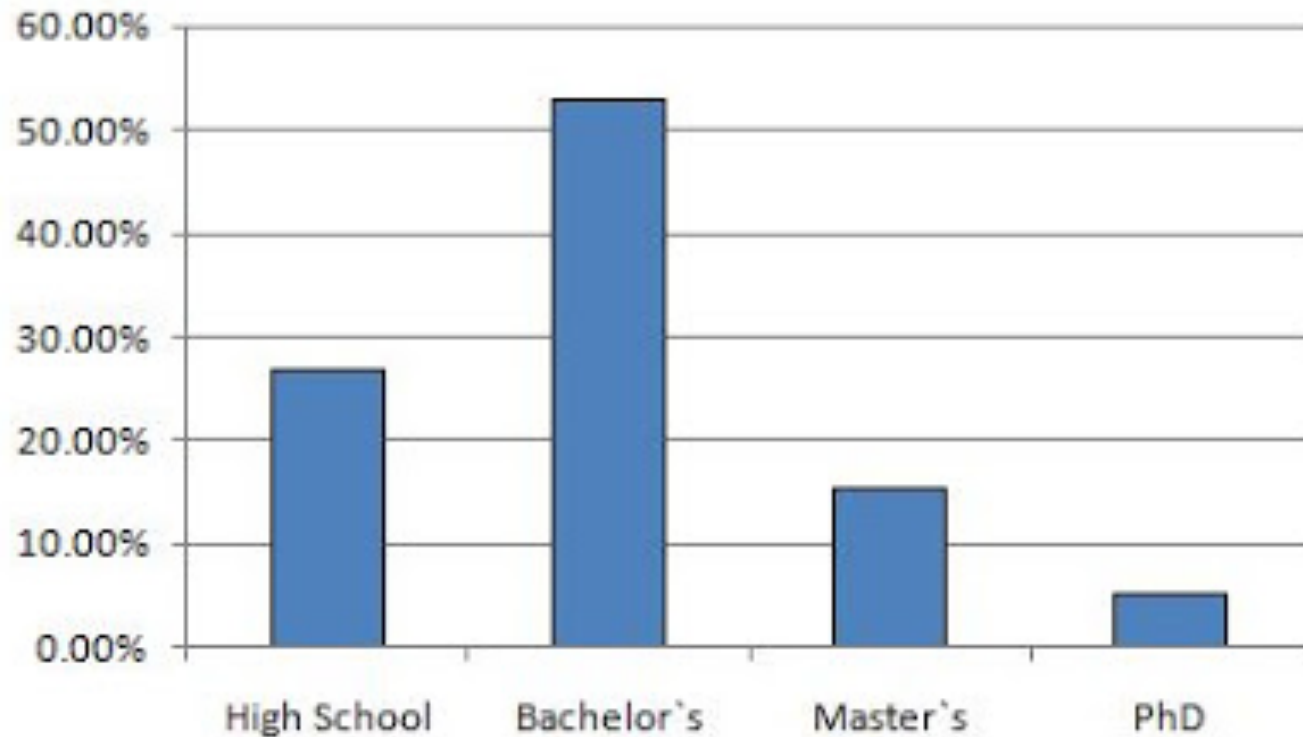
More female workers than male workers!

MTurk Worker Demographics (2008): Age



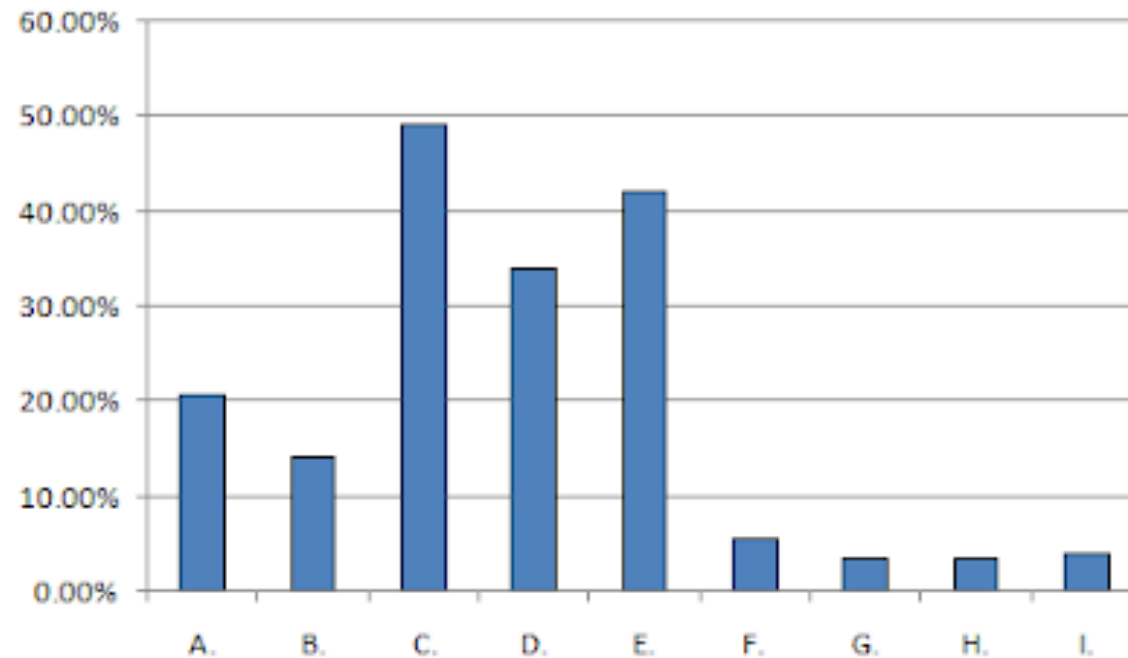
The majority of workers are under 40!

MTurk Worker Demographics (2008): Education



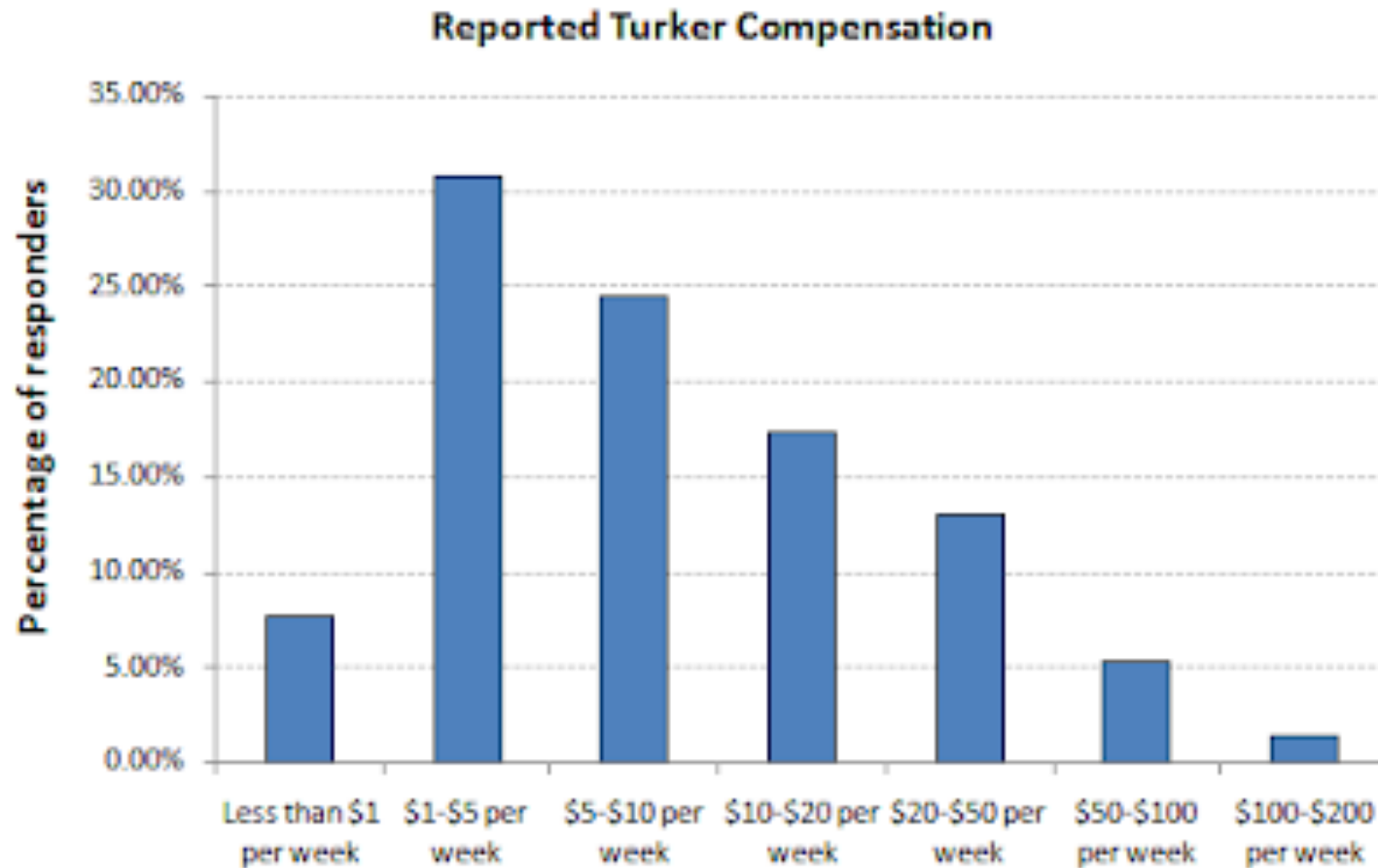
The majority of workers have bachelor degree or higher

MTurk Worker Demographics (2008): Purpose



- A. Kill Time
- B. Fruitful way to spend free time (Instead of watching TV, playing video games/online games, Sense of purpose when watching TV, something to do during downtime in work)
- C. Income purposes (Gas, Bills, Make money, Credit card, Groceries, School, Help family)
- D. Pocket change/extra cash (Hobbies, Mad money, Buy personal stuff)
- E. For fun, interesting, addiction
- F. Challenge, self-competition
- G. Unemployed, no regular job, as part-time job
- H. To sharpen/ To keep mind sharp
- I. Learn English

MTurk Worker Demographics (2008): Payment received



<http://www.behind-the-enemy-lines.com/2008/09/how-much-turking-pays.html>

MTurk Worker vs. Internet Users (2008, US)



Younger! 54%

Age: 21-35

22%

More Female! 70%

Female

50%

Lower Income! 65%

**Household
income < 60K**

45%

Smaller Family! 45%

**Household
<= 2 people**

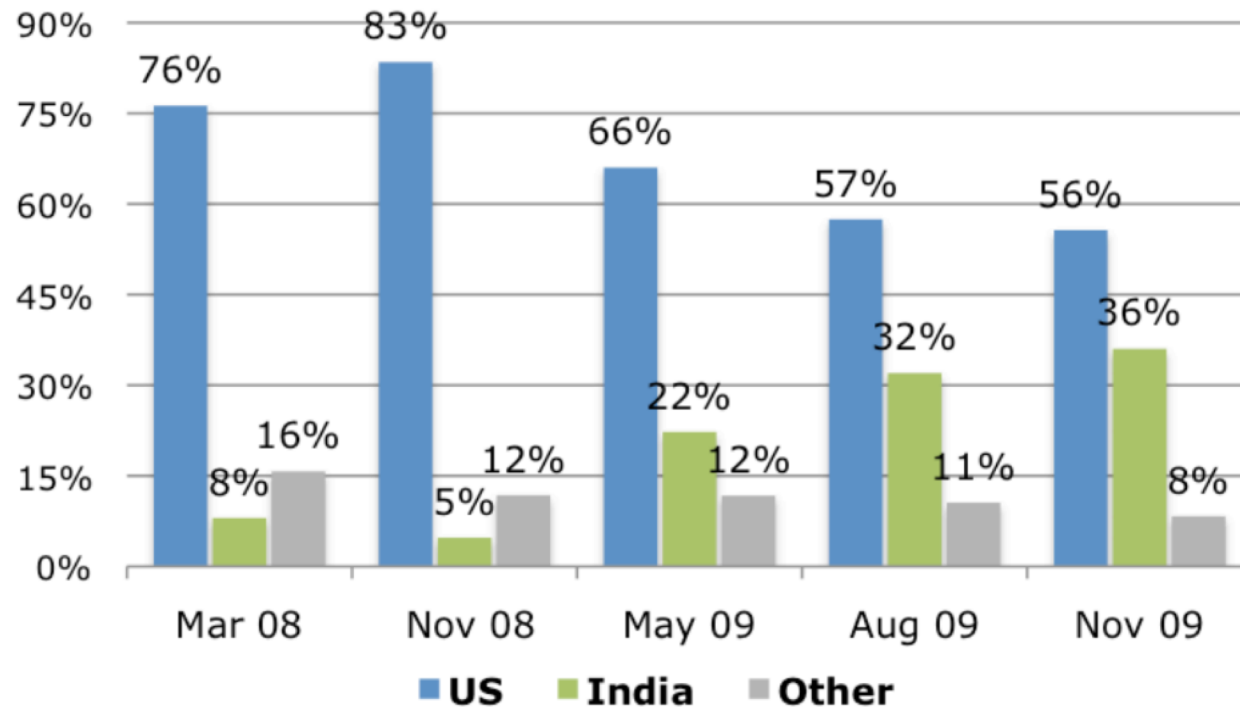
28%

Faces of MTurk workers



https://waxy.org/2008/11/the_faces_of_mechanical_turk/

But Demographics Also Changes Over Time...



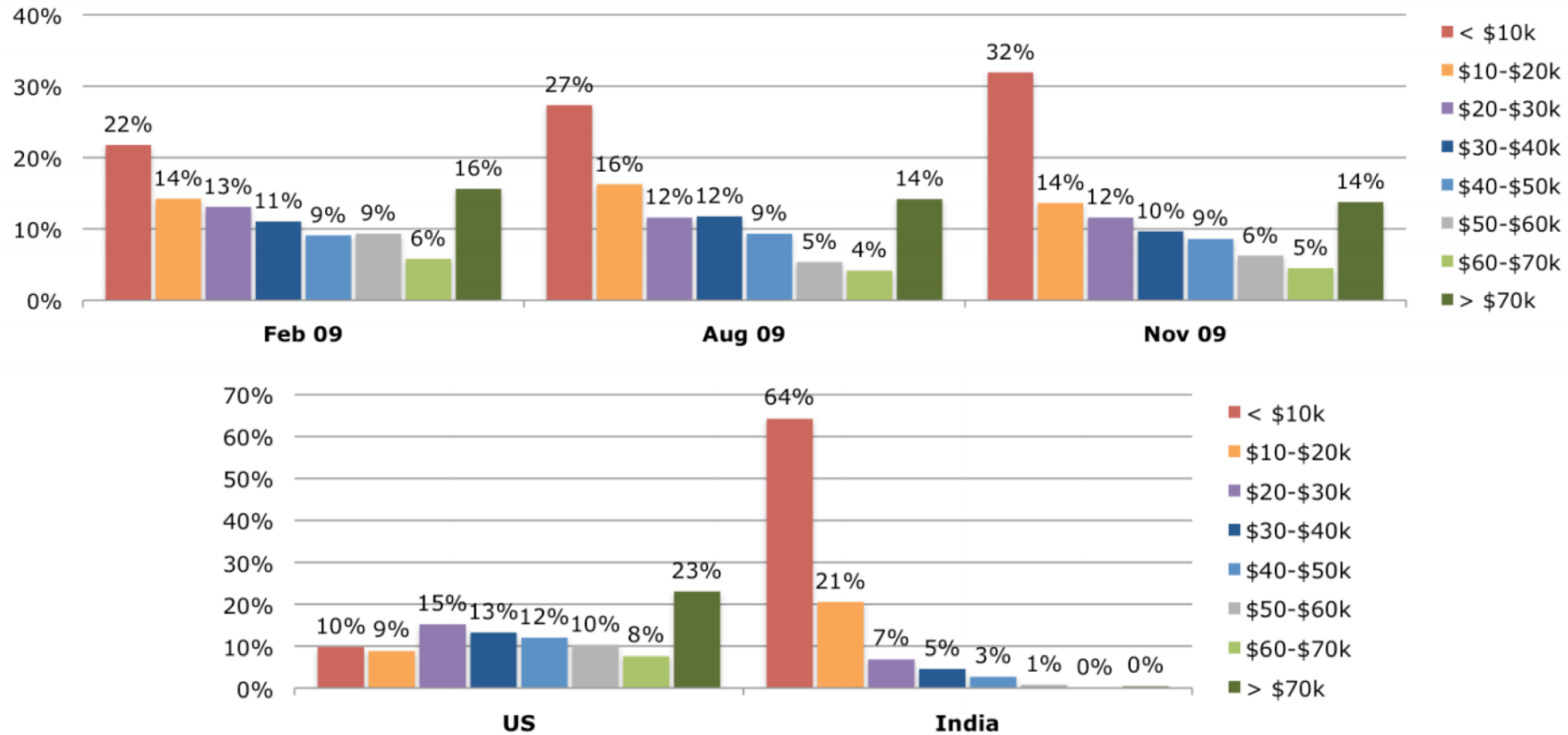
From a primary US-based workforce to an increasingly international group of workers.

But Demographics Also Changes Over Time...

		Nov 08	May 09	Aug 09	Nov 09
Average Age	<i>US</i>	33.6	34.3	33.2	35.4
	<i>India</i>	28.5	28.8	27.6	26.4
Gender	<i>US</i>	28% male, 72% female	34% male, 66% female	31% male, 69% female	37% male, 63% female
	<i>India</i>	75% male, 25% female	61% male, 39% female	69% male, 31% female	66% male, 34% female
Education	<i>US</i>	32% Bachelors, 11% Graduate	34% Bachelors, 14% Graduate	34% Bachelors, 19% Graduate	38% Bachelors, 17% Graduate
	<i>India</i>	69% Bachelors, 29% Graduate	56% Bachelors, 18% Graduate	56% Bachelors, 13% Graduate	45% Bachelors, 21% Graduate

Ross, Joel, et al. "Who are the crowdworkers?: shifting demographics in mechanical turk." *CHI'10 EA*

But Demographics Also Changes Over Time...



Ross, Joel, et al. "Who are the crowdworkers?: shifting demographics in mechanical turk." *CHI'10 EA*

MTurk-Tracker: A Long-Term Demographic Survey



Gender

Gender (US)

Gender (India)

Year of Birth

Year of Birth (US)

Year of Birth (India)

Marital Status

Marital Status (US)

Marital Status (India)

Household Size

Household Size (US)

Household Size (India)

Household Income

Household Income (US)

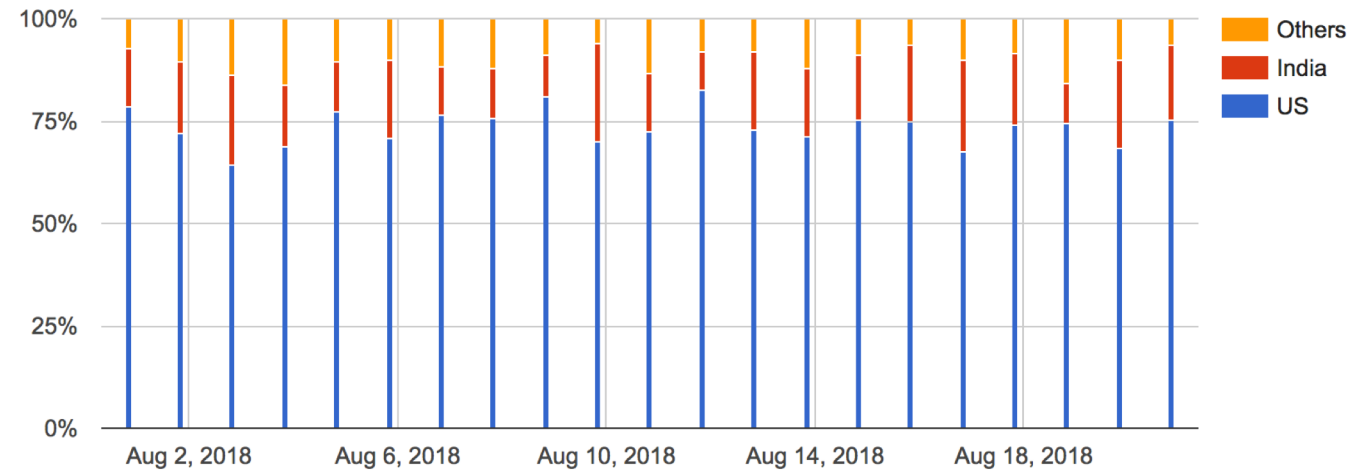
Household Income (India)

Countries

API

08/01/2018 08/21/2018

hourly daily day of week



Each worker can take at most one survey in 30 days

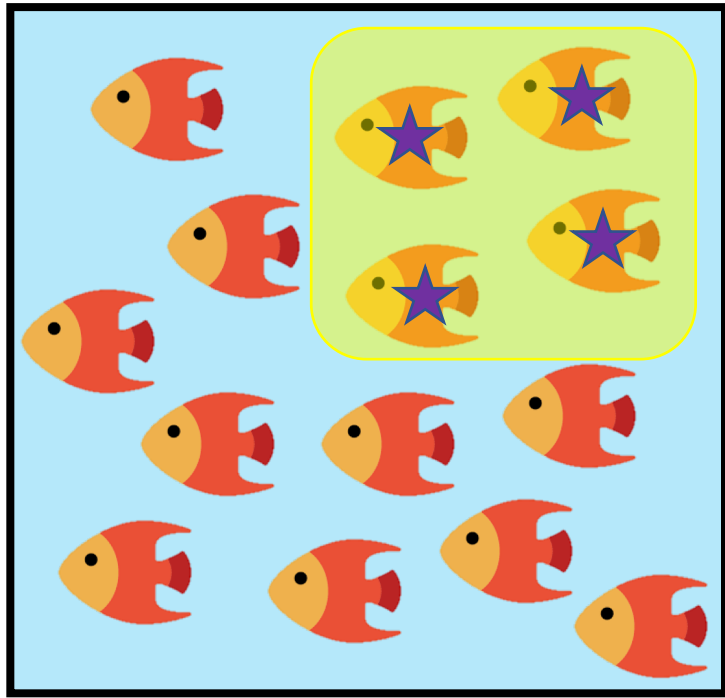
Discussion

Does the demographic information collected from self-reported survey responses suffer from any problems?

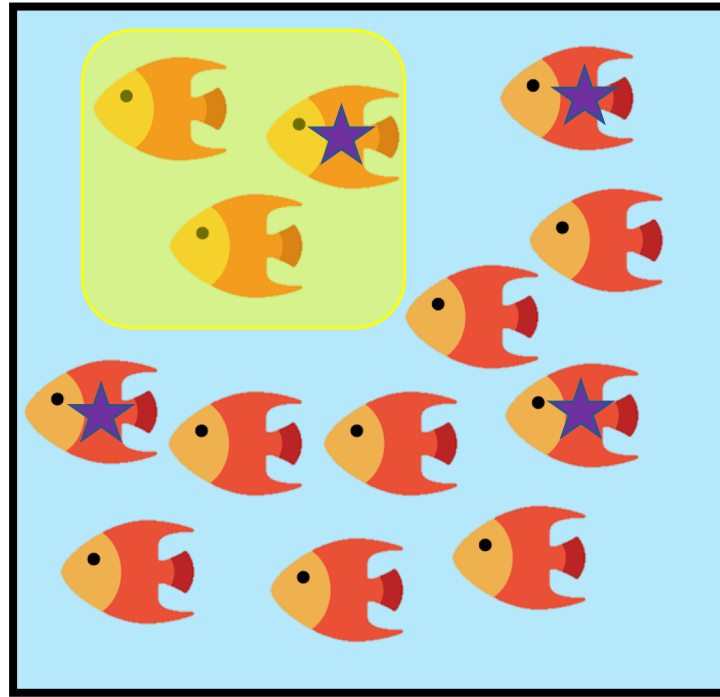
- Self-selection bias
- Untruthful self-reports

How Large is the Crowd?

The capture-recapture analysis



M fish, N_1 captured (& marked)



N_2 recaptured, n marked

$$n = \frac{N_1}{M} \times N_2$$

$$M = \frac{N_1 N_2}{n}$$

How Large is the Crowd?

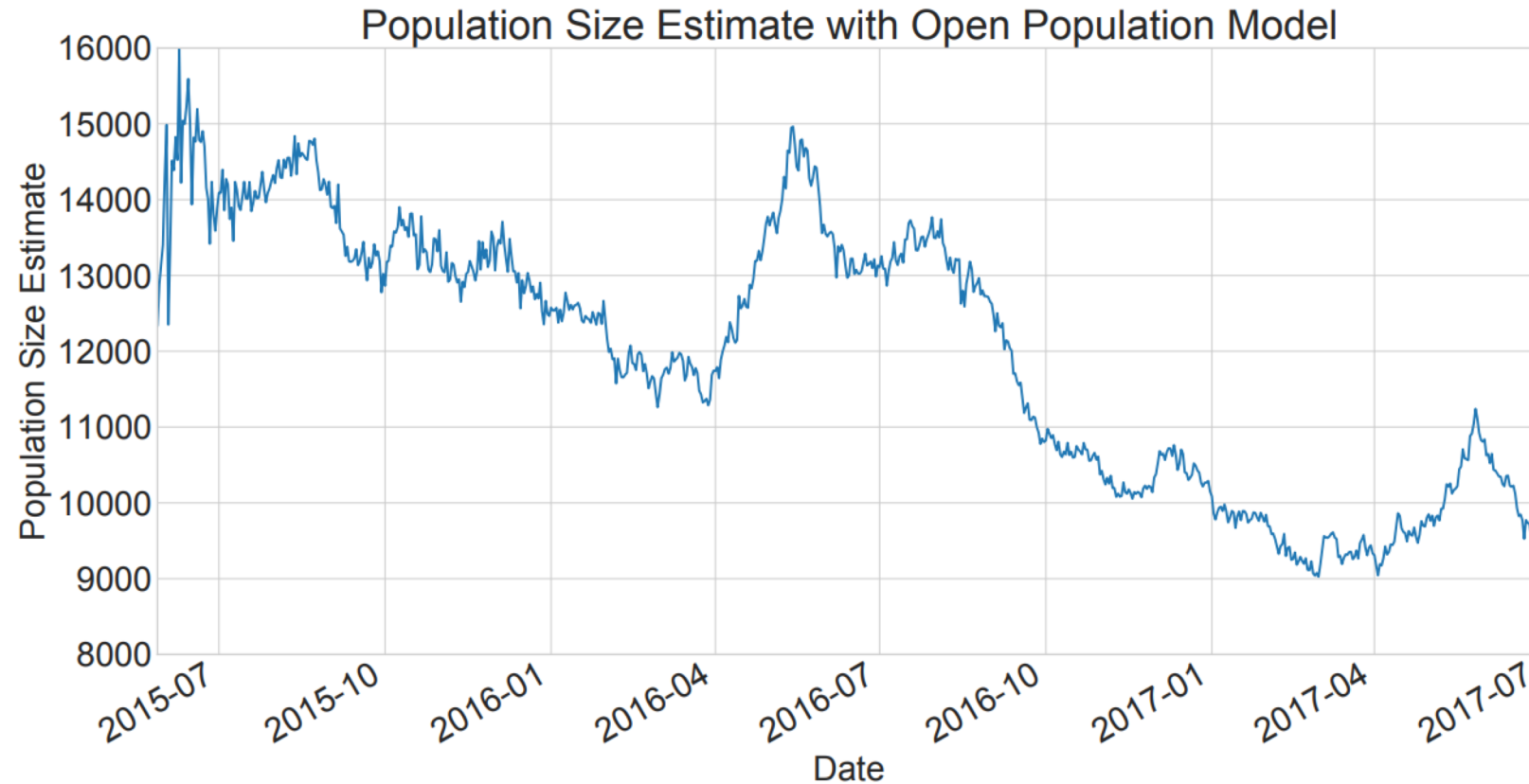
- Applying the capture-recapture analysis to workers who respond to demographic surveys, we concluded that $M = 13,410$.
- Two Key assumptions
 - Closed population model: No workers will leave the worker pool, and no new workers will join the pool
 - Equal propensity of participation: The probability to participate in demographic survey is equal across all workers.

How Large is the Crowd?

Open population model

- Survival probability: $S(t) = \exp(-\lambda t)$
- At time $d - t$, N_{d-t} workers participated in the survey
- At time d , assume that there are M_d workers in total. Among N_d workers that participated in the survey, $n_{d,t}$ workers also participated in the survey at time $d - t$.
- $n_{d,t} = \frac{N_{d-t} \exp(-\lambda t)}{M_d} \times N_d$, $M_d = \frac{N_{d-t} N_d \exp(-\lambda t)}{n_{d,t}}$

How Large is the Crowd?



Half-life of the
MTurk worker
population is 404
days

How Large is the Crowd?

Accounting for propensity of participating surveys

- Assume there are N workers in total, each worker gets a propensity score $a_i \sim p(a)$
- Capture n_1 workers, $P(\text{capture}|a_i) = 1 - (1 - \frac{a_i}{\sum_{j=1}^N a_j})^{n_1} \approx \frac{n_1 a_i}{NE[a]}$
- Recapture n_2 workers, $P(\text{capture}, \text{recapture}|a_i) = \frac{n_1 n_2 a_i^2}{N^2 E[a]^2}$
- The expected number of workers participating in both surveys: $m = N \int \frac{n_1 n_2 a_i^2}{N^2 E[a]^2} p(a) da = \frac{n_1 n_2}{N} (1 + \frac{\text{Var}[a]}{E[a]^2})$
- Following this method, the estimate for the number of Mturk workers is 178,000!

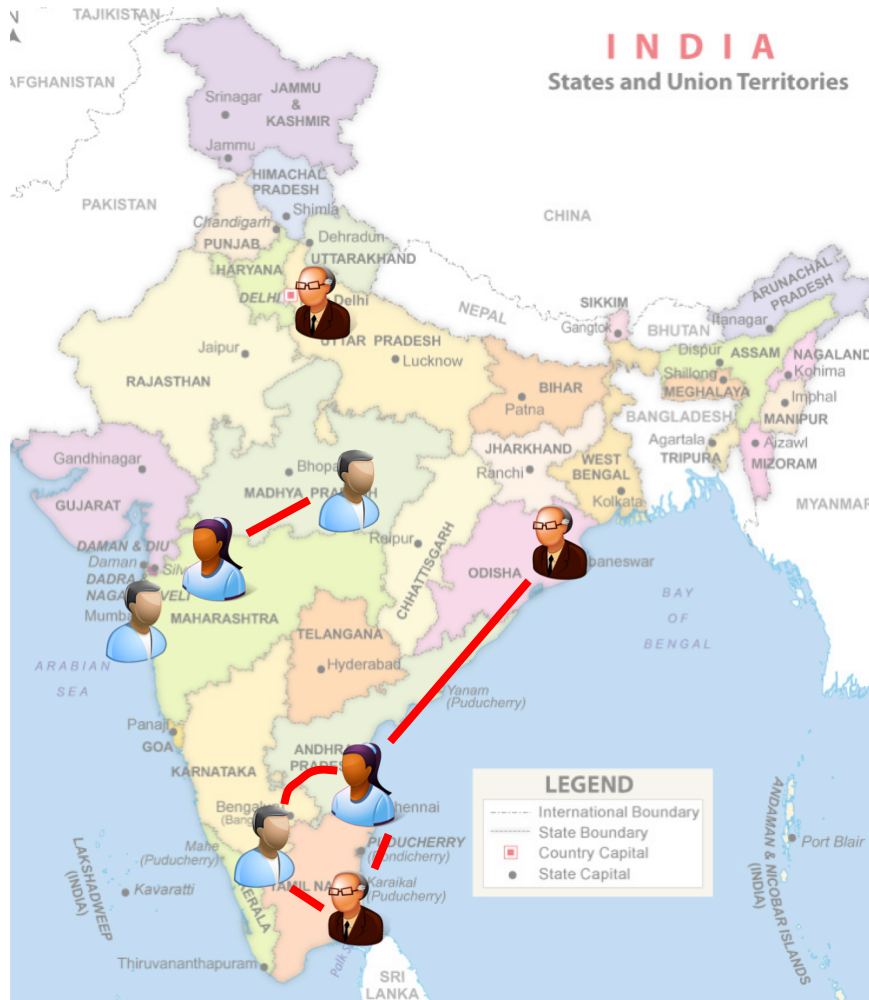
Up until this point...

Crowd workers on MTurk are...

- Mostly live in US and India, young, well-educated, yet with lower income
- Demographics changes over time
- A large population
- Seems independent?

Some Evidence From the Field

No! They talk to each other to...
(based on ~100 interviews)



Help with
administrative
overhead

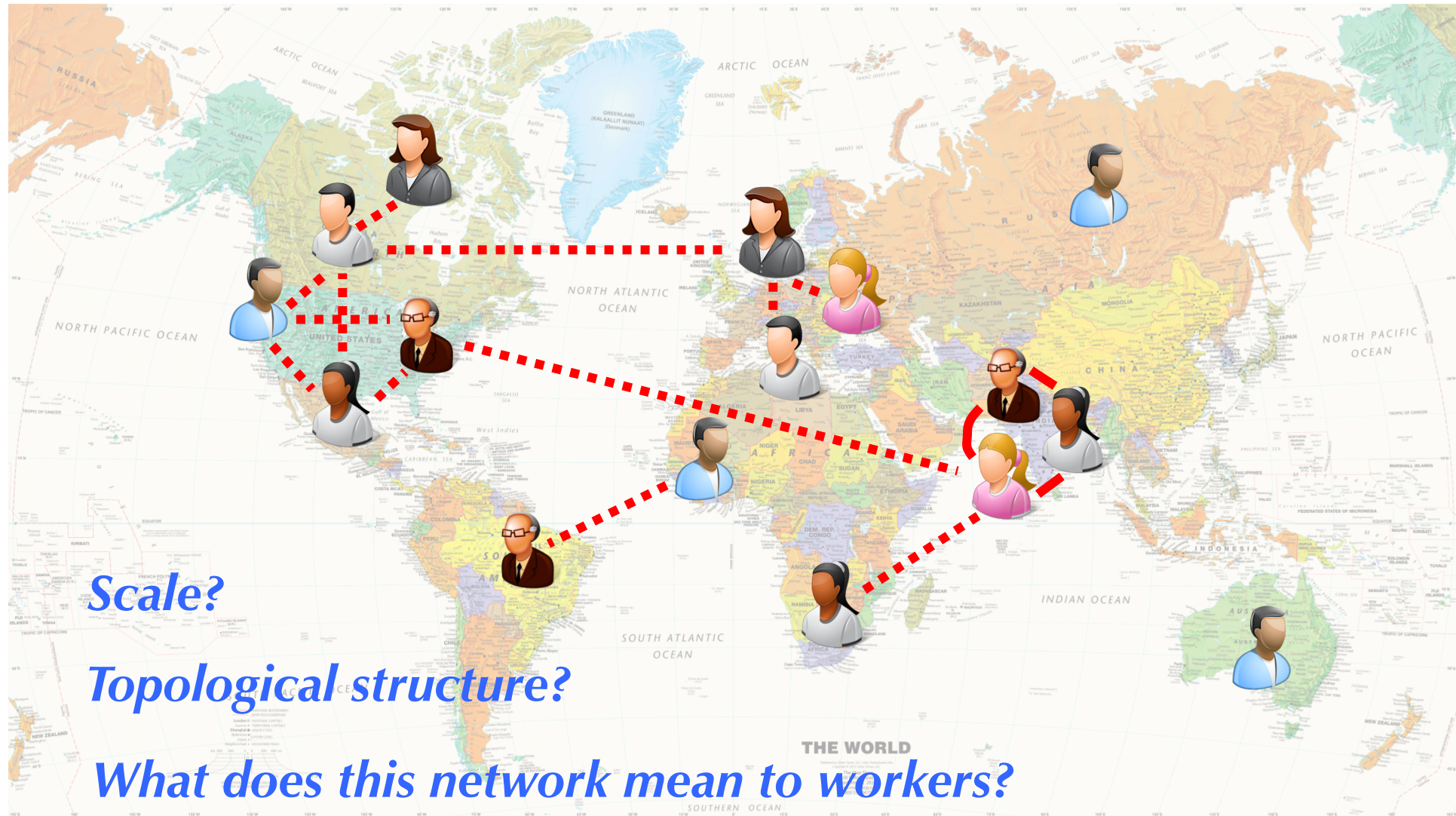


Share useful
information



Recreate social
connections

Map the Network!



Why is it Challenging?



Not accessible
through API



Not on the
MTurk platform



Nowhere to
download



Can't just crawl
from the web

We want...

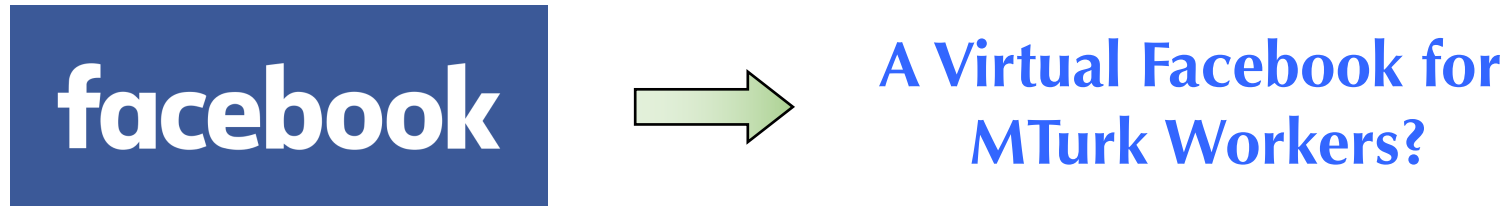
- ◆ Elicit “true” connections only!
- ◆ Elicit as many true connections as possible!
- ◆ Preserve workers’ privacy!

**Can't directly ask for
names!**

**Can't pay by
connections!**

A Virtual Facebook for Network Mapping

Motivate workers intrinsically!



A Web Application that ...

- ◆ Workers **self-report** their connections in a privacy-preserving way
- ◆ Workers can **visualize** the communication network
- ◆ Provides some **value back** to workers so they want to report as many true connections as possible

The Network Mapping App



Step 1: Create a nickname for yourself

The Network Mapping App



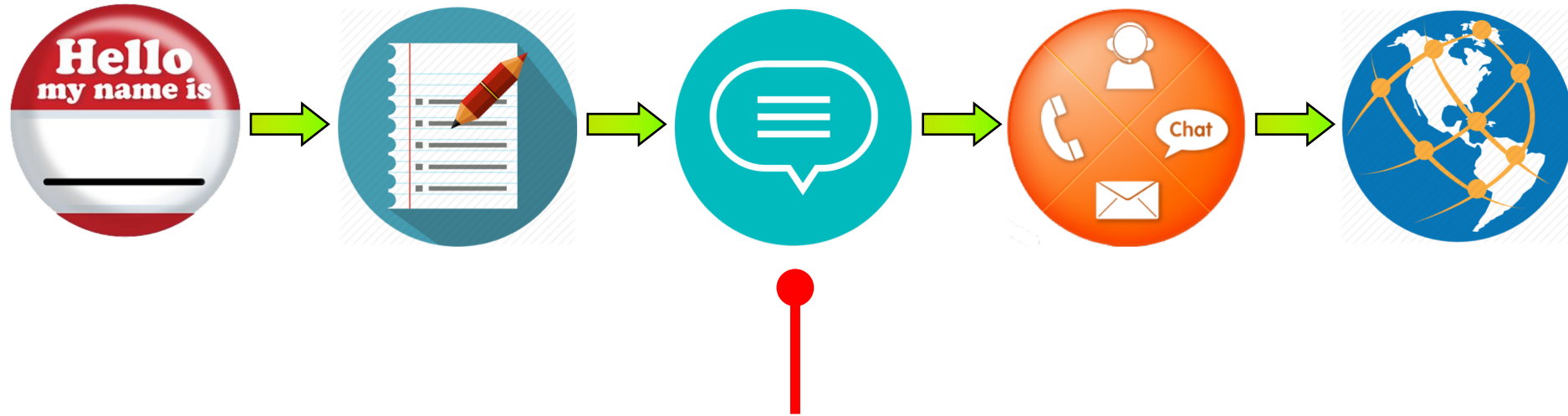
Step 2: Complete a brief demographic survey

- | | |
|---------------|---|
| Age | <input checked="" type="radio"/> Share with all other workers |
| Gender | <input type="radio"/> Share with workers connected to me |
| Country | <input type="radio"/> Not share with anyone |
| Approval rate | |

...

Value back: Who are the other workers?

The Network Mapping App



Step 3: Tell us about your personal experience with MTurk

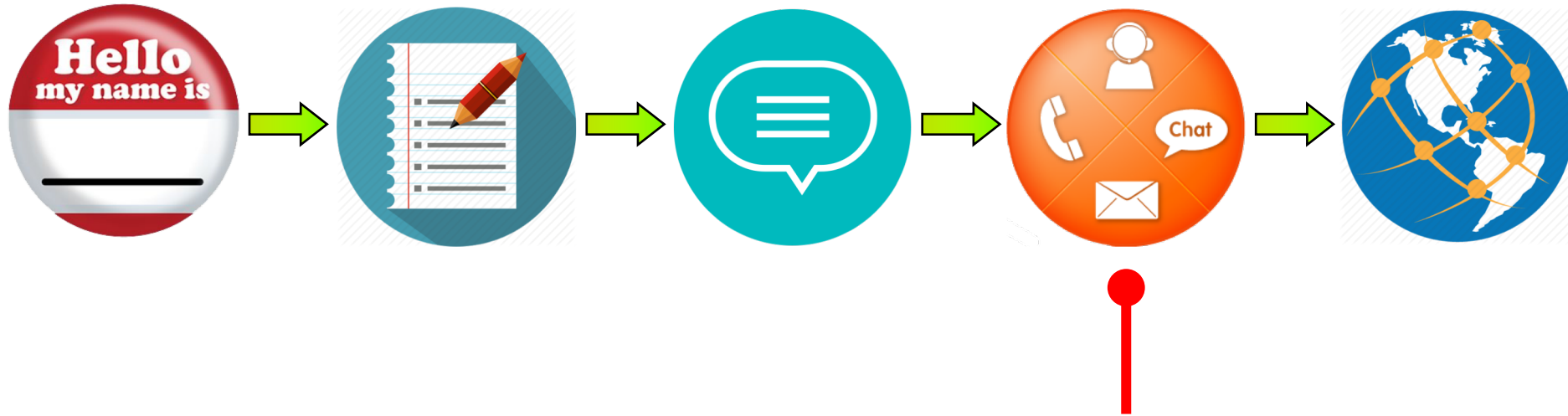
Why did you start Turking?

What motivates you to keep Turking?

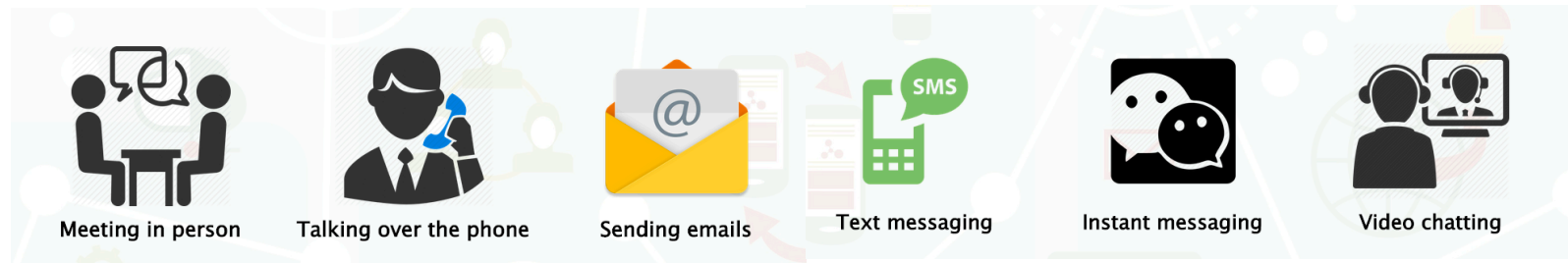
(Selected based on a pilot study!)

Value back: What are other workers' Turking stories?

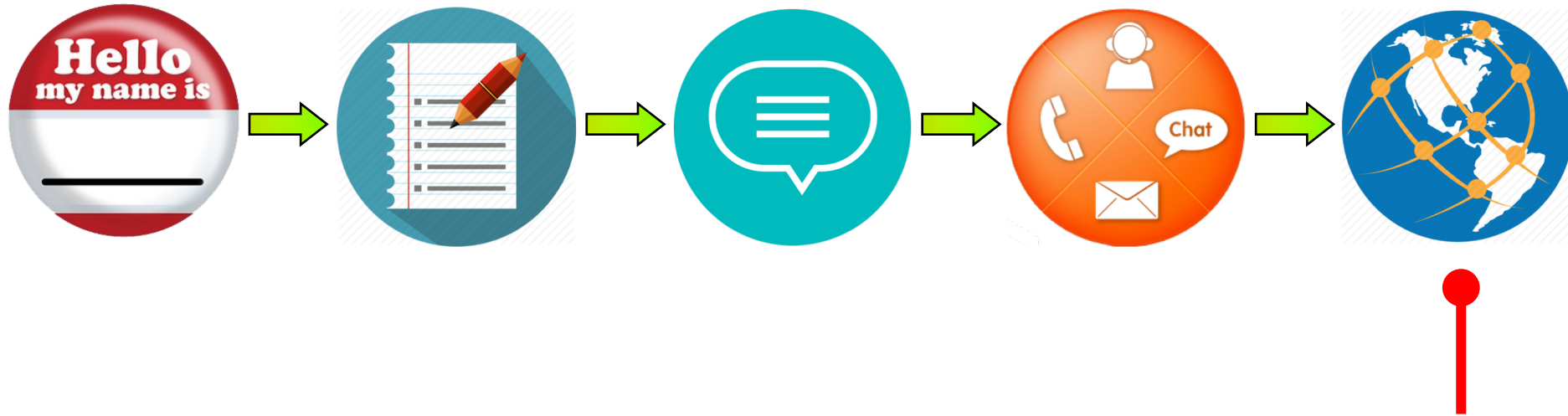
The Network Mapping App



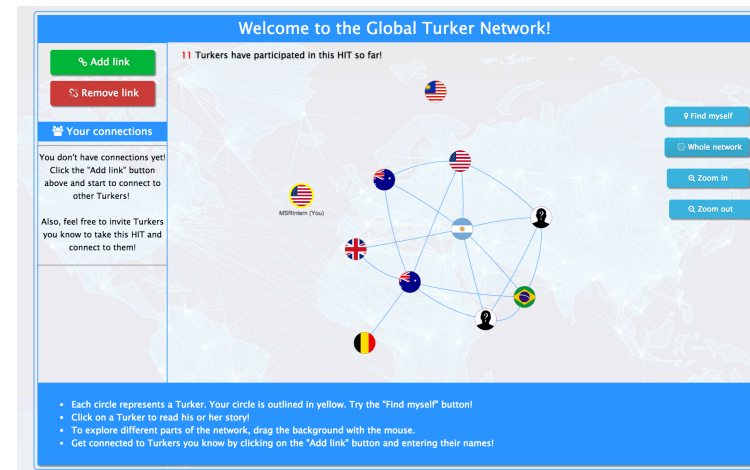
Step 4: Swap nicknames with Turkers you know



The Network Mapping App



Step 5: Explore the Turker network



Explore the Turker Network

Welcome to the Global Turker Network!

Add link

Remove link

Your connections

You don't have connections yet!
Click the "Add link" button above and start to connect to other Turkers!

Also, feel free to invite Turkers you know to take this HIT and connect to them!

11 Turkers have participated in this HIT so far!

MSRIntern (You)

Find myself

Whole network

Zoom in

Zoom out

- Each circle represents a Turker. Your circle is outlined in yellow. Try the "Find myself" button!
- Click on a Turker to read his or her story!
- To explore different parts of the network, drag the background with the mouse.
- Get connected to Turkers you know by clicking on the "Add link" button and entering their names!

Explore the Turker Network

Welcome to the Global Turker Network!

[Add link](#)

Nickname: N/A

Add more links to find out if this Turker is someone you know

With an approval rate of 97.2% on MTurk.
Tasks mostly done on MTurk: Data entry; Survey

Why did you start Turking: My sister found out about it on reddit.com and told me about it. I like doing turks to build up my amazon gift card balance. I like how you can transfer the money you earn immediately to amazon whenever you want.

What motivates you to keep Turking: My motivation is money! I buy a lot of stuff off of amazon so I use the extra money to buy myself books and other stuff that I want.

11 Turkers have participated in this HIT so far!

[Rem](#)

[Your c](#)

You don't have

Click the "Ad

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Also, feel free t

you know to ta

connect

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Find myself

Whole network

Zoom in

Zoom out

```
graph TD; USA1[USA] --- AUS[Australia]; USA1 --- UK[UK]; USA1 --- BEL[Belgium]; AUS --- UK; UK --- BEL; BEL --- USA1; ARG[Argentina] --- USA2[USA]; ARG --- BRA[Brazil]; ARG --- UNK1[?]; BRA --- UNK2[?]; UNK1 --- UNK2;
```

- Each circle represents a Turker. Your circle is outlined in yellow. Try the "Find myself" button!
- Click on a Turker to read his or her story!
- To explore different parts of the network, drag the background with the mouse.
- Get connected to Turkers you know by clicking on the "Add link" button and entering their names!

Explore the Turker Network

Welcome to the Global Turker Network!

11 Turkers have participated in this HIT so far!

Add link

Remove link

Your connections

AwesomeAlice

Find myself

Whole network

Zoom in

Zoom out

- Each circle represents a Turker. Your circle is outlined in yellow. Try the "Find myself" button!
- Click on a Turker to read his or her story!
- To explore different parts of the network, drag the background with the mouse.
- Get connected to Turkers you know by clicking on the "Add link" button and entering their names!

Explore the Turker Network

Nickname: AwesomeAlice

27 years old; female; living in Canada; with an approval rate of 97.2% on MTurk.

Tasks mostly done on MTurk: Data entry; Survey

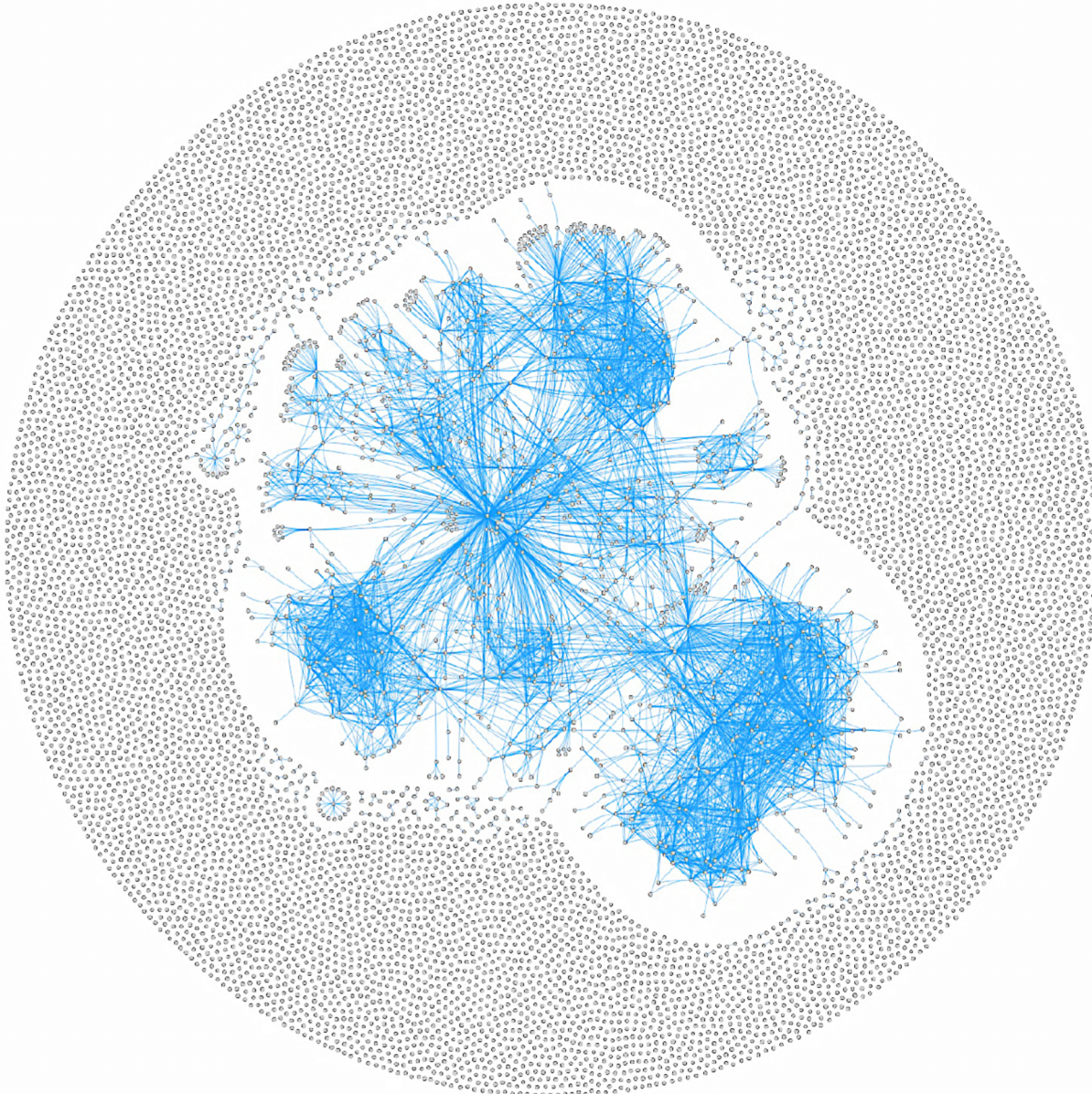
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After 18 Days...

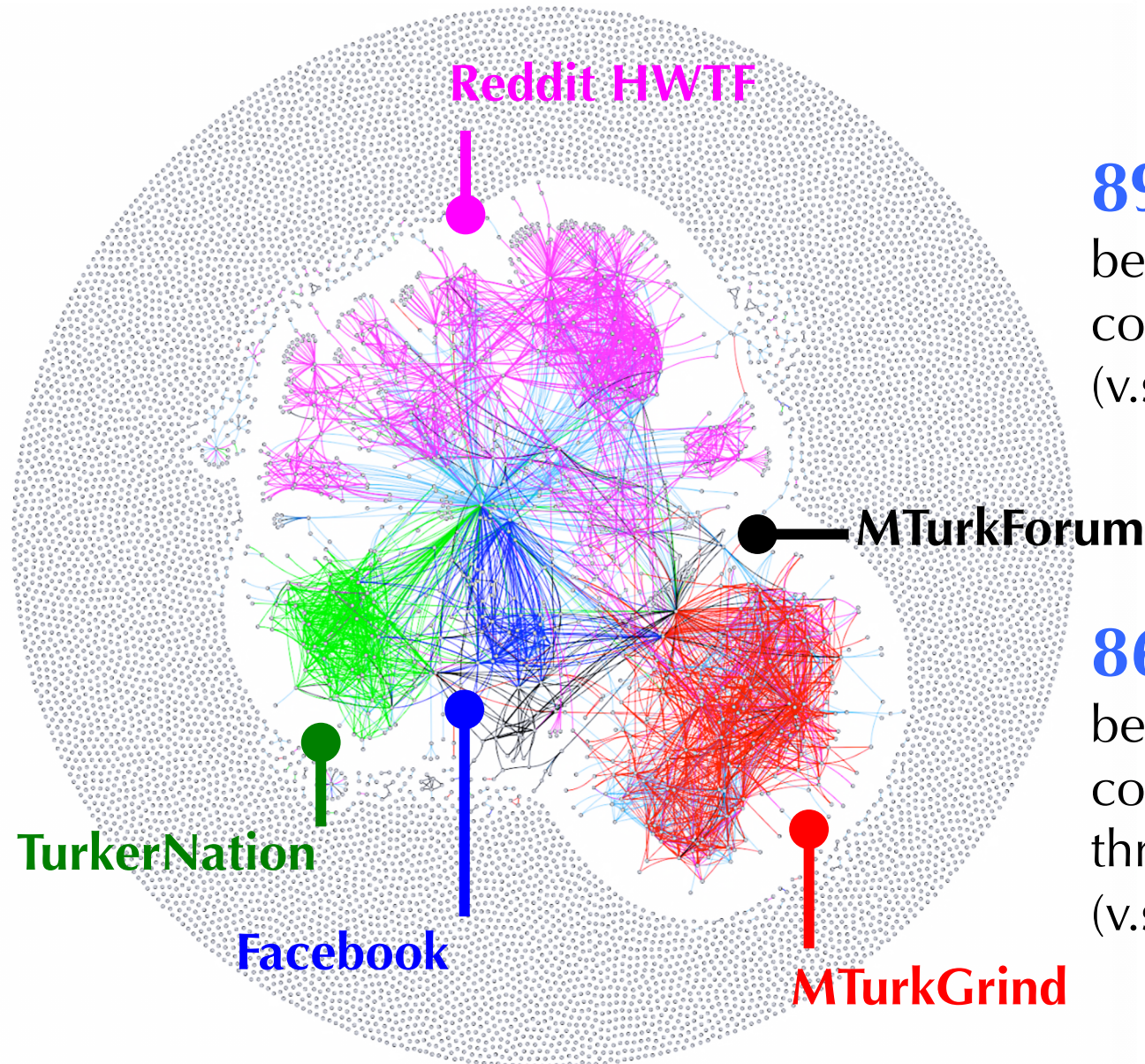


10,354 workers

5,268 connections

1,389 (13.4%)
workers are connected!

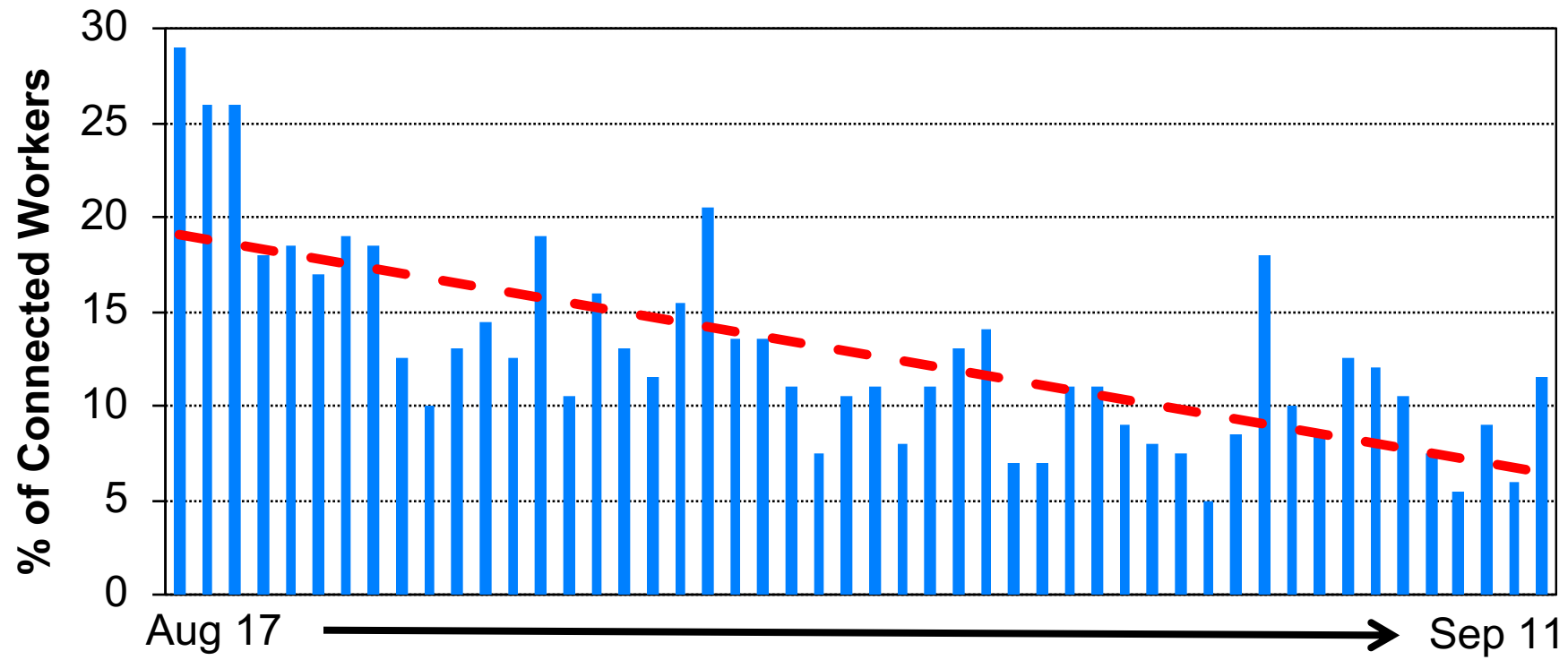
A Network Enabled By Forums



89.9% of all edges are between workers who communicate via forums! (v.s. **13.8%** via 1-on-1)

86.2% of all edges are between workers who communicate *exclusively* through forums! (v.s. **10.1%** via 1-on-1)

Connected Workers Find HITs Earlier



Connected Workers Get Emotional Support

When I'm down, I talk with my friend who also does MTurk. She *keeps me motivated* as she has the same goals as me.

Being on a forum is a must. You *feel less alone, learn a lot*, and it *keeps it interesting*.

I have a community of turkers that we all chat together on a *video cam* so we *keep ourselves motivated* throughout the day with this interwoven community we've made.










Discussion

- What are the implications of this study?
- Are there any limitations?

Another Angle: Delve into the Digital Trace

TURKERNATION

Forums



Search

Help

Log in

Register






Threads 1 to 20 of 1390

Page 1 of 70

1 2 3 11 51 ... Last

Forum: Daily mTurk HIT Threads
Please share any great HITs you see here! **Requesters:** Please only post your HIT once per day. If you have multiple HITs, you can post each once daily. Please use the link near the top of the forum to advertise your link. If you don't see the yellow banner with this link in it, please follow the instructions in the private message you received titled "URGENT! PLEASE READ!"

Forum Tools Search Forum

Title / Thread Starter	Replies / Views	Last Post By
Announcement: How you can support Turker Nation spamgirl (Community Manager)		04-17-2015 Views: 54,583
Sticky Threads		
 Global: When a HIT asks for your Worker ID, DON'T make these mistakes or you'll get rejected!! Hi all, I'm running a survey right now, and I'm having so many problems. But what's making me the most crazy is that some of them are totally...	Replies: 27 Views: 92,149	Jsays1 07-19-2018 04:31 PM
Started by spamgirl, 12-21-2017 03:37 PM 1 2 3		
 Global: We need your help in keeping Turker Nation online The time has come to pay the server bill, and we need your help. Our Amazon Affiliate payments have dried up, so we're looking to make enough via...	Replies: 100 Views: 432,777	spamgirl 08-13-2018 09:11 AM
Started by spamgirl, 06-01-2015 09:24 AM 1 2 3 ... 11		
 Sticky: Tips, Tricks and Scripts to make the Daily HITs Thread easier to use Started by spamgirl, 11-24-2014 09:04 PM	Replies: 91 Views: 60,601	Rosie The Robot Today, 02:17 AM
Started by spamgirl, 11-24-2014 09:04 PM 1 2 3 ... 10		
 Sticky: Requester HIT advertising thread Started by spamgirl, 04-20-2015 06:15 PM	Replies: 0 Views: 12,766	spamgirl 04-20-2015, 06:15 PM
Started by spamgirl, 04-20-2015 06:15 PM		
Normal Threads		
 08/21/2018 Bots Are Heartless! Tuesday Started by bromeliad, Today 06:18 AM	Replies: 278 Views: 5,405	Giskard Today, 04:02 PM
Started by bromeliad, Today 06:18 AM 1 2 3 ... 28		

Purposes and Earnings

Why do they work?

- Money
- *“While I do find some of the HITS fun and actually learn an incredible amount by doing HITS, I do it for the cash.”*

How much they earn in a year?

- \$1,179 to \$14,476.93. Rather low-paid!

Why do they “choose this wage”?

- From primary income to make ends meet to supplementary
- A safety-net for some!

Requester-Worker Relationship

- Asymmetric information: Workers share information on “requesters hall of fame/shame”
 - Good requesters: fair pay, quick approval, willing to communicate
 - Bad requesters: rejections without clear reasons, demeaning comments, unfair treatment
- Asymmetric power and limited communication (provided by the platform):
 - Requesters can reject work but workers can hardly appeal
 - Requesters can block workers but workers can't easily block requesters

Invisible Work

- Search for good HITs / good requesters
- Learn how to best set up computers/ tools
- Learn how to best improve skills in a certain task
- Learn how to manage turking and record keeping

Discussion

- Do you see any limitations of such methodology (i.e., ethnographic analysis of worker's digital trace)?
- Based on your own experience of being a worker in assignment 1, are there any other issues you see from the perspectives of workers?
- What else is missing from the current crowd work environment compared to traditional work environment?
- What are some possible improvements of the platform that you can envision based on what you read and have experienced?

Next Class

- No reading!
- Create a HIT on MTurk
- Sign up as a requester on MTurk following the instructions “Be an MTurk Requester (Part 1)” before next class
- Bring laptops to class!