The Gig Economy Challenges and Opportunities

Dr Gianluca Demartini

Senior Lecturer in Data Science

Information School, University of Sheffield

http://gianlucademartini.net

@eglu81

Gianluca Demartini

g.demartini@sheffield.ac.uk

- B.Sc., M.Sc. at U. of Udine, Italy

- Ph.D. at U. of Hannover, Germany
  - **Computer Science** (Entity Retrieval)

- Worked at the eXascale Infolab U. Fribourg (Switzerland), UC Berkeley (on Crowdsourcing), Yahoo! (Spain), L3S Research Center (Germany)

- Senior Lecturer in Data Science at the **iSchool**, U. of Sheffield

- Tutorials on Entity Search and on Crowdsourcing at international research conferences and at Facebook

www.gianlucademartini.net

The Gig Economy

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Photo by amassie on flickr

New Yorkers agree: Airbnb is great for New York City

Airbnb provides supplemental income for tens of thousands of New Yorkers. It also helps the local businesses in our neighborhoods and strengthens our communities. Airbnb is great for NYC.

airbnb NYC

For more information, visit AirbnbNYC.com

Photo by 7273543@N08 on flickr

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It is disrupting well-defined structures

Photo by aaronpk on flickr

It is controversial and laws are not clear

THE
NATIONAL LAW REVIEW

UK Employment Tribunal Rules that Individuals Working in the "Gig Economy" are Entitled to Paid Leave

Friday, February 17, 2017

Explainer: what rights do workers have to getting paid in the gig economy?

January 22, 2017 7.10pm GMT

Are workers Employees or Self-employed?

What about rights and wages?

What are Unions doing?

http://www.natlawreview.com/article/uk-employment-tribunal-rules-individuals-working-gig-economy-are-entitled-to-paid

https://theconversation.com/explainer-what-rights-do-workers-have-to-getting-paid-in-the-gig-economy-70281

Academics started to study how it works

Gig Work, Online Selling and Home Sharing

24% of Americans report earning money from the digital 'platform economy' in the past year. The extra income they make is a luxury for some, but a necessity for others.

BY AARON SMITH

Quantifying the growth, understanding the participation

Talent Economy

How The Gig Economy's Rise is Reinventing Attitudes on Work

Now more than ever, workers are rethinking their careers by using shifting attitudes around the gig economy to do more work on a per-contract basis

February 9, 2017

40 percent of the U.S. workforce are contingent workers or independent contractors

The most in-demand skills within the freelance economy include **graphic design, web developers, IT support, computer programmers, technical writers, marketing and public relations professionals and construction contractors**

So what?

- Is this going to last?
- What about delivery drones?
- What about worker rights?
- What about artificial intelligence taking over our jobs?

- Everyone is an entrepreneur
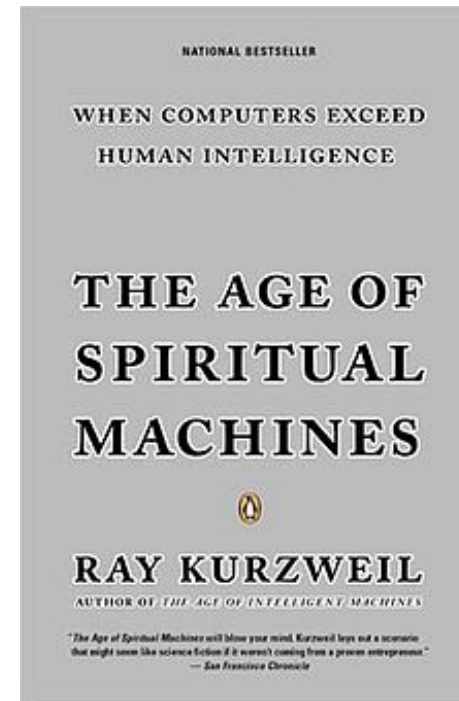
Disclaimer

This talk is not about:

- How the current **regulations** are dealing with these changes
- What **policy makers** should do about it
- The **ethical implications** of doing this

But rather about the **data science aspects** of this phenomenon

These new forms of work are driven by **data**

- Facebook processes 750TB/day of data
  - 48k iPhones every day
  - 7PB of photo storage / month

- This requires computers (a lot of them!)

Data Science

- "Data Scientist: The Sexiest Job of the 21st Century", in Harvard Business Review

- Companies want **data-driven decisions**

- Graduates from the MSc Data Science in Sheffield go work in:
  - Telecommunication data analysis
  - Cancer research
  - Housing market

Algorithms rule the world

- **Uber** prices are decided by a software programs
    - The boss of Uber drivers is a computer
    - It decides how they work and how much money they make

- Computers know a lot about people but not the other way around

Understanding Work Experiences

**Algorithmic Labor and Information Asymmetries:
A Case Study of Uber's Drivers**

ALEX ROSENBLAT[1]
Data & Society Research Institute, USA

LUKE STARK
New York University, USA

The Impact of Crowd Work on Workers   CHI 2015, Crossings, Seoul, Korea

**Working with Machines: The Impact of Algorithmic
and Data-Driven Management on Human Workers**

Min Kyung Lee[1], Daniel Kusbit[1], Evan Metsky[1], Laura Dabbish[1, 2]
[1]Human-Computer Interaction Institute, [2]Heinz College
Carnegie Mellon University
{mklee, dkusbit, emetsky, dabbish}@cmu.edu

"Uber is very close lipped about what actually happens right I mean they say 'oh we route it to the closest driver' or whatever but who really knows what's going on behind the scene it's up to whoever engineers their iPhone app"

"I mean you can always decline to pick up a passenger if you can make that decision within 12 seconds. (Uber/Lyft) make it sort of difficult to say no"

On-line gig work

- Online freelancing (big part of the market)

  99designs   **Upwork**™

- Micro-tasks crowdsourcing (small but growing)

THE GLOBAL OPPORTUNITY IN ONLINE OUTSOURCING

Differences between casual 'gig workers' and those who are more financially reliant

% of U.S. adults who …

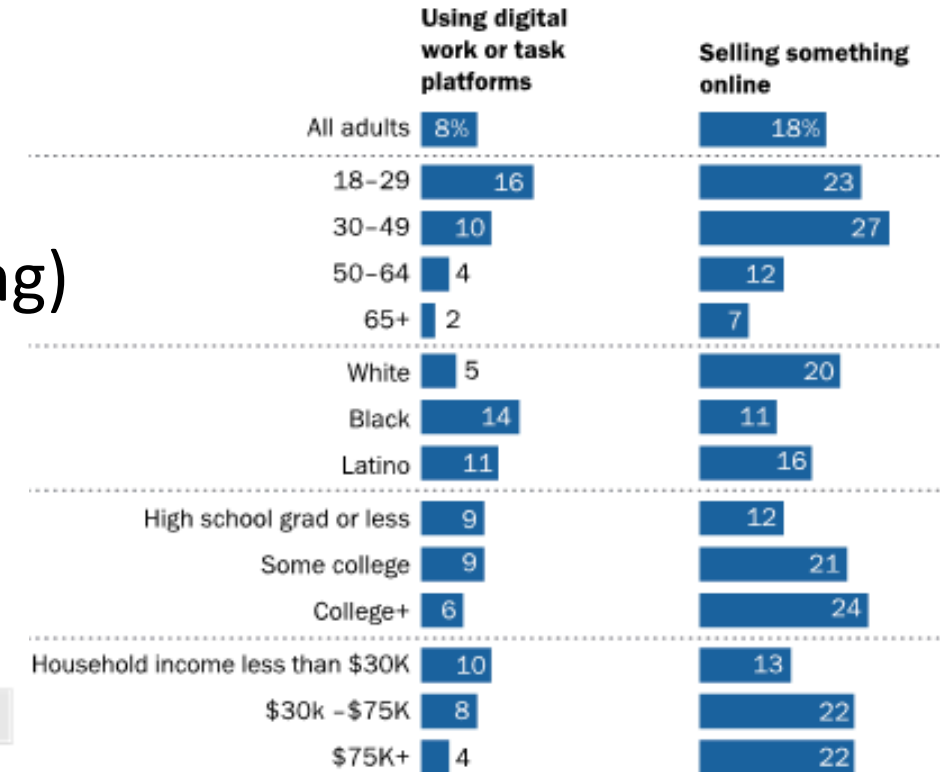**Earned money in the last year from online job platforms**

| 8% | 92% did not earn money in this way |
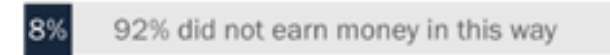
Of that share, % saying that income is …

Essential or important 56% | 42% **Nice to have**
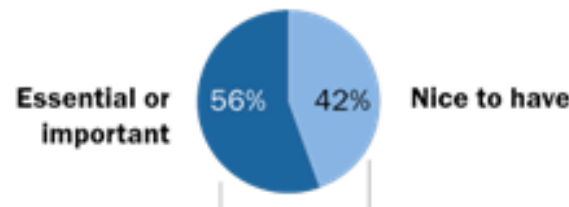
Gig work, online selling appeal to different segments of the population

% of U.S. adults in each group who have earned money in the last year by …

	Using digital work or task platforms	Selling something online
All adults	8%	18%
18–29	16	23
30–49	10	27
50–64	4	12
65+	2	7
White	5	20
Black	14	11
Latino	11	16
High school grad or less	9	12
Some college	9	21
College+	6	24
Household income less than $30K	10	13
$30k –$75K	8	22
$75K+	4	22

Source: Survey conducted July 12-Aug. 8, 2016.
'Gig Work, Online Selling and Home Sharing'

PEW RESEARCH CENTER

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Crowdsourcing

- Leverage human intelligence at scale to solve
  - Tasks simple for humans, complex for computers
  - With a large number of humans (the Crowd)
  - Small problems: micro-tasks/ HITs (Amazon MTurk)
- Examples
  - Wikipedia, Image tagging
- Incentives
  - Financial, fun, visibility
- See my tutorials at ESWC 2013, ISWC 2013, ICWSM 2016, WebSci 2016, Facebook and upcoming FnTWeb paper.

mechanical turk
Artificial Artificial Intelligence
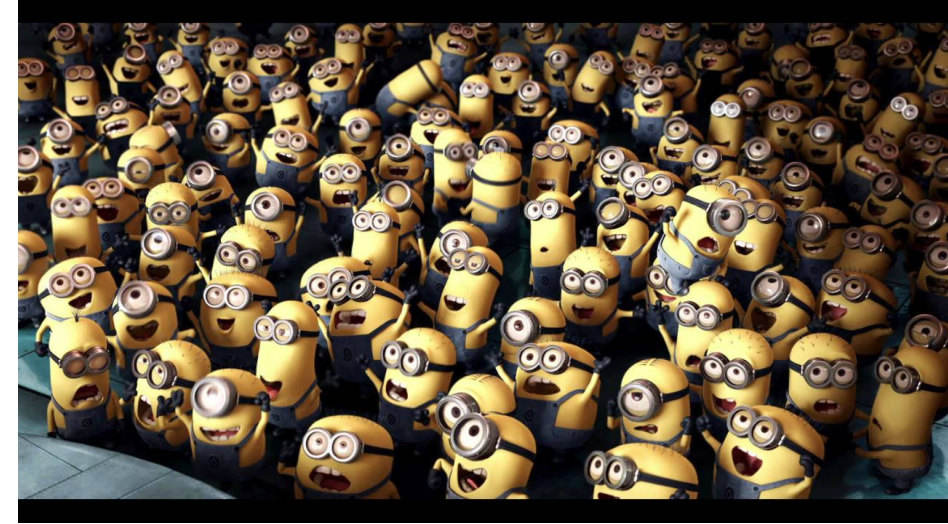
amazon
beta

Why online crowdsourcing?

- **Artificial Int needs a lot of data**!
  - (for now…)
  - E.g., tagged images
  - In some cases we give this data for free

- Micro-task crowdsourcing platforms
  - Amazon Mturk
  - CrowdFlower
  - prolific.ac (U. Oxford spin-off)

With 'Napalm Girl,' Facebook Humans (Not Algorithms) Struggle To Be Editor

September 10, 2016 · 11:12 PM ET
Heard on All Things Considered

AARTI SHAHANI

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Deep Learning vs Crowdsourcing

- Deep Learning / Artificial Intelligence
  - Needs massive amounts of data
  - Cannot easily explain why decisions are made
  - Fails when training data does not give good coverage (AlphaGo)

- A good complement, not a replacement to human intelligence

Citizen Science

Pixels indicate Clickworker's identified craters
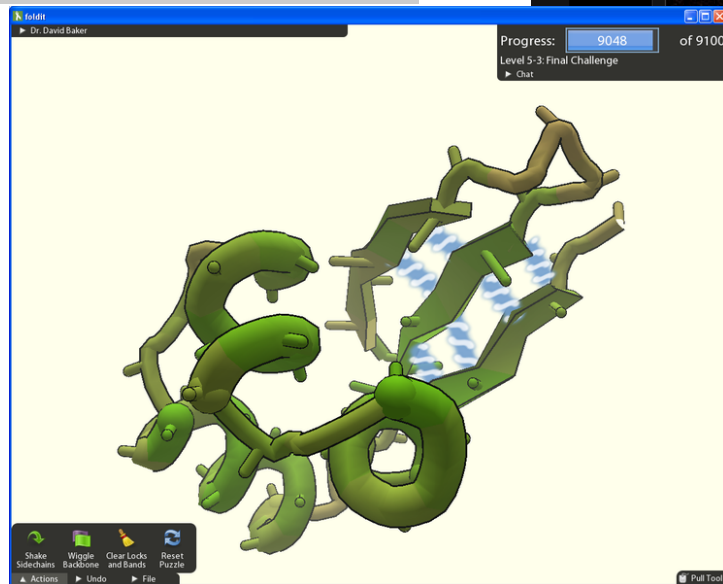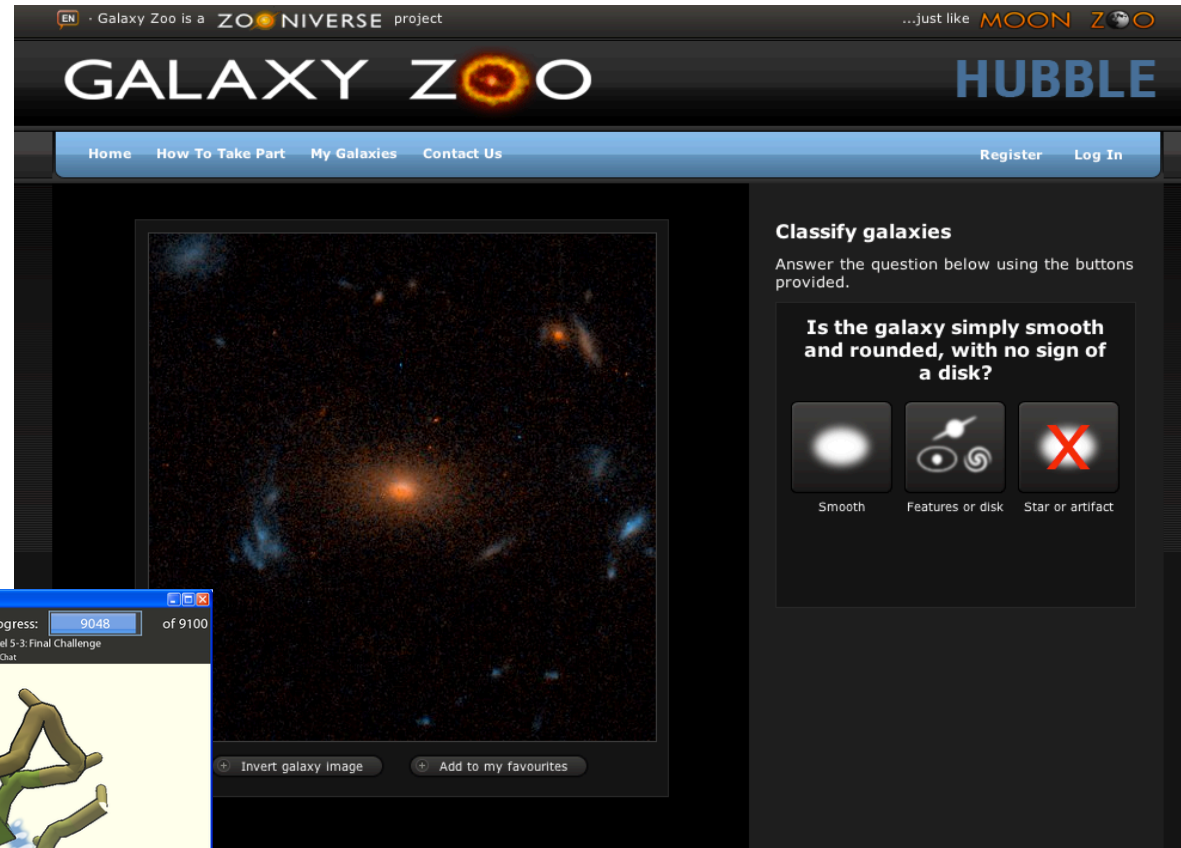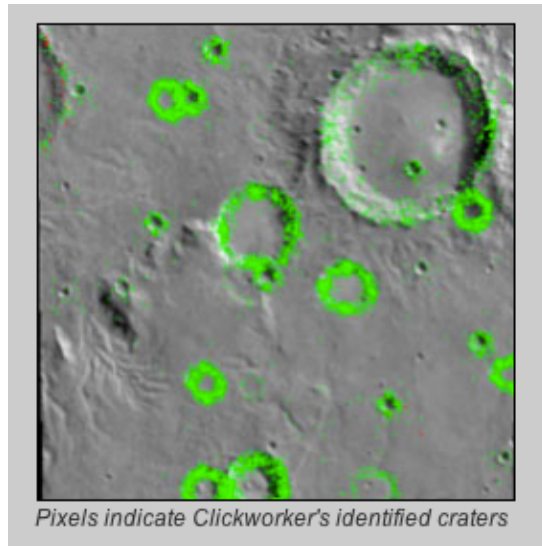
Paid Crowdsourcing Ethics

- People work full-time as crowd workers
- Chinese crowdsourcing platform with 5.5M workers
- Pros
  - Help developing countries
  - Provide cash fast to people == short-term satisfaction
  - Job Flexibility
- Cons
  - No job security
  - No social security
  - Long term satisfaction? Career plans?

Our Research at Sheffield

- **We make Crowdsourcing better** (more efficient and more effective)

- Thanks to the very generous support of

5-year Analysis of Amazon MTurk workload

- Mturk-tracker.com
  - Collects metadata about each visible **batch** (Title, description, rewards, required qualifications, HITs available, requester, etc), that is, set of similar tasks or **HITs**
  - Records batch progress (every ~20 minutes)
  - Covers 130M tasks
  - 2009-2014

Djellel Eddine Difallah, Michele Catasta, Gianluca Demartini, Panagiotis G. Ipeirotis, and Philippe Cudré-Mauroux. **The Dynamics of Micro-Task Crowdsourcing -- The Case of Amazon MTurk**. In: 24th International Conference on World Wide Web (**WWW 2015**), Research Track.

Country-Specific HITs
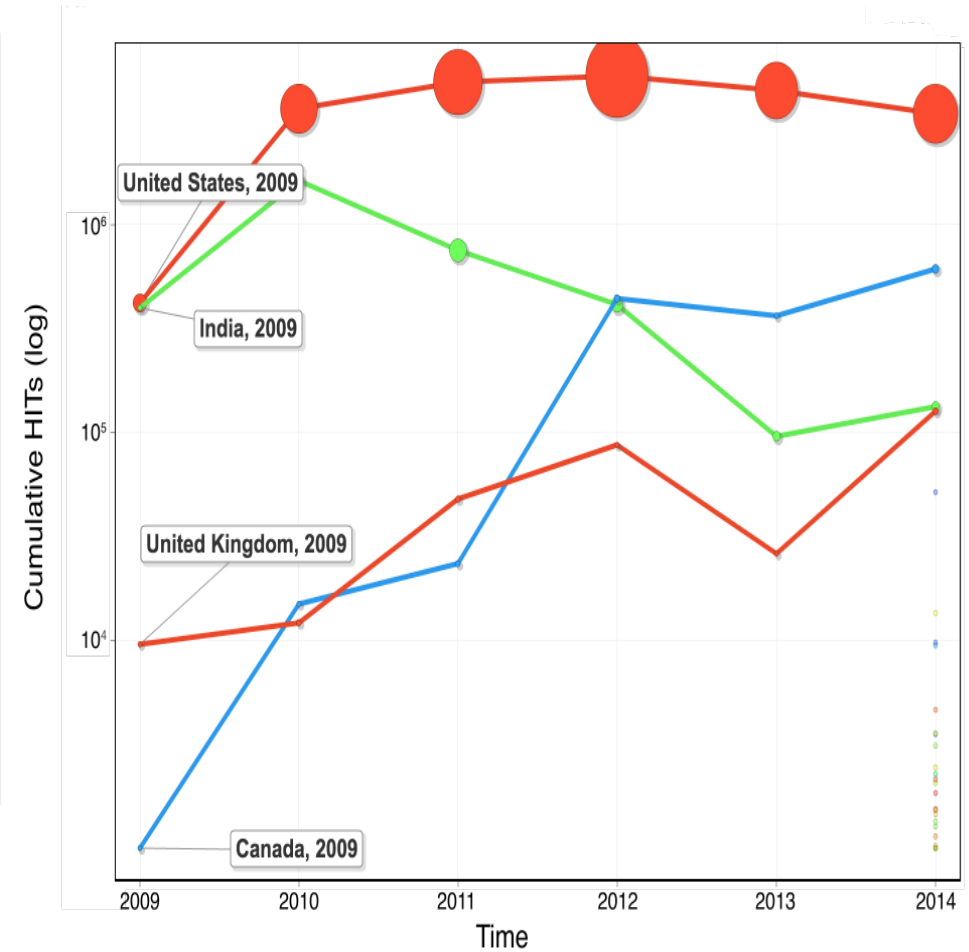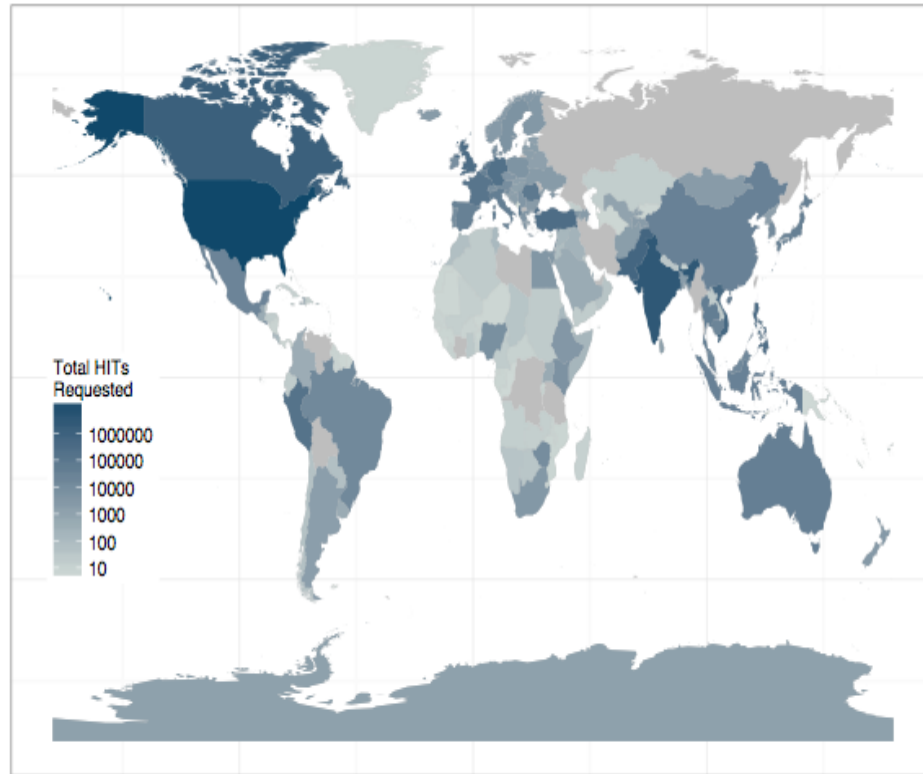
Workers from US, India and Canada are the most sought after.

http://exascale.info/mturk-mrkt/ for interactive visualizations

Task Reward
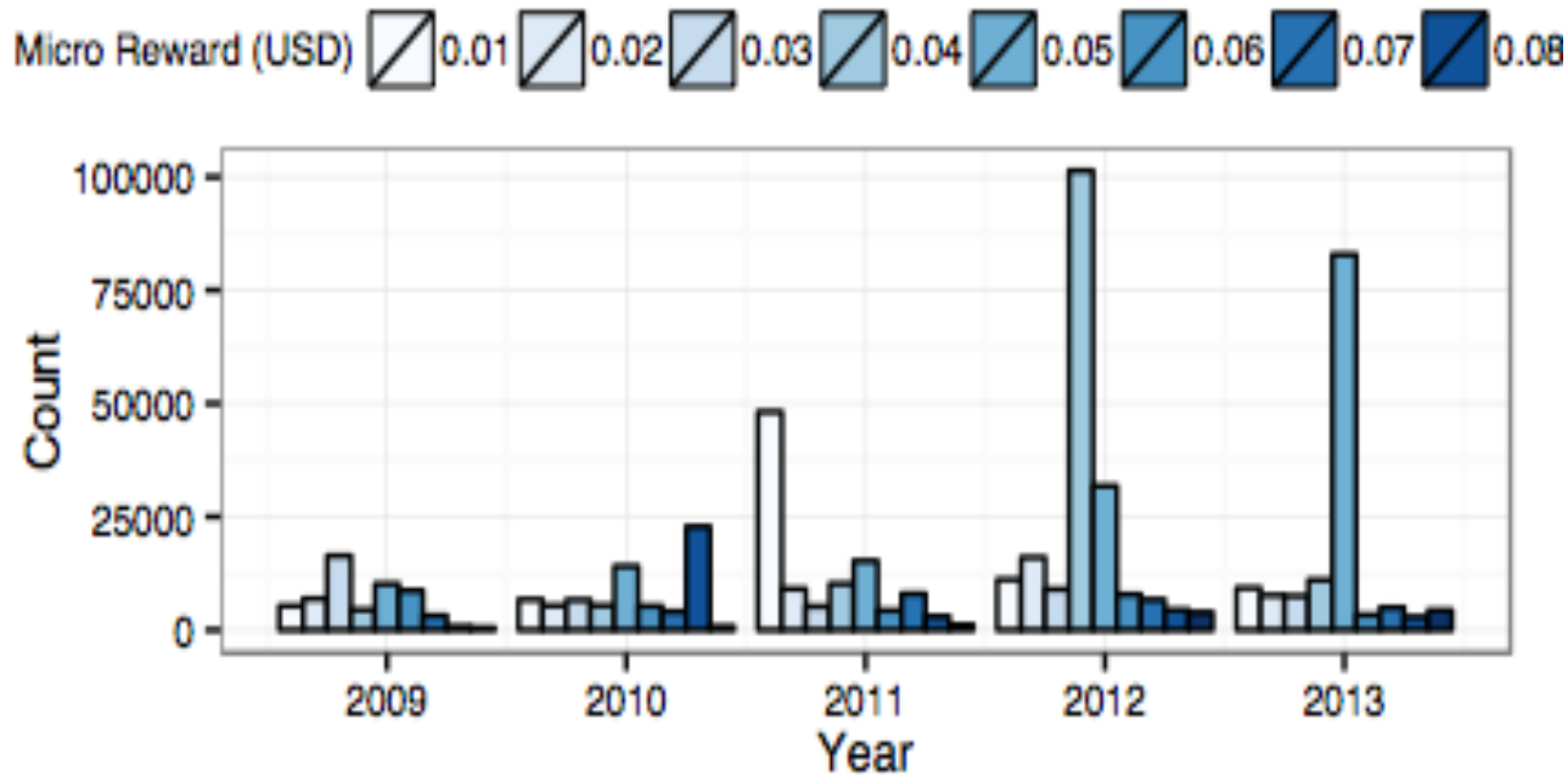
5-cents is the
new
1-cent

#mturkdynamics

Top MTurk Requesters over 1 month

Top-1000 Requesters, report for April 16, 2016 to May 16, 2016

Requester name	hits	reward
Speechpad	23857	$172,994.63
Percy Liang	883	$7,320.48
Princeton Vision	51187	$5,762.44
Stanford GSB Behavioral Lab	3749	$2,110.70
Chris Callison-Burch	8157	$2,064.29
RC.org Mechanical Turk	6591	$2,011.33
VacationrentalAPI	399	$1,373.50
Med Expertise	869	$1,303.50
Bluejay Labs	13613	$1,288.59
YL Testing	1051	$1,236.83

Other Findings

- Task reward has increased over time
- **Audio transcription** is the most popular task
- Demand for Indian workers has decreased
- **Surveys** are most popular for US workers
- 1000 new requesters per month join
- 10K new Tasks arrive and 7.5K Tasks get completed every hour

- Check #mturkdynamics for the main findings

Hybrid Human-Machine Information Systems

- Combine the scalability of computers and the power of human intelligence
- Do better than Artificial Intelligence alone
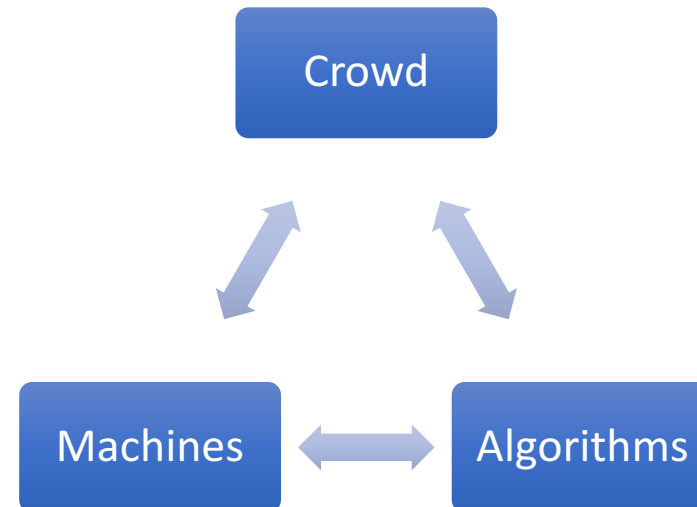
Human-powered Data Integration
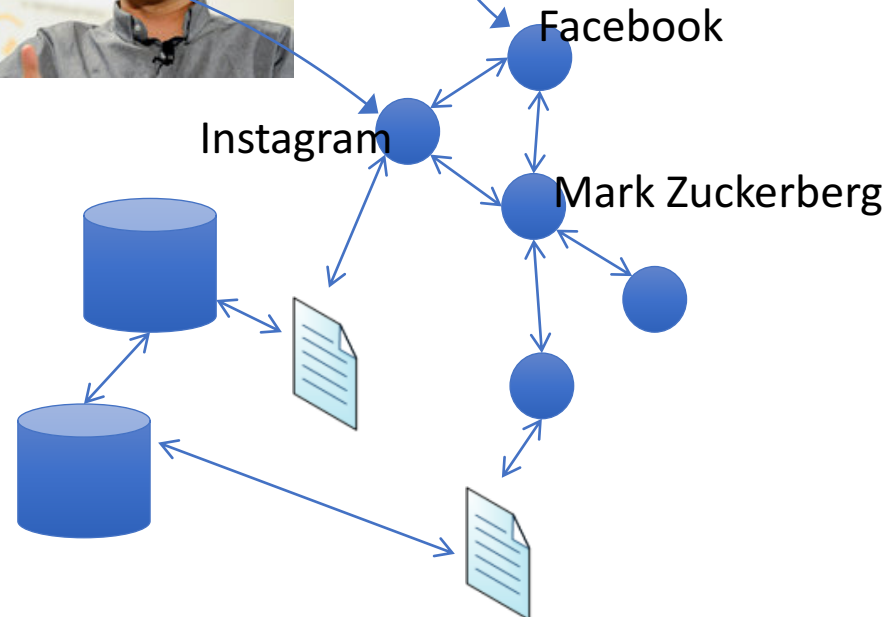
ZenCrowd Architecture
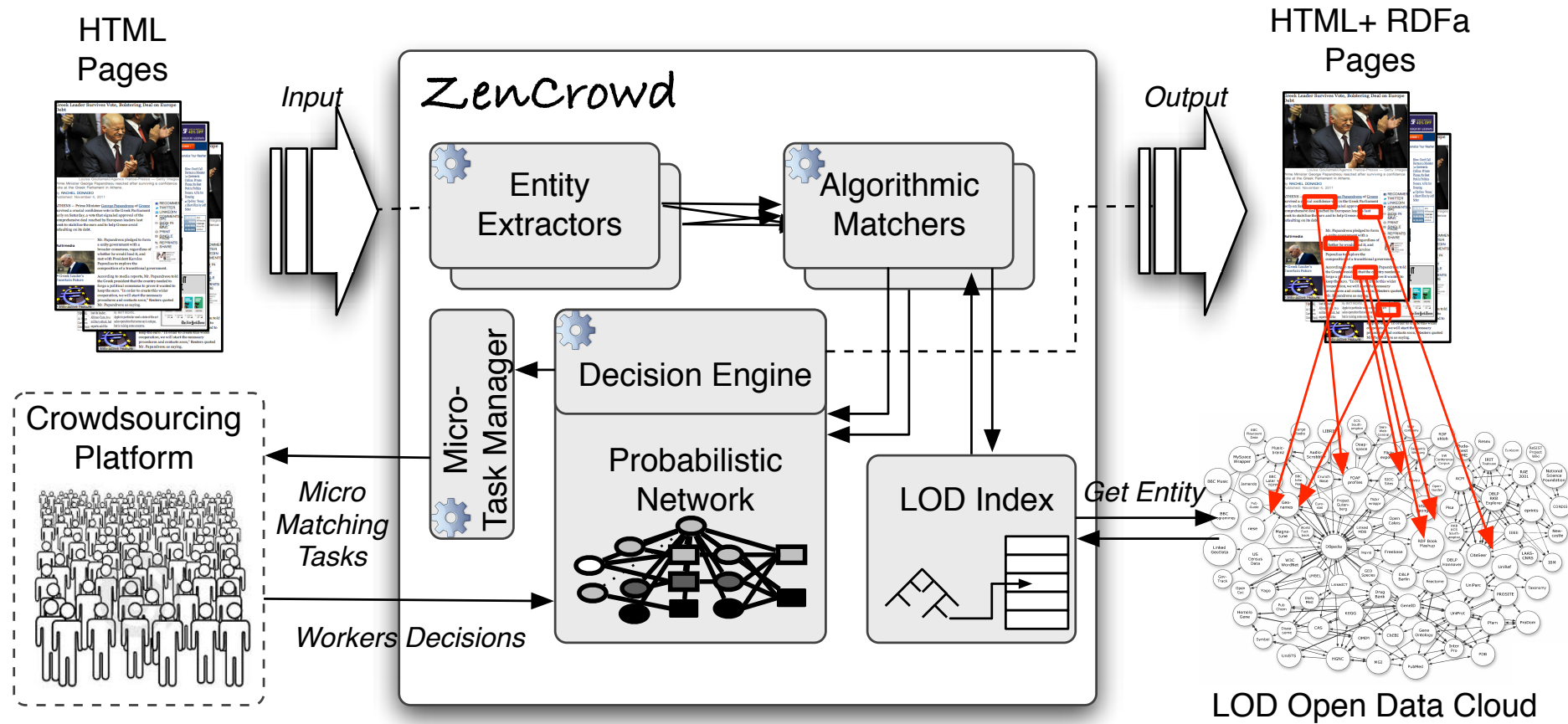
Gianluca Demartini, Djellel Eddine Difallah, and Philippe Cudré-Mauroux. ZenCrowd: Leveraging Probabilistic Reasoning and Crowdsourcing Techniques for Large-Scale Entity Linking. In: 21st International Conference on World Wide Web (**WWW 2012**).

Pick-A-Crowd
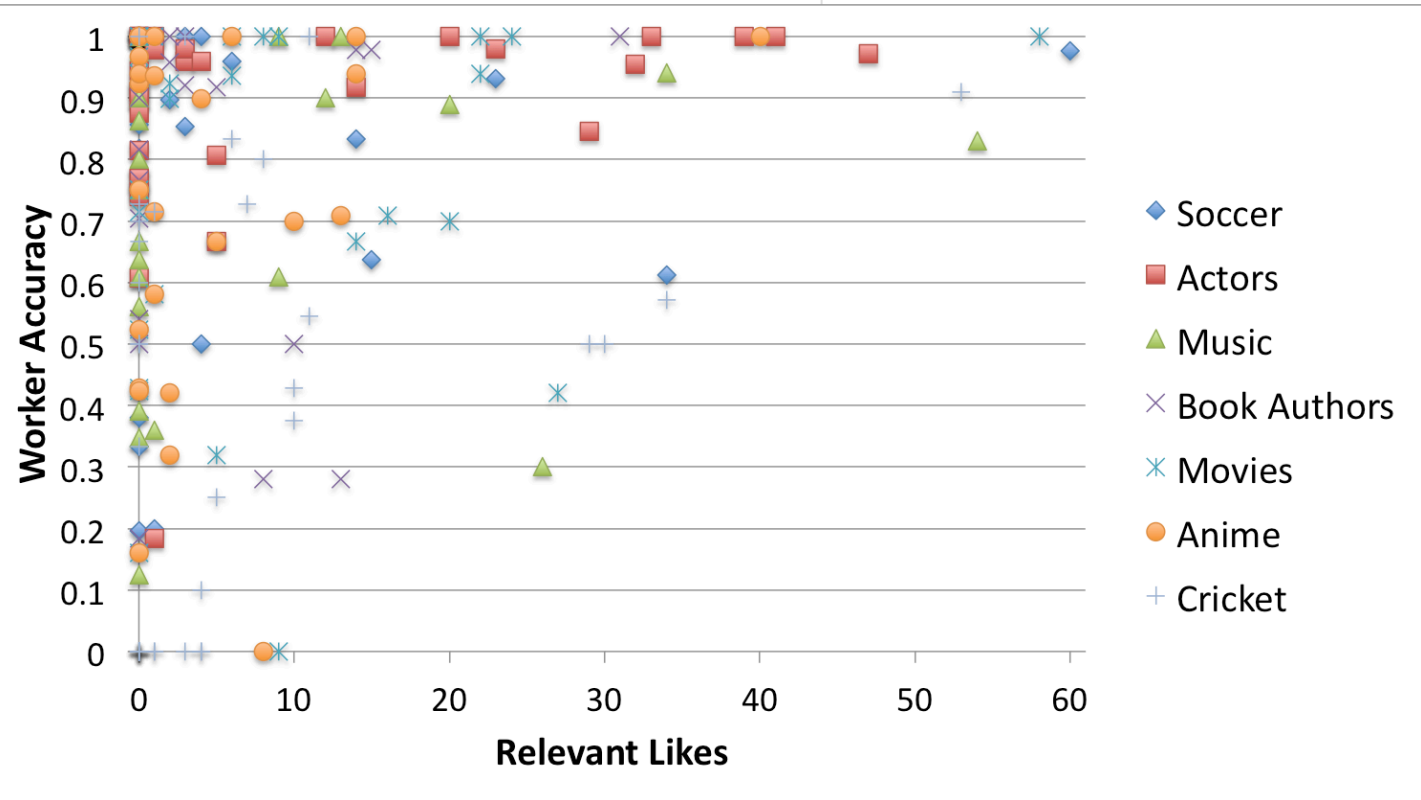
Djellel Eddine Difallah, Gianluca Demartini, and Philippe Cudré-Mauroux. Pick-A-Crowd: Tell Me What You Like, and I'll Tell You What to Do. In: **WWW2013**

FashionBrain:
Understanding Europe's Fashion Data Universe

fashionbrain-project.eu

Predicting upcoming fashion trends

Search fashion products by image

Opportunities of the Gig Economy

- We can reduce unemployment (It is a growing market)
- We can use data to improve the way we work
    - Allocate tasks to the right person
    - Personalise rewards to people
    - Optimize task execution based on the available workforce
- It brings short-term satisfaction to workers

Kuek, Siou Chew; Paradi-Guilford, Cecilia Maria; Fayomi, Toks; Imaizumi, Saori; Ipeirotis, Panos. 2015. *The global opportunity in online outsourcing*. Washington, D.C. : World Bank Group. http://documents.worldbank.org/curated/en/138371468000900555/The-global-opportunity-in-online-outsourcing

Short-term satisfaction?

After 23 years in salaried jobs, I traded comfort and career for the thrill, autonomy and diverse learning when I moved to being a full-time freelancer (sounds rather nice..."full-time freelancer") in 2014. Even though gig economy is at its inception here in India (though in traditional functions it's been around for ages), it's been a great ride and I am learning everyday something new that I wouldn't otherwise. When I see around, I find lots of youngsters are actively considering or many of already are a freelancer, and several senior professionals who are done with the tenure in the cubicle or want to be out of the rat race are inclined to pursue next innings in the gig economy. I hope to see the market opening up in the coming time.

Challenges of the Gig Economy

The Future of Crowd Work

Aniket Kittur[1], Jeffrey V. Nickerson[2], Michael S. Bernstein[3], Elizabeth M. Gerber[4], Aaron Shaw[4], John Zimmerman[1], Matthew Lease[5], and John J. Horton[6]

[1]Carnegie Mellon University, [2]Stevens Institute of Technology, [3]Stanford University, [4]Northwestern University, [5]University of Texas at Austin, [6]oDesk
{nkittur, johnz}@cs.cmu.edu, jnickerson@stevens.edu, msb@cs.stanford.edu, {egerber, aaronshaw}@northwestern.edu, ml@ischool.utexas.edu, john_horton@odesk.com

Career trajectories
Management roles
Rewards
Social security

It's Past Time To Give Gig Economy Workers Benefits and Security

WIRED

TWEET

COMMENT
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EMAIL

JESSI HEMPEL   BUSINESS   01.04.16   7:00 AM

GIG ECONOMY WORKERS NEED BENEFITS AND JOB PROTECTIONS. NOW.

We need **smart regulation** that will define new categories for workers—or at least offer better protection within existing categories.

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Are you ready for the Gig economy?

The way we work is changing!
- Short-term
- On-demand
- Flexible
- Skill-based
- Driven by data and algorithms
- Replaced by machines

Can we change it or should we get ready for it?

- We need relevant policies
- **We can use data** to understand and support workers

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