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

- 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.gianluca_demartini.net
The Gig Economy

Photo by amassie on flickr

Photo by 7273543@N08 on flickr

New Yorkers agree: Airbnb is great for New York City

Photo by alper on flickr
It is disrupting well-defined structures
It is controversial and laws are not clear

Are workers Employees or Self-employed?

What about rights and wages?

What are Unions doing?


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

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

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

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 program
  - 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
“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”

“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”
On-line gig work

• Online freelancing (big part of the market)

• Micro-tasks crowdsourcing (small but growing)
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.
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
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
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

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

<table>
<thead>
<tr>
<th>Requester name</th>
<th>Hits</th>
<th>Reward</th>
</tr>
</thead>
<tbody>
<tr>
<td>Speechpad</td>
<td>23857</td>
<td>$172,994.63</td>
</tr>
<tr>
<td>Percy Liang</td>
<td>883</td>
<td>$7,320.48</td>
</tr>
<tr>
<td>Princeton Vision</td>
<td>51187</td>
<td>$5,762.44</td>
</tr>
<tr>
<td>Stanford GSB Behavioral Lab</td>
<td>3749</td>
<td>$2,110.70</td>
</tr>
<tr>
<td>Chris Callison-Burch</td>
<td>8157</td>
<td>$2,064.29</td>
</tr>
<tr>
<td>RC.org Mechanical Turk</td>
<td>6591</td>
<td>$2,011.33</td>
</tr>
<tr>
<td>VacationrentalAPI</td>
<td>399</td>
<td>$1,373.50</td>
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<tr>
<td>Med Expertise</td>
<td>869</td>
<td>$1,303.50</td>
</tr>
<tr>
<td>Bluejay Labs</td>
<td>13613</td>
<td>$1,288.59</td>
</tr>
<tr>
<td>YL Testing</td>
<td>1051</td>
<td>$1,236.83</td>
</tr>
</tbody>
</table>
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 #mturkdymanics 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

APRIL 9, 2012, 1:15 PM MERGERS & ACQUISITIONS

Facebook Buys Instagram for $1 Billion

BY EVELYN M. RUSLI

2:02 p.m. | Updated

Facebook is not waiting for its initial public offering to make its first big purchase.

In its largest acquisition to date, the social network has purchased Instagram, the popular photo-sharing application, for about $1 billion in cash and stock, the company said Monday.

Facebook  Instagram  Mark Zuckerberg
ZenCrowd Architecture

ZenCrowd

Input

Entity Extractors
Algorithmic Matchers
Decision Engine
Probabilistic Network
LOD Index

Output

HTML Pages

HTML+ RDFa Pages

Crowdsourcing Platform

Micro-Task Manager

Workers Decisions

Micro Matching Tasks

Get Entity

LOD Open Data Cloud

Pick-A-Crowd

FashionBrain: Understanding Europe’s Fashion Data Universe

fashionbrain-project.eu
Predicting upcoming fashion trends
Search fashion products by image

SHOP THE LOOK

Ray-Ban
149,95 €

Gipsy
199,95 €

Lyle & Scott
139,95 €

Shine Original
29,95 €

Brooklyn's Own by Rocawear
39,95 €

Won Hundred
134,95 €

adidas Originals
99,95 €

Brixton
59,95 €
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

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, Jeffrey V. Nickerson, Michael S. Bernstein, Elizabeth M. Gerber, Aaron Shaw, John Zimmerman, Matthew Lease, and John J. Horton

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

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