

ICT & Social Epistemology

L2. Peer production and collective intelligence

Management of Organisations
ESC Dijon Bourgogne
1-5 March 2010

Dario Taraborelli
Centre for Research in Social Simulation
University of Surrey

Peer production and collective intelligence

From distributed ranking systems (L1)

To:

- Collaborative production
 - *peer production systems*
- Collaborative problem solving
 - *crowdsourcing*
 - *human computation, games with a purpose*

Peer production systems



WIKIPEDIA
The Free Encyclopedia



open source



 **OpenOffice**

 **Apache**
SOFTWARE FOUNDATION

Peer production systems

“Commons-based peer production [...] has particular advantages as an information process for identifying and allocating human creativity available to work on information and cultural resources. It depends on very large aggregations of individuals independently scouring their information environment in search of opportunities to be creative in small or large increments.”

Yochai Benkler

Coase's Penguin, or Linux and the Nature of the Firm

Peer production systems

If the problems of motivation and organization can be solved, then peer production has two major advantages over firms and markets:

1. Peer production provides a framework within which individuals who have the best information available about their own fit for a task can **self-identify for the task**.
2. It allows **larger groups of individuals** to scour larger groups of resources in search of materials, projects, collaborations, and combinations than is possible for firms or individuals who function in markets.

Commons-based peer production

“Commons-based” systems:

- resources are collectively controlled
- the product is released to the public domain or open licensed

Typical objections to commons-based peer production

1. No one will invest in a project if they cannot appropriate its benefits. That is, **motivation** will lack.
2. No one has the power to organize collaboration in the use of the resource. That is, **organization** will lack and collaboration will fail.

Commons-based peer production

Benkler's answers:

- 1. Motivation: Social-psychological rewards**

Diverse motivations animate human beings, and, more importantly, that there exist ranges of human experience in which the presence of monetary rewards is inversely related to the presence of other, social-psychological rewards.

- 2. Organisation: Modular tasks**

When a project of any size is broken up into little pieces, each of which can be performed by an individual in a short amount of time, the motivation to get any given individual to contribute need only be very small

Crowdsourcing

The act of taking tasks traditionally performed by an employee or contractor, and **outsourcing them to a group** (crowd) of people or community in the form of an open call.

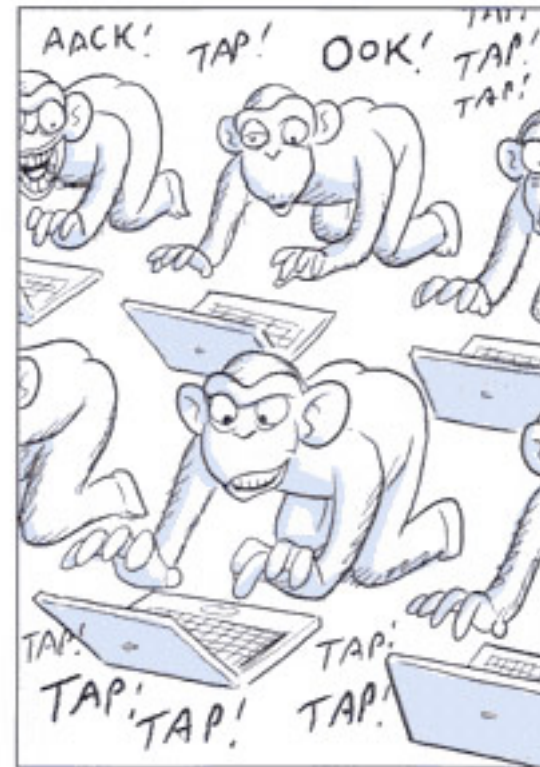
For example, the public may be invited to:

1. develop a new technology or carry out a design task (distributed participatory design)
2. refine or carry out the steps of an algorithm (human-based computation)
3. help capture, systematize or analyze large amounts of data (citizen science).

<http://en.wikipedia.org/wiki/Crowdsourcing>

Crowdsourcing

- Frugal and effective solution to solve otherwise unmanageable problems
- Rationale
 - problem: unmanageable tasks if tackled in traditional ways
 - solution: harness the *wisdom of the crowds*



HelpMeInvestigate.com

Help me
investigate...^{BETA}

Connect. Mobilise. Uncover.

Why my doctors have an 0845 number



Paul and

24 others

10

How much does Good Hope Hospital in Sutton Coldfield make from parking charges?



Paul and

24 others

48

✔ How much does Birmingham City Council spend on PR?



heatherb and

23 others

7

Investigate MP expenses

We have **457,153** pages of documents. **20,863** of you have reviewed **175,119** of them. Only **282,034** to go...

[Start reviewing](#)

Please read our [privacy policy](#) to find out how we use your data. You must also read our [terms of service](#). By reviewing pages, you are agreeing that you have read the terms of service, and that you agree to them.

What kind of page is this?

Claim

An expense form

Proof

Receipt, invoice or purchase order

Blank

Nothing to see here

Other

Something we haven't thought of

Is this page interesting? Should we investigate further?

Not interesting

e.g. a coversheet or stationery

Interesting

It's significant expenses data

Interesting but known

e.g. it's a duckhouse

Investigate this!

I would like to know more

[Go to the next unreviewed page](#)

Enter individual line items here

Items already reported for this page:

Telephone bill (unitemised)	£122.12	11th Dec 2006
-----------------------------	---------	---------------

[Report inaccuracies](#)

Amazon Mechanical Turk

Make Money by working on HITs

HITs - *Human Intelligence Tasks* - are individual tasks that you work on. [Find HITs now.](#)

As a Mechanical Turk Worker you:

- Can work from home
- Choose your own work hours
- Get paid for doing good work



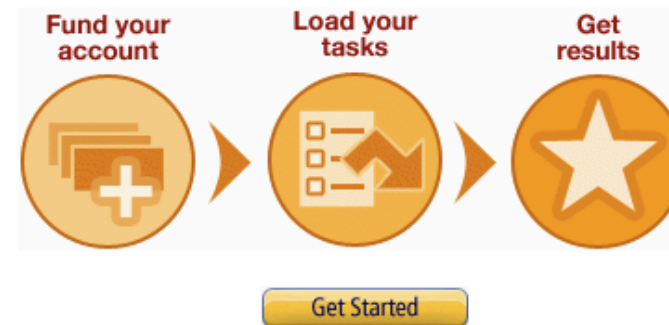
or [learn more about being a Worker](#)

Get Results from Mechanical Turk Workers

Ask workers to complete HITs - *Human Intelligence Tasks* - and get results using Mechanical Turk. [Register Now](#)

As a Mechanical Turk Requester you:

- Have access to a global, on-demand, 24 x 7 workforce
- Get thousands of HITs completed in minutes
- Pay only when you're satisfied with the results



or [learn more about being a Requester](#)




Amazon Mechanical Turk

- **Amazon Mechanical Turk** is a Web-based marketplace that helps companies find people to perform tasks computers are generally lousy at – identifying items in a photograph, skimming real estate documents to find identifying information, writing short product descriptions, transcribing podcasts.
- Amazon calls the tasks HITs (**human intelligence tasks**); they're designed to require very little time, and consequently they offer very little compensation – most from a few cents to a few dollars.



OPEN CHALLENGES

Show Newest Challenges [View all Challenges >>](#)

	Predictive Data Analysis	\$100,000 USD	85 active solvers
	NASA Challenge: Coordination of Science for Extraterrestrial Research	\$20,000 USD	42 active solvers
	Green Chemistry Process	\$10,000 USD	35 active solvers

FEATURED CHALLENGE **CHALLENGE CENTER**

What Do We Not Know to Cure Type 1 Diabetes?



This Challenge is asking InnoCentive Solvers to formulate well-defined problems aimed at advancing our knowledge about Type 1 Diabetes and ultimately eradication of the disease. This is an Ideation Challenge with a guaranteed award for at least one submitted solution. [Learn More](#)

Reward: **\$5,000 USD**

Type: **Ideation**

Deadline - **Mar 15, 2010**

Innocentive: crowdsourcing R&D

- The companies – or “seekers”, in InnoCentive parlance – pay “solvers” anywhere from \$10,000 to \$100,000 per solution.
- More than 30 percent of the problems posted on the site have been cracked, which is 30 percent more than would have been solved using a traditional, in-house approach.

Challenges for crowdsourcing systems

Reach critical mass

How to recruit enough users to perform a task?

Reduce gaming

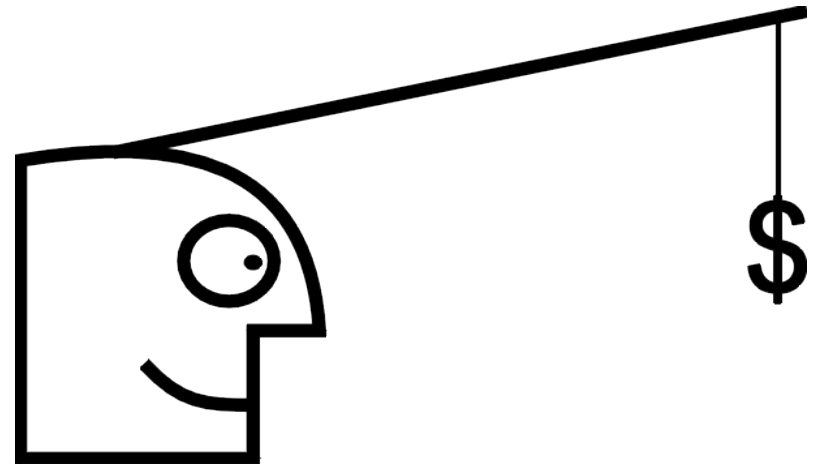
How to control the promotion of self interest?

Incentivise participation

What drives (fair) participation?

Incentives for crowdsourcing

- **Social rewards**
(participation in producing public goods)



- **Individual reputation rewards**
(authorship, peer acknowledgment)
- **Individual benefits**
(money, air time, credits)

Incentives for crowdsourcing

Low individual effort



High individual reward



Global benefit

Minimalist rewards: the urinal fly

“Our goal at UrinalFly.com is to make the world cleaner one bathroom at a time. This simple product works with a man’s basic instincts to produce a cleaner bathroom. Give them something to aim for and you will be amazed by the results”



Human Computation

“Each year, people around the world spend billions of hours playing computer games. What if all this time and energy could be channeled into useful work? What if people playing computer games could, without consciously doing so, simultaneously solve large-scale problems?”



Luis von Ahn

Labelling random images

ESP Game x Tag a Tune Verbosity Squigl Matchin logg

score 400 time 1:04

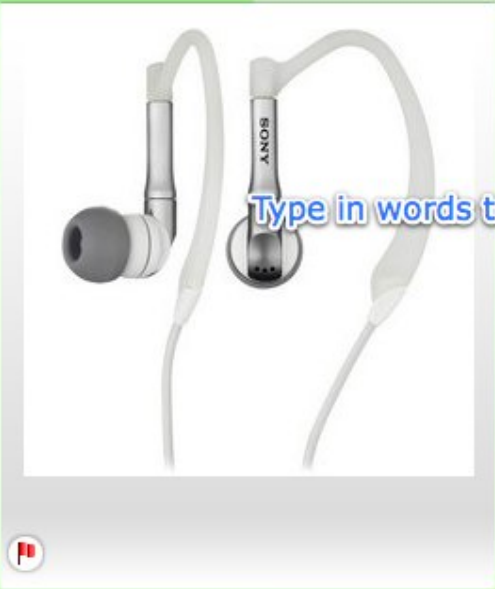
Bonus

ESP Game Concentrate...

What do you see?

taboo words

- plugs
- buds
- grey



guesses

Type in words to describe the image

+ submit → pass

Labelling images

- Many users play this game more than 40 hours per week. Within a few months of initial deployment on 25 October 2003, the game collected more than 10 million image labels
- if hosted on a major site like MSN Games or Yahoo! Games, all images on the Web could be labeled in a matter of weeks.

Solving captchas

- Solve a visual problem to register a free email account
- Ask (highly motivated) people to solve this problem for you



Recaptcha

overlooks inquiry

Type the two words:

Human Computation

- Games with a purpose
 - obtain reward in the form of entertainment
- Recaptcha
 - control access to obtain reward
 - (or: *why pornographers are smart people*)

Key questions

- What makes some problems easier to *crowdsource* than other problems?
- What incentives are available to drive participation and reach critical mass?