



Crowdsourcing

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Introduction

Definition

Terminology

Typologies

The myths of crowdsourcing

Games With A Purpose (GWAPs)

WYMR: what you must remember

What is crowdsourcing?



Crowdsourcing

Crowdsourcing *is the act of outsourcing tasks, traditionally performed by an employee or contractor, to an undefined, large group of people or community (a crowd), through an open call. [Wikipedia, 2 déc. 2010]*

A very expressive portmanteau word...

*The term “crowdsourcing” is a portmanteau of “**crowd**” and “**outsourcing**”, first coined by Jeff Howe in a June 2006 Wired magazine article “The Rise of Crowdsourcing”. Howe explains that because technological advances have allowed for cheap consumer electronics, the gap between professionals and amateurs has been diminished. Companies are then able to take advantage of the talent of the public, and Howe states that “It’s not outsourcing; it’s crowdsourcing.”*

[Wikipedia, 2 déc. 2010]

...that loses a lot at translation time (in French)

- ▶ Grand Dictionnaire terminologique du Québec: externalisation ouverte
- ▶ Journal Officiel: production participative
- ▶ G. Adda in [Sagot et al., 2011]: [myriadisation](#)

Different types of productions

All sorts, including:

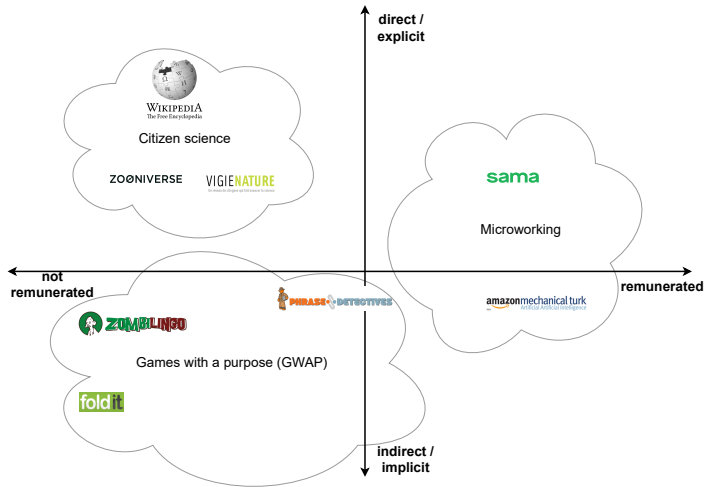
- ▶ crowd**voting**: votes on a question, a product, etc
- ▶ crowd**creation**: competition of ideas
- ▶ crowd**wisdom**: answers to questions (Yahoo! questions)
- ▶ crowd**funding**: collecting fundings for a project, a political campaign, etc
- ▶ crowd**data** (?): data production

Taxonomies?

As many taxonomies as points of view on crowdsourcing

See [Geiger et al., 2011] for a detailed state of the art

A (simplified) taxonomy of crowdsourcing



Some Remarquable Successes

Wikipedia¹ (August 2025) :

- ▶ **213 million pages** in more than **279** languages (2019)
- ▶ **more than 1 billion pages** of the French Wikipedia viewed per month

Distributed Proofreaders (Gutenberg Project)² :

- ▶ nearly **50,000** books were digitalized and corrected

Digitalization of the declarations of conflicts of interest from the French elected representatives:³ :

- ▶ 11,095 extracts of declarations digitalized and corrected in **10 days**
- ▶ nearly 8,000 participants

¹<https://stats.wikimedia.org/v2/#/all-wikipedia-projects>

²<https://www.pgdp.net/c/>

³<http://regardscitoyens.org/interets-des-elus/>

Introduction

The myths of crowdsourcing

M_1 = "Crowdsourcing is recent"

M_2 = "Crowdsourcing involves a lot of participants"

M_3 = "Crowdsourcing involves non-experts"

Amazon Mechanical Turk: a legendary platform

Games With A Purpose (GWAPs)

WYMR: what you must remember

Visibility...

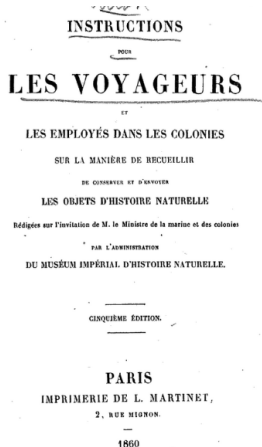
Since the advent of Web 2.0:

- ▶ easy access to an unprecedented mass of persons
- ▶ possibility to interact with the visited Webpage (Web 2.0, aka "social Web")

Examples: Wikipédia, Project Gutenberg (*Distributed proofreaders*)

... is not discovery

Instructions for the travellers and employees in the French colonies



Citizen science:

- ▶ published by the French Museum National d'Histoire Naturelle
- ▶ so that the travellers and employees in the French colonies:
"make known the results of their own experiments, in order to benefit from them and to share them with the scientific world"
- ▶ first edition: **1824**

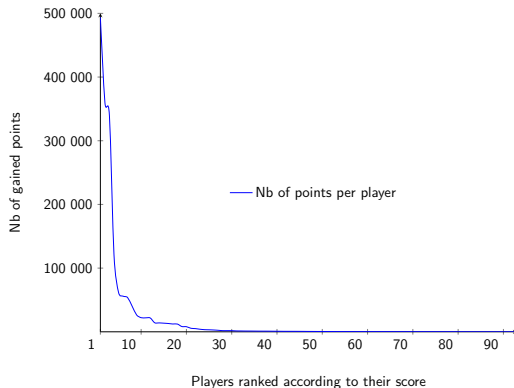
Other examples

- ▶ Ligue de Protection des Oiseaux⁴:
 - ▶ monitoring of birds populations
 - ▶ created more than a century ago
 - ▶ 5,000 active participants
- ▶ Longitude rewards⁵ (1714):
 - ▶ "system of inducement prizes offered by the British government for a simple and practical method for the precise determination of a ship's longitude at sea" (Wikipedia, August 2025)
 - ▶ awarded in 1773 to John Harrison, an English carpenter and clockmaker

⁴<https://www.lpo.fr/partager-vos-observations/partagez-vos-observations>

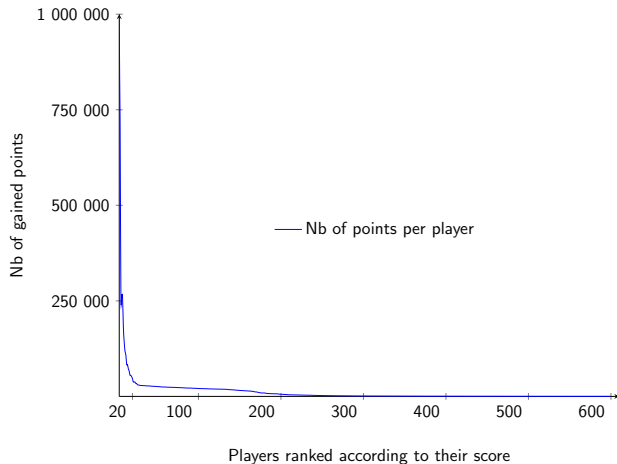
⁵https://en.wikipedia.org/wiki/Longitude_rewards

A crowd of players? Phrase Detectives [Chamberlain et al., 2013]



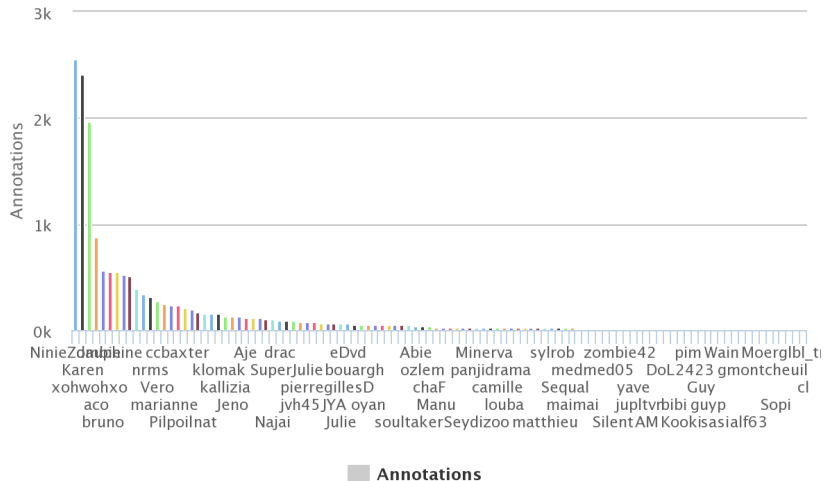
Number of players on *Phrase Detectives* according to their ranks in points (Feb. 2011 - Feb. 2012)

A crowd of players? JeuxDeMots



Number of players on *JeuxDeMots* according to their ranks in points
(source: <http://www.jeuxdemots.org/generateRanking-4.php>)

A crowd of players? ZombiLingo



A crowd of workers? [Fort et al., 2011]

Number of active *workers* on Amazon Mechanical Turk (MTurk):

- ▶ registered on the Website in 2010: more than 500,000
 - ▶ 80% of the tasks (HIT) are performed by the 20% most active *workers* [Deneme, 2009]
- ⇒ really active: between 15,059 and 42,912

Experts vs non-experts

Example of named entity annotation in a microbiology corpus:

- ▶ experts from the domain?
 - ▶ of the corpus (microbiology)?
 - ▶ of the application (NLP) ?

Experts vs non-experts

Example of named entity annotation in a microbiology corpus:

- ▶ experts from the domain?
 - ▶ of the corpus (microbiology)?
 - ▶ of the application (NLP) ?

→ experts of the task

Mythe #3 : "Crowdsourcing involves non-experts"

Extracts from the forum of ZombiLingo

4 zombies ont donné leur avis

1084 (Phrase de référence)



25 %

Le principal critère d' évaluation de l' efficacité a été de mesurer si le taux dans le sang de phosphatases alcalines sériques (enzyme impliquée dans la dégradation des os) est revenu à la normale ou est **REDESCENDU** d' au_moins 75 % pour se rapprocher des taux normaux .

Suivre la discussion

Discuter de la réponse

Annotation expert

Justin a écrit il y a 9 mois :

est redescendu est le passé composé du verbe redescendre, de même que "est revenu" est le passé-composé du verbe revenir. Si on les considèrait comme des présents de l'indicatif au passif, il faudrait pouvoir écrire "il a été revenu" et "il a été redescendu". Ce qui n'est pas le cas...

17 zombies ont donné leur avis

22637



35 %

Graphes associés à un jeu de Nim Dans la **grande** majorité des cas , l' ensemble des situations , même s' il est très grand , est **FINI** .

Suivre la discussion

Discuter de la réponse

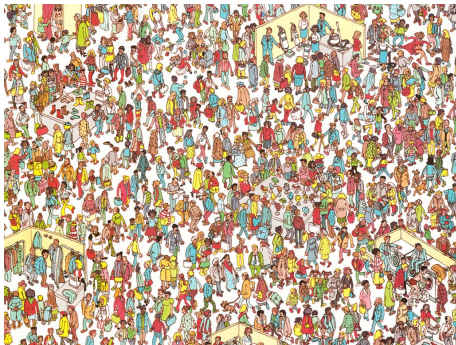
Annotation expert

Zeltron a écrit il y a 9 mois :

l'ensemble est fini donc il n'est pas infini : rien à voir avec finir

Crowdsourcing

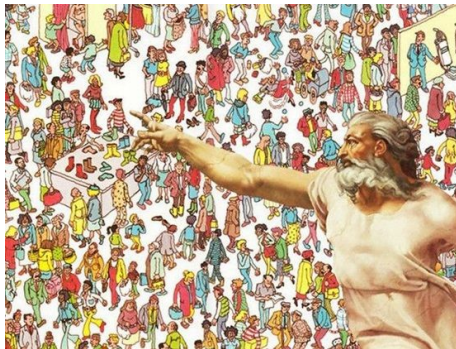
Using a crowd of "non-experts" annotators?



Crowdsourcing

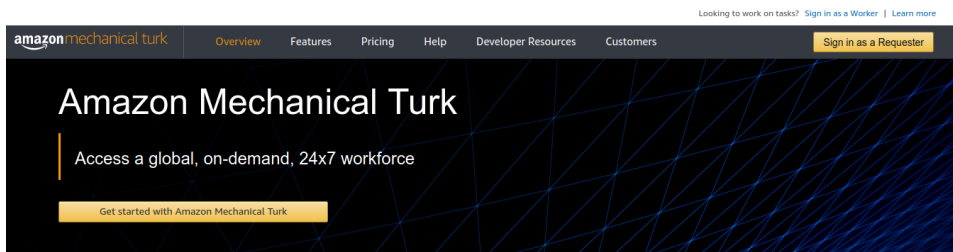
~~Using a crowd of "non-experts" annotators?~~

→ Finding/training experts (of the task) in the crowd



Amazon Mechanical Turk: see course on ethics

MTurk

The image is a screenshot of the Amazon Mechanical Turk website. At the top, there is a dark navigation bar with the Amazon Mechanical Turk logo on the left and a series of links: Overview, Features, Pricing, Help, Developer Resources, and Customers. On the far right of this bar is a yellow button that says "Sign in as a Requester". Above the navigation bar, on the right side, is a small link that says "Looking to work on tasks? Sign in as a Worker | Learn more". The main content area has a dark background with a blue geometric pattern of lines. The title "Amazon Mechanical Turk" is prominently displayed in white. Below it, a subtitle reads "Access a global, on-demand, 24x7 workforce". At the bottom of this section is a yellow button that says "Get started with Amazon Mechanical Turk".

amazon mechanical turk

Overview Features Pricing Help Developer Resources Customers

Sign in as a Requester

Looking to work on tasks? [Sign in as a Worker](#) | [Learn more](#)

Amazon Mechanical Turk

Access a global, on-demand, 24x7 workforce

Get started with Amazon Mechanical Turk

Amazon Mechanical Turk (MTurk) is a crowdsourcing marketplace that makes it easier for individuals and businesses to outsource their processes and jobs to a distributed workforce who can perform these tasks virtually. This could include anything from conducting simple data validation and research to more subjective tasks like survey participation, content moderation, and more. MTurk enables companies to harness the collective intelligence, skills, and insights from a global workforce to streamline business processes, augment data collection and analysis, and accelerate machine learning development.

Introduction

The myths of crowdsourcing

Games With A Purpose (GWAPs)

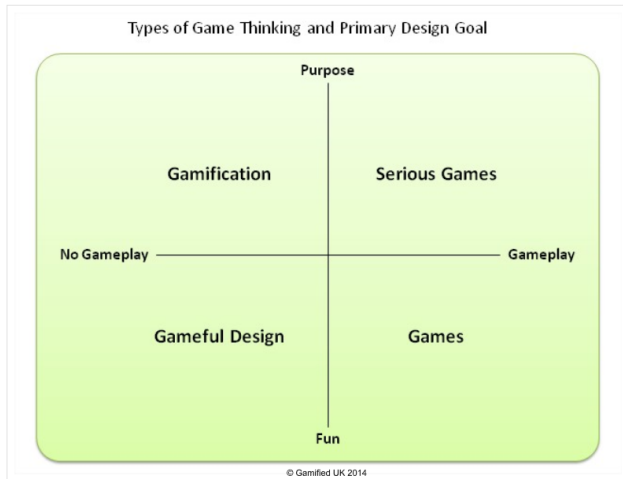
Definitions and examples

Creating a game

GWAPs' specifics

WYMR: what you must remember

Games vs gamification



Serious games

Definition

[...] game designed for a primary purpose other than pure entertainment.

[Wikipedia, Serious game, consulted in August 2025]

Serious games *generally* aim at training players through, for example, simulation

Serious games: examples

Kriegsspiel :

- ▶ *Instructions for the Representation of Tactical Maneuvers under the Guise of a Wargame*
- ▶ to train officers of the Prussian army
- ▶ first game of rules: 1812

[Wikipedia, Kriegsspiel, consulted in August 2025]

Games With A Purpose

Definition

A human-based computation technique of outsourcing steps within a computational process to humans in an entertaining way. [Wikipedia, Game With A Purpose, consulted in August 2025]

Games With A Purpose: some examples

- ▶ ESP game: 13,500 participants labeled 1.3 million images in 3 months! [von Ahn, 2006] → sold to Google
- ▶ Duolingo: the participants, while learning a language, translate Web pages [Luis von Ahn] → fake serious game, real GWAP
- ▶ JeuxDeMots [Lafourcade, 2007]
- ▶ PhraseDetectives [Poesio et al., 2013]
- ▶ HostoMytho [Hiebel et al., 2024]

Taking advantage of the knowledge of the world of the players



Jeux de mots

The text "Jeux de mots" is written in a playful, rounded font. Each letter is a different color: 'J' is light green, 'e' is dark green, 'u' is teal, 'x' is blue, 'd' is dark blue, 'e' is purple, 'm' is light purple, 'o' is pink, and 't' is magenta. Below the text is a thick, orange-brown brushstroke underline that starts under the 'J' and tapers off to the right.

JeuxDeMots: playing associating ideas...

...to create a lexical network [Lafourcade and Joubert, 2008]

More than **300 million relations** created by more than 6,000 players, **constantly** updated

Very sophisticated game mechanism:

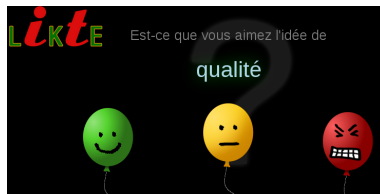
- ▶ play by pairs
- ▶ challenges between players
- ▶ process, hot potatoes, gifts, etc.



JeuxDeMots: the mini-games

...to enrich the lexical network [Fort et al., 2018]

- ▶ LikeIt: 25,000 polarized terms in 3 months, 150,000 votes
- ▶ to compare to Polarimots: 7,473 polarized words, 3 annotators [Gala and Brun, 2012]
- ▶ also SexIt [Lafourcade and Fort, 2014], ColorIt, PolitIt...



Taking advantage of the school knowledge of the players



Phrase Detectives: playing being a detective...

...to annotate anaphora [Poesio et al., 2013]

Annotated corpus of 3.5 million words:

- ▶ pre-annotated corpus
- ▶ detailed instructions
- ▶ training phase
- ▶ 2 ways of playing

DETECTIVES CONFERENCE
Another detective has made a decision about a phrase, either that it refers to another phrase, it has not been mentioned before, it is a property or it does not refer to anything. Do you agree with them?

Knitta (Wikipedia)
PolyCott and AtoZky came up with their own names, then invented names for other members in a brainstorming session they considered "one of the more hilarious meetings". Some former member names include Knottaceous N.U.T., SorcOdaddy and Polyboby.
As of January 2008, the group has two female members and one male, ages 26 to 73, who wish to remain anonymous. Current members are PolyCott, MassuKnobby, and Granny Sq. An estimated five to twelve regional groups exist around the world.
Usually tagging on Friday nights and Sunday mornings, Knitta taggers leave a paper tag on each work, bearing the slogan "Knitta please" or "shaddup knitta!" They tag trees, lamp posts, railings, fire hydrants, monuments and other urban targets, and even get a little "hardcore" with ideas like hanging knitted-bagged sweaters over aerial telephone cables. The crew marks holidays by using themed work, using, for example, pink yarn for their Valentine's Day pieces and speedily yarn for New Years. When Knitta is not working with a theme, they work on projects, tagging specific targets or specific areas.
The phrase in blue is the **closest** phrase that refers to the phrase in orange.

NAME THE CULPRIT
Has the phrase shown in orange been mentioned before in this text or is it a property? Use your mouse to select the **closest phrase(s)** if it has been mentioned before.

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Taking advantage of the learning capacities of the players



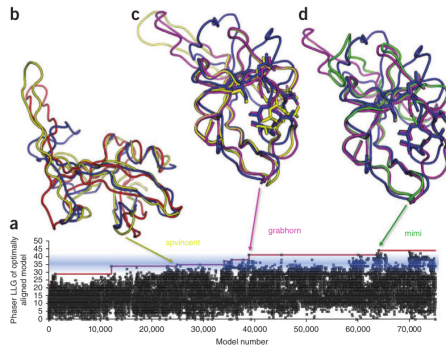
FoldIt: playing protein folding in 3D...

...to solve scientific problems [Khatib et al., 2011]

Solving the crystal protein structure responsible for the propagation of simian AIDS in rhesus macaques

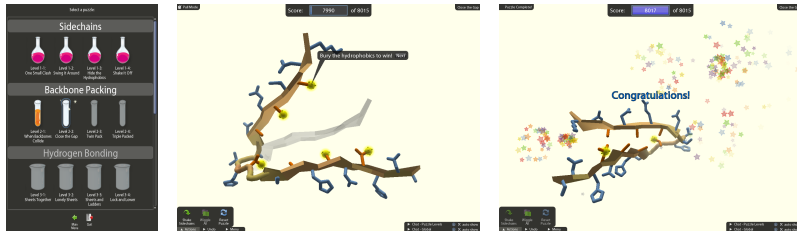
Solution to a decade old unsolved problem:

- ▶ found in three weeks
- ▶ step by step
- ▶ by a team of players



FoldIt: playing protein folding in 3D...

...with no prior knowledge in biochemistry [Cooper et al., 2010]



Training step by step:

- ▶ tutorial decomposed by concepts
- ▶ sets of puzzles for each concept
- ▶ access granted to the following puzzles only if the number of gained points is enough

ZombiLingo: playing zombie, eating heads...

...to annotate corpora in dependency syntax [Guillaume et al., 2016]



- ▶ task decomposed by relation type (not by sentence)
- ▶ tutorial for each relation type
- ▶ reference sentences proposed regularly
- ▶ duels, forum

Creating a game



Find 4 ways to motivate the players

Motivation vs volition [Fenouillet et al., 2009]

motivate people to **come and play** (motivation)

then

motivate people to **continue playing** (volition)

Motivate people, in general

for example to betray (their country) or to spy on someone

Analysis of the CIA, MICE (adapted to games) :

- ▶ Money: reward

Motivate people, in general

for example to betray (their country) or to spy on someone

Analysis of the CIA, MICE (adapted to games) :

- ▶ Money: reward
- ▶ Ideology: interest

Motivate people, in general

for example to betray (their country) or to spy on someone

Analysis of the CIA, MICE (adapted to games) :

- ▶ Money: reward
- ▶ Ideology: interest
- ▶ Constraint: light and legal

Motivate people, in general

for example to betray (their country) or to spy on someone

Analysis of the CIA, MICE (adapted to games) :

- ▶ Money: reward
- ▶ Ideology: interest
- ▶ Constraint: light and legal
- ▶ Ego: situation in the community

Types of players according to [Bartle, 1996] (simplified)

- ▶ *Achievers*: like to succeed in the game

Types of players according to [Bartle, 1996] (simplified)

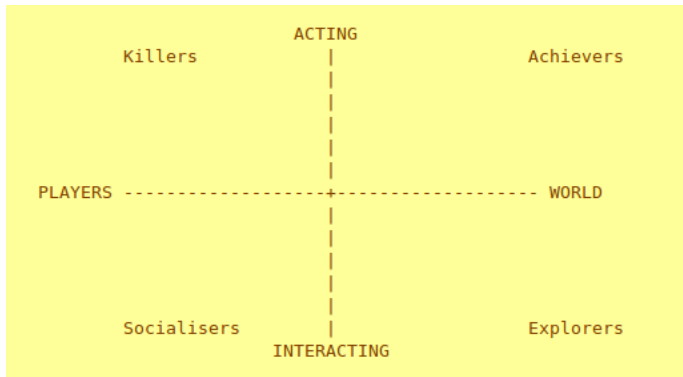
- ▶ *Achievers*: like to succeed in the game
- ▶ *Explorers*: like to know all the hidden corners of the game

Types of players according to [Bartle, 1996] (simplified)

- ▶ *Achievers*: like to succeed in the game
- ▶ *Explorers*: like to know all the hidden corners of the game
- ▶ *Socializers*: like to interact with others

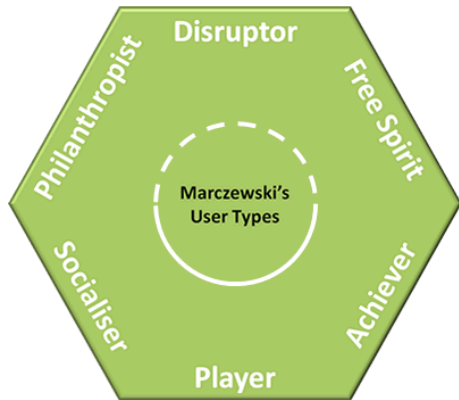
Types of players according to [Bartle, 1996] (simplified)

- ▶ *Achievers*: like to succeed in the game
- ▶ *Explorers*: like to know all the hidden corners of the game
- ▶ *Socializers*: like to interact with others
- ▶ *Killers*: like to attack the game or the players

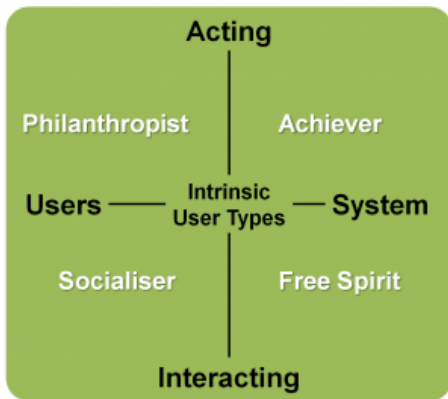


[Bartle, 1996]

Types of players according to Marczewski

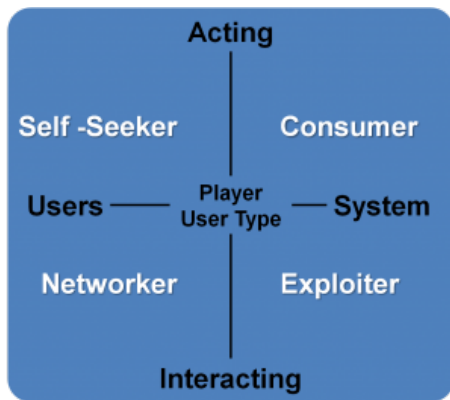


<http://www.gamified.uk/>



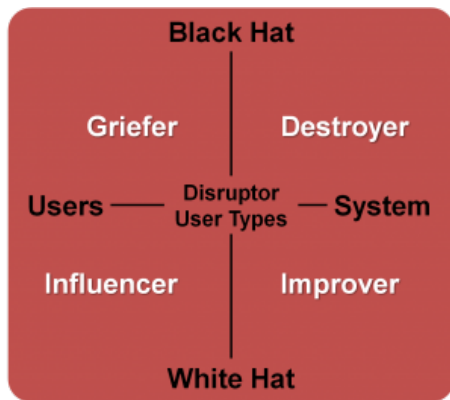
<http://www.gamified.uk/>

A bit less simple: *players*



<http://www.gamified.uk/>

A bit less simple: *disruptors*



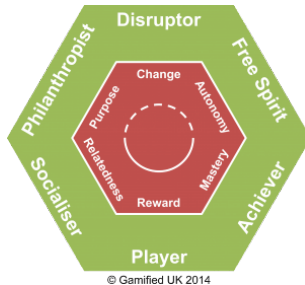
<http://www.gamified.uk/>

Which **type of player** are you?

Motivate the players according to their type



Creating a game



Find examples instantiating each elements (for example in the games you played)

Creating quality data vs fun features

preserving the virtuous circle is not so easy



Creating quality data vs fun features

preserving the virtuous circle is not so easy



sentence that disappears in dans ZombiLingo:

- + the player is surprised: "fun"
- the player clicks everywhere: creation of a bad quality resource

Creating quality data vs fun features

preserving the virtuous circle is not so easy



sentence that disappears in dans ZombiLingo:

- + the player is surprised: "fun"
- the player clicks everywhere: creation of a bad quality resource

player who found a hack in JeuxDeMots to get more time to play:

- + creates more good quality data
- creates resentment within the player pool: bad for the game

Evaluating the quality of the produced data



Phrase Detectives

evaluate with a reference

Evaluation:

- ▶ reference corpus
- ▶ high IAA [Chamberlain et al., 2009]

Failure: properties identification

*Jon, the **postman**, delivered the letter*

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The group and their followers consider their graffiti "a method of beautifying public space".

The phrase in blue is the **eldest** phrase that refers to the phrase in orange.

Disagree Agree

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None, they work on projects, tagging specific targets or specific areas.

Not mentioned before ☐ This is a property

SEARCH CLUES

Words like **they, she, her** and **it** are likely to refer to something else in the text. Try to find the closest mention of this phrase.

Words like **they or those** could refer to more than one thing in the text so select more than one phrase if necessary.

Always look for the **eldest previous mention** of the phrase to score maximum agreement points.

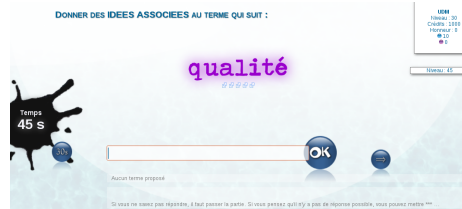
Feedback

JeuxDeMots

evaluate with a game

Evaluation:

- ▶ no reference
- ⇒ creation of an application to validate the resource [Lafourcade et al., 2011]



Creating a GWAP

to produce quality language resources

Can be very efficient, but not so simple to do:

- ▶ need to train the players on complex tasks
- ▶ knowledge of game mechanics
- ▶ development and design should be consistent
- ▶ need for a lot of advertising (takes time)

Perspectives

A platform of GWAPs for **citizen science** to share the efforts in:

- ▶ communication
- ▶ community management
- ▶ development
- ▶ hosting services (servers)

<https://lingoboingo.org/>



Play Games. Make the World Smarter.

ABOUT

GAMES

Choose Language





Myriadisation :

- ▶ definition and myths of crowdsourcing
- ▶ what is a GWAP and what are the types of players

-  Bartle, R. (1996).
Hearts, clubs, diamonds, spades: Players who suit MUDs.
The Journal of Virtual Environments, 1(1).
-  Chamberlain, J., Fort, K., Kruschwitz, U., Lafourcade, M., and Poesio, M. (2013).
Using games to create language resources: Successes and limitations of the approach.
In Gurevych, I. and Kim, J., editors, The People's Web Meets NLP, Theory and Applications of Natural Language Processing, pages 3–44. Springer Berlin Heidelberg.
-  Chamberlain, J., Kruschwitz, U., and Poesio, M. (2009).
Constructing an anaphorically annotated corpus with non-experts: assessing the quality of collaborative annotations.
In Proceedings of the 2009 Workshop on The People's Web Meets NLP: Collaboratively Constructed Semantic Resources, People's Web '09, pages 57–62, Stroudsburg, PA, USA. Association for Computational Linguistics.

 Cooper, S., Treuille, A., Barbero, J., Leaver-Fay, A., Tuite, K., Khatib, F., Snyder, A. C., Beenen, M., Salesin, D., Baker, D., and Popović, Z. (2010).

The challenge of designing scientific discovery games.

In Proceedings of the Fifth International Conference on the Foundations of Digital Games, FDG '10, pages 40–47, New York, NY, USA. ACM.

 Deneme (2009).

How many turkers are there?

<http://groups.csail.mit.edu/uid/deneme/>.

 Fenouillet, F., Kaplan, J., and Yennek, N. (2009).

Serious games et motivation.

In 4ème Conférence francophone sur les Environnements Informatiques pour l'Apprentissage Humain (EIAH'09), vol. Actes de l'Atelier "Jeux Sérieux: conception et usages", pages 41–52, Le Mans, France.

 Fort, K., Adda, G., and Cohen, K. B. (2011).

Amazon Mechanical Turk: Gold mine or coal mine?

Computational Linguistics (editorial), 37(2):413–420.

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