Characterising Volunteers' Task Execution Patterns Across Projects

on Multi-Project Citizen Science Platforms

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Lesandro Ponciano and Thiago Emmanuel Pereira. 2019. **Characterising volunteers' task execution patterns across projects on multi-project citizen science platforms**. In Proceedings of the 18th IHC. ACM, New York, NY, USA, Article 16, 1–11. DOI:https://doi.org/10.1145/3357155.3358441

Citizen Science

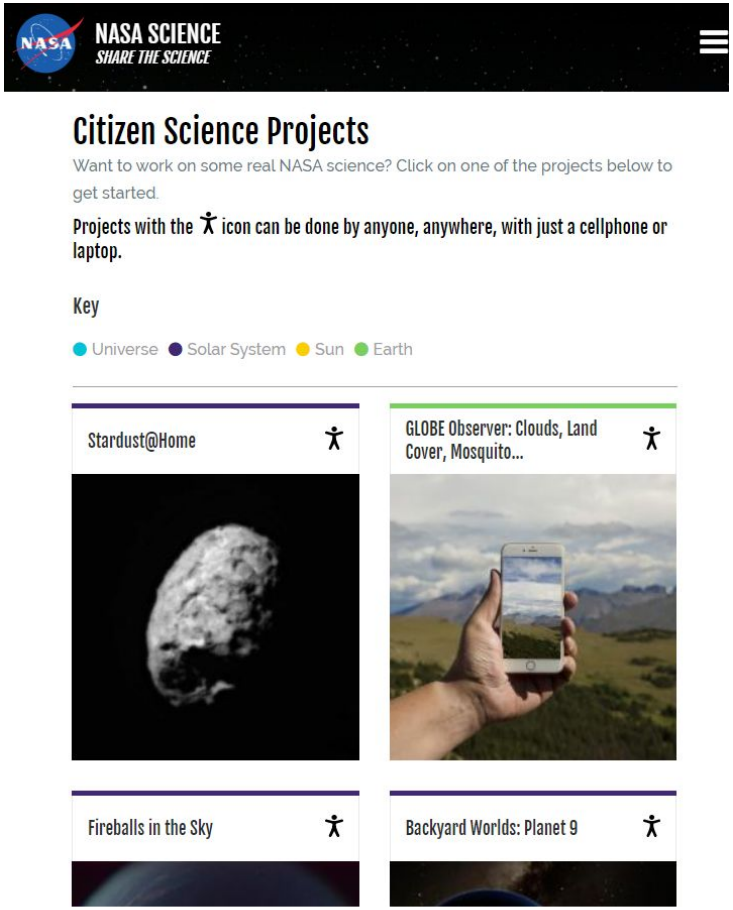
Partnership

SCIENTISTS

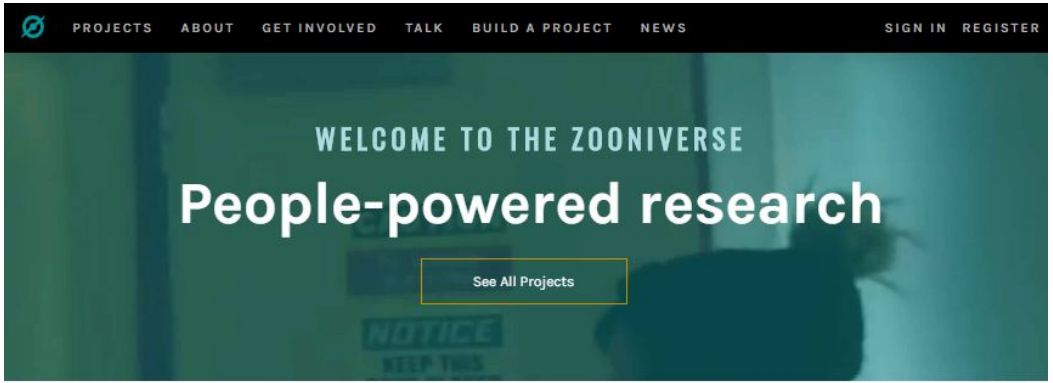
+

ORDINARY PEOPLE

Offline and Online



https://science.nasa.gov/citizenscience



FEATURED PROJECT

https://zooniverse.org

Motivations of Volunteers

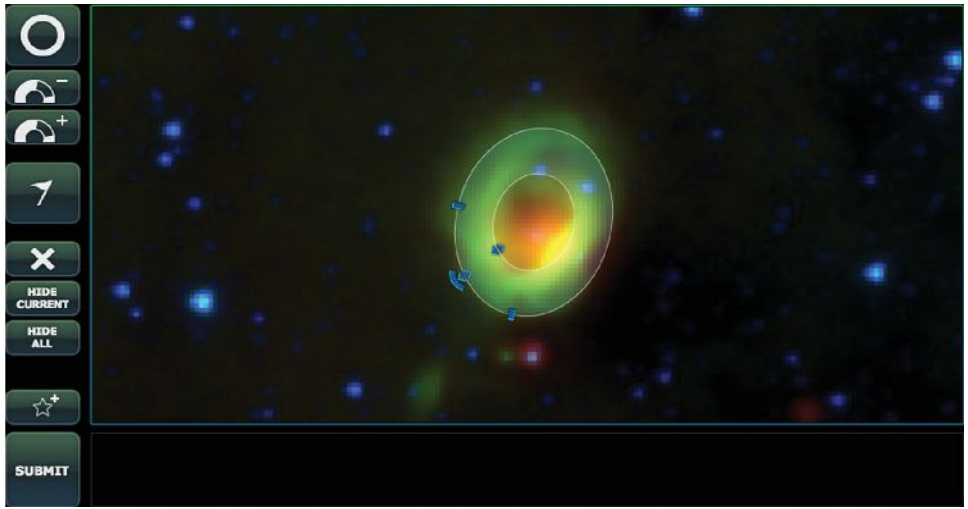
- Wish to contribute to science
- Willing to volunteer for a cause
- Feel it is important to help
- Have a personal interest in the topic studied
- Desire to learn something new
- Desire to discover something new
- Desire to spend time in nature
- Socialising with like-minded people

“Galaxy Zoo: Exploring the Motivations of Citizen Science Volunteers” DOI: http://dx.doi.org/10.3847/AER2009036

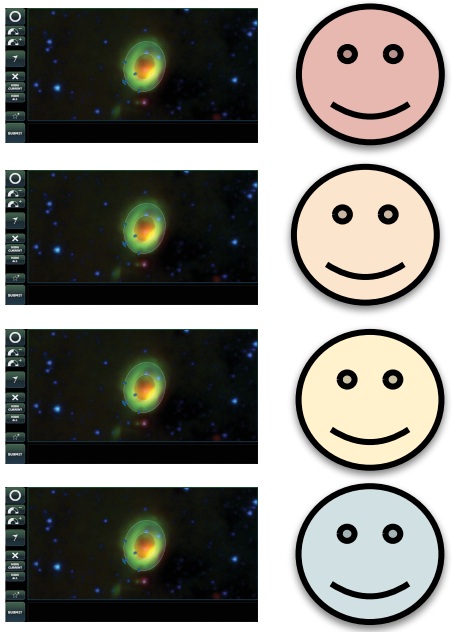
“The motivations of volunteers in citizen science”. http://eprints.bournemouth.ac.uk/24680/

Crowd-sourced Citizen Science Projects

Human Computation Tasks



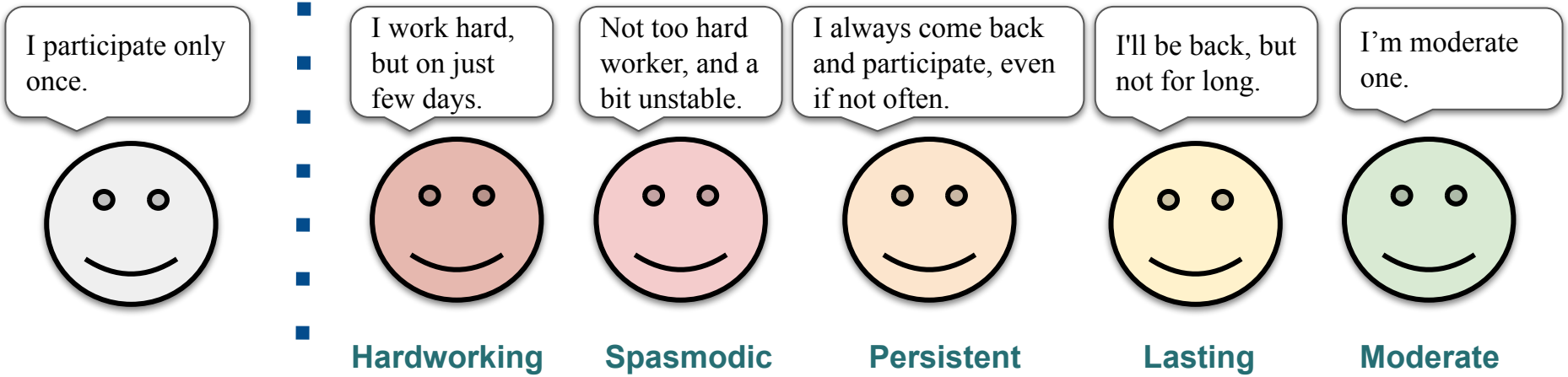
Example of a task from **The Milky Way Project**



"Considering human aspects on strategies for designing and managing distributed human computation" DOI: https://doi.org/10.1186/s13174-014-0010-4

"Agreement-based credibility assessment and task replication in human computation systems" DOI: https://doi.org/10.1016/j.future.2018.05.028

Volunteers' Engagement Profiles



Transients
1 day contributors

Regulars
>1 day contributors

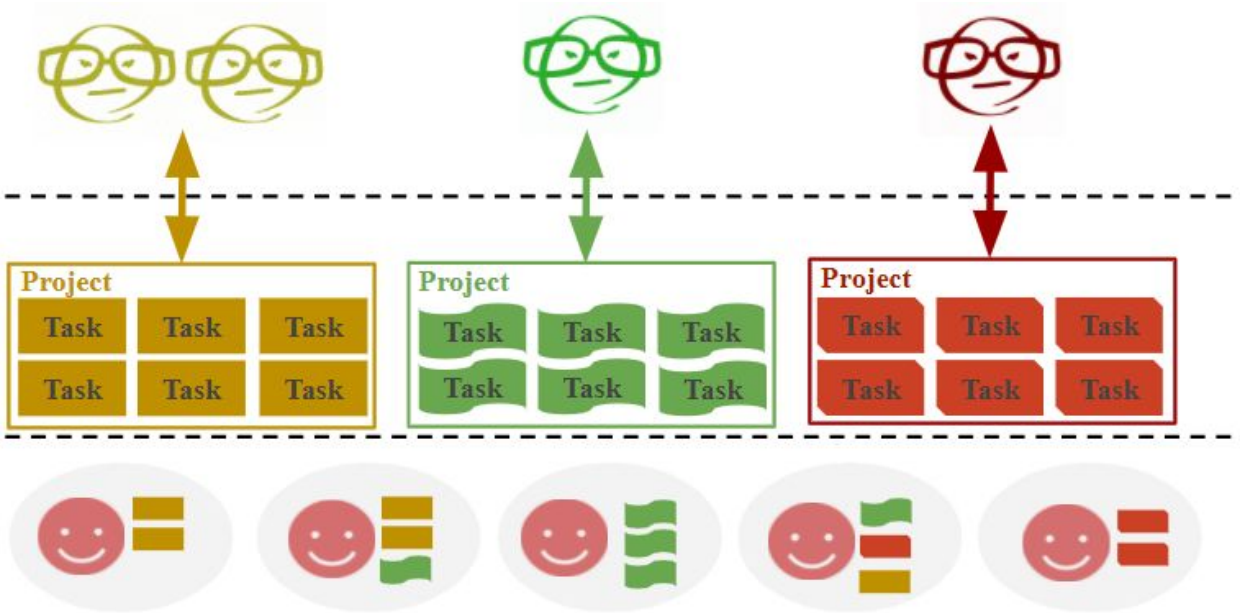
"Volunteers' engagement in human computation for astronomy projects". DOI: https://doi.org/10.1109/MCSE.2014.4
"Finding Volunteers' Engagement Profiles in Human Computation for Citizen Science Projects". DOI: http://dx.doi.org/10.15346/hc.v1i2.12

Multi-Project Platforms

Scientists (or research teams) join the platform, create projects, their tasks, and receive their outcomes

Platform manages projects, the execution of tasks, and activities of scientists and volunteers

Volunteers join the platform, search for projects, and perform tasks on those they are willing to participate



Research Questions

Understanding

1. to what extent the multi-project nature of platforms facilitate the attraction of volunteers to new projects

2. to what extent the existence of multiple projects can lead volunteers to engage with the platform regularly

3. what are the main features of multi-project platforms fostering a cross-project engagement

Using Goal, Question and Metrics (GQM) for Measuring Cross-Project Engagement

Perspective	Goal	Question	Metric
Volunteer	To discover new relevant projects in which they can contribute and sustainably engage with them.	To what extent does the volunteer experience the diversity of projects available on the platform?	Exploration rate
		To what extent does the volunteer regularly engage with the projects available on the platform?	Engagement rate
		Do multi-project volunteers stay on the platform longer than single-project volunteers?	Relative activity duration

Metrics for **multi-project** citizen science

VOLUNTEERS

- Exploration rate
- Engagement rate
- Relative activity duration

PLATFORM

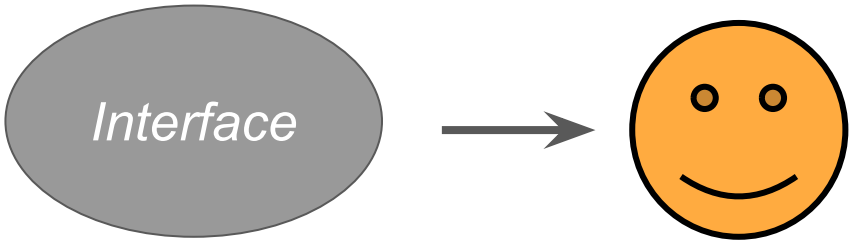
- Inequality in volunteers' recruitment by the projects
- Inequality in the received contribution by the projects

SCIENTISTS

- Balance in recruitment
- Balance in computing

Using **Semiotic Inspection Method (SIM)** for Inspecting Cross-Project Features

Our purpose is to understand what the **designers** are communicating to the **users** about multiples projects.



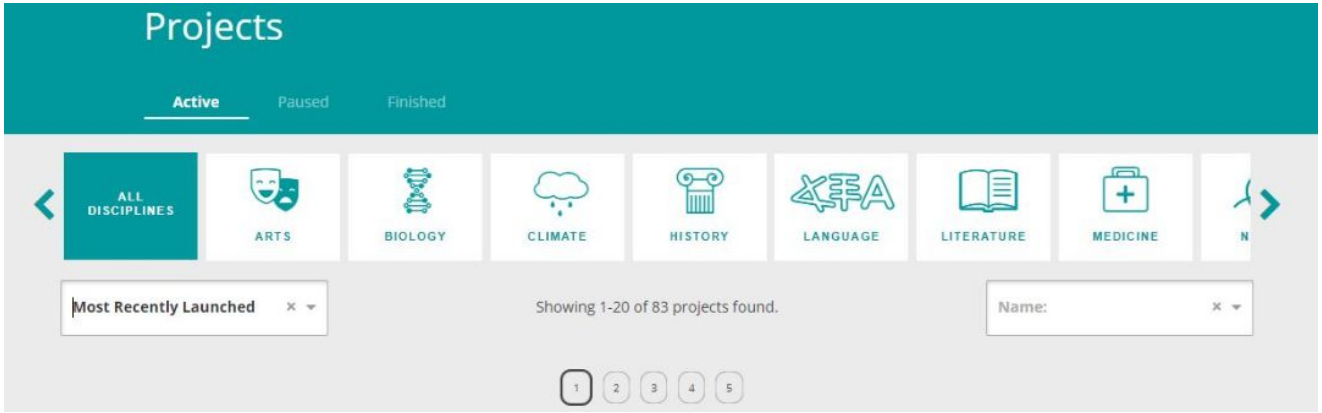
- Analysis of metalinguistic signs
- Analysis of static signs
- Analysis of dynamics signs
- Collate & compare
- Appreciation of the quality of the metacommunication

Materials and Methods

Multi-Project Citizen Science Platforms

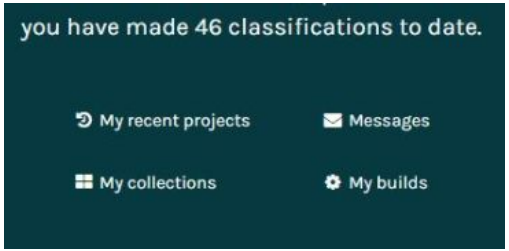
Platform	#Volunteers	#Projects	Qualitative (GQM)	Qualitative (SIM)
Crowdcrafting	26,133	22	X (2012-2014)	X (2018)
GeoTagX	727	16	X (2013-2015)	-
Socientize	1,667	10	X (2014-2016)	-
Zooniverse	-	-	-	X (2018)
CitSci.org	-	-	-	X (2018)

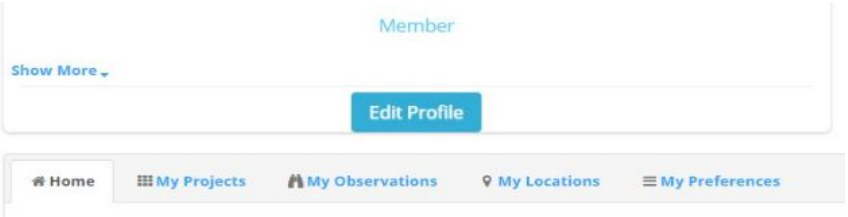
Signs of project search



Signs of projects preferred or recommended by the platform

Signs of volunteer's projects

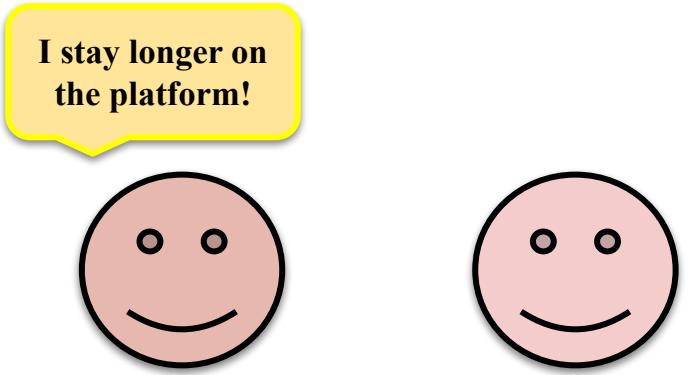




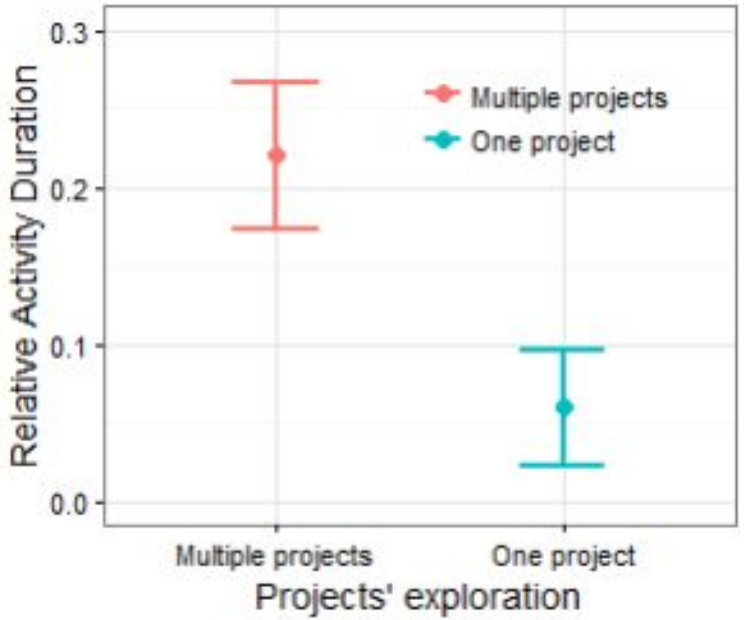
Volunteers typical behaviour: platform transient, and one project. Few volunteers are multi-project explorers.

Dimension	Classes	Crowdcrafting	Socientize	GeoTag-X
Platform	Platform regular	7%	33%	27%
	Platform transient	93%	67%	73%
	Sum	100%	100%	100%
Project	Multi-project explorer	15%	13%	26%
	Multi-project regular	1%	5%	6%
	One project	84%	82%	68%
	Sum	100%	100%	100%

Multi-project regulars stay longer on the platform



Multi-project regular **One project**



Only regular Volunteers - GeoTag-X platform

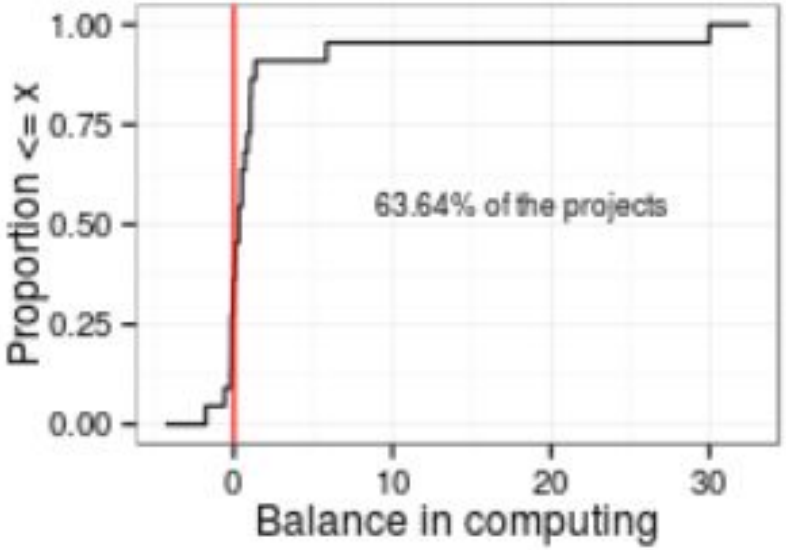
Inequality: many projects, but few attract volunteers and few receive their contribution.

Platform	Inequality in volunteers recruitment	Inequality in received contribution
Crowdcrafting	0.93	0.95
GeoTag-X	0.47	0.64
Socientize	0.61	0.80

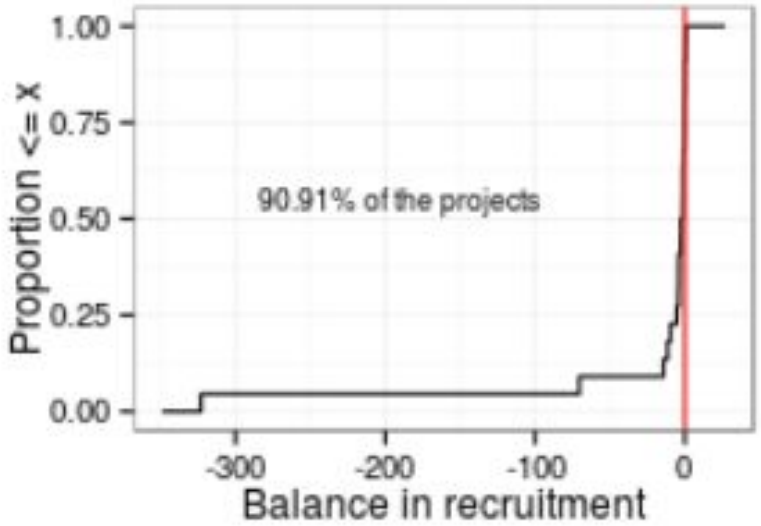
* Gini coefficient

Few projects attract most of the attention from the volunteers and are responsible for most of the activity of the volunteers on the platforms.

New projects inherit fewer volunteers from the platform than they recruit



Crowdcrafting platform



... but such inherited volunteers perform more tasks than the recruited ones

Implications for Design

1. Platforms should encourage a cross-project engagement
   a. when the volunteer has not permanently engaged with a project
   b. when the volunteer is exhibiting an explorer behaviour
   c. when the project in which the volunteer is regular has been completed
2. Projects' recommendations should be personalised to each volunteer according to their participation preferences and behaviour
3. Platforms should provide feedback and recognition to the volunteers for their multi-project participation

Take Home Message

- Volunteers participate, but they engage little in multiple projects
- There is significant inequality in the attention projects receive from volunteers in multi-project platforms
- Recruiting volunteers from other projects is a positive thing for projects, volunteers, and the platform

Current and Future Work

1. Citizen science in HCI research
2. Engagement online versus offline
3. Recommendations and explanations in Human Computation tasks

Thank you!

If you are interested, read our paper :)

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