



# **Automated filter: An approach towards increasing participants' motivations and improving data quality in citizen science projects**

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November 28<sup>th</sup>, 2019



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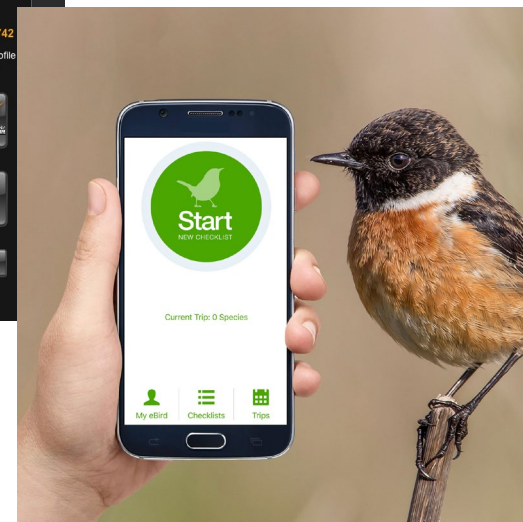
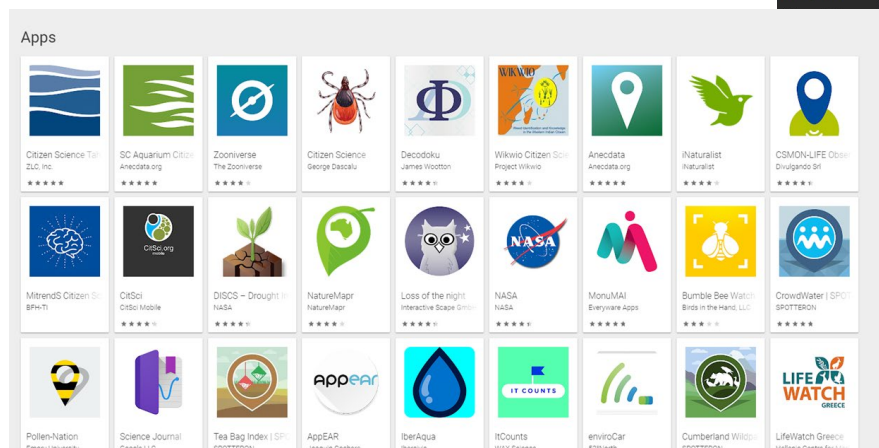
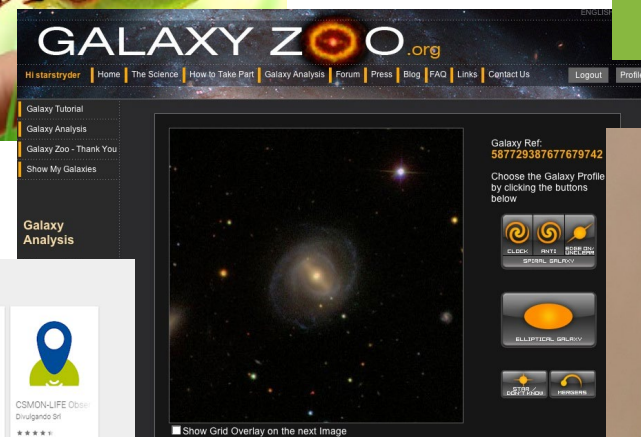
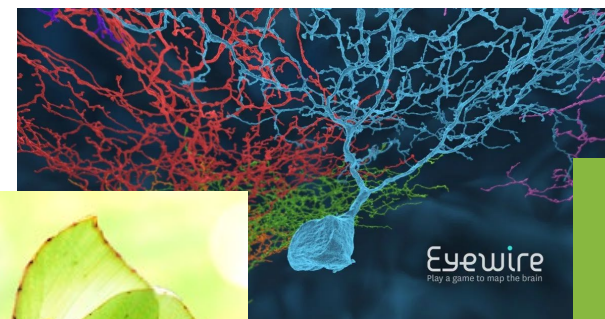
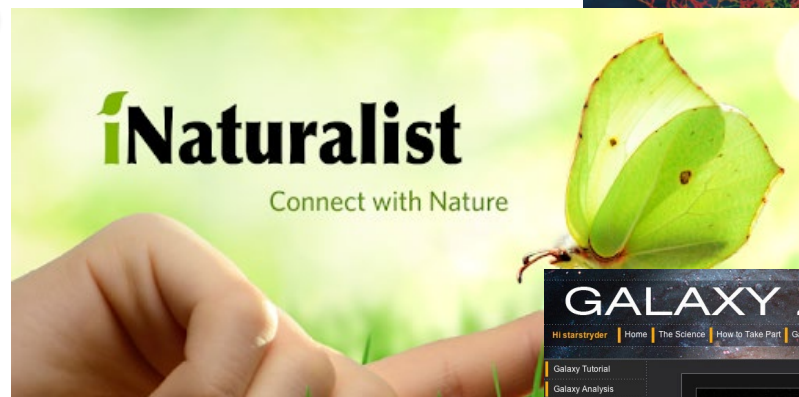
Haute Ecole Spécialisée  
de Suisse occidentale

# What is Citizen Science?

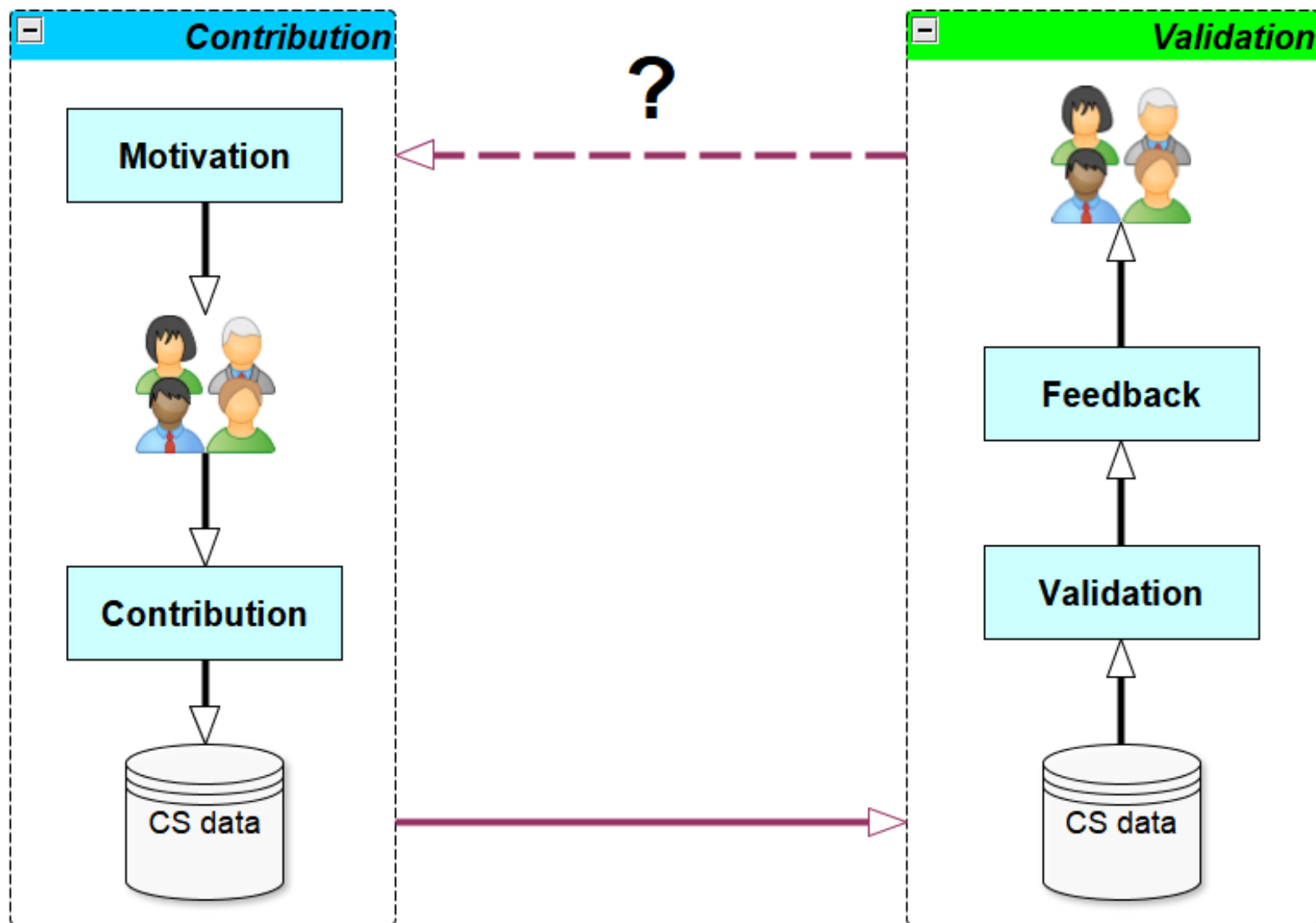


## Public Participation in Scientific Research (PPSR)

- Classic Citizen Science
- Community/Civic Science
- Citizen Cyber-Science:
  - ☐ Gamified Citizen Science
  - ☐ Participatory Sensing
  - ☐ Volunteered Thinking
  - ☐ Volunteered Computing



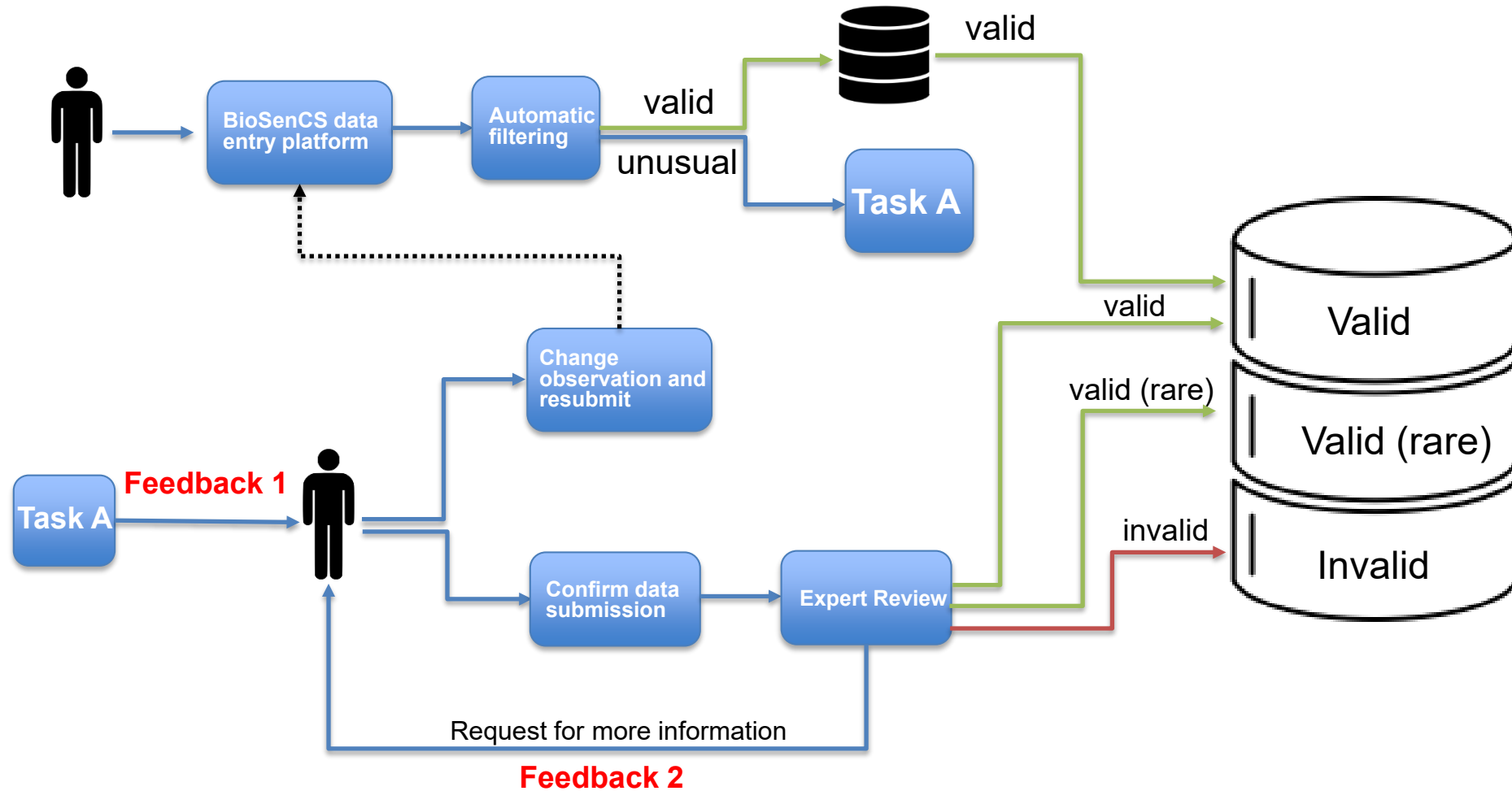
# Main Elements of Citizen Science



# Motivation

Level 1	Level 2	Level 3							
		Classic citizen science		Citizen science game		Citizen cyber-science			
		Primary	Secondary	Primary	Secondary	Volunteered Thinking		Volunteered Computing	
						Primary	Secondary	Primary	Secondary
Intrinsic	Learning	Interest in learning about nature/environment (BeeWatchers, Biodiversity obs collection)	understanding the scientific process	Interest in science(foldit/eyewire) learn new knowledge(Folit/eyewire) mastering a topic(eyewire)	curiosity	Interest in science (e.g. astronomy Galaxy Zoo, Planet Hunters)	Learning about science (GalaxyZoo, Planet Hunters)		To learn and acquiring new skills
	Contribution	Contributing to research		Contributing to research desire to support worthy cause (eyewire/Foldit)		Contribution to scientific research (GalaxyZoo) Desire to be more connected to science(Planet Hunters)	goals of the project	Contributing to something worthy or research	goals of the project
	Altruism	Nature conservation Care about the environment Helping the science		a desire to help the project scientists help other members within the game (eyewire) encouraging new players(eyewire)		Helping the scientists contributing to science		offering their personal machine computing power Wanting to give to a community	to share acquired knowledge over the years with others (MalariaControl, BOINC)
	Enjoyment/personal satisfaction	spending time in the nature Outdoor recreation		friendship built among the participants problem solving for fulfilment and success	system of points and ranking(Foldit, only one interviewer)	Making a discovery (Planet Hunters)	personal enjoyment of the activity, for instance classifying objects (GalaxyZoo)	Feeling of being useful (MalariaControl, BOINC) Enthusiast in fully utilization of computing power	
Extrinsic	Social interaction		interaction with others (e.g. group data collection) Social bonding is a central motivatic factor in such projects	<div>Constructive Feedback</div>				Interaction for task discussion only	interaction with others Get to know people and build friendship
	Expected future returns		Receiving something in return is not a strong motivation factor					receiving extra awards such as t-shirt, vouchers, certificates, and virtual badges (Planet Hunters)	Obtain credits for a course (MalariaControl)
	Ego enhancement		Being known among others	compete with other players gain recognition as top player through leaderboard	desire for points or high ranks (Foldit) use the knowledge learnt from the game for personal reasons such as school grade (eyewire)	to be offered co-authorship and acknowledgment in scientific papers  to be recognized (Being co-author in scientific articles)  Being named after a scientific discovery (e.g. a detected object in galaxy images)	Being among the firsts to make scientific discoveries	Recognition Reputation	Competition Self-expression and empowerment
	Community	Working with like-minded people		Being a part of a divers community with shared goal	improve self-status within the community Reputation in the community	Being known as part of a research team	Joining the community (Planet Hunters)	identification in a community	

# Validation: Automated Filter



## Date validation



species visibility period  
DB



## Location validation



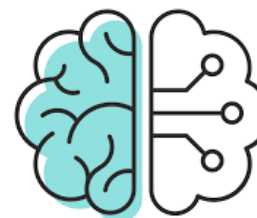
species distribution  
map



## Image validation



tags and probabilities  
generated by the model





# Image recognition using Clarifai API



Patrice Prunier

PREDICTED CONCEPT	PROBABILITY
nature	0.994
no person	0.989
flower	0.989
outdoors	0.979
summer	0.976
leaf	0.968
flora	0.961
blur	0.954
wild	0.954
grass	0.935
stamen	0.919
pollen	0.916

```
PS C:\clarifaiTest> python .\speciesImage.py
select species type:tree
[0.9943669, 0.9892851, 0.9890503, 0.97857535, 0.97588277, 0.9679595, 0.9605919, 0.95377016, 0.9535944, 0.9349278, 0.9194071, 0.9158164]
['nature', 'no person', 'flower', 'outdoors', 'summer', 'leaf', 'flora', 'blur', 'wild', 'grass', 'stamen', 'pollen']
Are you sure the species type is selcted correctly as tree ?
Our image recognition model says that a tree is not presented in the predicted tags.
But we trust you more than the machine 💎
```

# Summary

- ❑ Whether or not the **auto-filtering** approach and specially the combination of **citizen science** and **machine learning** would:
  - ❖ **Simplify** data **validation** and improve **data quality**
  - ❖ **Motivate** volunteers by giving them **feedbacks**
- ❑ Evaluate the quality of collected data with and without the filtering procedure
- ❑ Evaluate the evolution of user engagement
- ❑ Check the proposed approach for other citizen science use cases





Thanks for your attention ☺

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