Socially intelligent computing to support citizen science

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GOALS

1. Develop an understanding of the conditions under which SoCS can enable and enhance citizen science projects;

2. Generate new models of SoCS that support large-scale public participation in scientific research; and

3. Develop and test SoCS that reflect human cognitive and social abilities.

PHASE I

Survey and case studies of citizen science websites

Finding: Surprisingly little use of games as motivation

PHASE II & III

Design, develop, and evaluate systems to support citizen science projects

We developed two types of citizen science games:

Happy Match: A gamified version of a species classification task

Forgotten Island: A fantasy game that used the classification task only as a way to advance in the game play
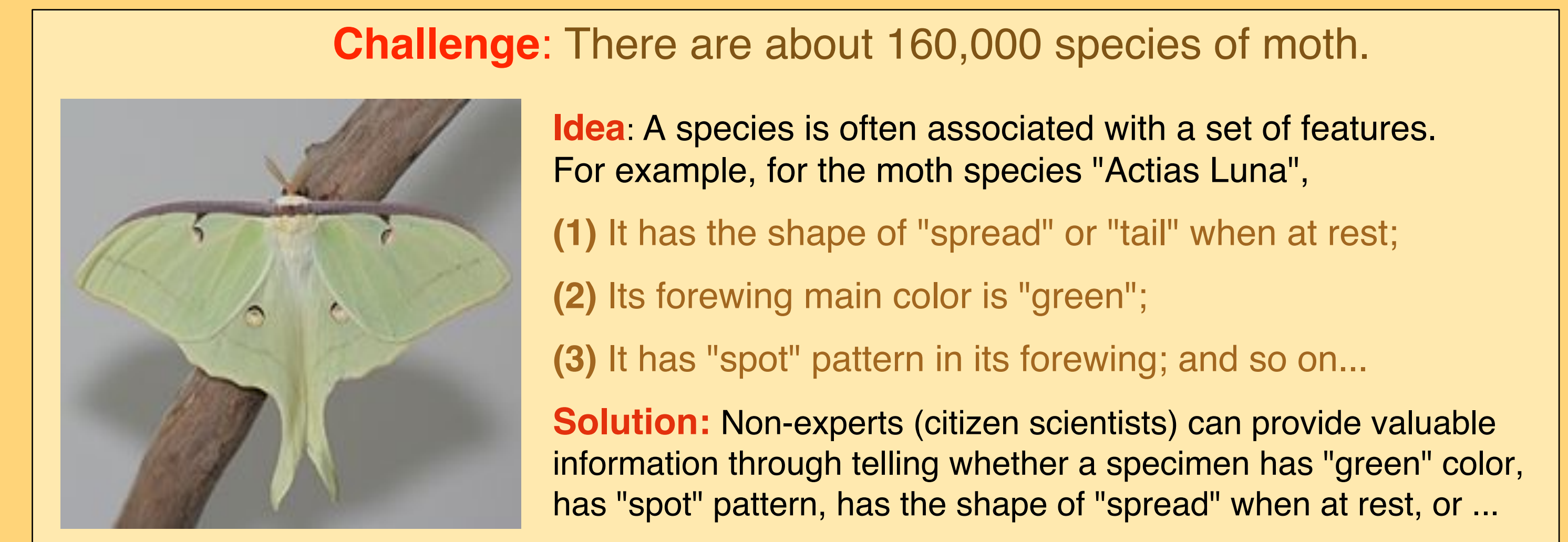
RESULTS

~1000 registered users in 8 months. ~100,000 classification decisions on 3 species (moth, ray, shark).

Data quality: Surprisingly, though we did observe cheating in the fantasy game, data quality from the two games was not significantly different.

Learning effect: Players seemed not improve their classification performance over time.

ONGOING WORK

1. Providing a social interaction space for players.

2. Improving player classification accuracy by engaging them in learning more about the species, and about how to best classify specimens.

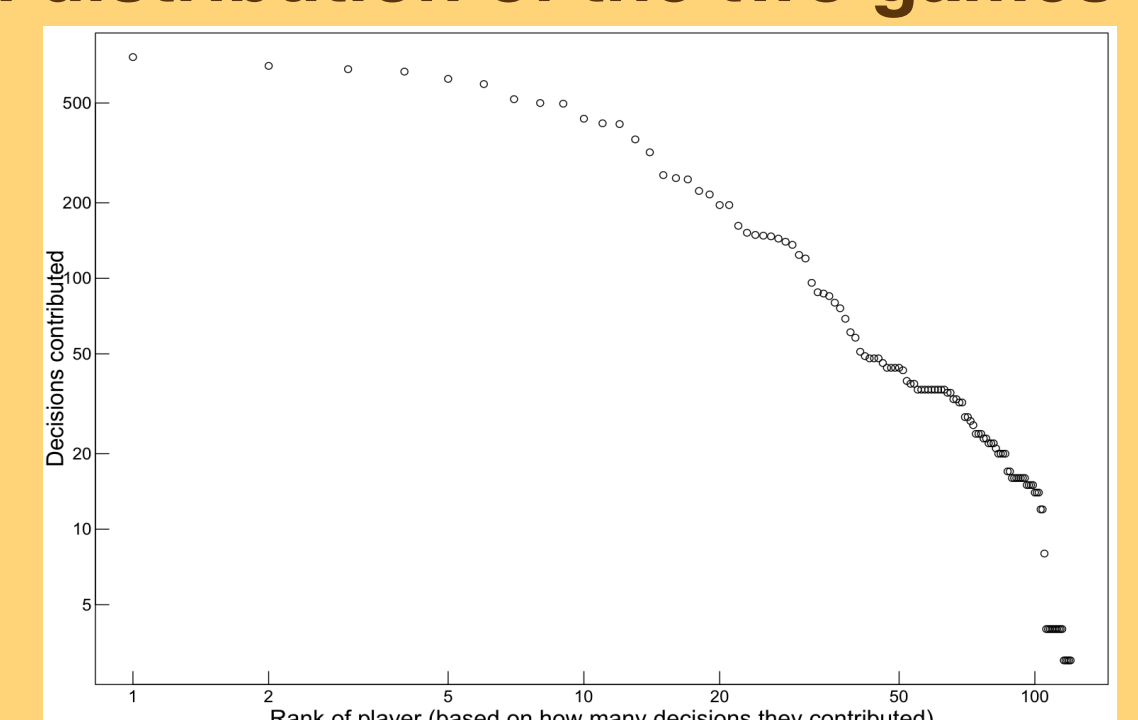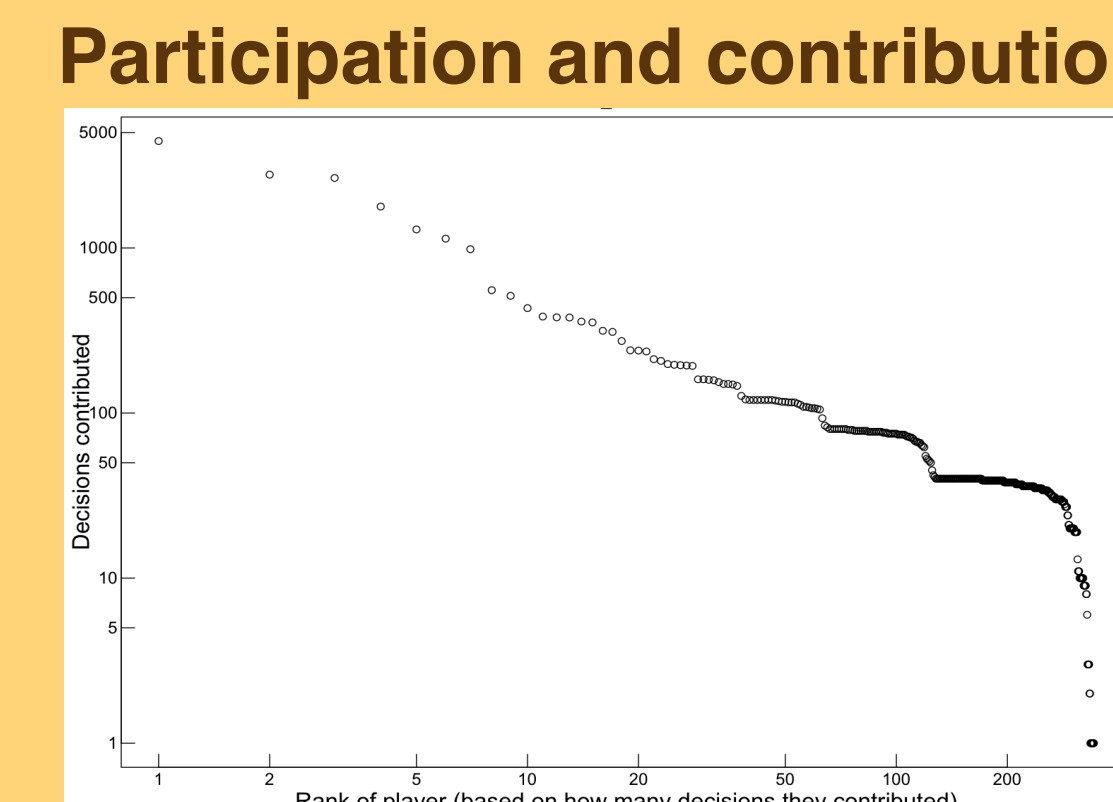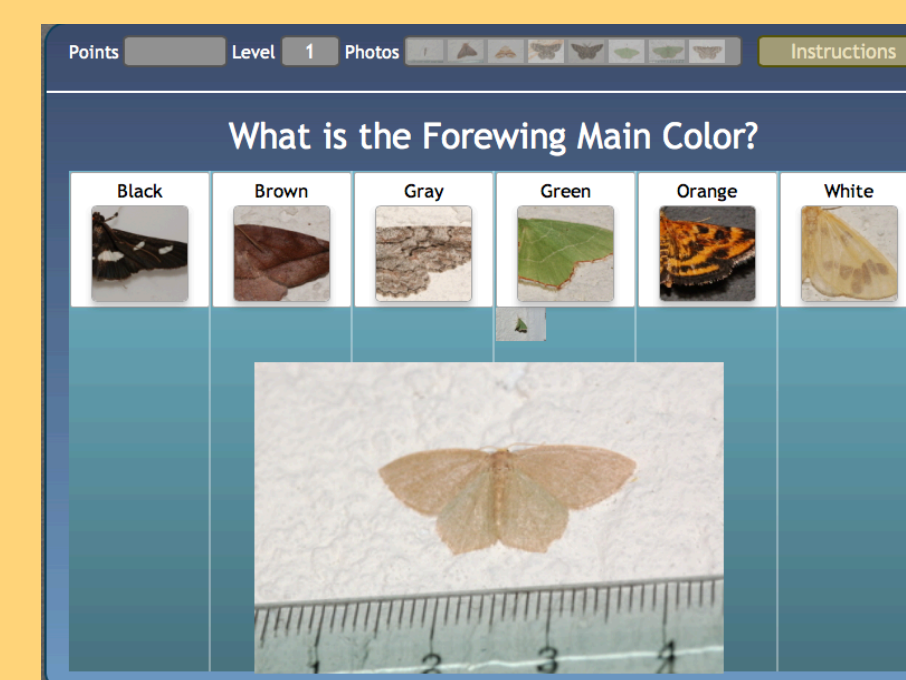3. Collaborating with scientists to apply the user-generated data to their real scientific tasks.

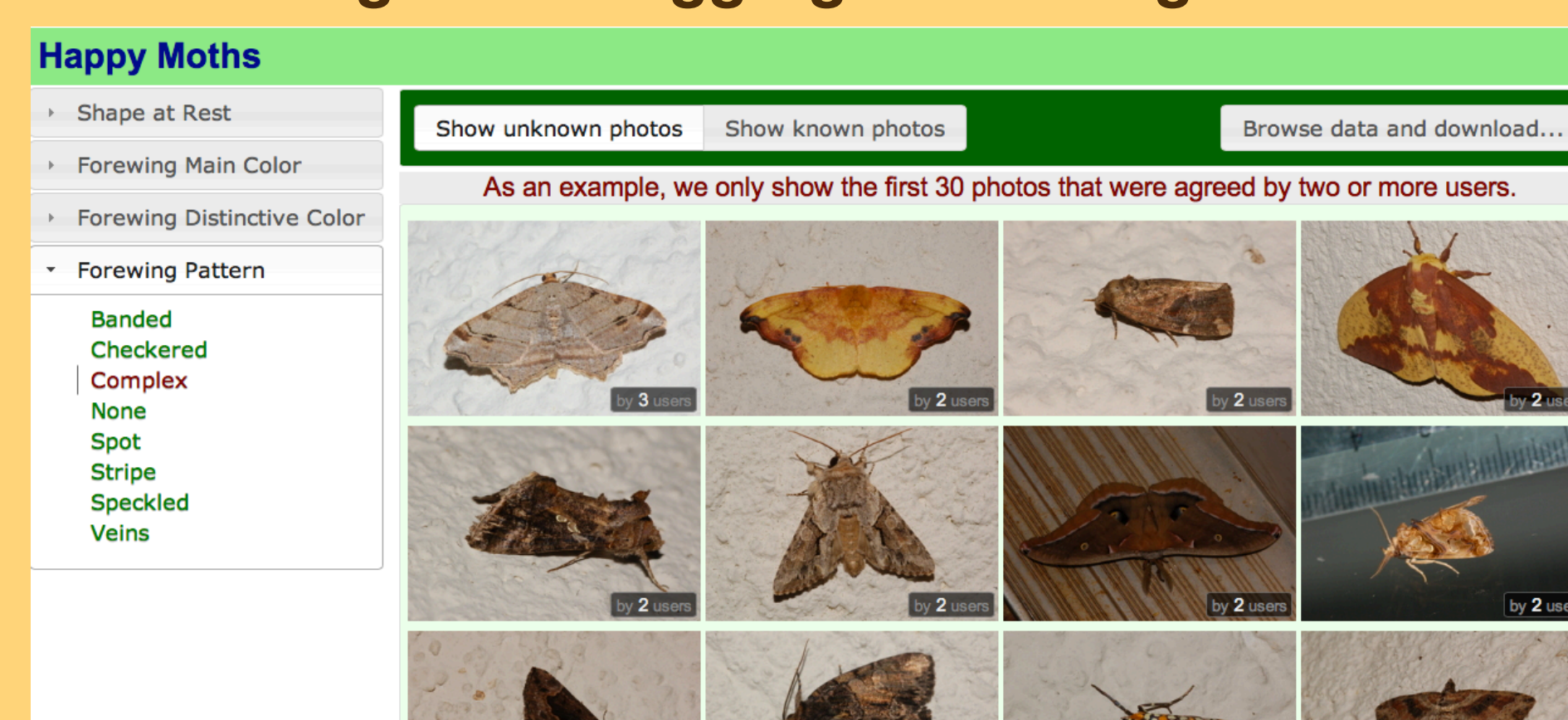A biologist has a large collection of specimens

Is there any new species?

Is there any species in danger? (Is the number decreasing?)

Can someone help me identify the species of the specimens?

Challenge: There are about 160,000 species of moth.

Idea: A species is often associated with a set of features. For example, for the moth species "Actias Luna",

(1) It has the shape of "spread" or "tail" when at rest;

(2) Its forewing main color is "green";

(3) It has "spot" pattern in its forewing; and so on...

Solution: Non-experts (citizen scientists) can provide valuable information through telling whether a specimen has "green" color, has "spot" pattern, has the shape of "spread" when at rest, or ...

http://citizensort.org

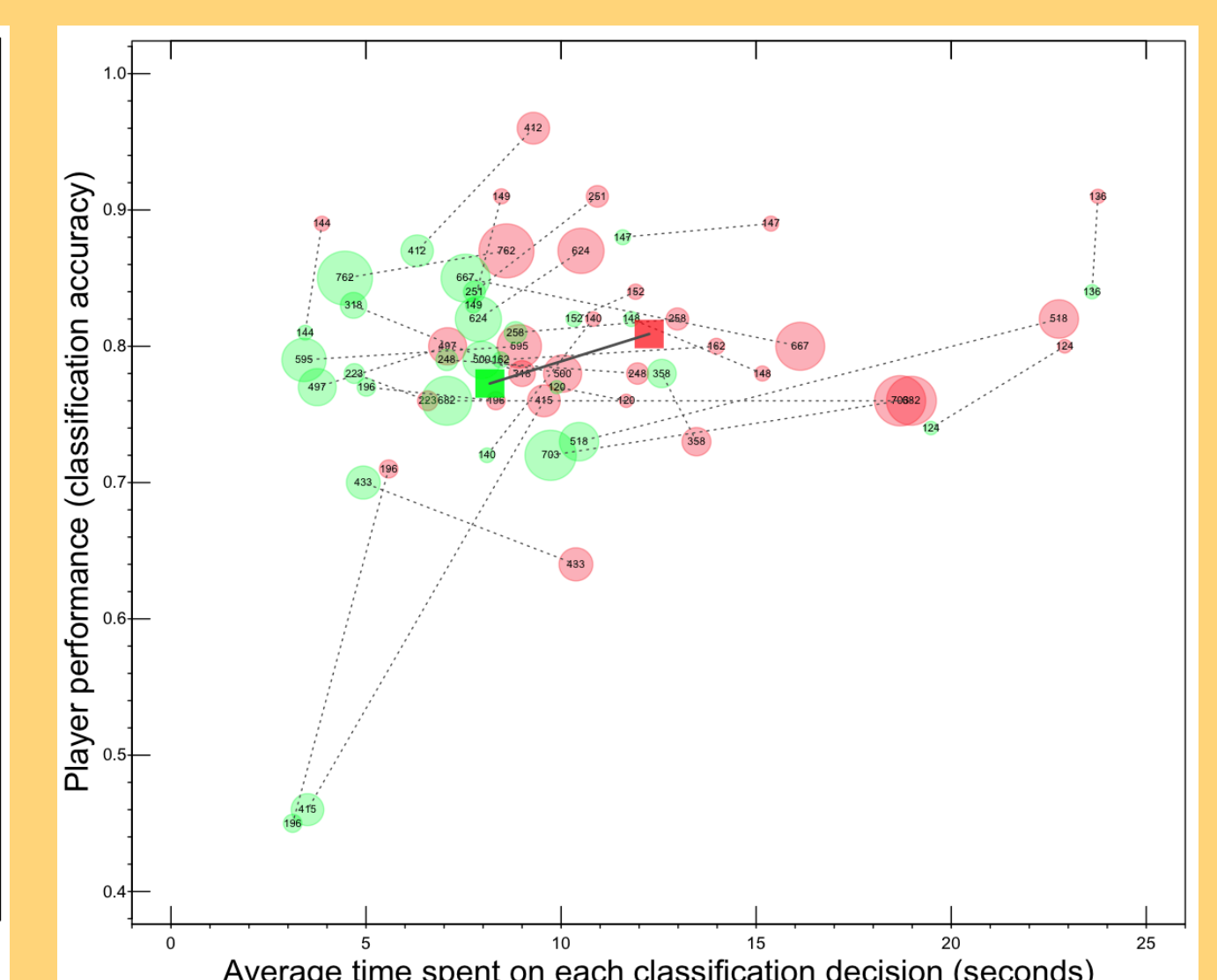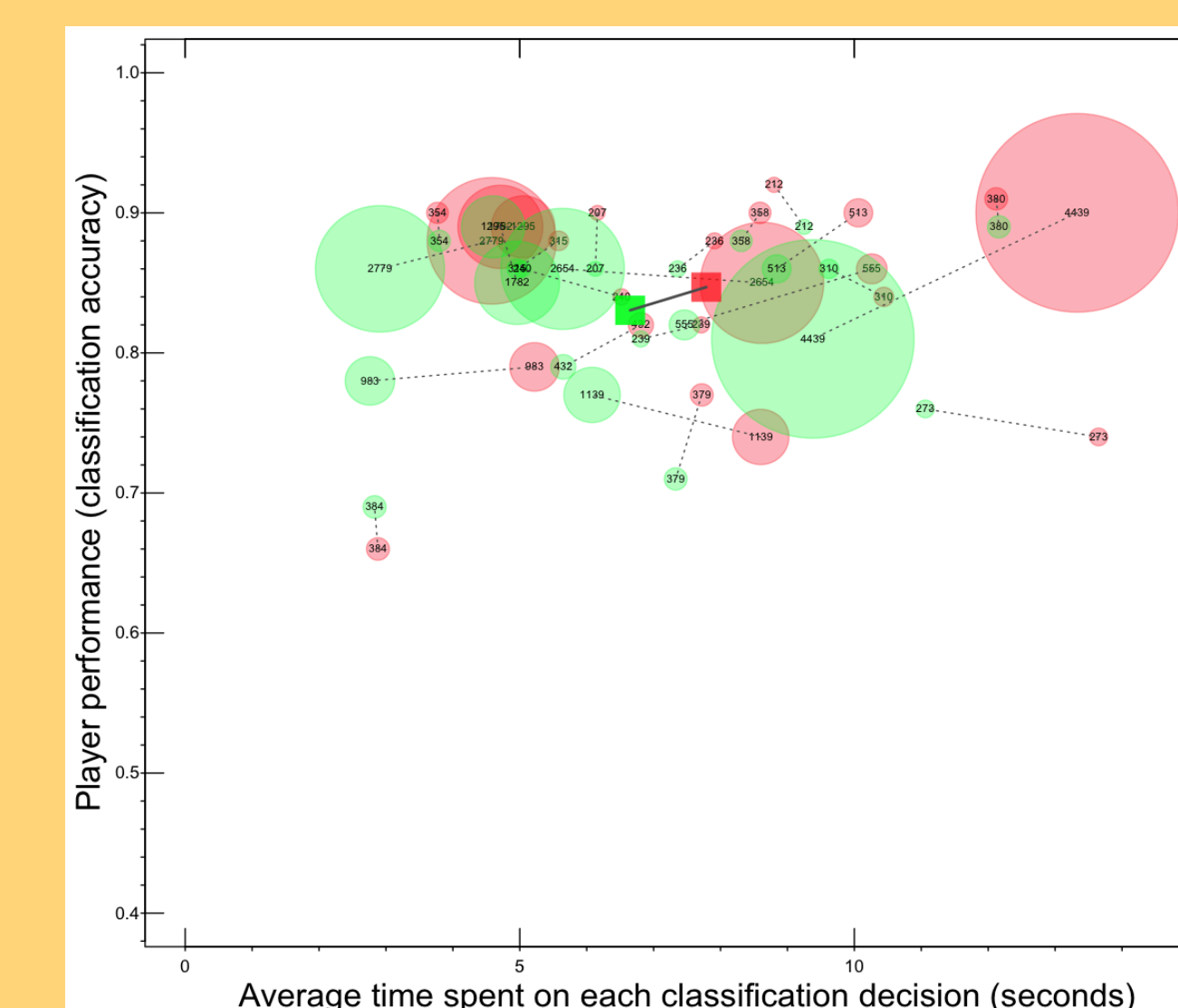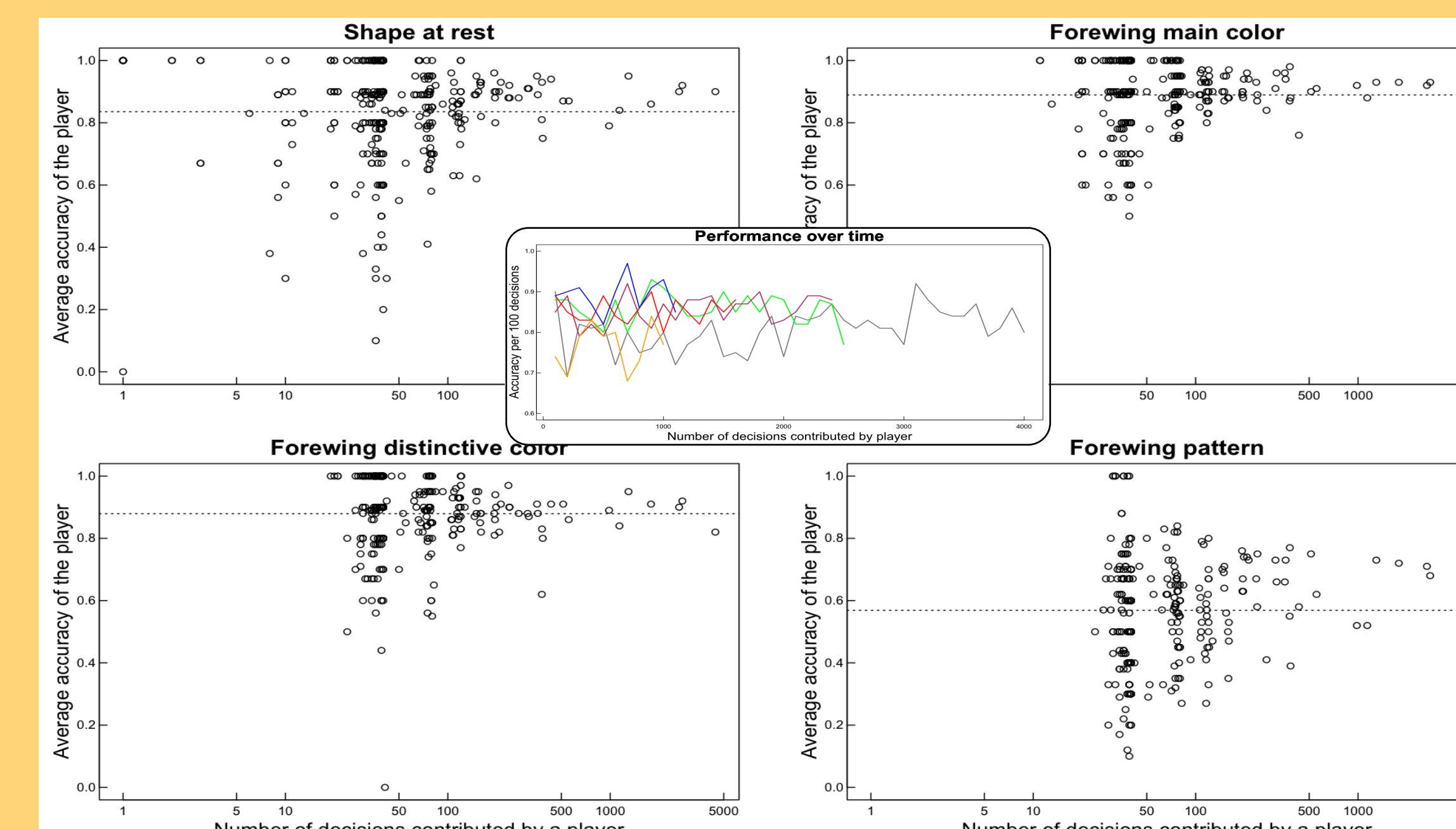**Happy Match**

Forgotten Island

Scientists get back aggregated user-generated data

Contrary to our hypothesis, there was no significant correlation between the number of decisions contributed by a player and his/her classification accuracy.

Some players performed consistently better than others, suggesting that we could integrate a learning tool to improve player performance.

Participation and contribution distribution of the two games

Typical types of participants

- I'm a teacher looking for activities to use with my students.
- Because my teacher wants me to learn something new!
- Saw it on io9, looked interesting.
- I love nature and like to contribute.
- To play a game that will hopefully be beneficial to the scientific community.

User performance (effectiveness and efficiency)
Red: Early stage;   **Green:** Overall performance
Contrary to our hypothesis, the data quality was not significantly different between the two games.

Simple game (Happy Match**) elicits much more contribution.**
Fantasy game (Forgotton Island**) elicits more attention from the public.**