



Participation Patterns, VGI, and Gamification

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Agenda

- **Part I**
Empirical findings on participation in VGI
- **Part II**
A comparison of game patterns for improving participation

Volunteered Geographic Information

■ OSM

- Registered users: 1.6 m
- Active contributors: 20-25k / month
- New contributors approx. 7k / month

■ Research challenges

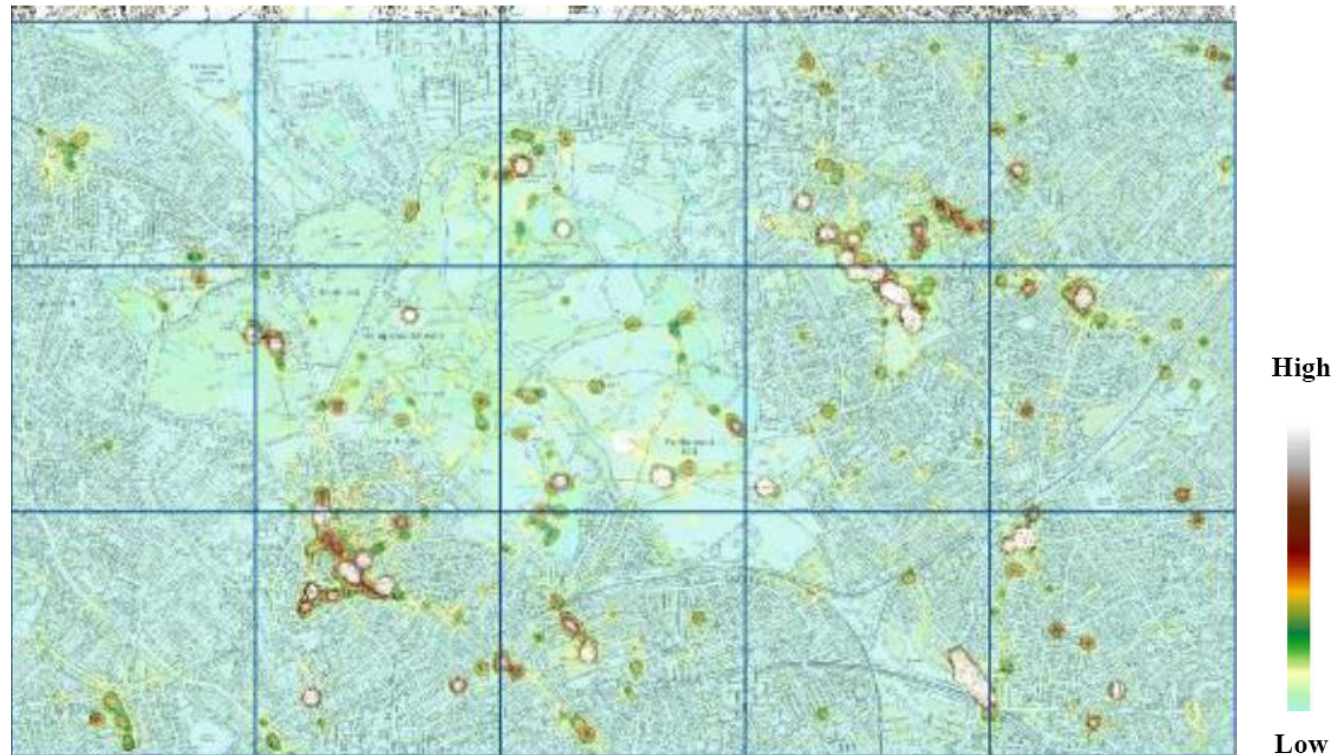
- OSM data quality and fitness-for-purpose
- new, social-related, sources of uncertainty emerge for VGI datasets

Participation Pattern in Flickr and Geograph

Dataset Identity	
Region	Greater London, UK
Source	www.geofabrik.de
Changesets / history	OSM API

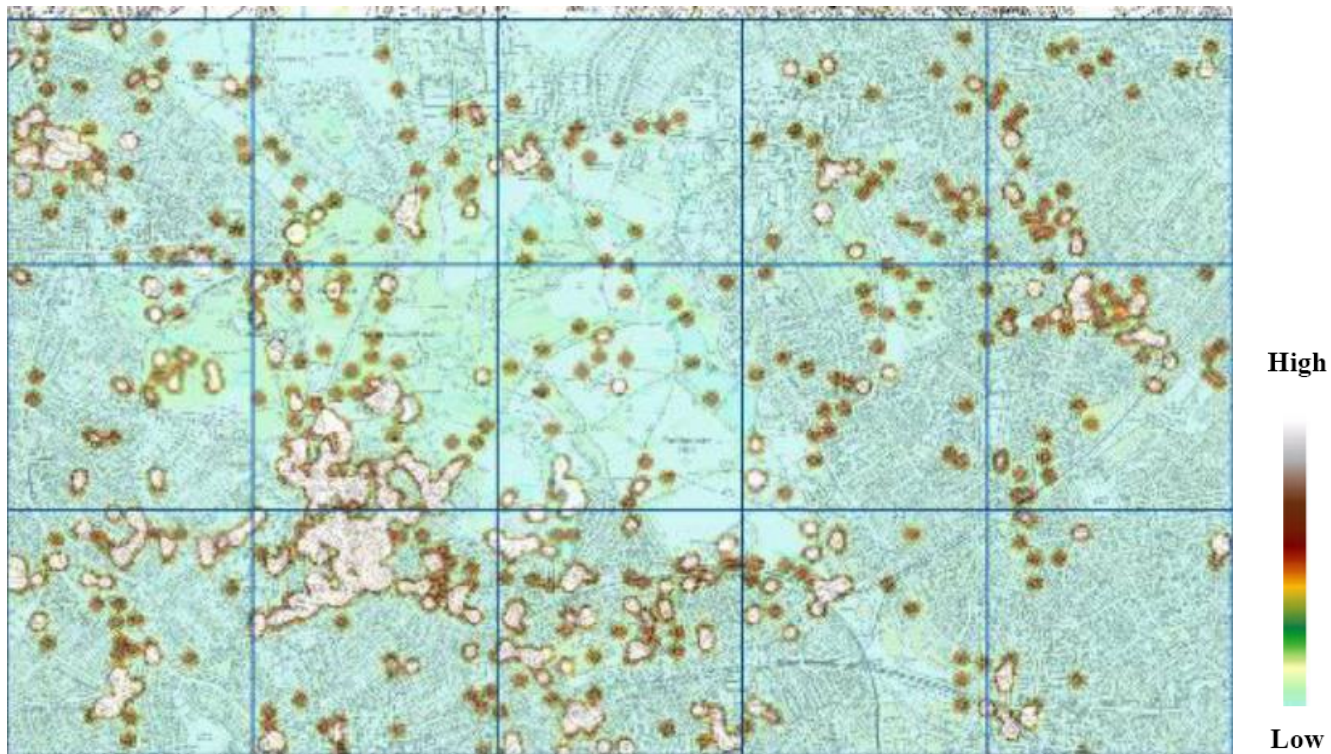
Dataset Statistics	
Num. of features :	438,980
Num. of unique contributing users:	3,230
Num. of versions:	917,000
Versions per feature (average):	2.09
Versions per user (average):	283.9

Participation Pattern in Flickr and Geograph



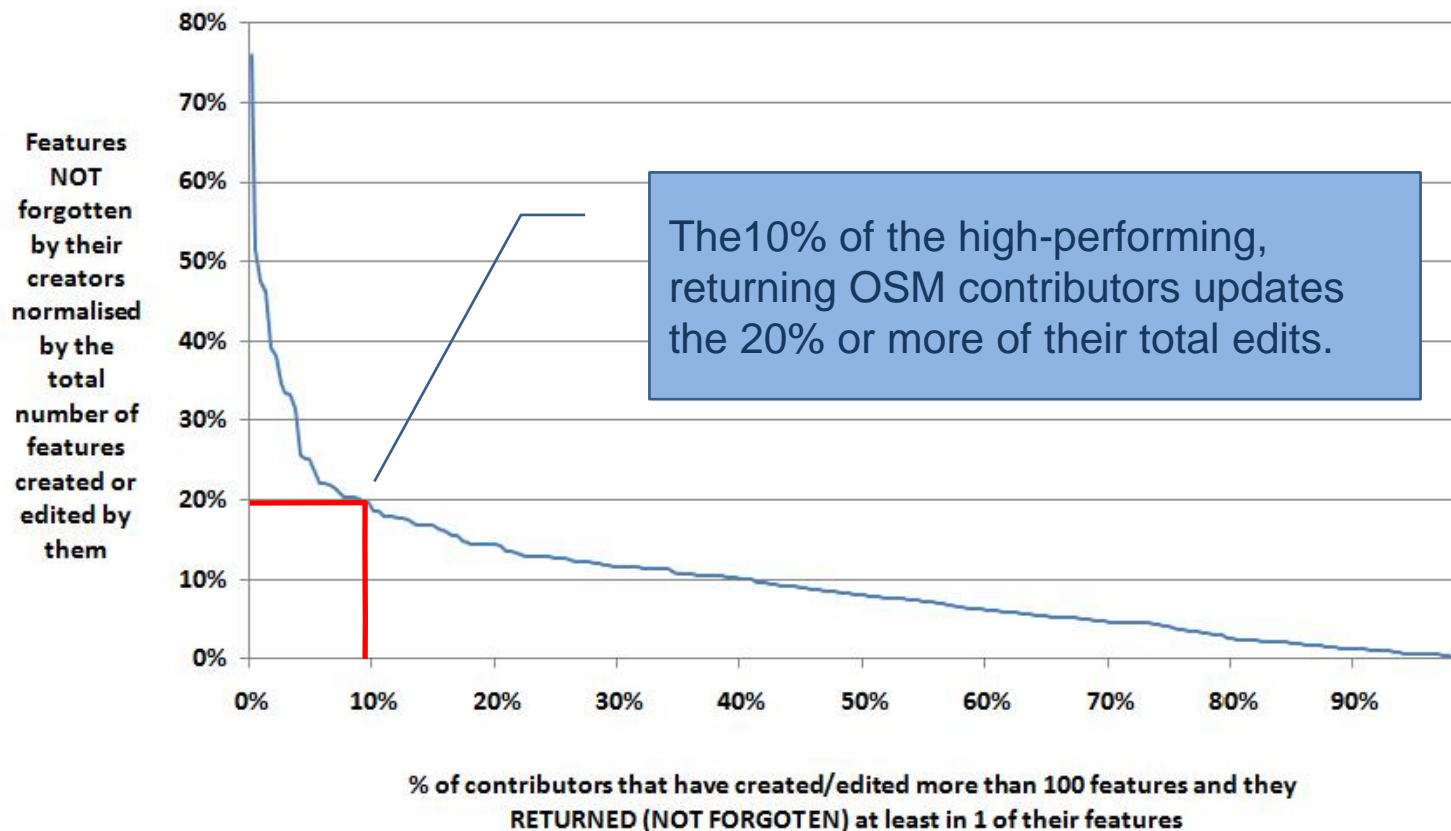
Flickr: 7993 photos

Study Area and Data Description

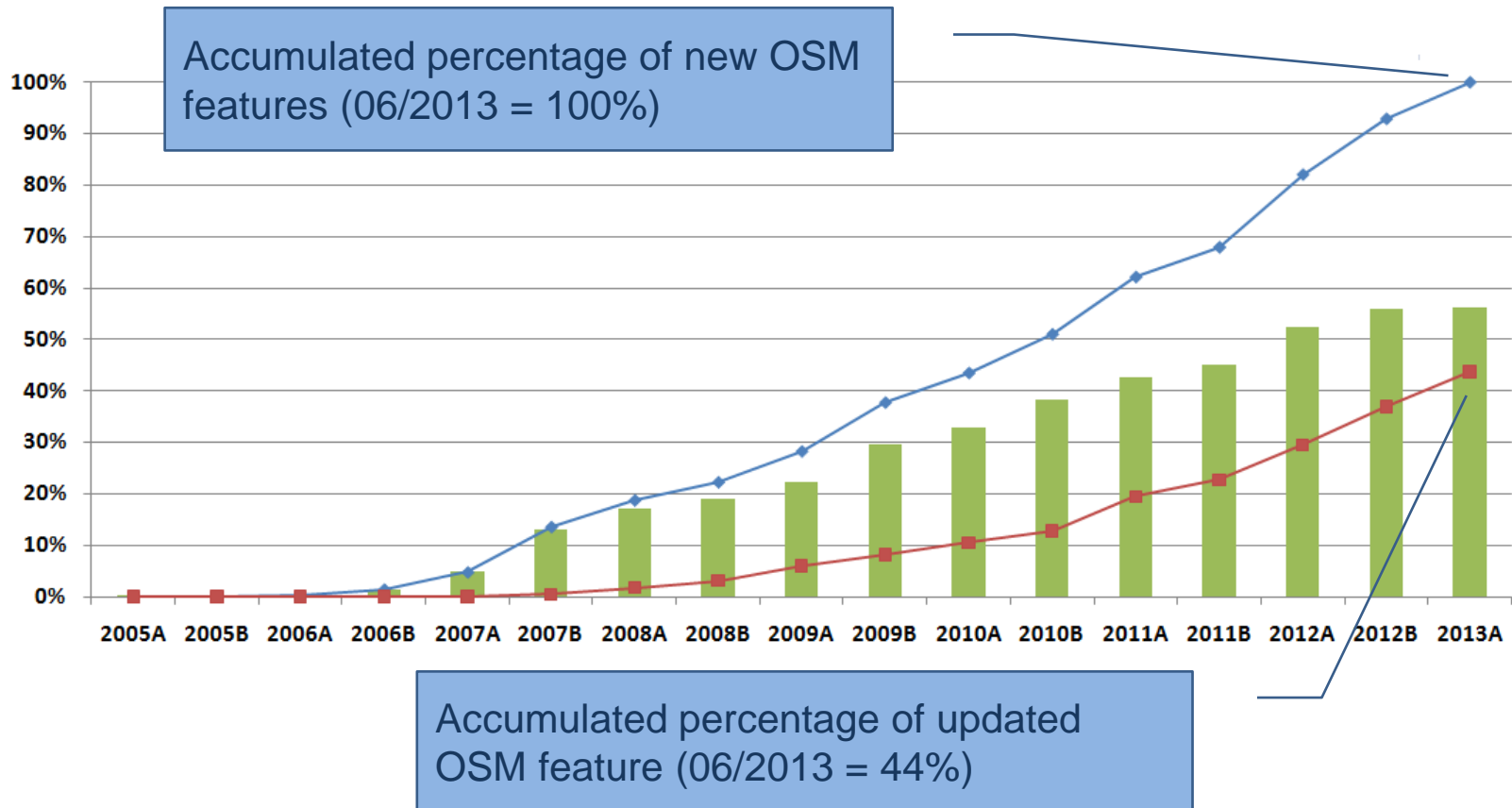


Geograph: 1109 photos

Commitment of OSM contributors



Updating of OSM features

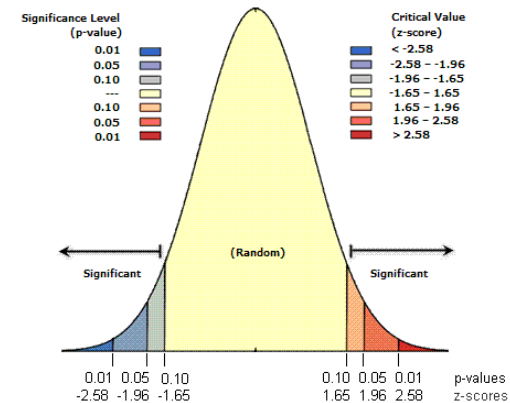


Spatial patterns in contributor behavior



area of significantly lower mapping activity

area of significantly higher mapping activity



Challenges to VGI user participation

■ Commitment problem

- User commitment and local knowledge contribution is not the norm.

■ Update problem

- Contributors are failing to keep OSM datasets up-to-date.

■ Clustering problem

- Social element for quality assessment
- Biased user participation that needs to be counter-balanced

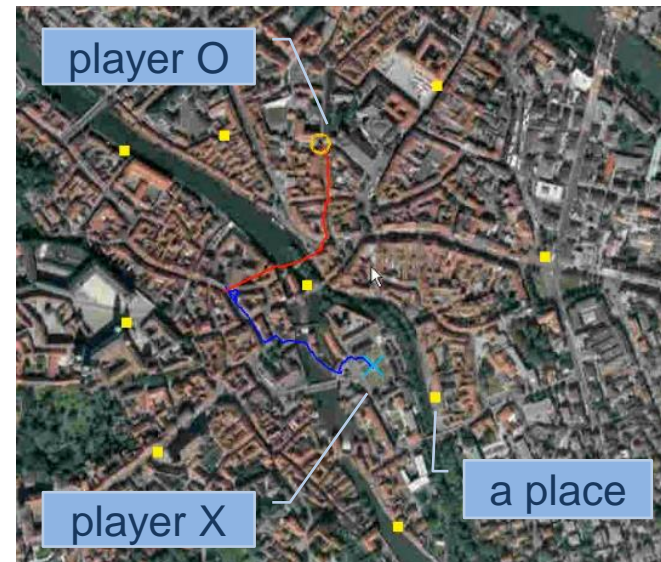
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Spatial allocation games

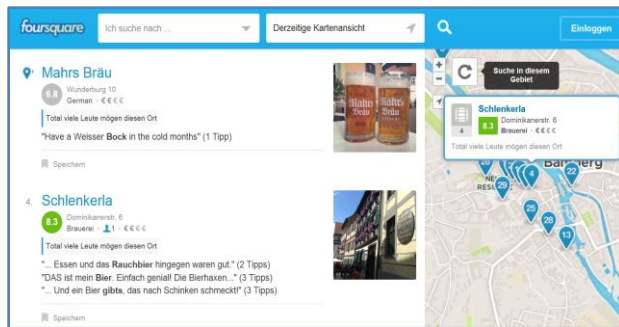
■ Principle

- In a spatial allocation game, places are considered resources which are allocated to the players according to specific rule sets
- A criterion which evaluates the allocation establishes the winner.



GeoTicTacToe

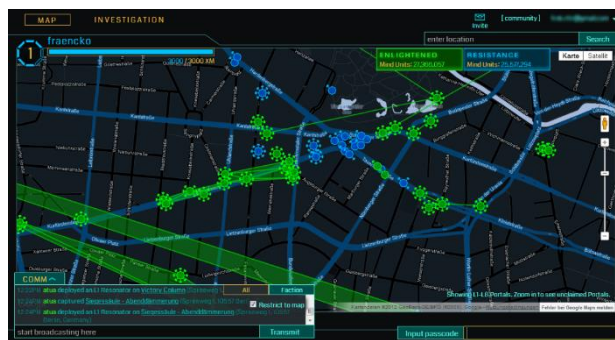
Examples of allocation games



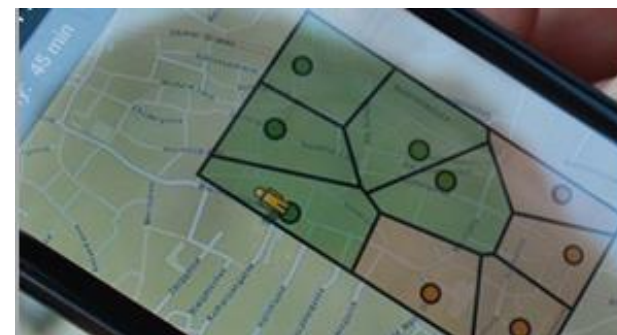
www.foursquare.com



geograph.uk.org



www.ingress.com



Neocartographer

Design parameters

	spatial boundary	temporal boundary	allocation type
Geographing	game field	pervasive play	exclusive
Foursquare	global	pervasive play	multiple
Ingress	global	pervasive play	exclusive
Neocartographer	game field	playing time	exclusive

	Place-to-player ratio
Geographing	$10 < r < 100$
Foursquare	$10^{-2} < r < 10^{-1}$
Ingress	$10^4 < r < 10^5$ (?)
Neocartographer	$1 < r < 10$

Allocation pattern

	mechanics	design objective	example
First-to-visit	the place goes to the first visitor	spatial coverage	Geograph points (Geographing) claiming a portal (Ingress) claiming a cell (Neocartographer)
Nth-to-visit	the place goes to the n-th visitor	game balancing	second visitor points (Geographing)
Most-revisits	the place goes to the most frequent visitor	revisit frequency	mayor of a place (Foursquare)

Game pattern for allocation and deallocation

■ Commitment problem

- Most-revisits allocation pattern

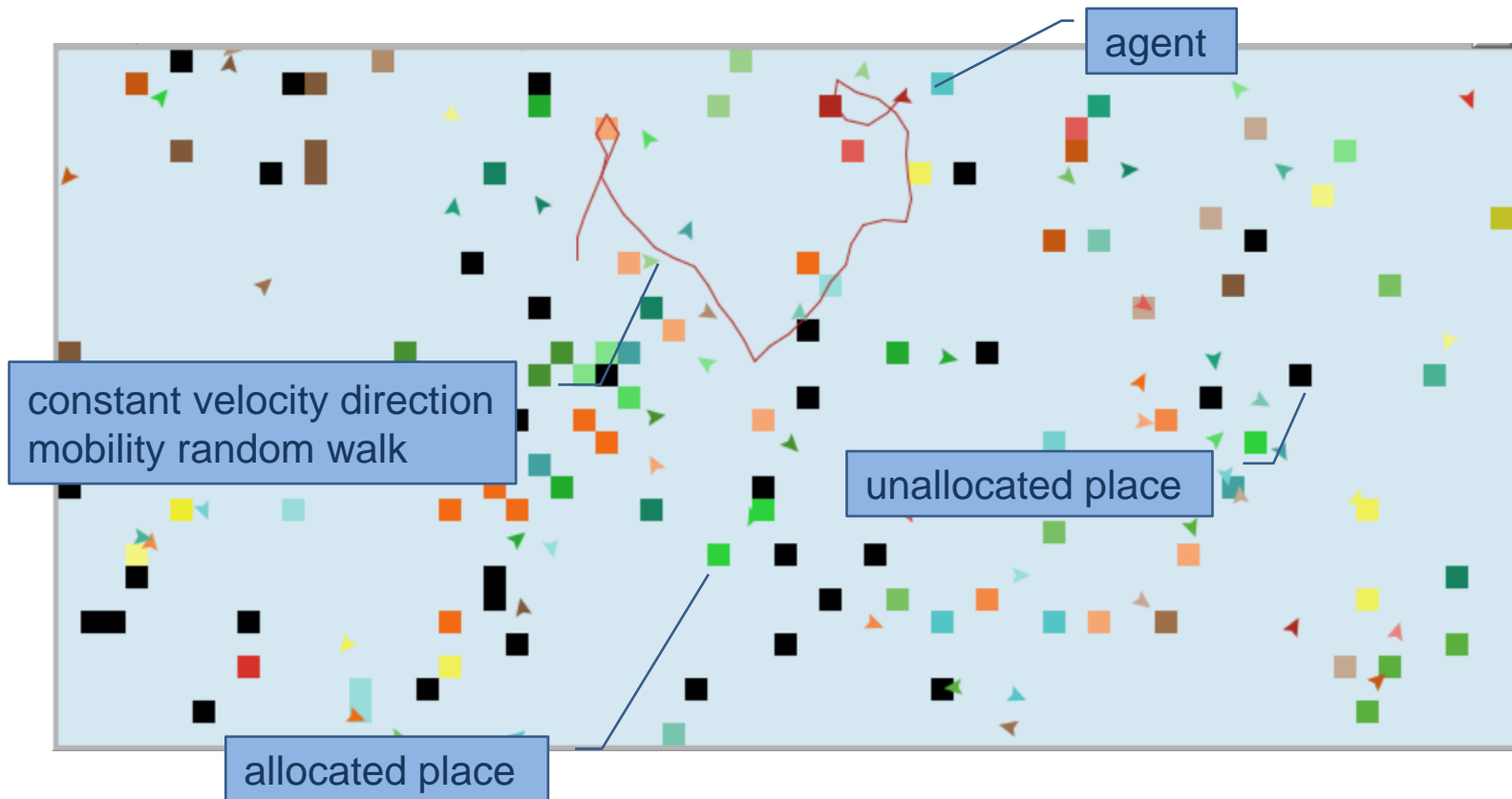
■ Update problem

- When-reclaimed deallocation pattern

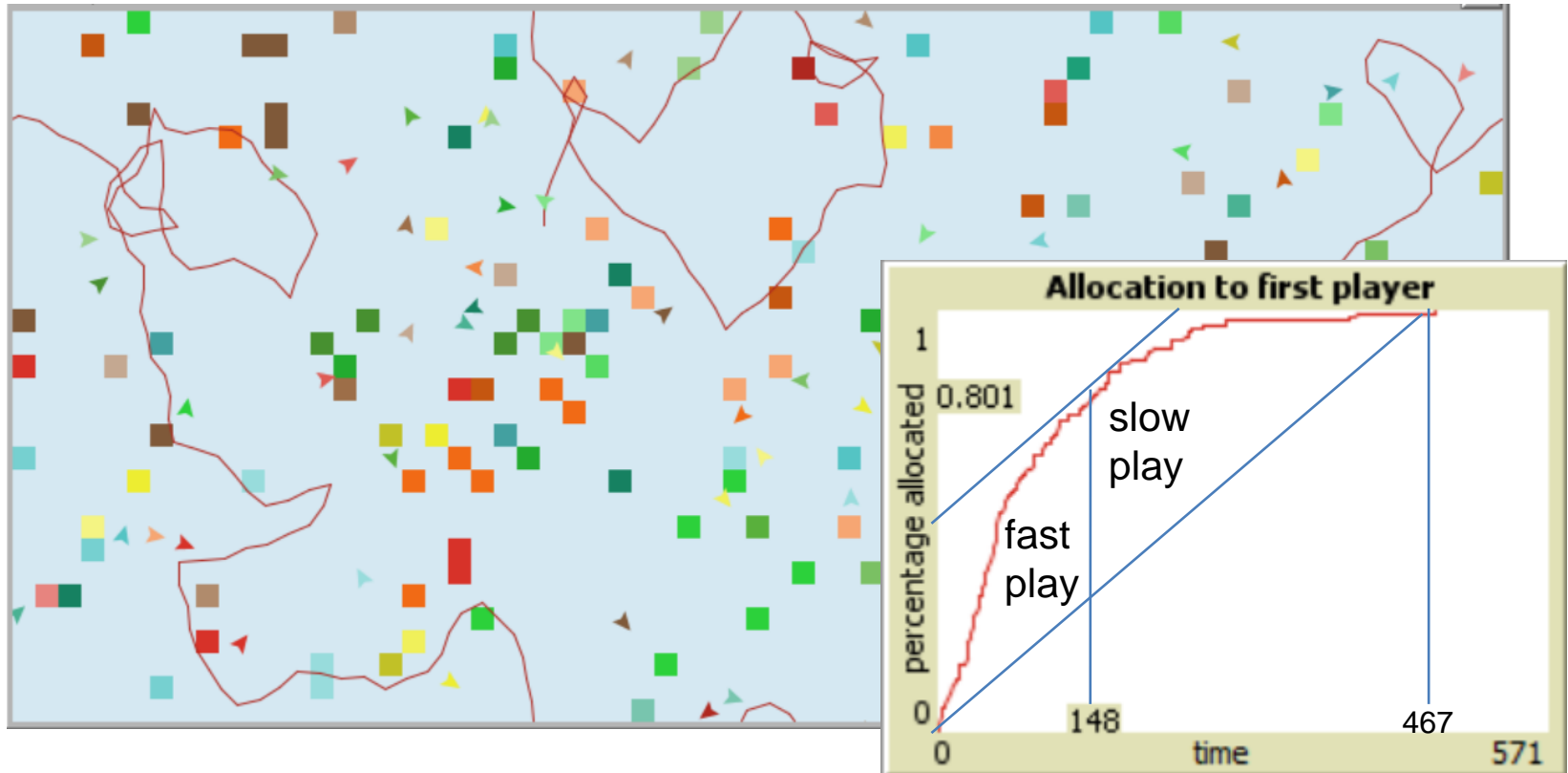
■ Clustering problem

- First-to-visit allocation pattern

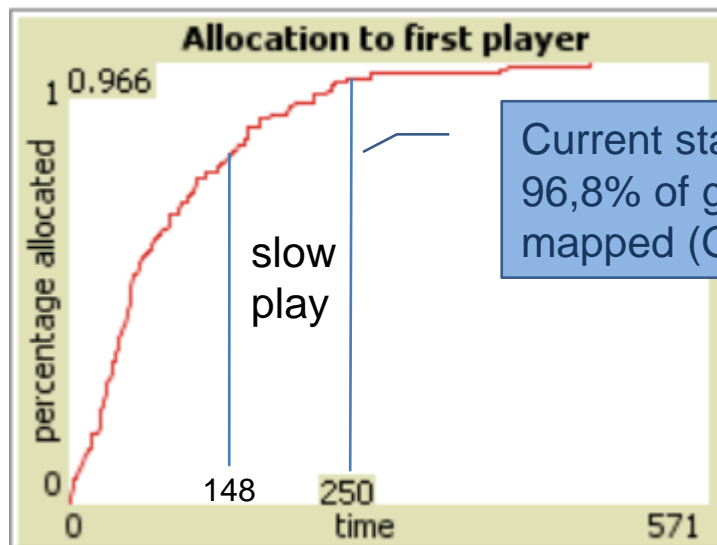
Agent-based simulation



First-to-visit allocation



The problem of accumulated advantage



Current status of Geograph:
96,8% of grid squares
mapped (Great Britain only)

Prediction: At this stage, the game is mostly of interest to the highest performing players

Top 250 Leaderboard :: First Geograph Points

Listed below are the top 250 contributors based on number of geograph points awarded (see this [FAQ](#) for details).

Position	Contributor	First Geograph Points	Depth
1st	Kenneth Allen	12103	6.33
2nd	Richard Webb	10115	2.52
3rd	Jonathan Billinger	5200	2.18
4th	Oliver Dixon	4235	1.84
5th	Derek Harper	3055	4.83
6th	Andrew Smith	3046	2.38

Deallocation pattern

	mechanics	design objective	example
Never	the place is allocated for the whole game	simplicity	Geograph points (Geographing)
When-claimed	The allocation changes if another player meets the allocation criterion	data recency game balancing	Reclaiming portals (Ingress)
When-decayed	after a time span, the allocation is cleared	game balancing	energy loss of resonators (Ingress) moving time window (Foursquare) time-gap points (Geographing)

Results and conclusions (1)

- Design parameters
 - The place-to-player ration constitutes a critical design parameter
 - Impacts on other design choices: multiple vs. exclusive allocation
- Slow-down problem
 - First-to-visit allocation without deallocation causes the game to transit from a fast play phase into a slow play phase

Results and conclusions (2)

■ Accumulated advantage

- First-to-visit allocation without deallocation
- winners are known almost from the beginning
- Too little „rubber-banding“!

■ Accumulated advantage

- First-to-visit allocation with when-reclaimed reallocation
- Winners are not known until the very last moment
- Too much „rubber-banding“!