

Crowdsourcing beyond the desktop

Experiences and challenges

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Community Imaging

Who



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What



Social networks and
crowdsourcing



Sensing urban
mobility



Public interactive
displays

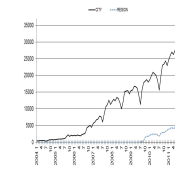


Security and
privacy

How



Instrumenting mobile
platforms



Real-time
city-sensing



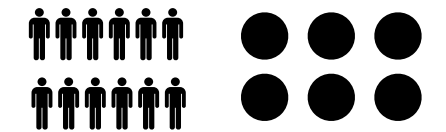
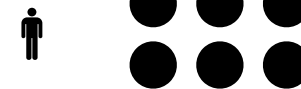
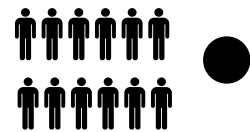
Human subjects
studies



Large scale
deployments



Ongoing research



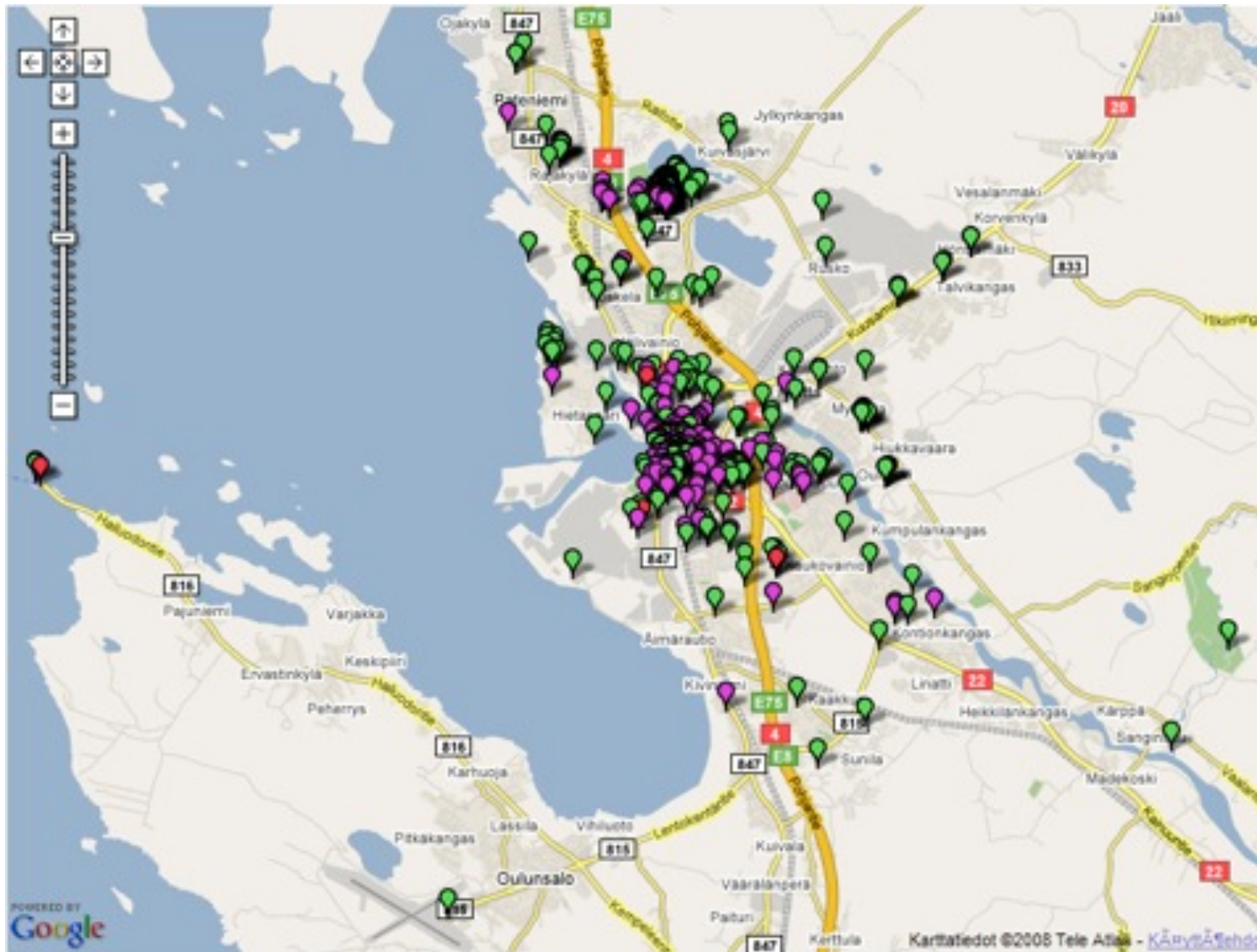
Usage



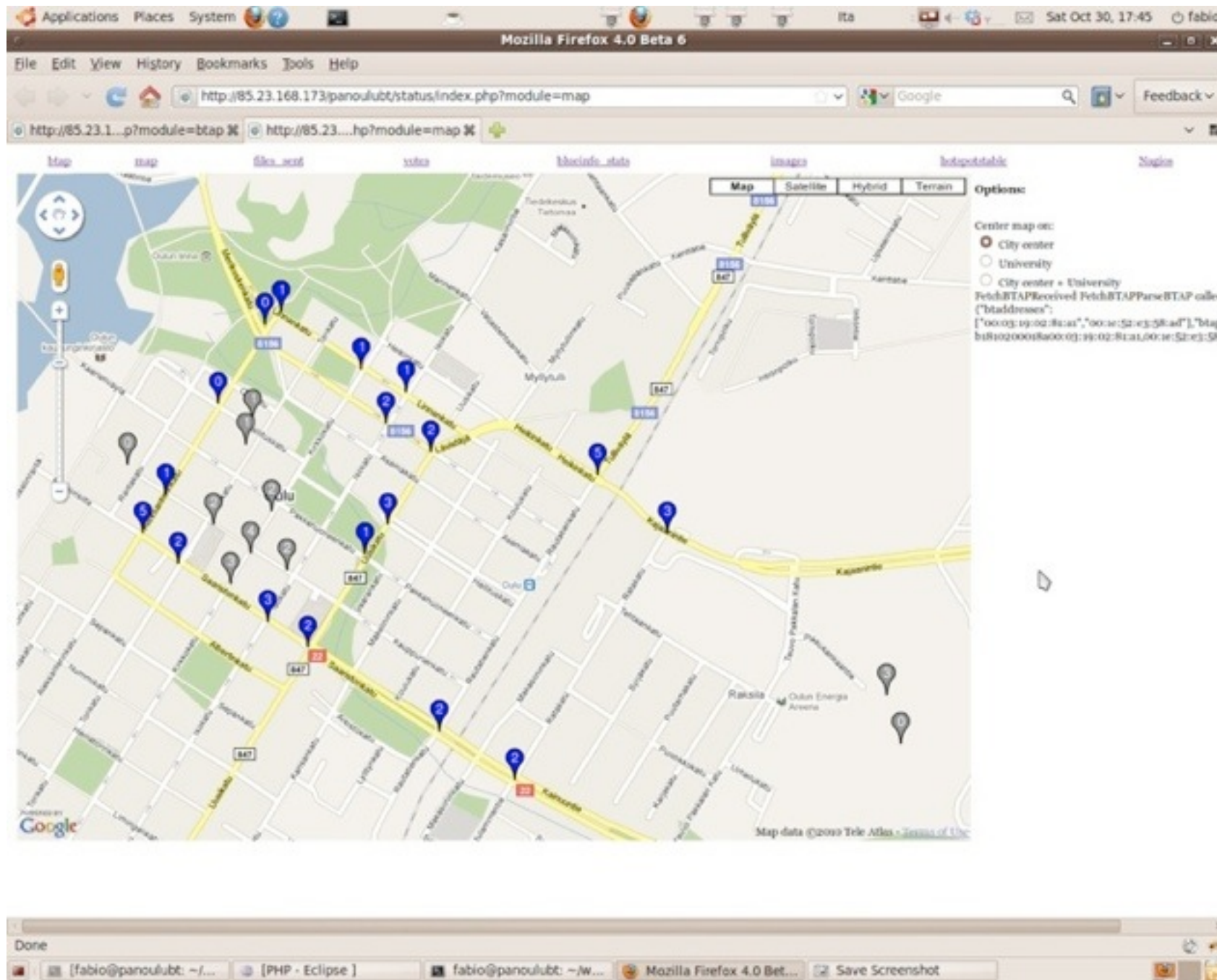
Our approach: the CITY is the system



panOulu WiFi



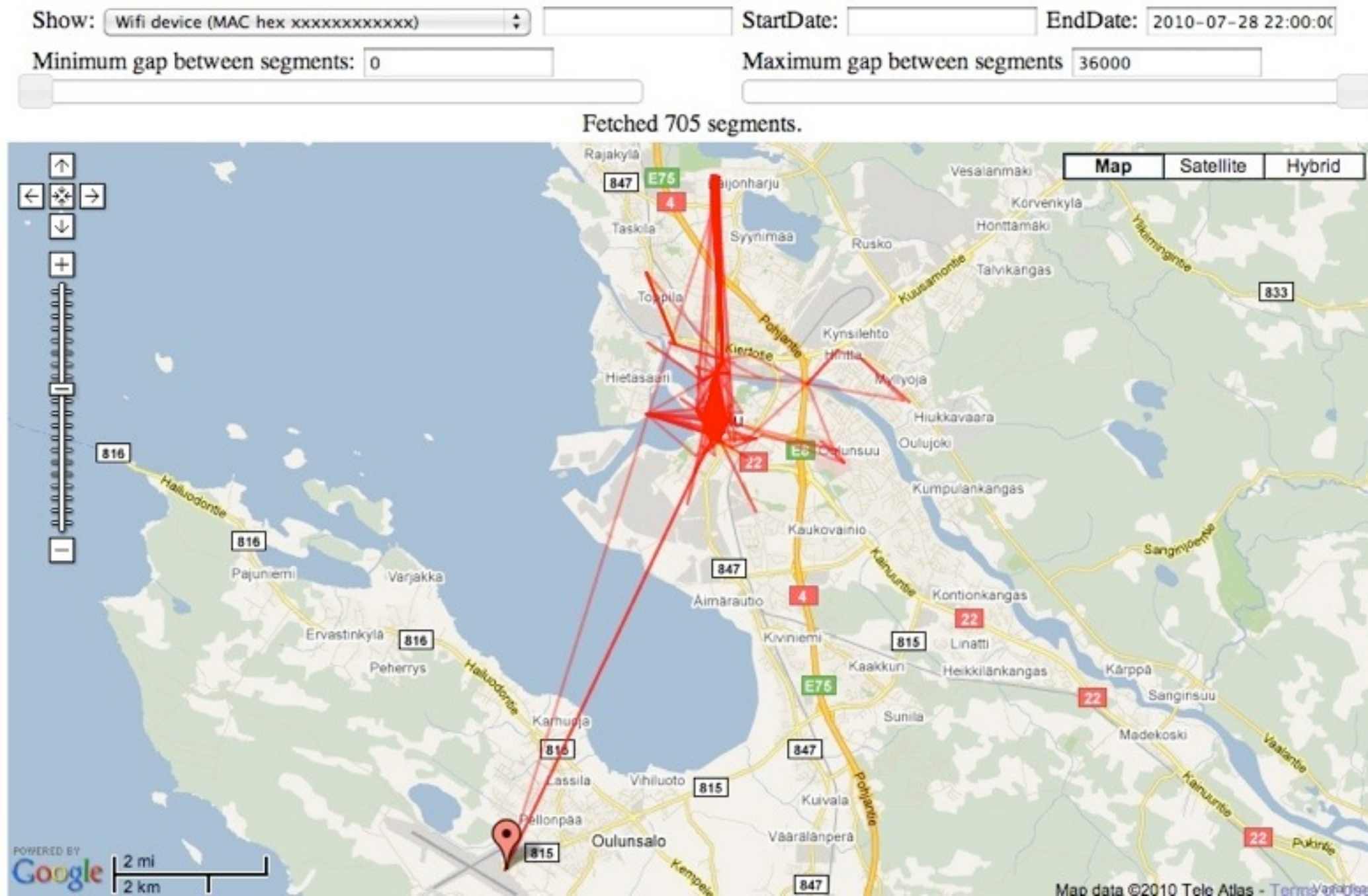
Bluetooth network

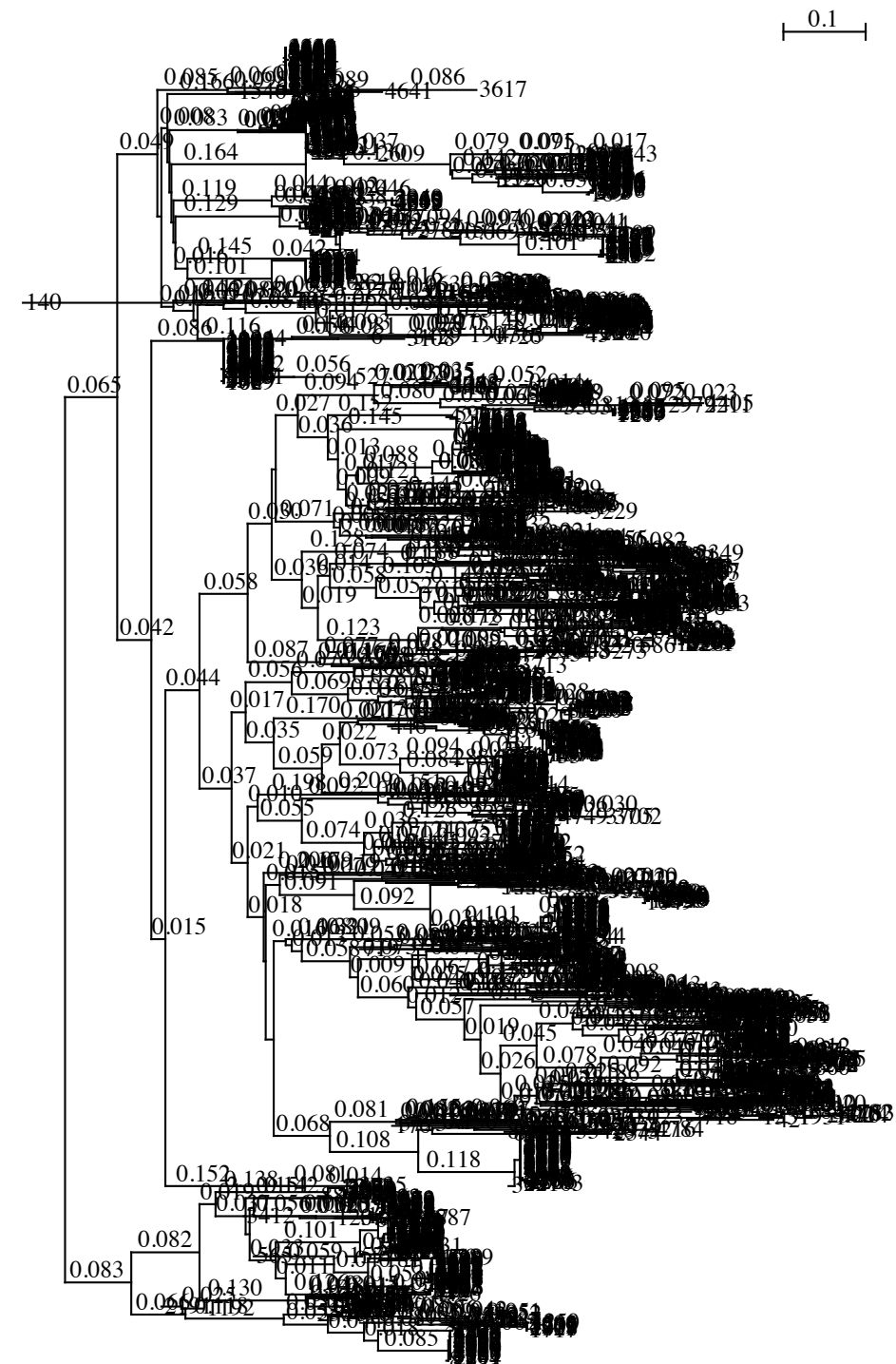
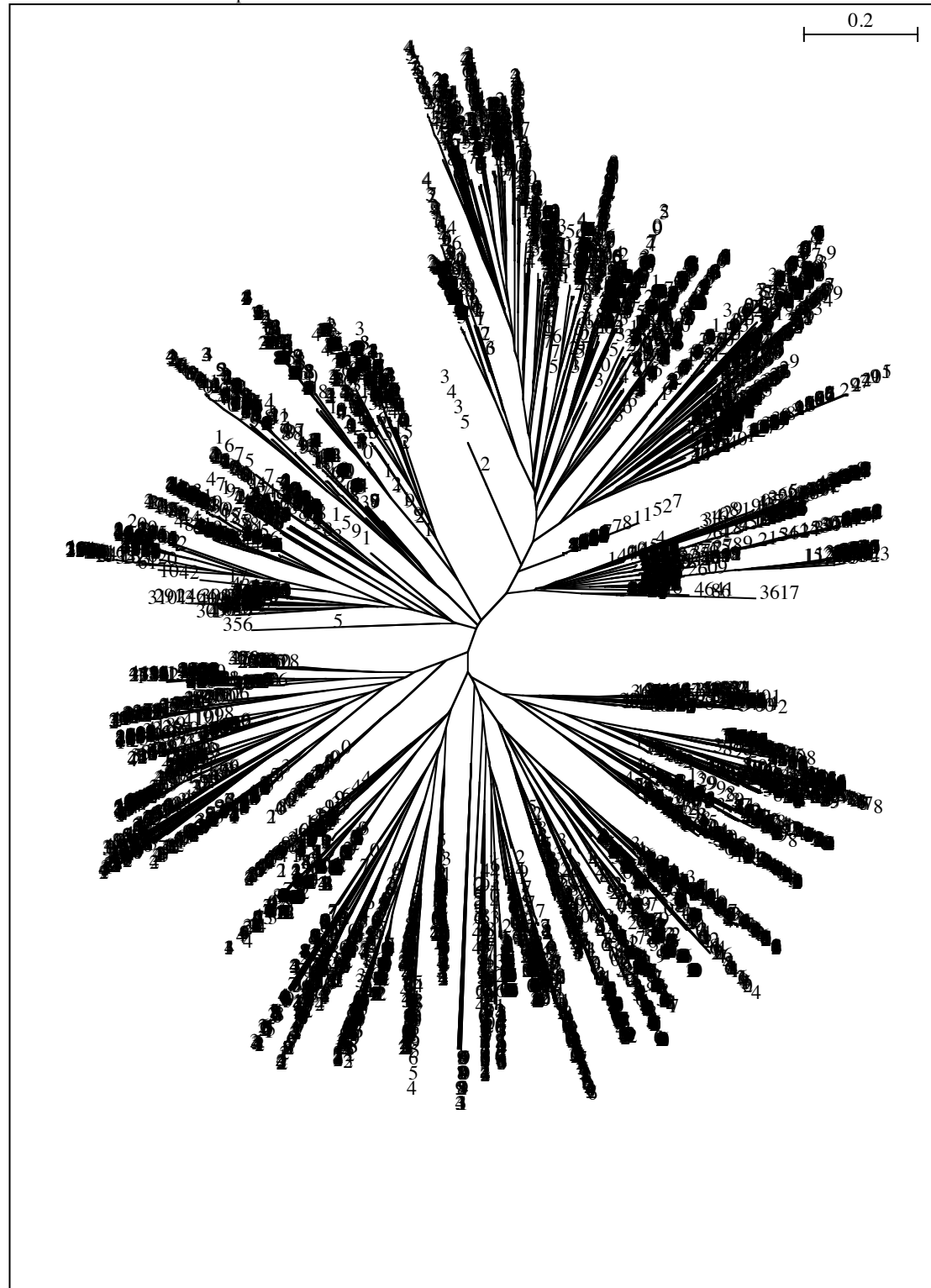


3D Oulu

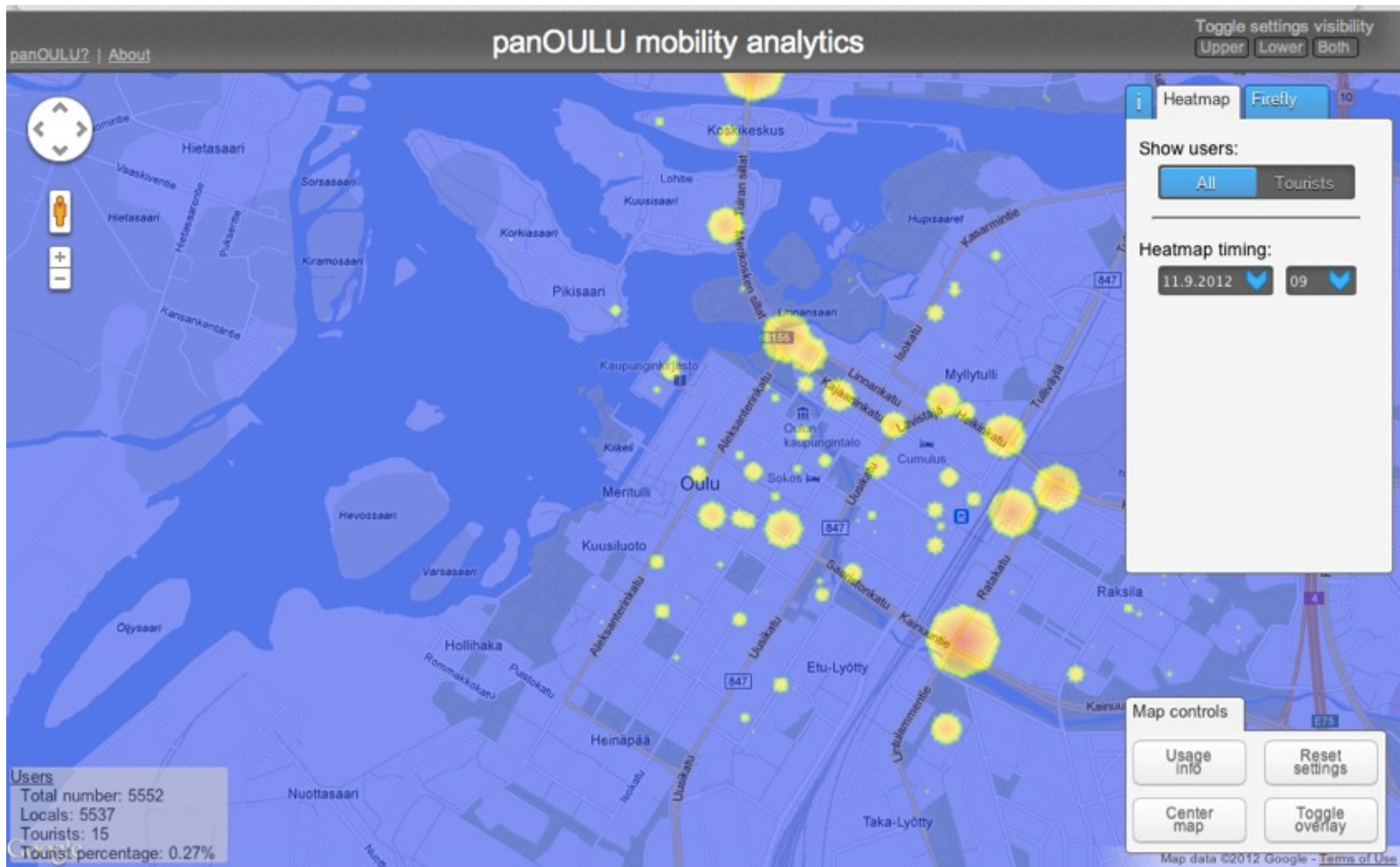


Reconstructing movement

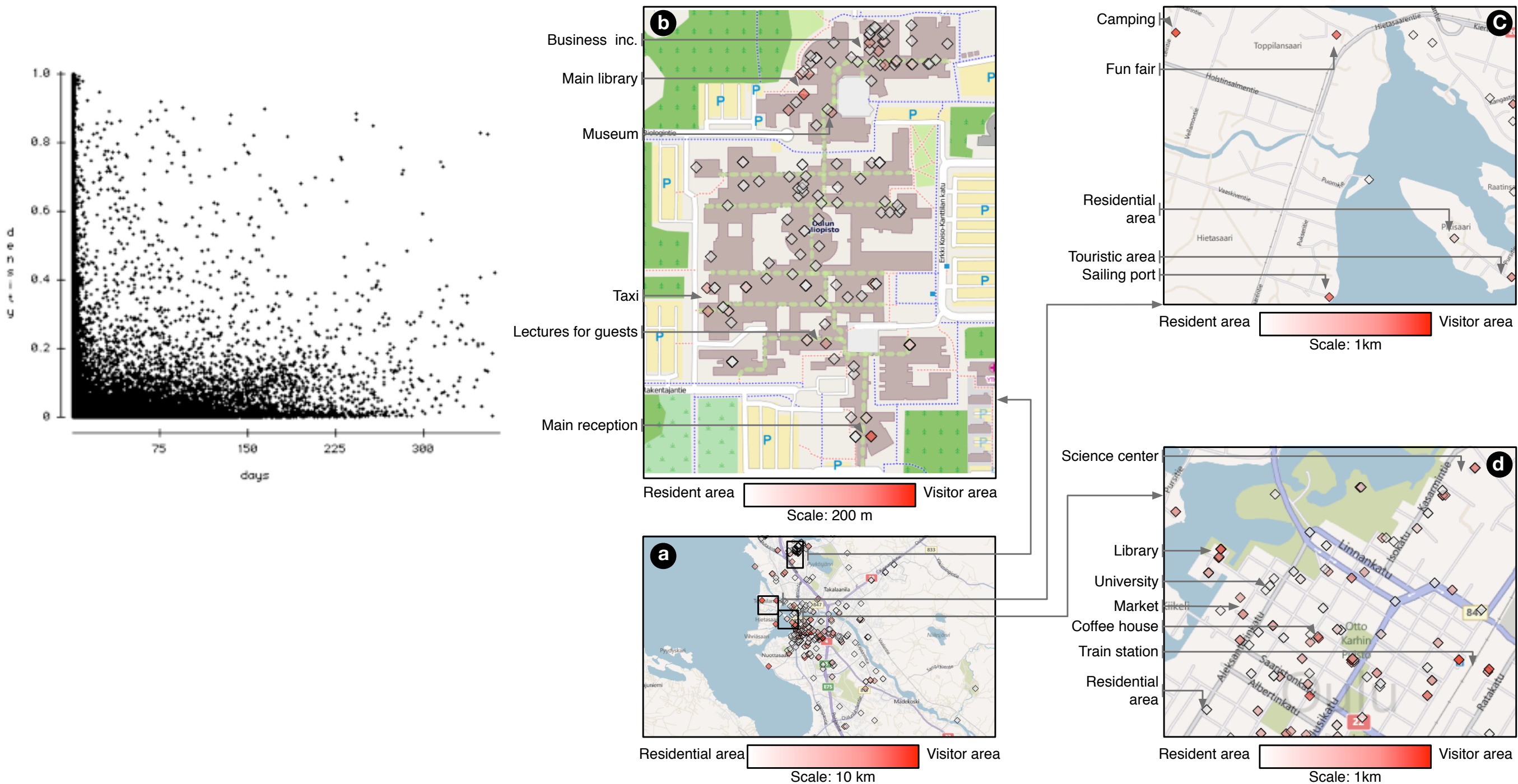




Where is it busy now?



Find visitors & visitor locations



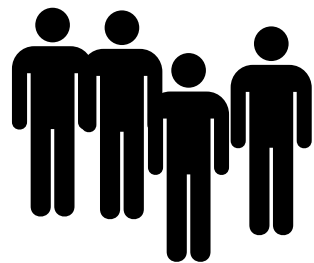
Our approach: the CITY is the system

Output

Input

Bandwidth

Cognition



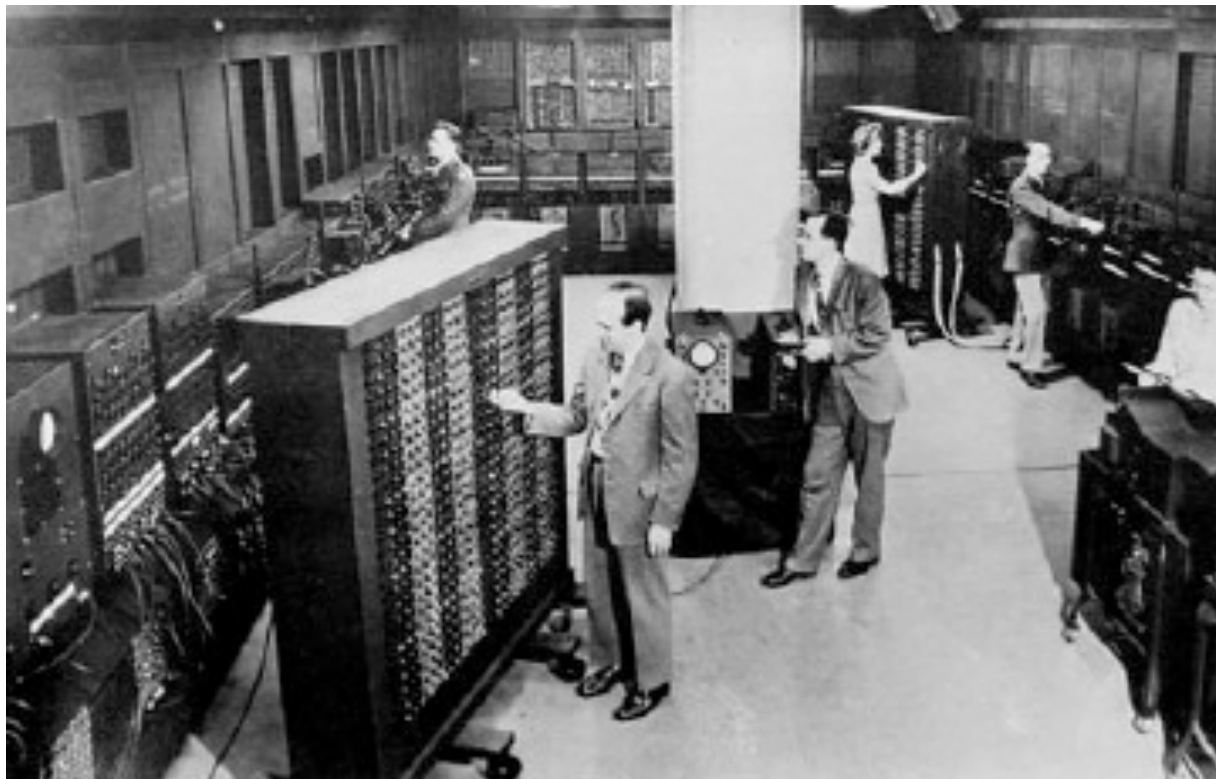
Human-Computer Interaction

Mobility analysis

Crowdsourcing



It is still early days



It is still early days



1960's



1980's



2000's



2020's



Synthesizing the big picture from multiple perspectives



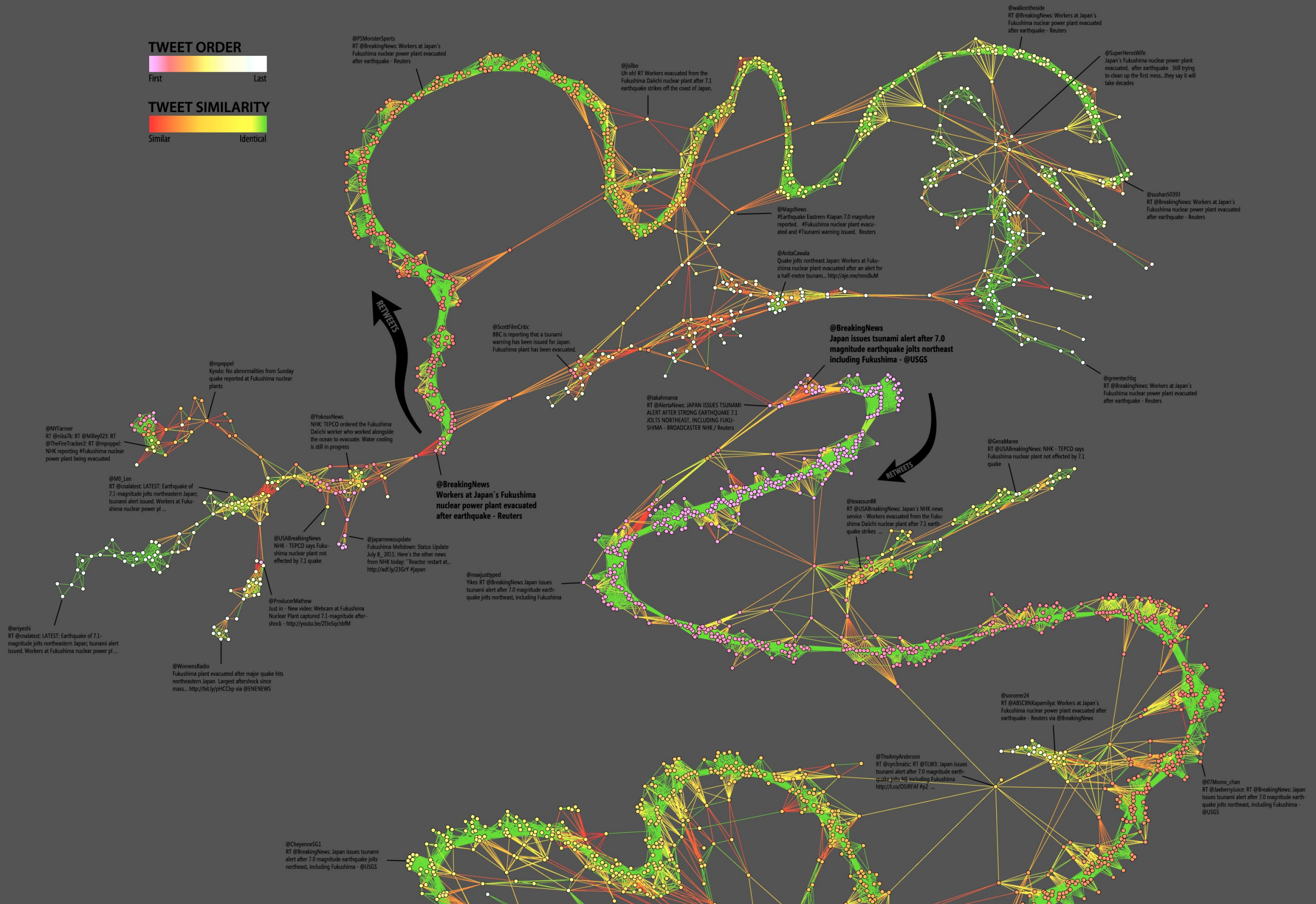
Spread of news regarding earthquake outside Japan on July 10, 2011
(internal structure of a 3766 node story from CrisisTrackerPrototype)

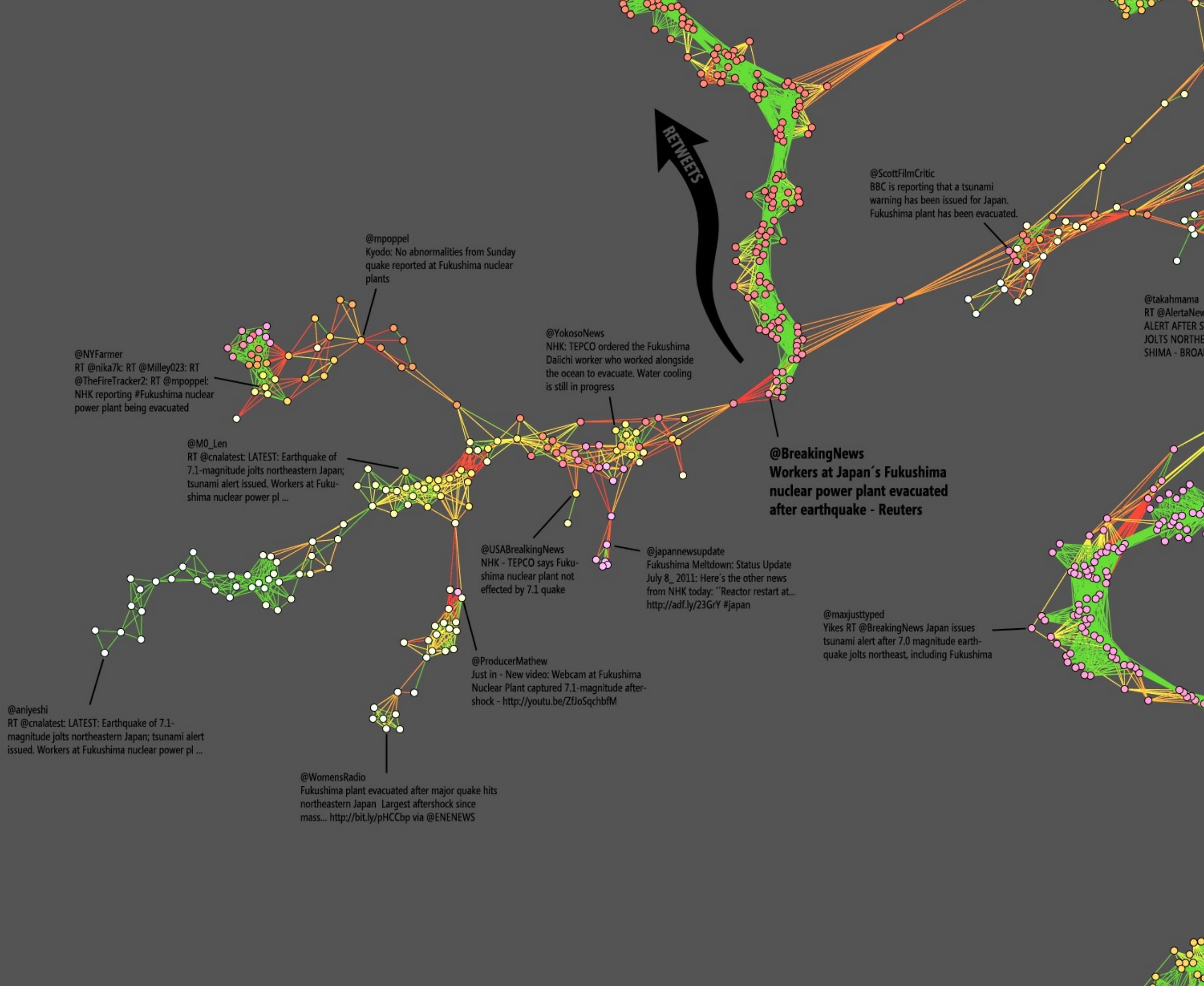


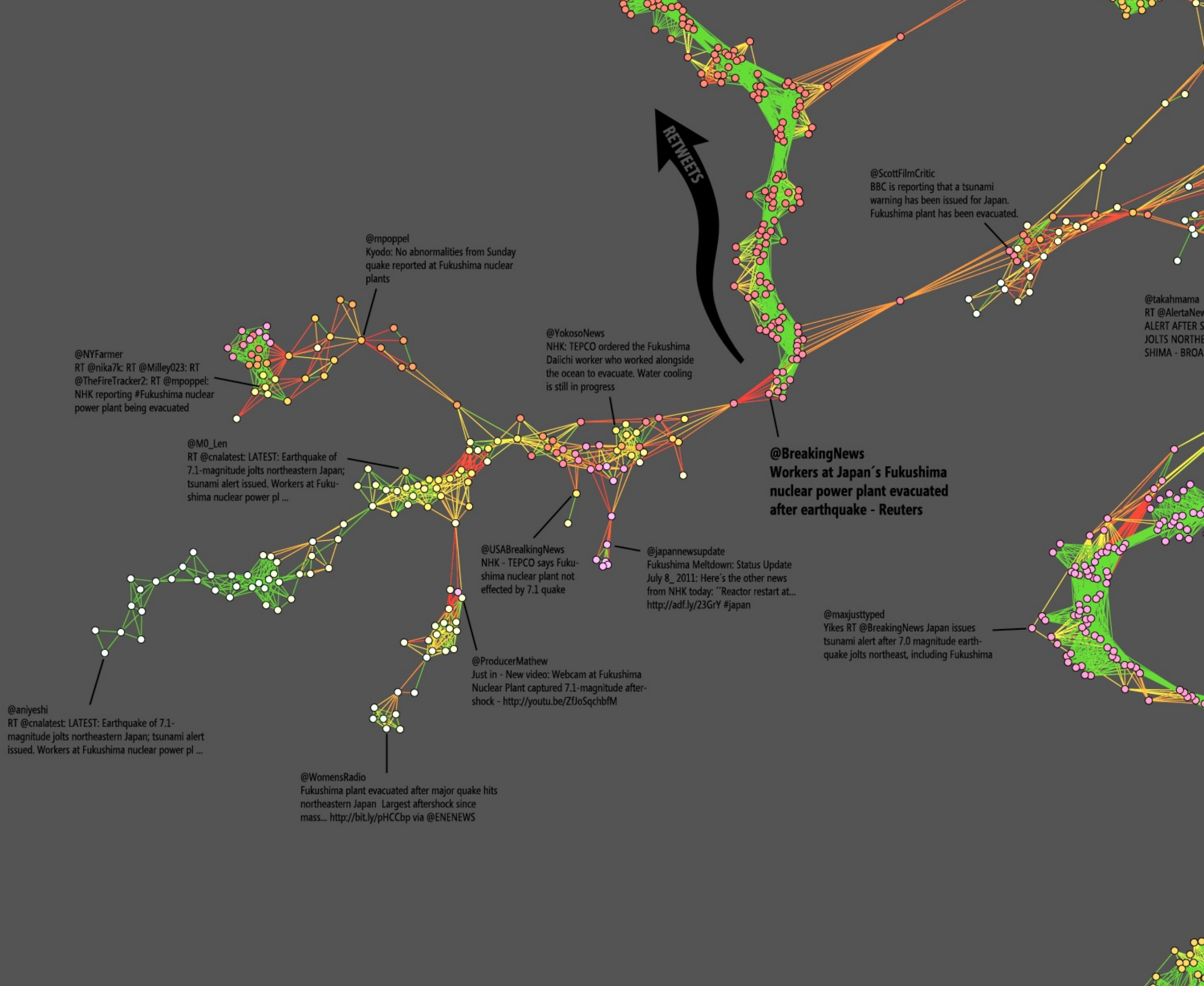
Information Propagation on Twitter

Spread of news regarding earthquake outside Japan on July 10, 2011

(internal structure of a 3766 node story from CrisisTrackerPrototype)







RETWEETS

@ScottFilmCritic
BBC is reporting that a tsunami warning has been issued for Japan. Fukushima plant has been evacuated.

@takahmama
RT @AlertaNew
ALERT AFTER S
JOLTS NORTHE
SHIMA - BROA

@YokosoNews
NHK: TEPCO ordered the Fukushima Daiichi worker who worked alongside the ocean to evacuate. Water cooling is still in progress

@BreakingNews
Workers at Japan's Fukushima nuclear power plant evacuated after earthquake - Reuters

@maxjusttyped
Yikes RT @BreakingNews Japan issues tsunami alert after 7.0 magnitude earthquake jolts northeast, including Fukushima

@USABreakingNews
NHK - TEPCO says Fukushima nuclear plant not effected by 7.1 quake

@japannewsupdate
Fukushima Meltdown: Status Update July 8_2011: Here's the other news from NHK today: "Reactor restart at... http://adf.ly/23GrY #japan

@ProducerMathew
Just in - New video: Webcam at Fukushima Nuclear Plant captured 7.1-magnitude aftershock - http://youtu.be/ZfJoSqchbfM

@WomensRadio
Fukushima plant evacuated after major quake hits northeastern Japan. Largest aftershock since mass... http://bit.ly/pHCCbp via @ENENEWS

@NYFarmer
RT @nika7k: RT @Milley023: RT @TheFireTracker2: RT @mpoppel: NHK reporting #Fukushima nuclear power plant being evacuated

@M0_Len
RT @cmlatest: LATEST: Earthquake of 7.1-magnitude jolts northeastern Japan; tsunami alert issued. Workers at Fukushima nuclear power pl ...

@aniyeshi
RT @cmlatest: LATEST: Earthquake of 7.1-magnitude jolts northeastern Japan; tsunami alert issued. Workers at Fukushima nuclear power pl ...

@mpoppel
Kyodo: No abnormalities from Sunday quake reported at Fukushima nuclear plants

Twitter realtime analysis

<http://ufn.virtues.fi/crisistracker>

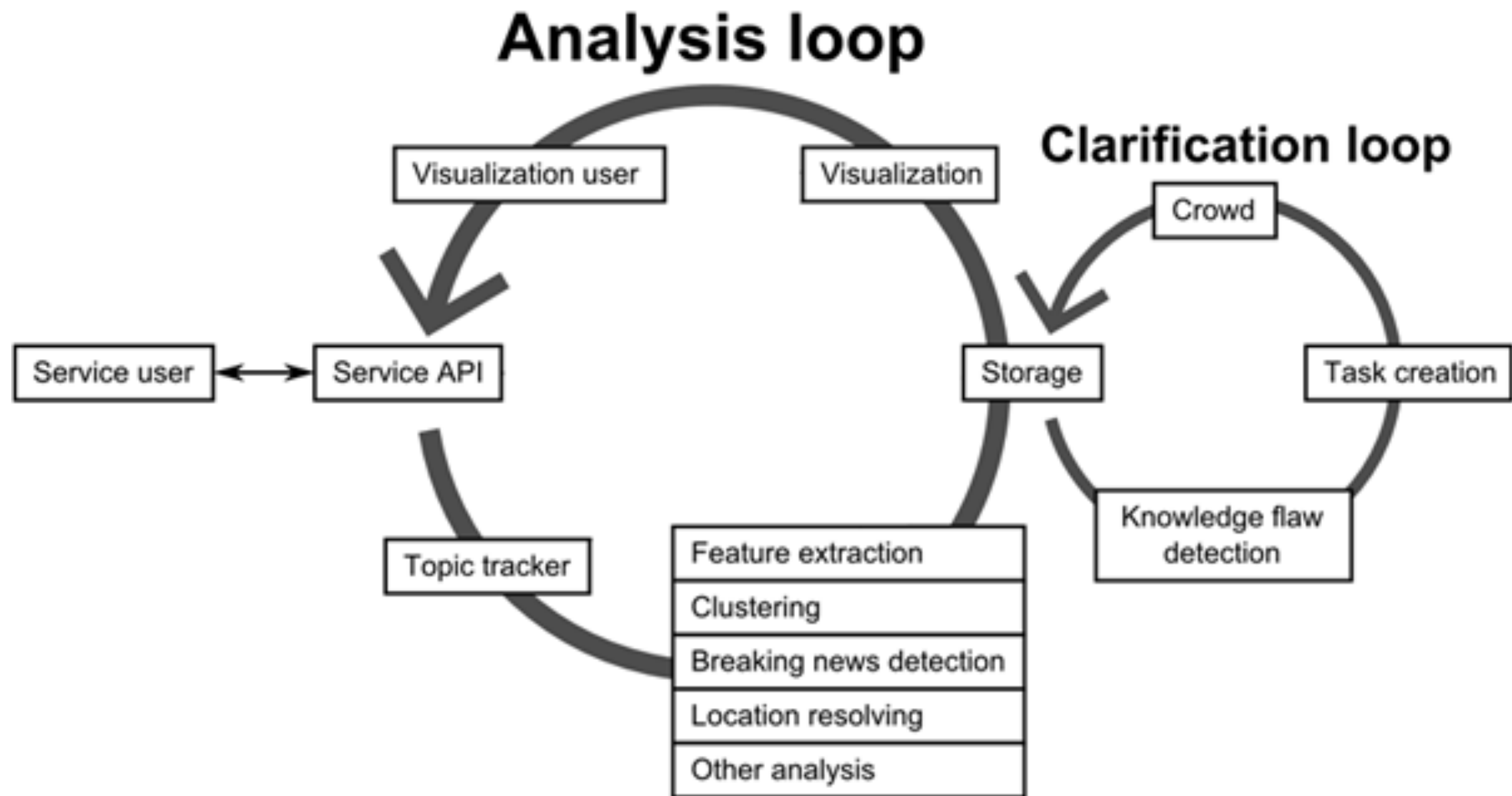
The screenshot shows the Crisis Tracker web application. At the top, there's a navigation bar with links: READ STORIES, LATEST NEWS, TAG STORIES, PERFORMANCE, and ABOUT. Below this, the interface is divided into several sections. On the left, under 'WHAT', there are filters for event types like Demonstration, Violence, Detained/Missing, etc. Below that is a 'WHO' section with a name input field. Further down is a 'WHEN' section with date range inputs. On the right, there's a 'WHERE' section with a map of the world and a search bar. At the bottom, there's a table of results with columns for Size, Time, Title, and Tags. The table shows three entries related to Syria.

Size	Time	Title	Tags
139	9 Sep 17:10	الطعام أمن الجامعة العربية #Syria http://t.co/Y70DE1Sj	0 0
229	9 Sep 15:19	Syria Criticizes France's Support of Rebels - http://t.co/CjsPYTlu - #world	0 1
92	9 Sep 10:38	New York police is joining the prayer for #Syria سوريا شرطة نيويورك تشارك بالنداء http://t.co/no2By9ka	1 4

Rogstadius, J., Teixeira, C., Vukovic, M., Kostakos, V., Karapanos, E., Laredo, J. (to appear). CrisisTracker: Crowdsourced Social Media Curation for Disaster Awareness. *IBM Journal of Research and Development*.



Algorithms & humans working together



Rogstadius, J., Kostakos, V., Laredo, J., Vukovic, M. (2011). Towards Real-time Emergency Response using Crowd Supported Analysis of Social Media. In **CHI 2011 Workshop on Crowdsourcing and Human Computation: Systems, Studies and Platforms**. Vancouver, Canada.

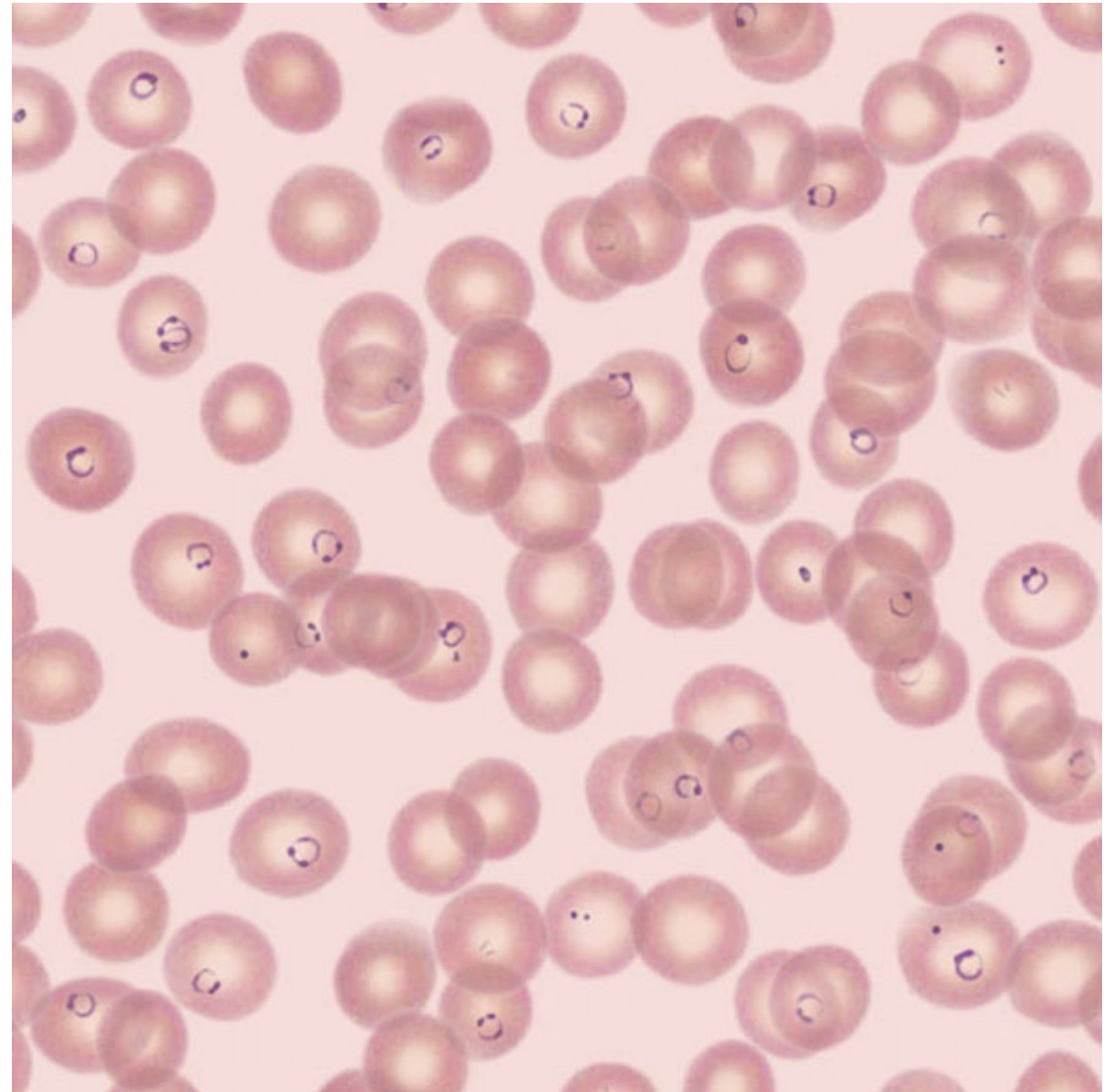


But will they do it for anyone?



The task

- Generated artificial images of infected blood cells
- Task
 - Count blood cells
 - Count parasites in double-dotted ring form
- Cover story
 - Big commercial pharmaceutical
 - World Health Organization

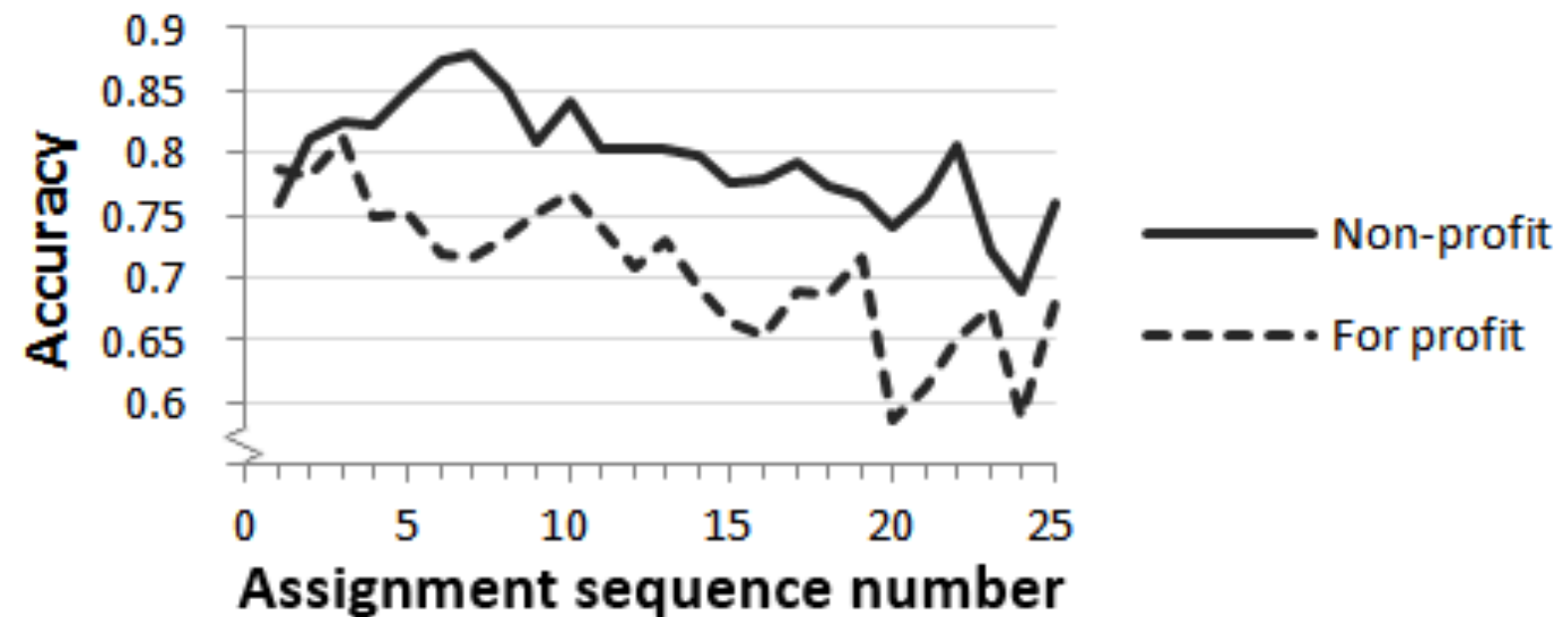
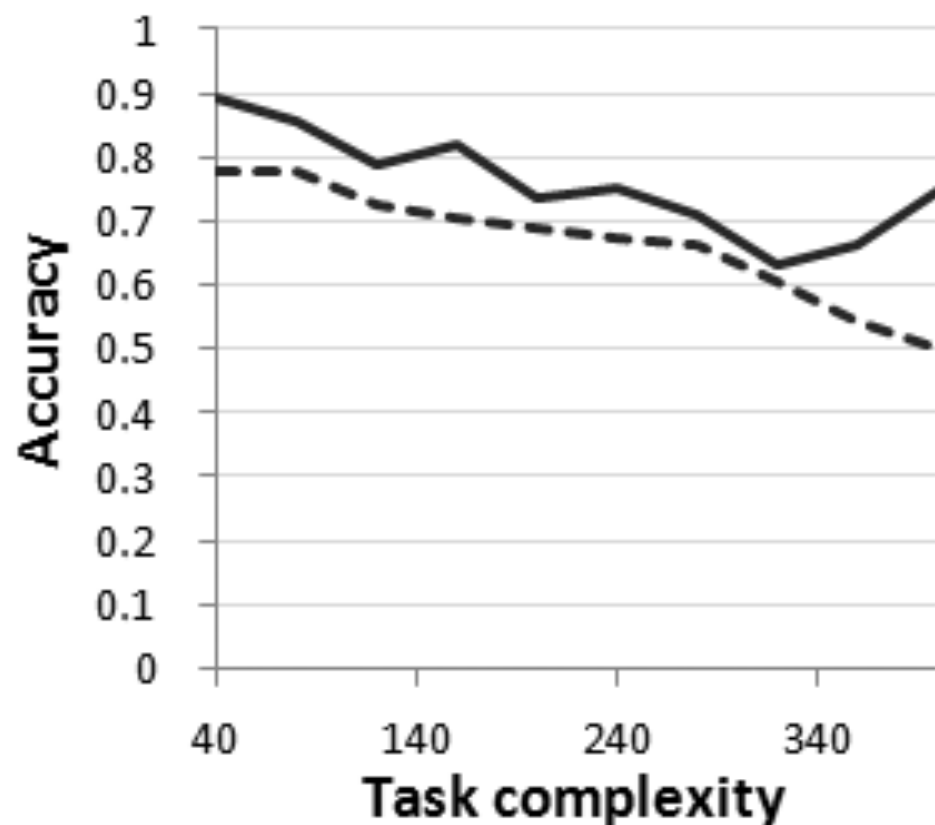


Rogstadius, J., Kostakos, V., Kittur, A., Smus, B., Laredo, J. Vukovic, M. (2011). An Assessment of Intrinsic and Extrinsic Motivation on Task Performance in Crowdsourcing Markets. In *AAAI Conference on Weblogs and Social Media*, Barcelona, Spain, p. 321-328.



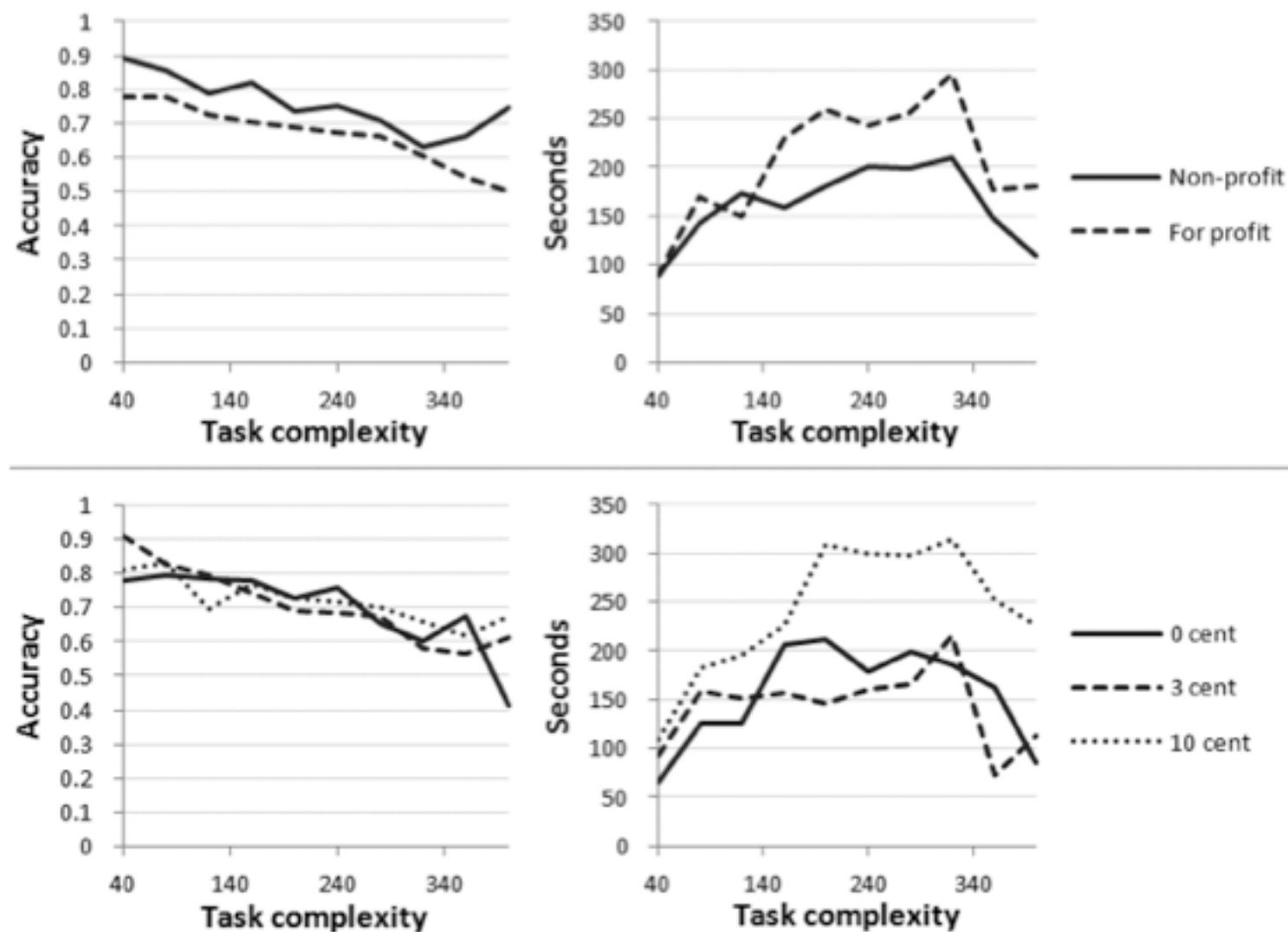
Varying cover story

- Working for charity = generally more accurate
- No effect on completion speed



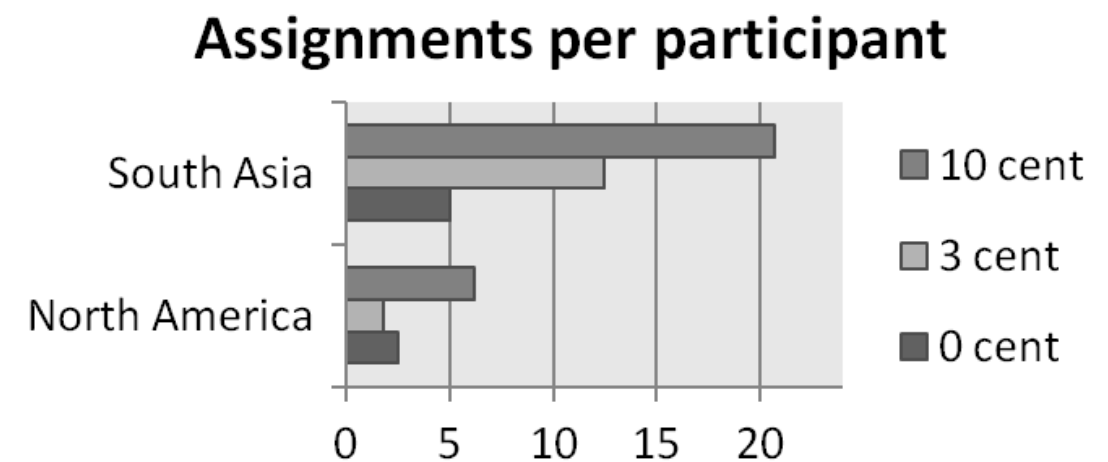
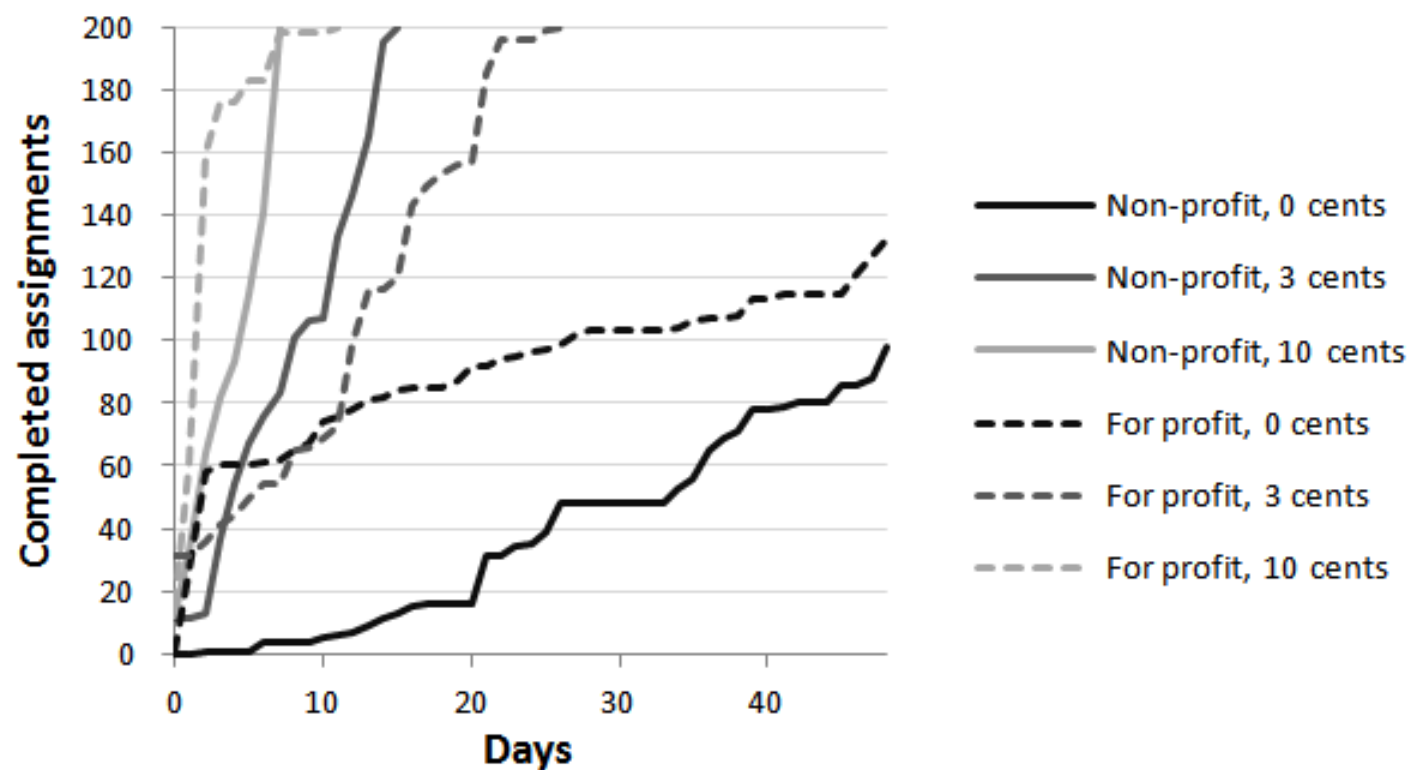
Difficulty threshold

- Beyond some difficulty threshold, people gave up



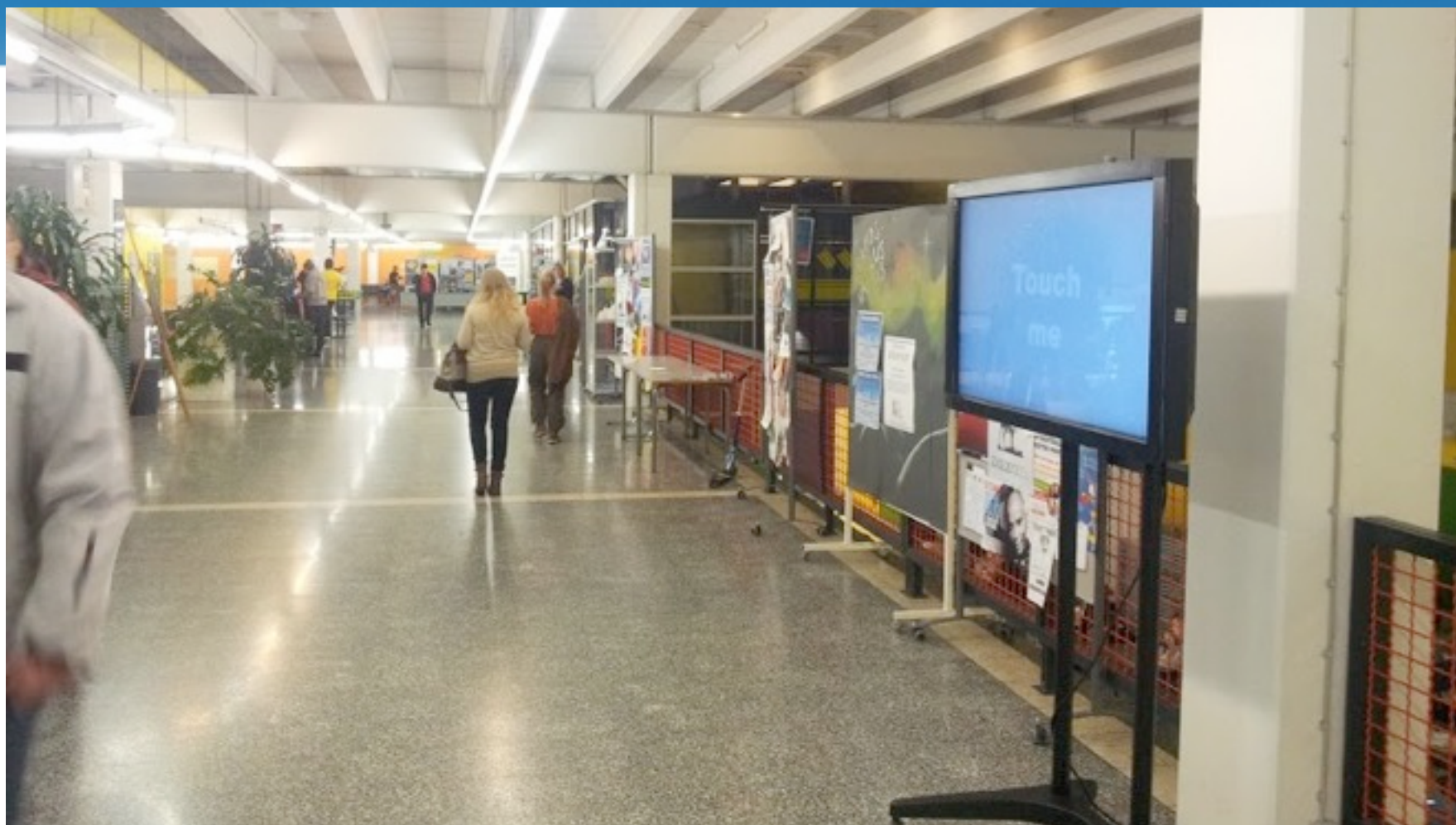
Varying payment

- More money = faster results
- Size of effect varies (with level of income?)
- Non-significant effects on accuracy



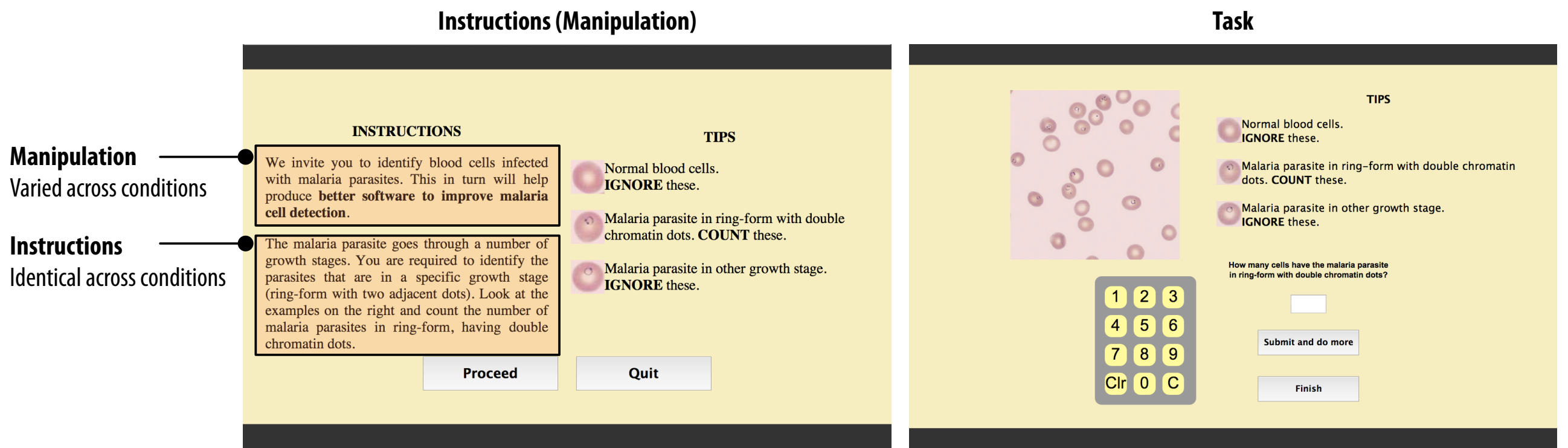
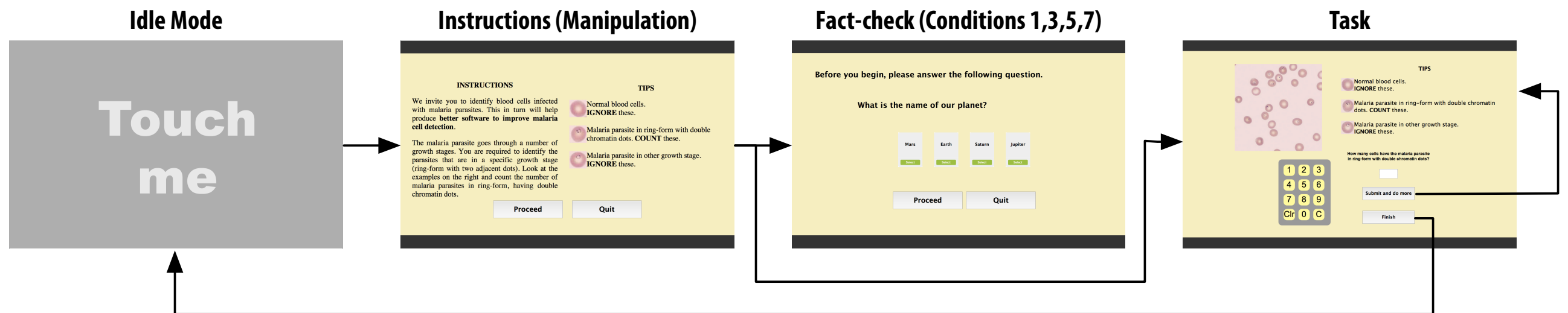
A better way to tap into altruism? (for free)





August 27, 2013

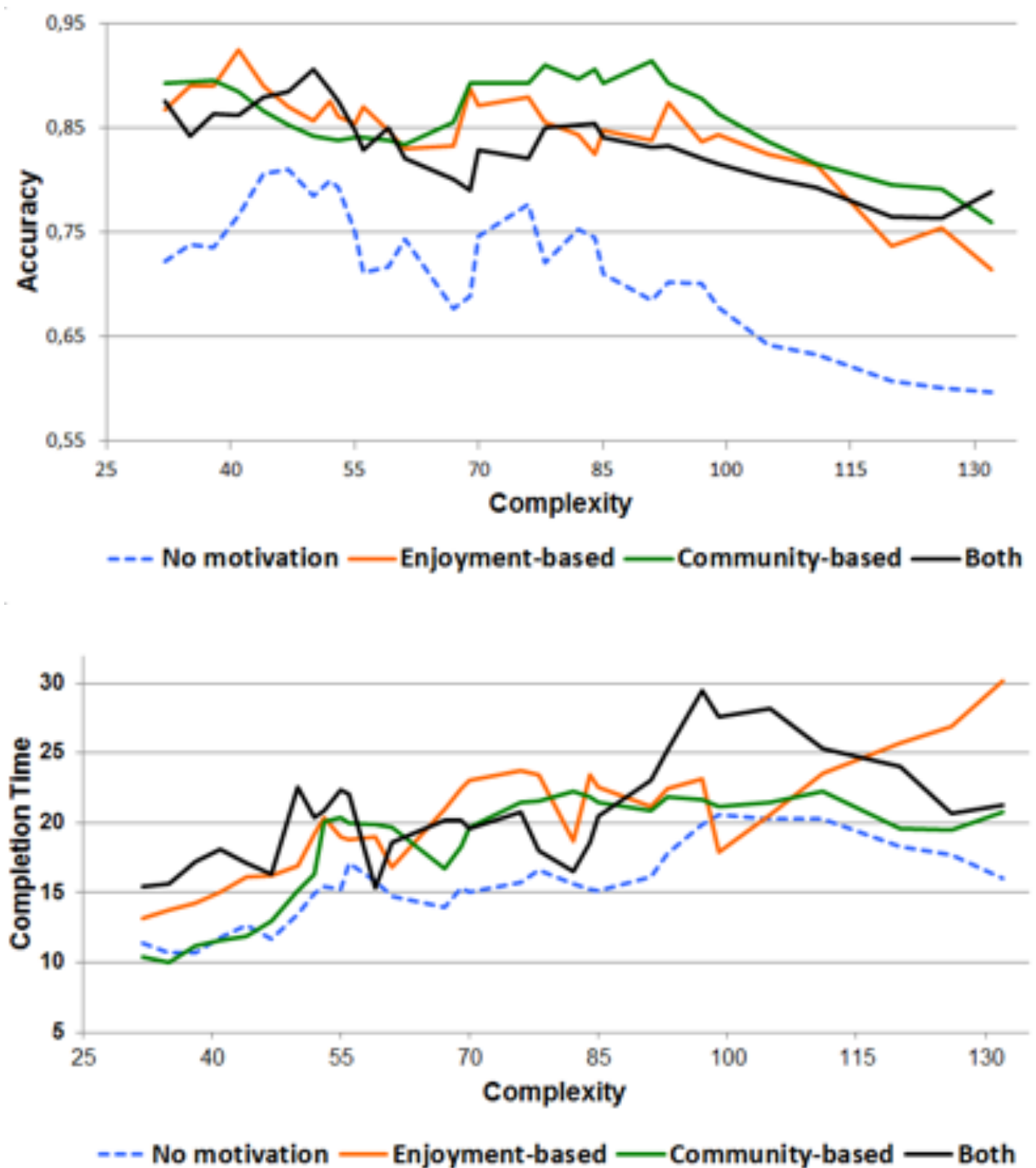




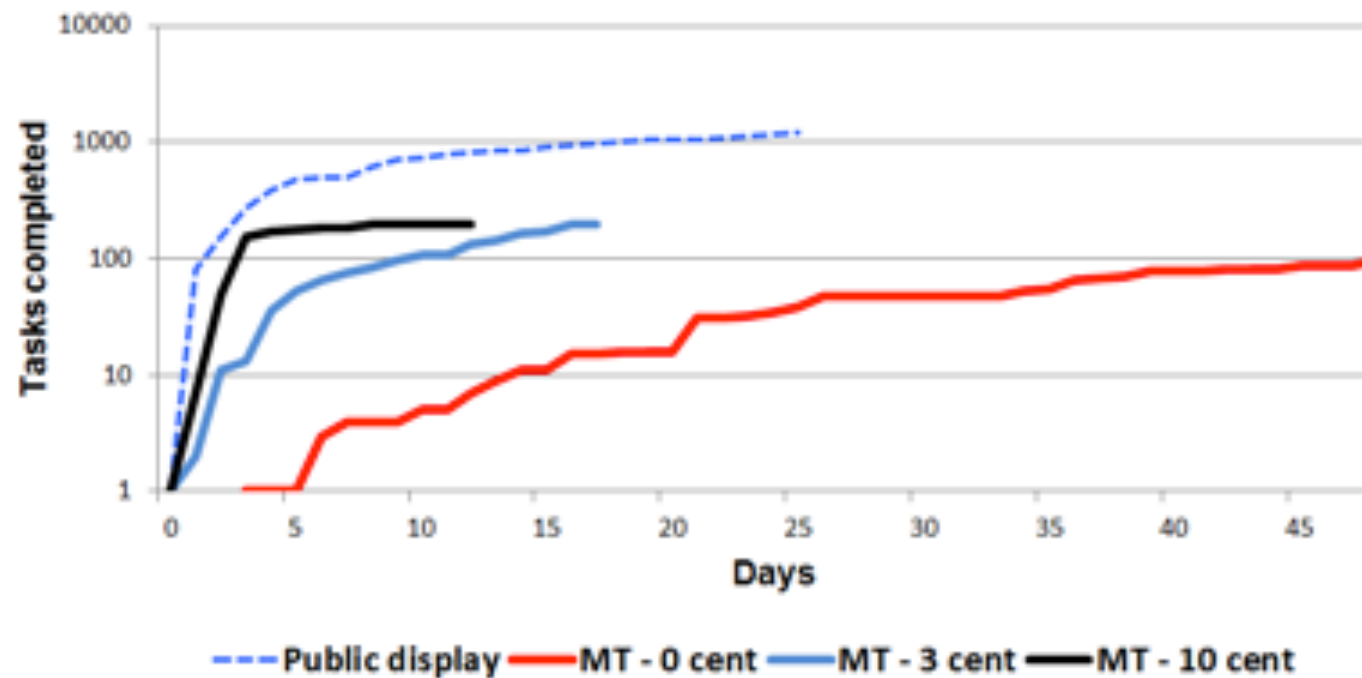
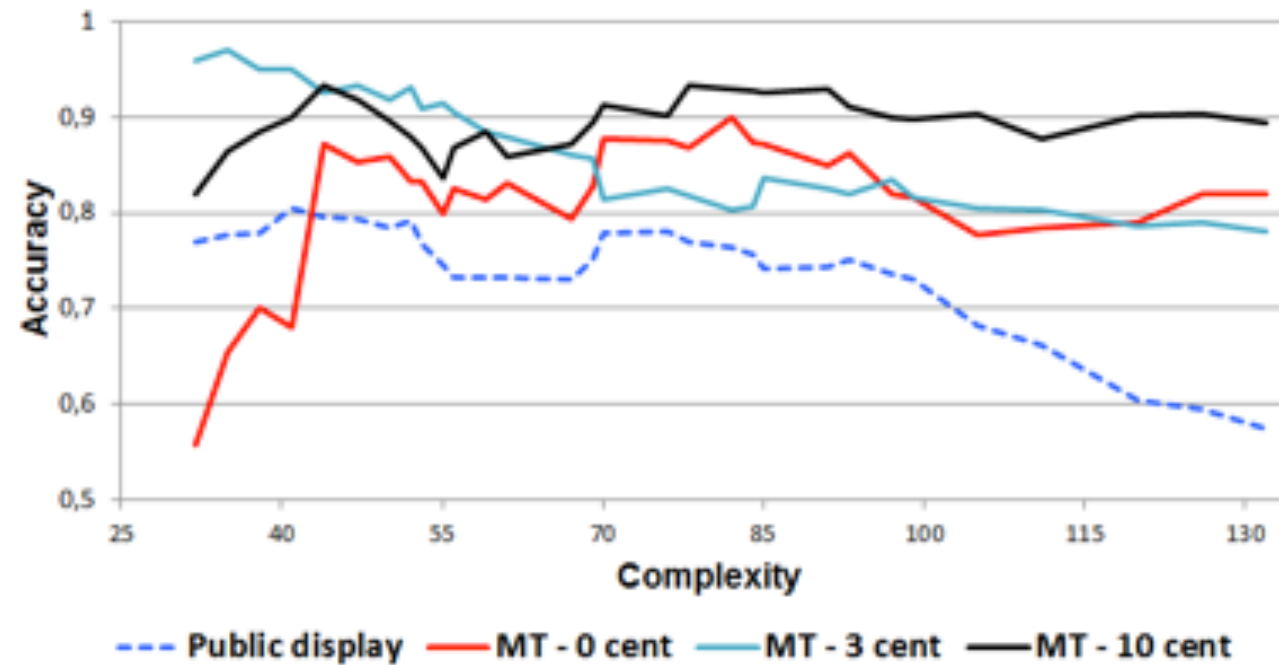
Goncalves, J., Ferreira, D., Hosio, S., Liu, Y., Rogstadius, J., Kukka, H., Kostakos, V. (2013). Crowdsourcing on the Spot: Altruistic Use of Public Displays, Feasibility, Performance, and Behaviours. In **Ubicomp 2013**, Zurich, Switzerland.

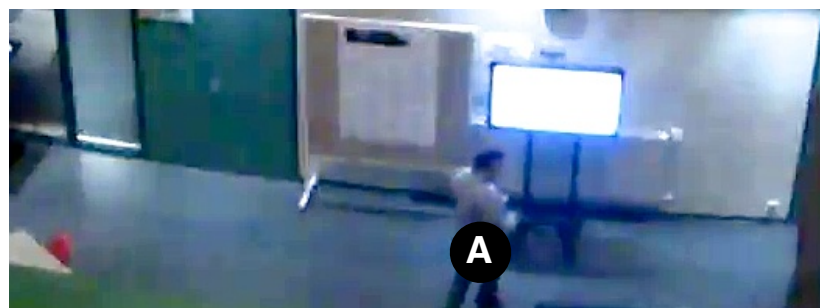
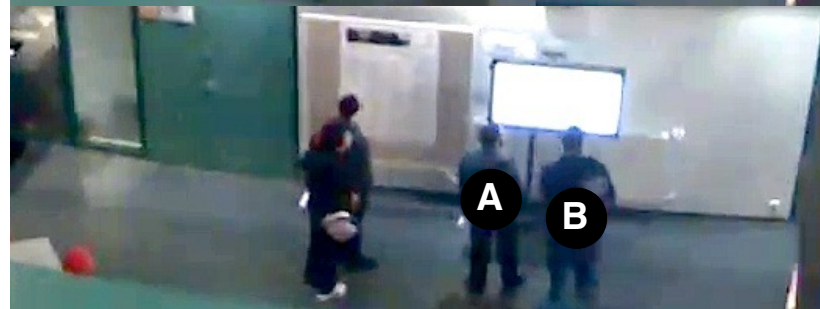
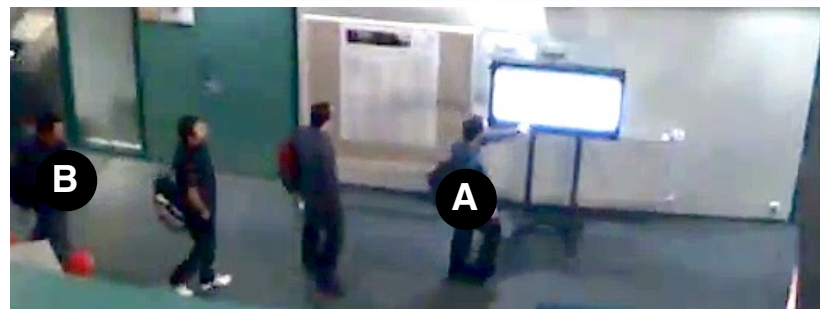


The cover story matters



Public Displays vs. MTurk





Going mobile





AWARE

Android Mobile Context Instrumentation Framework

<http://AwareFramework.com>



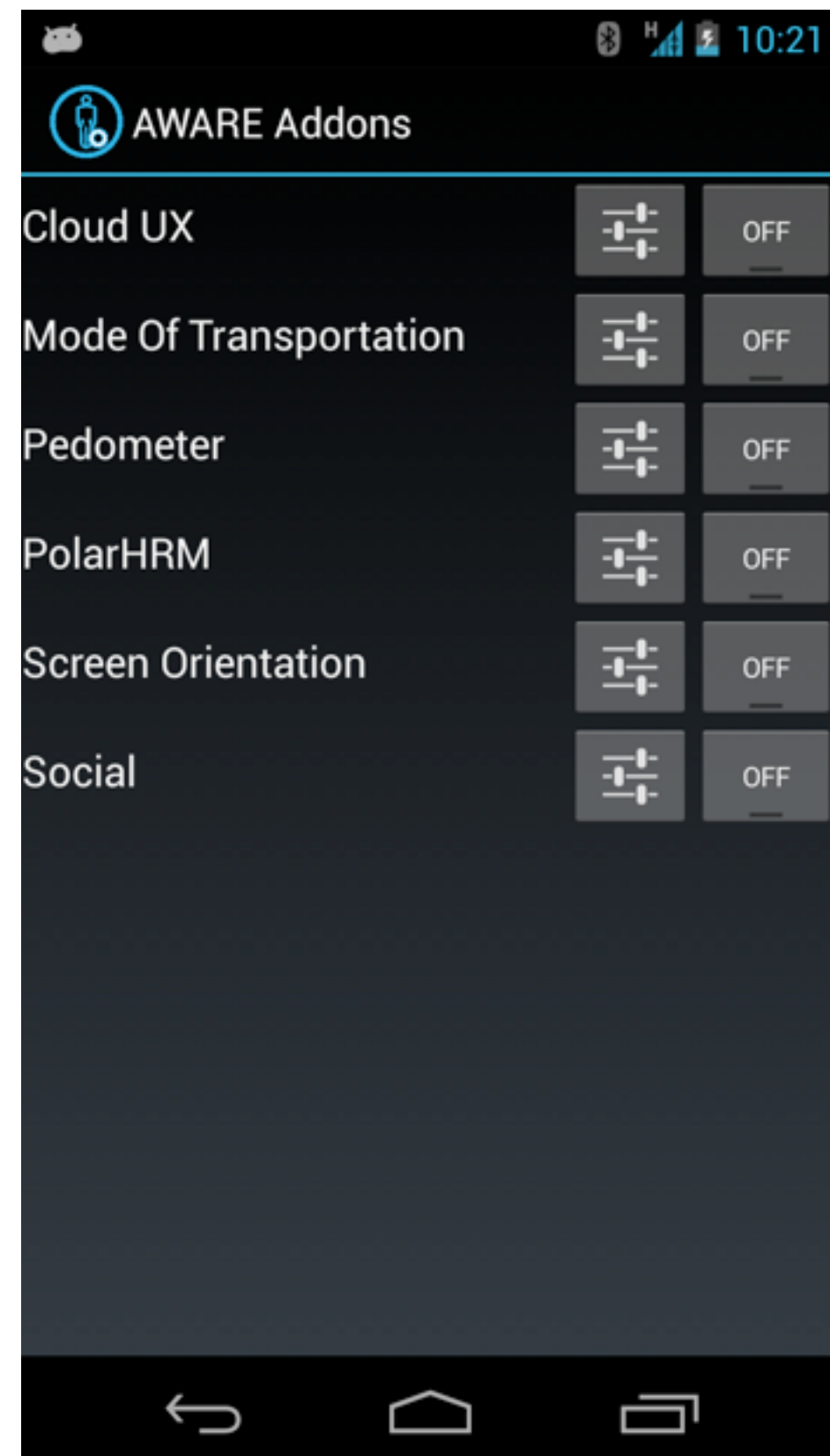
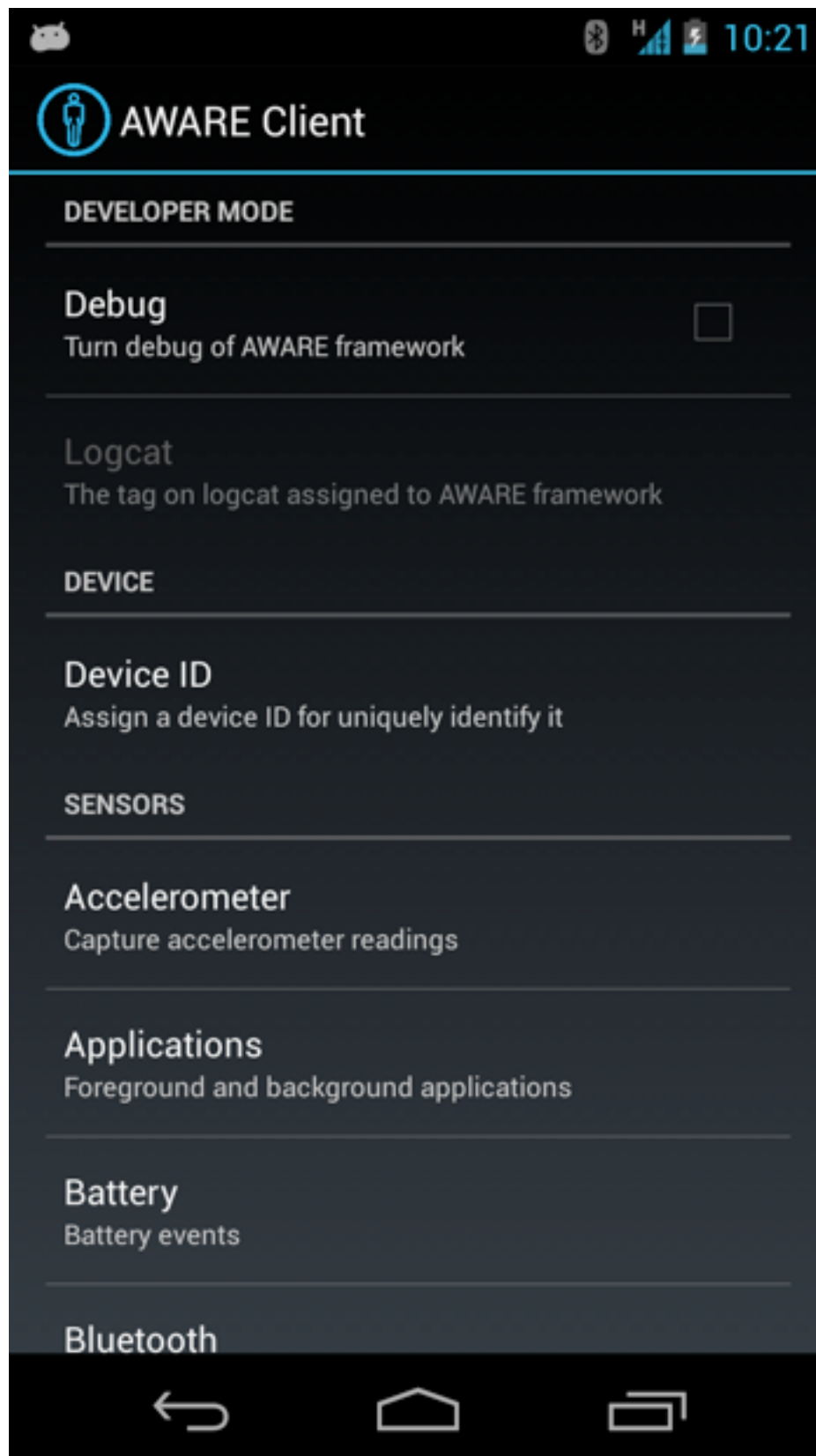
AWARE Client

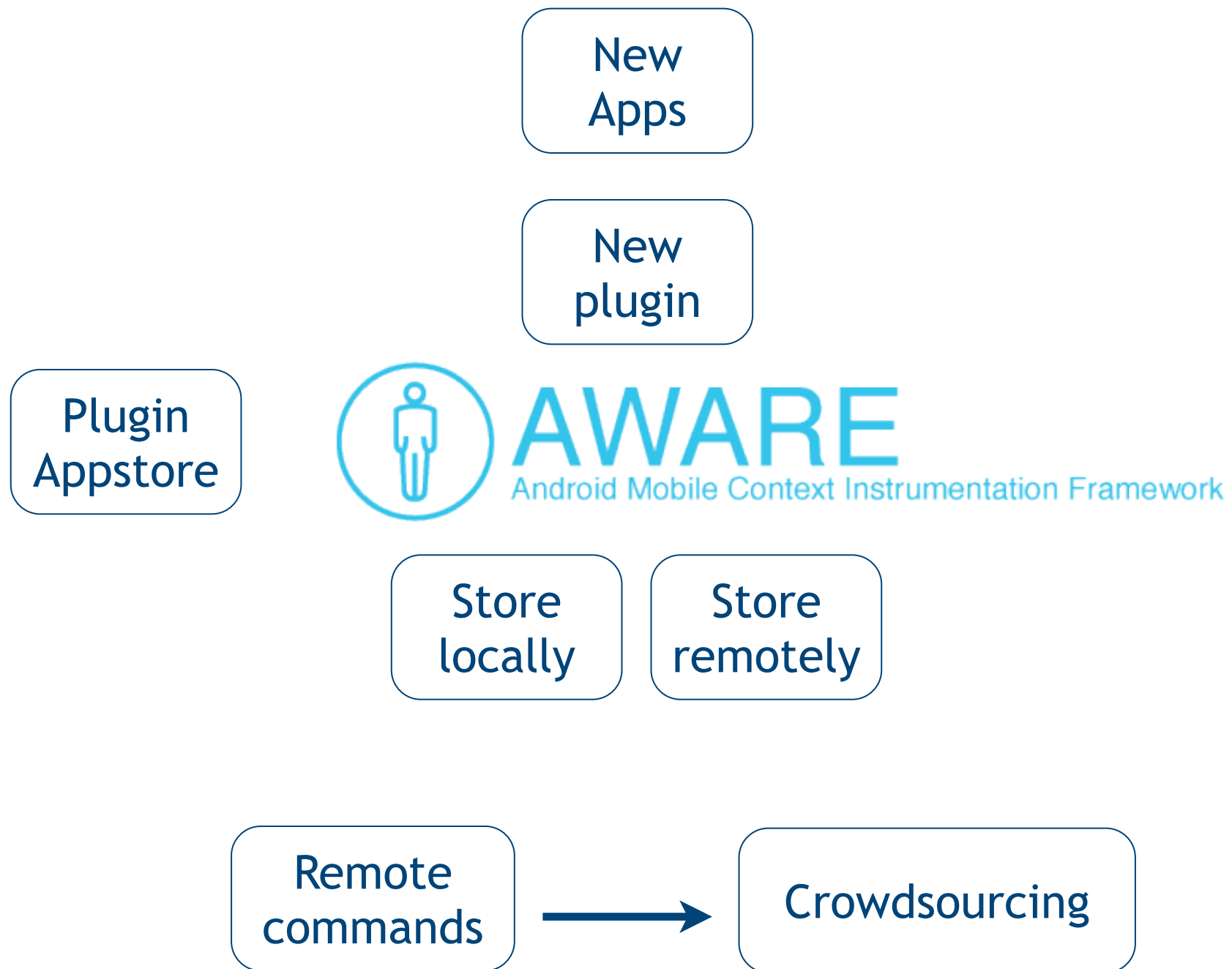
Android 2.3+ phone or tablet

AWARE Server

PHP + MySQL server







Closing thoughts



Closing thoughts

- How can we improve the way humans and algorithms work together?
- What is the potential of public displays in terms of crowdsourcing?
- Crowdsourcing / crowdsensing: what can we do with 100 million instrumented smartphones?
- In general, will crowdsourcing *beyond the desktop* catch up?



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