

Workshop on Mobile and Situated Crowdsourcing

Jorge Goncalves¹, Simo Hosio¹, Vassilis Kostakos¹, Maja Vukovic², Shin'ichi Konomi³

¹Community Imaging Group, University of Oulu, Finland

²IBM T.J. Watson Research Center, New York, USA

³Center for Spatial Information Science, University of Tokyo, Japan

¹firstname.lastname@ee.oulu.fi, ²maja@us.ibm.com, ³konomi@csis.u-tokyo.ac.jp

ABSTRACT

Crowdsourcing beyond the desktop is increasingly attracting interest due to the rapid proliferation of smart phones and other ubiquitous technologies, such as public displays. This workshop seeks to investigate the current state of the art of mobile and situated crowdsourcing by bringing together researchers of this thriving research agenda.

Author Keywords

Mobile crowdsourcing; situated crowdsourcing; ubiquitous technologies.

ACM Classification Keywords

H.5.m. Information interfaces and presentation (e.g., HCI): Miscellaneous.

INTRODUCTION

Crowdsourcing work, and the associated distribution of micro-tasks across large numbers of individuals, is becoming increasingly popular in settings beyond the desktop, thus enabling a wide range of applications. Ubiquitous technologies, such as smartphones and public displays, are now mature enough to allow users to contribute to crowdsourcing tasks wherever and whenever.

While online crowdsourcing markets (such as Amazon's Mechanical Turk, CrowdFlower and oDesk) make it convenient to pay for workers willing to solve a range of different tasks, they can suffer from a number of limitations. For instance, these online platforms do not always attract workers of desired background or skills. Thus, it can be a challenge to recruit workers that speak a specific language or live in a certain city [5].

Mobile and situated crowdsourcing can help fill in the gaps where online platforms are not ideal. Such mobile and situated crowdsourcing systems offer new possibilities for

conducting crowd work. A big advantage of mobile crowdsourcing is that many people almost always have their mobile devices with them in order to gather real-time information. This information can then be aggregated and presented in a useful way to other people (e.g. traffic information [21], airport information [4]). Furthermore, they are more readily accessible to people in developing countries that might not have access to computers and the Internet enabling them to participate in crowdsourcing efforts [10].

On the other hand, situated crowdsourcing consists of embedding input mechanisms (e.g., public displays, tablets) into a physical space and leveraging users' serendipitous availability [14] or idle time ("cognitive surplus" [16]). The use of these situated technologies means that this type of crowdsourcing does not require any deployment effort from workers. Furthermore, it allows for a geofenced and more contextually controlled crowdsourcing environment thus enabling targeting certain individuals, leveraging people's local knowledge, cognitive states, or simply reaching an untapped source of potential workers.

With this workshop we hope to bring added attention to these two forms of ubiquitous crowdsourcing. Our ultimate goal is to raise awareness within the community to not automatically default to online platforms for their crowdsourcing needs, but instead choose the type of crowdsourcing that better suits their objectives and applications. We also build on previous successful workshops at UbiComp 2010 and 2011 on ubiquitous crowdsourcing lead by one organiser of this workshop proposal [19,20].

BACKGROUND

Mobile crowdsourcing

Mobile crowdsourcing has allowed researchers to push tasks to the workers, anywhere and anytime [7]. There have been a plethora of crowdsourcing projects that leveraged mobile phones. For instance, to reach potential workers with knowledge that can be difficult to obtain online, researchers have developed platforms for inhabitants of developing countries. Some of these platforms are txtEagle [3], MobileWorks [15] and mClerk [10] that targeted workers to convert handwritten words to typed text from a variety of vestigial dialects. In a larger project, a mobile crowdsourcing platform called MoneyBee [9] was made

Permission to make digital or hard copies of all or part of this work for personal or classroom use is granted without fee provided that copies are not made or distributed for profit or commercial advantage and that copies bear this notice and the full citation on the first page. Copyrights for components of this work owned by others than the author(s) must be honored. Abstracting with credit is permitted. To copy otherwise, or republish, to post on servers or to redistribute to lists, requires prior specific permission and/or a fee. Request permissions from permissions@acm.org.

UbiComp/ISWC '15 Adjunct, September 07–11, 2015, Osaka, Japan. Copyright is held by the owner/author(s). Publication rights licensed to ACM.

ACM 978-1-4503-3575-1/15/09...\$15.00.

DOI: <http://dx.doi.org/10.1145/2800835.2800966>

accessible to mobile phone users in emerging markets through their mobile operators resulting in a higher number of potential workers.

Advances in mobile phone technology has also enable for more intricate tasks to be pushed to potential workers. Both Alt *et al.* [1] and Vääätäjä *et al.* [18] explore location-based crowdsourcing for distributing tasks to workers enabled by Internet and GPS capabilities of smartphones. In these experiments, workers could help each other providing textual information, pictures or videos regarding a specific restaurant, the weather or local events. mCrowd [22] enables mobile users to utilise sensors on their smartphone to participate and accomplish crowdsourcing tasks including geolocation-aware image collection, image tagging, road traffic monitoring, and others.

In addition, there are several platforms that enable the rapid collection of data from the crowd through their phones and other multiple sources (e.g. social media). For example, Ushahidi [17] is an open-source crisis map platform created in 2007 and has been deployed in several problematic areas like Haiti, Kenya and Afghanistan. A more leisure-oriented platform called Clickworker [2] enables the crowd to gather, verify and research local information like meal deals, city trips or restaurant reviews using their smartphones.

Situated crowdsourcing

Situated crowdsourcing is relatively under-explored when compared to online and mobile crowdsourcing due to its novelty. One such example of leveraging situated technologies for crowdsourcing purposes was *Umati* [11]. *Umati* used a vending machine with a touch display for locally relevant tasks and gave out snacks as rewards upon task completion.

The organisers of this workshop have been on the forefront of the recent developments of situated crowdsourcing. At UbiComp'13, Goncalves *et al.* [5] presented the first attempt to investigate altruistic use of interactive public displays in naturalistic usage settings as a crowdsourcing mechanism. The main objectives were to investigate different levels of motivation, to compare performance between situated and online crowdsourcing, and analyse different worker behaviours when completing tasks in this setting. In a follow-up paper, Goncalves *et al.* [6] developed a crowdsourcing game that enabled the creation of a keyword dictionary to describe locations. By using the crowd to both provide and evaluate input, they demonstrate that despite their public nature, situated technologies can provide reliable results.

Further, at UbiComp'14, Goncalves *et al.* [8] developed and validated a projective test to detect individuals' current emotion. The aggregated crowdsourcing results successfully captured the community's diurnal rhythms of emotion consistent with an independent conduct DRM study and literature on affect. More recently, Hosio *et al.*

explored the use of public displays to poll public opinion [12]. Finally, Hosio *et al.* [13] investigated the feasibility of a situated crowdsourcing market with a variety of tasks and worker payment. Their results showed that a situated crowdsourcing market can attract a populous workforce with comparable quality of contributions to its online and mobile counterparts while maintaining higher task uptake.

OBJECTIVES OF THE WORKSHOP

The first objective of this workshop is to provide a shared forum for researchers interested in crowdsourcing using ubiquitous technologies. This includes researchers who are interested in crowdsourcing but have mainly utilised online platforms as well as researchers who could benefit from conducting their crowdsourcing experiments using mobile and other ubiquitous technologies. We hope this workshop will make an impact as a venue for crowdsourcing researchers to join and share their knowledge, experience reports, novel applications and ideas. The long-term objective of this workshop is to foster a community interested in conducting crowdsourcing experiments beyond the desktop, leveraging ubiquitous technologies for this purpose.

EXPECTED OUTCOMES

We encourage contributions especially in the following key areas and considering a mobile or situated crowdsourcing context:

- Applications: crowdsourcing applications that can benefit from being conducted using mobile or situated technologies as opposed to using online platforms.
- Quality control and incentives: designing crowdsourcing applications that encourage truthful responses.
- Methodologies: methods and methodologies used for gathering and evaluating crowd contributions.
- Behaviours: understanding worker behaviours.

All accepted manuscripts will be included in the ACM Digital Library and supplemental proceedings of the main conference. All workshop papers must be up to 6 pages long in the SIGCHI Extend Abstract archival format, and be ready for inclusion into ACM digital library and the supplementary proceedings by July 15, 2015.

ESTIMATED ATTENDANCE

We will accept around 10 papers through review by the technical program committee to be presented in the workshop. In total we expect to attract 20 to 30 participants (including the presenters and organisers).

CONDUCTING THE WORKSHOP

Pre-workshop preparations

In order to attract as many submissions as possible we will provide all necessary information to all potentially interested researchers as early as possible. We will do so using the following channels:

Workshop website

The workshop website at <http://comag oulu.fi/wmsc2015> will go live before any calls for participation are sent out. The website will contain all workshop details and information, including: relevant topics for the workshop, submission and review process, email to be used for submission, important dates and program committee. The website will be updated to show accepted submissions as soon as possible in order to attract additional participants beyond the attending authors.

Calls for participation

The call will be distributed electronically through relevant mailing lists of the HCI and Ubicomp community. In addition, the organisers will also publicise the call in their home organizations and among their peers. We will also advertise the workshop through social networks (Facebook and Twitter).

Important dates

Deadline for submissions: June 19, 2015

Response to authors: July 1, 2015

Camera-ready submission deadline: July 15, 2015

Workshop structure & schedule

The workshop will cover a full day. It will consist of a single paper-track, with participants presenting his/her workshop paper during maximum of 15 minutes, followed by a 5 minutes discussion. After the third paper session, the organisers will give a 30 minute presentation about the original motivations and reasons for organizing the workshop and about their personal ongoing work on the topic as well. Finally there will be a one-hour long panel discussion, led by the organizers. The workshop will conclude with a coffee to continue informal discussion and to network with other researchers.

9:30 - 10:30 - Workshop welcome, paper presentations

10:30 - 11:00 - Coffee break

11:00 - 12:00 - Paper presentations

12:00 - 13:30 - Lunch

13:30 - 15:00 - Paper presentations

15:00 - 16:00 - Organisers' presentation, coffee and end of workshop (including discussion regarding special issue, collaborations and potential future events).

Post-workshop

The summarised results of the workshop will be reviewed and made available online. Further, after the workshop the organisers will compose a journal article of the most prominent contributions of the accepted submissions to report on the state of the art of conducting crowdsourcing experiments using ubiquitous technologies.

ORGANISERS

The workshop organisers' are all experts in crowdsourcing, and frequent publishers of papers on this research agenda.

Jorge Goncalves is a doctoral candidate and a member of the Community Imaging research group at the University of Oulu, Finland. His research interests include ubiquitous

computing, human-computer-interaction, crowdsourcing and social computing. Goncalves received an MSc in Computer Science from the University of Madeira under the Portugal | Carnegie Mellon partnership. Contact him at jorge.goncalves@ee oulu.fi.

Simo Hosio is a postdoctoral researcher and a member of the Community Imaging research group at the University of Oulu, Finland. His research interests include social computing, crowdsourcing, and large scale public display deployments. Hosio received his PhD from the University of Oulu, Finland. He is a member of IEEE. Contact him at simo.hosio@ee oulu.fi.

Vassilis Kostakos is a Professor of Computer Engineering and the director of the Community Imaging research group at the University of Oulu, Finland. His research interests include ubiquitous computing, human-computer interaction, and social systems. Kostakos received a PhD in Computer Science from the University of Bath, UK. He is a member of ACM. Contact him at vassilis.kostakos@ee oulu.fi.

Maja Vukovic is a Manager, IT Transformation at IBM T.J. Watson Research Center. Maja is a co-founder of a number of workshops: Enterprise Crowdsourcing, Ubiquitous Crowdsourcing and Social Web for Disaster Management. She is also an IBM Master Inventor. Maja received her PhD from University of Cambridge, UK. She is a Senior Member of the IEEE. Contact her at maja@us.ibm.com

Shin'ichi Konomi is an Associate Professor at the Center for Spatial Information Science at the University of Tokyo, Japan. His research interests include ubiquitous computing, human-computer interaction, context awareness, urban computing, crowdsourcing and computer-supported collaborative work. Konomi received his PhD in Computer Science from Kyoto University, Japan. He is a member of the ACM and IEEE. Contact him at konomi@csis.u-tokyo.ac.jp

SUMMARY

In a nutshell, the workshop on Mobile and Situated Crowdsourcing solicits contributions and discussion about the possibilities afforded by the new ubiquitous technologies and their use when conducting crowdsourcing experiments. The organising committee has a strong background in ubiquitous computing and crowdsourcing, conducting and evaluating field trials in authentic environments. We believe this workshop is a great addition to the UbiComp conference.

REFERENCES

1. Florian Alt, Alireza Shirazi, Albrecht Schmidt, Urs Kramer and Zahid Nawaz. 2010. Location-based crowdsourcing: extending crowdsourcing to the real world. In *Proceedings of the 6th Nordic Conference on Human-Computer Interaction* (NordiCHI '10), 13-22. <http://dx.doi.org/10.1145/1868914.1868921>
2. Clickworker. 2015. <http://www.clickworker.com>. Retrieved 30 May, 2015.

3. Nathan Eagle. 2009. txteagle: Mobile Crowdsourcing. In *Proceedings of the 3rd International Conference on Internationalization, Design and Global Development* (IDGD '09), 447-456. http://dx.doi.org/10.1007/978-3-642-02767-3_50
4. GateGuru. 2015. <https://www.gateguru.com/>. Retrieved 30 May, 2015.
5. Jorge Goncalves, Denzil Ferreira, Simo Hosio, Yong Liu, Jakob Rogstadius, Hannu Kukka and Vassilis Kostakos. 2013. Crowdsourcing on the spot: altruistic use of public displays, feasibility, performance, and behaviours. In *Proceedings of the 2013 ACM International Joint Conference on Pervasive and Ubiquitous Computing* (UbiComp '13), 753-762. <http://dx.doi.org/10.1145/2493432.2493481>
6. Jorge Goncalves, Simo Hosio, Denzil Ferreira and Vassilis Kostakos. 2014. Game of Words: Tagging places through crowdsourcing on public displays. In *Proceedings of the 2014 Conference on Designing Interactive Systems* (DIS '14), 705-714. <http://dx.doi.org/10.1145/2598510.2598514>
7. Jorge Goncalves, Vassilis Kostakos, Evangelos Karapanos, Mary Barreto, Tiago Camacho, Anthony Tomasic and John Zimmerman. 2014. Citizen motivation on the go: The role of psychological empowerment. *Interacting with Computers* 26, 3, 196-207. <http://dx.doi.org/10.1093/iwc/iwt035>
8. Jorge Goncalves, Pratyush Pandab, Denzil Ferreira, Mohammad Ghahramani, Guoying Zhao and Vassilis Kostakos. 2014. Projective testing of diurnal collective emotion. In *Proceedings of the 2014 ACM International Joint Conference on Pervasive and Ubiquitous Computing* (UbiComp '14), 487-497. <http://dx.doi.org/10.1145/2632048.2636067>
9. Dinesh Govindaraj, Naidu KVM, Animesh Nandi, Girija Narlikar and Viswanath Poosala. 2011. MoneyBee: Towards enabling a ubiquitous, efficient, and easy-to-use mobile crowdsourcing service in the emerging market. *Bell Labs Technical Journal* 15, 4, 79-92. <http://dx.doi.org/10.1002/bltj.20473>
10. Aakar Gupta, William Thies, Edward Cutrell and Ravin Balakrishnan. 2012. mClerk: enabling mobile crowdsourcing in developing regions. In *Proceedings of the SIGCHI Conference on Human Factors in Computing Systems* (CHI '12), 1843-1852. <http://dx.doi.org/10.1145/2207676.2208320>
11. Kurtis Heimerl, Brian Gawalt, Kuang Chen, Tapan Parikh and Björn Hartmann. 2012. CommunitySourcing: engaging local crowds to perform expert work via physical kiosks. In *Proceedings of the SIGCHI Conference on Human Factors in Computing Systems* (CHI '12), 1539-1548. <http://dx.doi.org/10.1145/2207676.2208619>
12. Simo Hosio, Jorge Goncalves, Vassilis Kostakos, Jukka Riekkö, 2015. Crowdsourcing public opinion using urban pervasive technologies: Lessons from real-life experiments in Oulu. *Policy & Internet* 7, 2, 203-222. <http://dx.doi.org/10.1145/2783446.2783577>
13. Simo Hosio, Jorge Goncalves, Vili Lehdonvirta, Denzil Ferreira and Vassilis Kostakos. 2014. Situated crowdsourcing using a market model. In *Proceedings of the 27th Annual ACM Symposium on User Interface Software and Technology* (UIST '14), 55-64. <http://dx.doi.org/10.1145/2642918.2647362>
14. Jörg Müller, Florian Alt, Daniel Michelis and Albrecht Schmidt. 2010. Requirements and design space for interactive public displays. In *Proceedings of the International Conference on Multimedia* (MM '10), 1285-1294. <http://dx.doi.org/10.1145/1873951.1874203>
15. Prayag Narula, Philipp Gutheim, David Rolnitzky, Anand Kulkarni and Bjoern Hartmann. 2011. MobileWorks: A mobile crowdsourcing platform for workers at the bottom of the pyramid. In *Proceedings of the AAAI Workshop on Human Computation* (HCOMP '11), 121-123.
16. Clay Shirky. 2010. *Cognitive surplus: How technology makes consumers into collaborators*. Penguin.
17. Ushahidi. 2015. <http://ushahidi.org>. Retrieved 30 May, 2015.
18. Heli Väättäjä, Teija Vainio, Esa Sirkkunen and Kari Salo. 2011. Crowdsourced news reporting: supporting news content creation with mobile phones. In *Proceedings of the 13th International Conference on Human Computer Interaction with Mobile Devices and Services* (MobileHCI '11), 435-444. <http://dx.doi.org/10.1145/2037373.2037438>
19. Maja Vukovic and Soundar Kumara. 2011. Second international workshop on ubiquitous crowdsourcing: towards a platform for crowd computing. In *Adjunct Proceedings of the 13th International Conference on Ubiquitous Computing* (UbiComp '11), 617-618. <http://dx.doi.org/10.1145/2030112.2030243>
20. Maja Vukovic, Soundar Kumara and Ohad Greenspan. 2010. Ubiquitous crowdsourcing. In *Adjunct Proceedings of the 12th ACM International Conference on Ubiquitous Computing* (UbiComp '10), 523-526. <http://dx.doi.org/10.1145/1864431.1864504>
21. Waze. 2015. <https://www.waze.com/>. Retrieved 30 May, 2015.
22. Tingxin Yan, Matt Marzilli, Ryan Holmes, Deepak Ganesan and Mark Corner. 2009. mCrowd: a platform for mobile crowdsourcing. In *Proceedings of the 7th ACM Conference on Embedded Networked Sensor Systems* (ENSS '09), 347-348. <http://dx.doi.org/10.1145/1644038.1644094>