



# First International Workshop on User Interfaces for Crowdsourcing and Human Computation

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## ABSTRACT

Recent years witnessed an explosion in the number and variety of data crowdsourcing initiatives. From OpenStreetMap to Amazon Mechanical Turk, developers and practitioners have been striving to create user interfaces able to effectively and efficiently support the creation, exploration, and analysis of crowdsourced information.

The extensive usage of crowdsourcing techniques brings a major change of paradigm with respect to traditional user interface for data collection and exploration, as effectiveness, speed, and interaction quality concerns play a central role in supporting very demanding incentives, including monetary ones.

The First International Workshop on User Interfaces for Crowdsourcing and Human Computation (CrowdUI 2014), co-located with the AVI 2014 conference, brought together researchers and practitioners from a wide range of areas interested in discussing the user interaction challenges posed by crowdsourcing systems.

## Categories and Subject Descriptors

H.4 [Information Systems Applications]: Miscellaneous

## Keywords

Crowdsourcing; User Interfaces; Human Computation; User Incentives

## 1. INTRODUCTION

Crowdsourcing and Human Computation raise a variety of new challenges for user interface and user interaction designers. How to efficiently and effectively support workers with implicit and/or explicit Crowdsourcing and Human Computation tasks is still an open research question. The goal of the CrowdUI 2014 workshop is to gather researchers and practitioners in the diverse fields related to the integration, interaction and visualization of data to explore the feasibility of using and combining different approaches to create ef-

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fective user interfaces and usage experience for applications relying on, or producing crowdsourced data.

Recent years witnessed an explosion in the number and variety of data crowdsourcing initiatives. From OpenStreetMap to Amazon Mechanical Turk, developers and practitioners have been striving to create user interfaces able to effectively and efficiently support the creation, exploration, and analysis of crowdsourced information. A representative example comes from the fields of Smart Cities and Human Mobility: there, new breeds of (mobile) human computation applications and games-with-a-purpose employ new interaction paradigms for the collection and retrieval of urban-related data. On the other hand, analysts and other urban stakeholders are provided with applications that fuse multiple datasources together in order to support sensemaking and knowledge-extraction processes for decision-making.

The extensive usage of crowdsourcing techniques brings a major change of paradigm with respect to traditional user interface for data collection and exploration, as effectiveness, speed, and interaction quality concerns play a central role in supporting very demanding incentives, including monetary ones. At this purpose, cross fertilization between different disciplines is mandatory: existing approaches for visual interfaces design and implementation, data visualization and interaction methodologies, crowdsourced data management, and human computation task design should be merged with the purpose of identifying the best interaction and visualization paradigms for crowd-driven data collection, analysis, and exploration applications.

The CrowdUI 2014 workshop, co-located with the AVI 2014 conference, brought together researchers and practitioners from a wide range of areas interested in discussing the user interaction challenges posed by crowdsourcing systems. The general call for papers of the workshop highlighted the following twelve topics for contributions: Interfaces for human computation tasks; Studies on quality, usability and effectiveness of human computation and crowdsourcing user interfaces; Innovative user interaction paradigms for task execution; Human computation interaction design tools; Game interfaces for crowdsourcing and human computation; Tools for human computation task design and deployment; Tools for visual analytics of crowdsourced data; Augmented reality and cross-media interfaces for human computation tasks; Spam detection for crowdsourced data collection and analysis; Human factors in human computation task interface design; Work modelling for user interface adaptation; Performer /Task and Task/Performer recommendation.

## 2. WORKSHOP

The workshop received 6 valid submissions. Five of them were accepted for presentation at the workshop, while two submissions were accepted for publication in the official AVI 2014 proceedings. All submissions covered topics related to crowdsourcing, with different point of views including: design of user interfaces for task search and execution; user incentives; and user models. Applications were seen: in incident and emergency response and management; data collection and cleansing; and collection of stories.

Section 2.1 provides a brief summary of the contributions of each submission, while in Section 2.2 we discuss the organization of the workshop.

### 2.1 Accepted Contributions

*Rahmanian and Davis*, in their paper *User Interface Design for Crowdsourcing Systems*, present a study on the effect of different user interface designs on the performance of crowdsourcing systems. They investigate how user interfaces designed to reduce workers' cognitive load may influence execution performance. Their results indicate that user interface design choices have a significant effect on crowdsourced worker performance.

*Effective Tasks Navigation in Crowdsourcing*, by *Kucherbaev et al*, presents an attempt to design and implement a specific user interface for task listing aimed to help workers spend less time searching for tasks and thus navigate among them more easily. Their findings suggest the presence of several usability and user interface design issues in current crowdsourcing platforms, with an effect on the time spent for searching tasks.

*Mobile Crowdsourcing Solution for Emergency Situations: Human Reaction Model and Strategy for Interaction Design* by *Nass et al* discusses the RESCUER Human Reaction Model, a user model for emergency situations that considers affect, behavior, and cognitive components. The model is used as a basis for determining an appropriate interaction strategy for gathering information during emergency situations. Authors describe three strategies: fully automatic, semi-automatic, and fully interaction-based. In authors' idea the findings described in this paper constitute the first step towards a concrete set of guidelines for promoting the usability and user experience of mobile applications to support emergency handling and crisis management.

*Murray-Rust et al*, in their paper *A graphic novel based approach to large scale elicitation of normative future scenarios*, discuss how scenario-based user interfaces can be used to collect life stories from citizens about changes in their environment. Scenario analysis has emerged as a necessary component of understanding and modelling large scale future developments in socio-political systems. The authors presents an early prototype of a crowdsourcing tool where participants are asked to graphically imagine a narrative for their future selves, relating to different aspects of their living and working lives.

*On the effectiveness of a Mobile Puzzle Game UI to Crowdsource Linked Data Management tasks* by *Celino, Della Valle, and Gualandris* introduces WikiFinder, a game-with-a-purpose inspired by popular mobile puzzle games for linked data

management tasks. Authors tackle the problem of understanding which are the right incentives to motivate large groups of people to contribute their time in solving problems. They study how effective is the user interface of a puzzle game in engaging casual mobile players in performing Linked Data Management tasks, using points and leaderboards as incentives. The paper reports on the results of an evaluation aimed at understanding the effectiveness of WikiFinder in processing linked data.

### 2.2 Workshop Day Organization

The CrowdUI workshop was organized to last half a day, and it has been structured to maximize the time allocated for group discussion and brainstorming. All the papers accepted for presentation have been made available in advance on the workshop Website, and attendees have been asked to get familiar with their topics in advance. The workshop has been organized with a "show, don't tell" approach in mind, where presenters of accepted contributionw were asked to concretely demonstrate as much as possible their work, to stem discussions and interactions. To this end, in addition to traditional presentation slots, the workshop featured a dedicated live demo session, where attendees were invited to ignite discussions by showing the features of their research prototypes.

### 2.3 Organizers

- *Alessandro Bozzon* is an Assistant Professor at the Delft University of Technology, with the Web Information Systems group. He holds a Ph.D. in Computer Science, with a thesis focused on model driven approaches for the design, development and automatic code generation of Search Based Applications. After the Ph.D. he held a Post-doc position at Politecnico di Milano. He participated in several European and national research projects, related to innovative multi-domain and audiovisual search platforms, Web technologies, and Web architectures, including: EU FP7 Pharos, CUBRIK, ERC Search Computing, Dutch COMMIT Program. His current research interests are in Web data management; human computation, crowdsourcing, and games with a purpose; and information retrieval.
- *Lora Aroyo* is Associate Professor in the Web & Media Group at the VU University of Amsterdam and a member of its Network Institute. She holds a doctorate in educational computer science from the University of Twente. She is expert in task-based information handling support in Web-based education. Her research concentrates on personalized ontological support for knowledge intensive work, including cultural heritage, interactive TV and e-learning. She was project leader of the FP7 NoTube project and the CHIP Project, which is part of the Dutch CATCH (Continuous Access to Cultural Heritage) program. She was recipient of a 2013 IBM Faculty Award for her work on Crowd Watson.
- *Paolo Cremonesi* is associate professor of Computer Engineering at the Department of Electronics and Information of Politecnico di Milano. His research interests cover two areas: computer systems performance

(high-performance and parallel computing, benchmarking of computer systems, queuing network performance models, green IT) and recommender systems (design of algorithms, off-line and on-line evaluation of recommender systems, applications of recommender systems in TV and tourism). Paolo holds an MSc in Aerospace Engineering (1991) and a PhD in Computer Science (1996), both from the Politecnico di Milano. Before joining the Politecnico di Milano, Paolo first worked with the NATO research center Von Karman Institute, doing research on high-performance computing. From 2001 until 2006 Paolo has been Editor of the Elsevier Journal of Systems Architecture. In 2001 Paolo co-founded Neptuny, the first and most successful Politecnico di Milano start-up company, specialized in capacity planning and recommender systems.

## 2.4 Program Committee

The program committee of CrowdUI 2014 has been assembled to thoroughly review all submissions to the workshop. Each submission is reviewed by various PC members, which results in a fair and balanced reviewing process and a helpful feedback for the authors. The program committee of CrowdUI 2014 consisted of:

- Irene Celino, CEFRIEL, Italy
- Emanuele Della Valle, Politecnico di Milano, Italy
- Frank Hopfgartner, Technische Universitet Berlin, Germany
- Martha Larson, TU Delft, The Netherlands
- Alan Said, CWI, The Netherlands
- Luca Galli, Politecnico di Milano, Italy
- Sven Casteleyn, Universitat Jaume I, Castellon, Spain
- Moira Norrie, ETH, Switzerland
- Marco Winkler, ICS-IRIT University Paul Sabatier, France
- Beat Signer - Vrije Universiteit Brussel

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