

# ACM Multimedia 2013 Workshop on Crowdsourcing for Multimedia

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## ABSTRACT

The topic “Crowdsourcing for Multimedia” encompasses the full range of techniques that combine human intelligence and a large number of individual contributors to advance the state of the art in multimedia research. The ACM Multimedia 2013 Workshop on Crowdsourcing for Multimedia (CrowdMM 2013) provided a forum for presenting new crowdsourcing techniques, exchanging innovative crowdsourcing ideas, and discussing crowdsourcing best practices for multimedia. The workshop program consisted of presented papers, a keynote speech and a panel discussion. A special feature of this year’s workshop was the “Crowdsourcing for Multimedia Ideas Competition”, the results of which were presented at the workshop.

## Categories and Subject Descriptors

H.1.2 [Models and Principles]: User/Machine Systems – *Human factors*.

## Keywords

Crowdsourcing, multimedia, human computation

## INTRODUCTION

The power of crowds—leveraging a large number of human contributors and the capabilities of human computation—has enormous potential to address key challenges in the area of multimedia research. The term “crowdsourcing” was coined in 2006 [2], and the concept developed greatly in the subsequent years, as described, for example by [3]. Currently, applications of crowdsourcing in the area of multimedia range from the exploitation of unsolicited user contributions, such as using tags to aid understanding of the visual content of yet-unseen images, to utilizing crowdsourcing platforms and marketplaces to create test collections. Crowdsourcing platforms that have been successfully used for multimedia research include Amazon Mechanical Turk (<http://www.mturk.com>), CrowdFlower (<http://crowdfower.com>) and Microworkers (<http://www.microworkers.com>). These platforms make it possible to micro-outsource tasks such as semantic video annotation to a large population of workers. Further, crowdsourcing offers a time- and resource-efficient

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method for collecting large volumes of input for system design and evaluation, making it possible to optimize multimedia systems more rapidly and to address human factors more effectively.

At present, crowdsourcing remains notoriously difficult to exploit effectively in multimedia settings: the challenge arises from the fact that community of users or workers is a complex and dynamic system that is highly sensitive to changes in the form and the parameterization of their activities. For example, on a crowdsourcing platform, workers are known to react differently depending on the way in which a multimedia annotation task is presented or explained and on the manner in which they are incentivized (e.g., the compensation that is offered or the appeal of the task). Crowdsourcing workers are not always reliable. Separating reliable from unreliable workers requires an understanding of the factors that influence how crowdsourcing workers interpret tasks and also of the conditions under which they carry out their work. Additionally, insight into the factors that motivate workers to submit unserious work is also critical. In the coming years, a thorough understanding of crowdsourcing for multimedia is crucial in order to enable the field to effectively address these challenges.

The CrowdMM workshop was dedicated to novel contributions to multimedia research that make use of human intelligence, but also take advantage of human plurality. CrowdMM 2013 followed the successful CrowdMM 2012 workshop held at ACM Multimedia 2012 in Nara, Japan [1]. The workshop defined crowdsourcing in the broad sense, namely, as encompassing both unsolicited human contributions, e.g., tags assigned by users to images, and also solicited contributions, e.g., annotations gathered by making use of crowdsourcing platforms. CrowdMM put a special focus on soliciting contributions that propose solutions for the key challenges that face widespread adoption of crowdsourcing paradigms in the multimedia research community. These include: identification of optimal crowd members (e.g., user expertise, worker reliability), providing effective explanations (i.e., good task design), controlling noise and quality in the results, designing incentive structures that do not breed cheating, adversarial environments, gathering necessary background information about crowd members without violating privacy, and creating effective descriptions of tasks.

## SIGNIFICANCE OF CROWDSOURCING

Crowdsourcing can be expected to exercise transformative impact on the field of multimedia in the coming years. While the use of human computation is not new (e.g., the term “computer” originally described a human worker), technological advances have created new opportunities to leverage human effort in concert with automated methods to address limitations of current

automation or to enhance current capabilities. The further enhancement of human intelligence attainable when contributions from multiple individuals are combined (“Wisdom of the Crowd”) has just begun to give indications of greater potential for the multimedia field. We expect that future multimedia computing innovations will increasingly explore judicious use of humans and human computation to complement and extend existing methodologies.

## WORKSHOP TOPICS AND GOALS

CrowdMM 2013 encouraged the submission of work discussing theoretical, experimental, and/or methodological developments advancing state-of-the-art knowledge of crowdsourcing techniques for multimedia research. It also solicited work regarding novel applications using crowdsourcing to address both traditional and emerging challenges in multimedia research. Topics of interest include the use of crowds, the Wisdom of Crowds, and human computation in multimedia, in the following areas of research:

- **Creation:** content synthesis, authoring, editing, and collaboration, summarization and storytelling.
- **Evaluation:** evaluation of multimedia signal processing algorithms, multimedia analysis and retrieval algorithms, or multimedia systems and applications.
- **Retrieval:** analysis of user multimedia queries, evaluating multimedia search algorithms and interactive multimedia retrieval.
- **Annotation:** generating semantic annotations for multimedia content, collecting large-scale input on user affective reactions.
- **Human factors:** designing or evaluating user interfaces for multimedia systems, usability study, multi-modal environment, human recognition and perceptions.
- **Novel applications:** putting crowdsourcing to new users in the service of multimedia systems (e.g., human as an element in the loop of computation).
- **Effective learning:** learning from crowd-annotated or crowd-augmented datasets.
- **Quality assurance:** identification of high quality work and reliable workers.
- **Motivation:** economics and incentive structures.
- **Resources:** programming languages, tools and platforms providing enhanced support.
- **Challenges:** inherent biases, limitations and trade-offs of crowd-centered approaches.

CrowdMM 2013 benefited from a keynote by Daniel Gatica-Perez, who presented joint work carried out with Joan-Isaac Biel, in a presentation entitled, “When the crowd watches the crowd: understanding impressions in online conversational video.” The talk presented a framework for understanding social impressions in online conversational video, which was applied to vlogging. The role that video crowdsourcing techniques can play in interpersonal perception research was examined, crowdsourcing techniques used to collect online impressions about vloggers were described, and associated challenges were discussed.

As with CrowdMM 2012, the high-level goals of the workshop were twofold. First, it provided a venue promoting

multimedia research that both makes use of human intelligence and also of numerous human contributors. Second, through panel discussion and invited talks, the workshop encouraged the multimedia community to define best practices for the use of crowdsourcing in multimedia and to give form to new methodologies and new paradigms that will allow crowdsourcing to push forward the state of the art in multimedia research.

## CROWDSOURCING FOR MULTIMEDIA IDEAS COMPETITION

In order to encourage the multimedia community to generate innovative ideas on ways in which crowdsourcing can be used, and encourage scientists to apply these ideas in practice, CrowdMM 2013 organized an ideas competition. The ideas submitted to the competition were judged using three criteria:

- The clarity and simplicity with which the idea is explained. (A clear and simple-to-understand task will run the most successfully on the crowdsourcing platform.)
- The relationship to the topics of the workshop.
- Innovation and contribution to the state of the art in crowdsourcing for multimedia.

In contrast to last year, the competition was larger in scale and also organized earlier than last year’s competition, in order that the results could be presented at the workshop. At CrowdMM 2013, a total of 15 ideas were submitted. The result of the judgment of the submissions was that all ideas were sponsored by Microworkers, enabling them to be put into practice. The workshop provided the opportunity for the contestants to present their ideas in a dedicated poster session. The announcement of the winner of the best idea was scheduled as a highlight of the workshop.

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