Social Computing as a Discipline (SCD-2013): Workshop Summary

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Abstract Despite growing interest and new potential applications in Social Computing, the field remains largely ill-defined and its constituency fragmented. An open, half-day workshop was held recently in Alexandria, Virginia to more deeply consider this state of affairs and produce recommendations. This report summarizes the goals, activities, and outcomes from that workshop: the first international workshop of *Social Computing as a Discipline* (SCD-2103), held on September 8, 2013 as part of the international SocialCom 2013 conference.

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[1] Collaborative workshop activities were borrowed or adapted from Gray, D., Brown, S., Macanufo, J. (2010) <u>Gamestorming – A Playbook for Innovators, Rulebreakers, and Gamechangers</u>, O'Reilly Media, Inc.

Introduction

Human Computation (HC) is an emerging, multidisciplinary field spanning communities. Broadly, it refers to human participation in computational systems and the information and capabilities that arise from that. Social Computing (SC) can be therefore construed as the intersection of HC and social behavior[2]. That is, SC is a large and prevalent subset of HC in which information processing results, at least in part, from social interaction. Beyond these general definitions, however, there is a tendency for multiple and sometimes conflicting perspectives, which leads to confusion, particularly for newcomers to the field. Such confusion is one of several indicators that, despite the tremendous activity and rapid growth of this field, HC (including SC) seems to fall short of being an established discipline.

What, then, stands between HC as a loosely bound multidisciplinary community with a common worldview and HC as a formal discipline in its own right? And in what ways, if any, would disciplinary advancement benefit the community? To explore this further, the research community was invited to participate in a free, half-day, open working session, conducted by the author and kindly sponsored by SocialCom[3] 2013.

Goals

The broad, stated goal of the workshop was to advance the collective interests of the SC research community. Specific related goals were to:

- Coalesce as an international group of academic, industry, and government contributors representing relevant theoretical disciplines and application domains.

- Explore and organize the conceptual space.

- Build on prior work in defining a research agenda.

- Understand community challenges and suggest amelioration strategies.

- Commit to concrete next steps.

Presentations were used to seed a variety of collaborative activities in service of these goals. These presentations, activities, and their outcomes are described below.

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[2] Michelucci, P. (2013), Synthesis and taxonomy of human computation. In: Michelucci P. (ed), Handbook of Human Computation. New York: Springer.

[3] Online: http://www.asesite.org/conferences/socialcom/2013/

Participants

Participants included registered SocialCom attendees as well as individuals joining only for the workshop. The number of workshop participants grew from 19 at the start to about 25 after the break, which included nearly all conference attendees. There was diversity and broad representation across sectors, locales, and disciplines as indicated in Table 1.

Sectors	Countries of Origin	Home Disciplines / Related Interests
Academia Private Industry Public / Federal	Australia Canada Ecuador Egypt Saudi Arabia USA	Computational Finance, Computational Economics, Computational Social Science, Computer Science, Computer Networks, Database Security, Development Economics, Information Security Management, Mathematics, Philosophy, Privacy, Physics, Network Theory, Social Network Analysis

Table 1: Workshop representation across sectors, countries, and disciplines.

A Research Agenda

Part I of the workshop built on the work of the SoCS meeting by exploring the scope of extant and possible Social Computing research and organizing that space of ideas. Thus, the SoCS findings were presented and seeded subsequent ideation by the workshop group.

SoCS Workshop Findings – Keynote Presentation

The topic of disciplinarity is part of an ongoing conversation in the community[4]. For this reason Prof. Kevin Crowston was invited to present on findings from the recent NSF SoCS[5] PI and Community meeting that convened to discuss a research agenda for SC. Dr. Crowston began by characterize the scope and dimensionality of SC, enumerating various aspects such as relationship arity (e.g., one-to-many), the modality and richness of interactions, the anonymity of participants,

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[4] See Michelucci, P. (2013), Human computation: a manifesto. In: Michelucci P. (ed), Handbook of Human Computation. New York: Springer.

[5] Online: http://www.nsf.gov/pubs/2010/nsf10600/nsf10600.htm

stakeholder configurations, and manifestation locus (i.e. online vs real world). Dr. Crowston went on to describe past, present, and potential future funding opportunities for SC research at NSF; he also discussed the recent PCAST recommendation[6] for an interagency initiative in Social Computing and some of the related efforts of the NITRD SEW sub-committee he chairs.

With this backdrop, Dr. Crowston enumerated several key research directions and challenges identified at the SoCS meeting. These are listed below with sub-areas:

- A science of human computation to support system design

- The emergence of computation social science

    - Better models of social structure

    - Connecting available data to social science problems

- Effects on society, e.g., of new kinds of work, ability to solve societal problems

- Lack of shared infrastructure for research on social computing platforms

    - Companies own a lot of the data

    - Better tools for system development

Dr. Crowston concluded by describing a forthcoming NSF-sponsored workshop to occur in October of 2013, which could serve, among other things, to continue the discussion of disciplinarity and community challenges for HC and SC.

Exploring the Research Space

Seeded by the ideas from the keynote presentation, the workshop participants individually generated as many research ideas as they could within the allocated time – writing each idea on a separate post-in note. These post-its were then communicated to the rest of the group and collaboratively arranged by similarity on the meeting room walls. As clusters began to form and associated topical areas became evident, we labeled the emergent research areas. Photographs of the resultant idea clusters are presented in Figure 1.

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[6] See Recommendation #2, Online:
http://www.whitehouse.gov/sites/default/files/microsites/ostp/pcast-nitrd2013.pdf
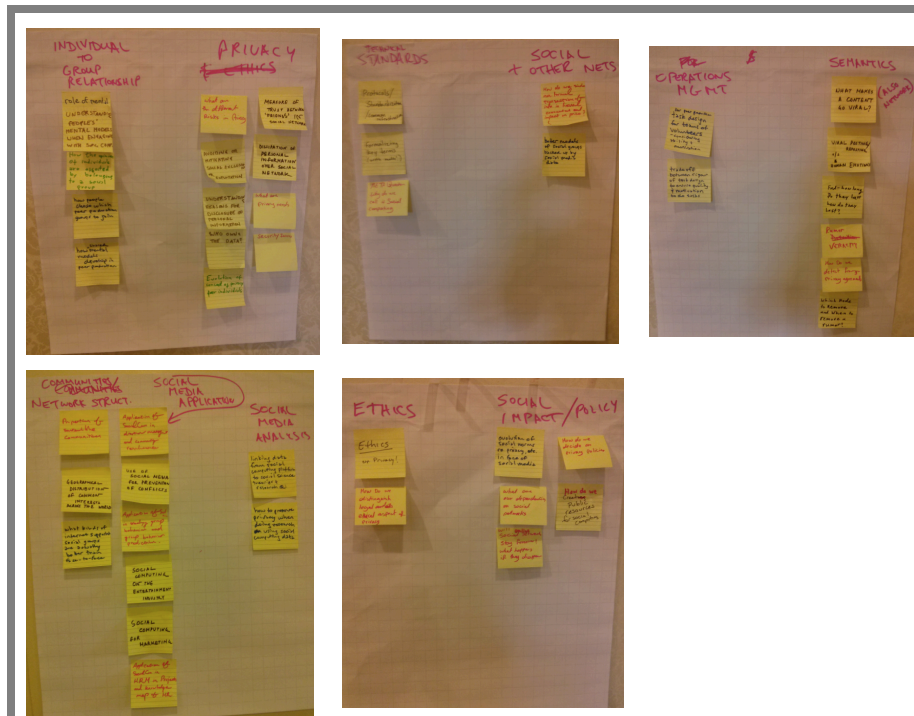
Figure 1: Affinity Map results for SC research areas.

The results from Figure 1 are cataloged for legibility in Table 2.

Emergent Research Area	Raw ideas
Individual to Group Relationship	- Role of mental models (hidden) - Understanding people's mental models when engaging with social computing - How the opinion of individuals are affected by belonging to a social group - How people chose which peer production groups to join - How shared mental models develop in peer production
Privacy	- What are the different risks in privacy - avoiding or mitigating social exclusion or exploitation - Understanding reasons for disclosure of personal information - Who owns the data? - Evolution of concept of privacy for individuals - Measure of trust between "friends" in social network - Dissipation of personal information over social network - What are privacy needs

	- Security issues
Technical Standards	- Protocols/ Standardization/Common infrastructure - Formalizing key terms (with math!) - Meta question: why do we call it social computing?
Social and Other Networks	- How do we [simulate?] non-formal transaction of info in financial communities and impact on price? - Better models of social groups backed up by social media data
Operations Management	- For peer production task design for teams of volunteers - considering ability and motivation - Trade off between rigor of task design to ensure quality and motivation to do tasks
Semantics	- What makes content go viral? - Viral posting/reposting, v/s and human emotions - Fad- how long do they last? How do they last? - Rumor veracity - How do we detect fraudulent privacy agreements - Which node to remove and when to remove a rumor?
Communities / Network Structure	- Properties of sustainable communities - Geographical distribution of common interests across the world - What kinds of internet supported social groups are actually better than face-to-face?
Social Media Application	- Application of Social com in disaster management and community resilience - Use of social media for prevention of conflicts - Application of social computing in studying group behavior and prediction - Social computing on the entertainment industry - Social computing for marketing - Application of social com in HRM in projects and knowledge map of HR
Social Media Analysis	- Linking data from social computing platform to social science theories and research Qs - How to preserve privacy when doing research using social computing data
Ethics	- Ethics! (esp. privacy) - How do we distinguish legal and ethical aspects of privacy?
Social Impact / Policy	- Evolution of social norms re: privacy, etc. in face of social media - What are our dependencies on social networks - Will online social networks stay forever? What happens if they disappear - How do we decide on privacy policies? - How do we create public resources for social computing?

Table 2: Affinity Map results: listing of research ideas and resultant topical areas

An Emerging Discipline

Part II of the workshop considered the disciplinarity of HC and relevant community challenges.

Social Computing as a Discipline - Presentation

The author seeded the activities to follow by presenting findings from a framework-based evaluation of HC as a discipline[4] (in this characterization, SC is considered a subset of HC). This framework[7] is based on a model of the characteristics of a scientific community: a focus of study, a world view or paradigm, a set of reference disciplines from which the new discipline emerged but is distinct, unique principles, an active research agenda, societal constructs such as educational activities and promotion of professionalism. This analysis suggests that HC has some but not all of these characteristics of a discipline, and in particular seems to lack some of the societal constructs.

Defining Key Challenges

In this workshop activity, participants took three minutes to generate key challenges facing the HC community – one per notecard. These notecards were collected and shuffled. Table 3 includes a partial, unordered listing of the community challenges recorded on the notecards.

Partial list of community challenges generated by workshop participants
ambiguity of discipline - anybody can be a part of it
limited funds for research with emphasis on economics
individuals are separated and scattered
find common interest or groups of people with same interest
how to sensibilize, inform the population (non-specialized audience) about social computing
(processing) understanding different contexts of human behavior

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[7] Keen, P. (1980). MIS Research: reference disciplines and cumulative tradition. In: Proceedings of the First International Conference on Information Systems, Philadelphia, Pennsylvania, pp. 9-18.

creating cohesive computation
efficient processing of data
the impact of autonomy of humans in systems - predictability / repeatability
bring people together to fight a local issue
make SC relevant to *both* practitioners and theorists
collaboration in research
publishing in high-quality journals
evolving from an interdisciplinary area to a discipline (career-wise?) is difficult, especially for jr. researchers
secure broader institutional support (funding, etc.)
identify benchmarks of progress
lack of available funding
general problem of multidisciplinarity, e.g., what publication outlets "count"?

Table 3: Seed ideas for community challenges

After transcribing ideas to notecards, participants self-organized into small groups. Three notecards were randomly distributed to each group, which was then tasked with developing a rough concept, seeded by the notecard ideas, to present back to the group. The resultant concepts are presented in Table 4.

Six key community challenges

Societal impact
Determine value of and rationale for establishing new discipline, and avoid fragmentation
Define research agenda with impact
Use big data tools to build a system that allows laymen to build HC mechanisms (like ReCaptcha); in other words, how to crowdsource mechanism design
Multidisciplinary field with yet undiscovered members / contributors; multidisciplinary research is hard
How do we sell this - what is the added value of this discipline

Table 4: Community challenge concepts resulting from brainstorming exercise

Next Steps

The preceding exercise concerning the identification of community challenges helped inform a follow-on activity to determine next steps for the community at large. In this activity, participants were asked to consider what activities the community should begin to engage in, what is the community doing that might be detrimental and should perhaps be stopped, and what is the community doing right that should be continued. These answers were recorded silently and individually by participants and then verbally shared with the group to fill out three corresponding bins, labeled "start", "stop", and "continue". The result of this exercise is provided in Table 5.

Start	Stop	Continue
SC section in top journals (e.g., CSCW)	field evolving - don't exclude by putting stakes in the ground	open access; show statistics
posture as sub-discipline	stop using discipline-specific language (standardize); yes, but editorial job to define things explicitly (can't change a culture)	academic crowd funding
magazine issue to attract journalists as companion to regular issues	stop spawning new "fields" that overlap existing	publish!
podcasts		communicate!
co-opt historical examples to show longstanding use of HC		network
funding channels - e.g., challenges; lobbying		endorsement
attract attention e.g., documentary		conferences
ethics/privacy committee		
bibliography to make finding research across disciplines easy		

research framework to bring people together - builds cohesion		

Table 5: List of activities the community should start, stop, or continue

Commitments

With a broad sense of direction for the community following from the preceding activity, workshop attendees were then invited to make a personal commitment to execute some action related to their workshop findings. In some cases, individuals made multiple commitments. Table 6 lists firm commitments made by participants (though attribution was recorded, it is not published herein).

What	When
Look to other disciplines	Now
Submit paper to HC journal	First issue
Hyperlink to journal	Tonight
Update Wikipedia page	Done
Summarize affinity map	Tonight
Look for SC applicability to field of developmental economics	Soon!
Pursue workshop idea	Paper to SocialCom 2014
SC analysys -> improve privacy	Master thesis: 2013
Facebook page for HC/SC	Tonight
Research interdisciplinary community -> paper	Within 3 months
Research proposal: semantics of social computation	This fall
New paper	Within 2 months
Publicize new journal on blog	Monday
Submit proposal on HC & finance to NSF	Fall 2013
Blog about this workshop	Friday

Architecture for HC – write conf. paper	Submit in 2013
Summarize workshop	End of October

Table 6: List of personal commitments made by workshop attendees.

Conclusion

Workshop participants brought forward a variety of ideas and perspectives, though not always in agreement with each other. Nonetheless, there was substantial concurrence about the organization of the research space and community challenges. The majority of participants sought disciplinary advancement for HC (and SC), primarily in terms of funding and societal constructs, though one or two voiced caution about adding "yet another field". In general, there seemed to be an expressed desire for greater clarity and agreement about the scope of Social Computing and formal mechanisms for its pursuit that transcend other disciplines.

Acknowledgments