Collective Creativity through a Micro-Tasks Crowdsourcing Approach

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Abstract
Research and commerce activity has been expanding the potential of micro-task markets. Initially used for simple, disconnected tasks, they have now been able to achieve impressive results in creative domains such as writing and design. The goals for this research are to further explore the possibilities of micro-task markets for performing creative work by defining a set of tasks and processes for such a synergistic creative collaboration, as well as expanding this micro-task approach beyond traditional markets such as Mechanical Turk to skilled and motivated communities.

Author Keywords
Creativity; crowdsourcing; CSCW.

ACM Classification Keywords
H.5.3. Group and Organization Interfaces: Computer-supported cooperative work;

Introduction
By using 100's to 100's of thousands of volunteers, crowdsourcing has accomplished a wide range of tasks that could not otherwise be done by a single human or computer. Among these approaches, one that has stood out for its cheap and fast results is the use of micro-task markets, such as Amazon's Mechanical Turk [9]. The logic behind this approach is to use humans to

perform small tasks that can be easily done by humans (e.g. transcribing audio), but cannot easily or accurately be done by computers. Those who perform the tasks are usually compensated with very small financial rewards (around US$0,03 [10]). Though the quality of the crowd's work has been a research focus [5,10], achieving good results in tasks such as science journalism, there is also promising potential in examining the crowd's creativity [3,8,13], that is, their potential to generate novel and useful output [12].

One way of achieving creative output from a crowd is through innovation contests, such as those hosted by InnoCentive (www.innocentive.com). This method, however, may not make full use of the potential benefits of synergy [4], as it employs individuals or small groups who do not collaborate with each other, even though it could be useful to do so. Expanding the boundaries between individuals or small teams to a crowd may eliminate some biases and open people to new ideas and approaches [11]. Some contests, therefore, allow teams to exchange information, resulting in situations such as the one seen in the Netflix challenge, where the winning team was the result of a merger between two competing teams late in the process [7].

The issue is that even when online communities of innovators collaborate, they commonly use discussion forums or similar tools as their communication medium, which may not be ideal in a larger scale. I have investigated current practices of collaboration in open source software communities, identifying issues in the tools used by them on their creative processes. Even though communities showed good domain knowledge, they displayed process issues such as little development of alternatives to an initial idea, lack of consensus, or difficulty for new participants in the discussion to contribute due to the length of the previous discussions. This work has been submitted for publication at another conference.

I see, therefore, potential for micro-task market approaches to overcome some of these issues by breaking the collaboration into smaller, simpler tasks that are intelligently assigned to the crowd. Yu and Nickerson demonstrated the potential of such an approach. They used crowdsourcing to generate designs of chairs by applying a form of human-based genetic algorithm, where the crowd both generates, evaluates and combines ideas [14]. They found later designs rated significantly more creative than earlier ones. Similarly, this research seeks to use a micro-tasks approach for enabling a creative, synergistic collaboration at a larger scale than previously possible.

The strategy is to first explore how creativity research can guide a micro-task based collaborative process in a way that fosters creativity by maximizing the synergy of ideas while avoiding bottlenecks such as groupthink within a regular market such as Amazon's Mechanical Turk. However, since there are limitations to what a micro-task user base can achieve [10], and since domain knowledge and motivation are essential aspects for creativity [1], I also plan to evaluate how this approach fares in skilled and motivated communities. The goal is to understand the effects of their skills and motivation on the micro-tasks workflow, and adapt this approach into a useful tool for such large communities to collaborate.

This research, therefore, asks two questions:

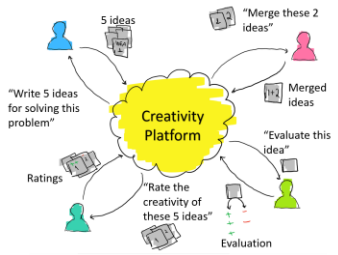

Figure 1: the platform will interact with the crowd by intelligently delegating tasks, such as generating or evaluating ideas, to each individual worker. Four tasks are represented in this image: "Write five ideas" (top left), "Merge two ideas" (top right), "Rate the creativity of five ideas" (bottom left), and "Evaluate one idea" (bottom right).

1. How can we guide a micro-task crowdsourcing process to elicit synergistic creative results?
2. How can we adapt this process to maximize its impact on a specialized and motivated community (e.g. open source communities)?

Approach

Building on Kittur's CrowdForge [10], I am developing a platform that mediates the creative process of crowds. Similarly to Yu and Nickerson's work [14], this platform uses the crowd to generate, evaluate, and combine ideas. Figure 1 shows some possible ways in which the platform can mediate the interaction between workers.

This research will expand on current approaches in two significant ways. The first is that it will define a set of tasks and processes necessary for creative work to be accomplished through a micro-tasks platform, in accordance to best practices seen in creativity research. Besides those used in the aforementioned research, such as generate or evaluate ideas, another more advanced example of a possible task could be to draw analogies from ideas, which is deemed as a very useful technique in the creative process [6].

The second way in which this research advances the field, is by adapting this platform to communities who are skilled and motivated in specific domains, in contrast to the "unknown" crowd used in traditional micro-task markets. One such community is those involved in open source software. This approach is particularly relevant to them since many tasks are too interconnected/interdependent to be efficiently broken down and effectively performed by micro-task workers [10]. More importantly, however, is that domain-knowledge and intrinsic motivation, rather than extrinsic motivation, play positive parts on creativity [1,2]. This means that a skilled user base that is interested in the domain will likely yield more creative results than one that is after financial rewards only.

Work in Progress

Phase 1: Guiding creativity in micro-task markets
In this phase I replicate current approaches and extend them by defining a set of tasks and processes that are necessary for the creative process. The goal is to be able to elicit more creative responses from a micro-task market user base in tasks that do not involve deep domain knowledge. Evaluation will be done through Amabile's Consensual Assessment Technique [1].

Phase 2: Evaluating the system in skilled communities
This platform will then be evaluated within communities who are skilled and motivated in a specific domain (e.g. open source communities). To be of practical use to them, this approach must be more effective than their current collaboration methods. Therefore, in this phase, I will compare this platform to common collaboration methods used within these communities, such as online forums. The outcome will be highlight the affordances in each approach that foster or hinder creativity.

Phase 3: Improvement and evaluation
Results from phase 2 will be applied to adapt and evaluate this platform for skilled communities. The outcome should be a platform that can enable creative collaborations at a large scale.

I am currently developing phase 1. I plan on having completed my comprehensive exams by the time of the CSCW conference, and to be working on my

dissertation proposal—a perfect time to integrate the feedback I expect to get from this doctoral colloquium.

Conclusion

By participating in this CSCW's doctoral colloquium, I hope to identify gaps in my thinking and approach, as well as to gain insight on how to resolve them. More importantly, I believe the CSCW community will be especially useful on guiding me to current research and best practices that are related to creativity and crowdsourcing techniques.

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