

A Brief Perspective on Microtask Crowdsourcing Workflows for Interface Design

Mengyao Zhao and André van der Hoek

Department of Informatics
University of California, Irvine
Irvine, CA, USA
{mengyao.zhao, andre}@uci.edu

Abstract—User interface design, as a crucial part of software design, is complex. Current microtask crowdsourcing workflows do not support its complexity well. The difficulty particularly relates to the process to decompose an interface design task into microtasks. In order to make microtask crowdsourcing more supportive for interface design, we need a workflow that can help task owners to break down interface design tasks more easily. This paper briefly describes three experiments that help inform various aspects of workflow design for interface design through microtask crowdsourcing.

Index Terms—Crowdsourcing, complex work, interface design.

I. INTRODUCTION

Microtask crowdsourcing has succeeded in problem solving and business production in a variety of domains [1]. By decomposing an overall task to be completed into microtasks of small granularity, and assigning these microtasks to a distributed crowd of workers, microtask crowdsourcing helps people to produce work in less time and with less money spent. For instance, Amazon Mechanical Turk¹, a marketplace for microtasks, helps people accomplish a variety of tasks with workers from all around the world in a less amount of time and cost compared to normal ways.

Besides using microtask crowdsourcing to recruit human labor to work on small tasks, there is a growing interest in applying it to more complex tasks [2][3][4][5]. Complex tasks are characterized in two ways: (1) intellectually, they require reasoning and non-repetitive creativity and (2) organizationally, they require multiple people working in multiple roles with interdependencies among the microtasks they perform. As a result, the typical “simple” and uniform workflows that dominate microtask crowdsourcing do not apply. It is impossible to break down complex work in identical microtasks to be performed in parallel. Rather, more elaborate and collaborative workflows need to be designed.

In this paper, we are interested in interface design, a key component of a software design project. Current microtask crowdsourcing workflows do not support it well, particularly because interface design is complex. Different parts of interface design are more dynamic, and the boundaries among each design part are unclear because of dependencies among design choices in different parts of the interface. For example, a

small decision change on layout design will influence the overall information architecture design, and then design decisions on other correlating parts need to follow.

To date, some research has begun to explore new workflows designed specifically for complex work. For example, flash teams [6] enable complex work on crowd-level by simulating the structures of traditional organizations, such as growing and shrinking teams to meet task demands, or pipelining in-progress work to down-stream tasks in order to accelerate completion time. Level-up [7] is a tool that enables in-tool training and learning of Photoshop skills, and therefore helps workers to accomplish complex creative work with a higher quality through Photoshop. However, despite such progress, several challenges still remain, particularly for interface design. In this paper, we detail these challenges, and outline three experiments informing various aspects of new workflow design.

II. CHALLENGES

A. Task unpredictability

In microtask crowdsourcing, microtasks are designed and planned by task owners beforehand. However, there are two reasons why it is difficult for task owners to envision and create microtasks for interface design tasks. First, the process of interface design is unpredictable. Different designers typically take different approaches to the same design problem. For example, some designers prefer to create an interface from scratch. They brainstorm design solutions to the specific design problems and craft their design ideas. Others may prefer modifying existing examples and templates. They analyze the design problems, look for similar cases, look at their solutions, and modify available resources into their unique solutions. Second, the results of interface design are unpredictable. A high quality interface design often reflects novel ideas from creative designers, ideas that in many cases are beyond the customers’ expectations. Thus instead of asking task owners to decide the design solutions and break them down into microtasks beforehand, a better workflow should support interface design task design with consideration of above unpredictability.

B. Workflow flexibility and design consistency

In microtask crowdsourcing, the designed workflows and microtasks are usually fixed. Crowd workers execute their task

¹ <https://www.mturk.com/mturk/welcome>

assignments following the owners' requirements. But for interface design, a restricted workflow may block the potential creativity from crowd workers. For example, designers need to ask for design critiques and look at alternative design solutions midway to inspire them with more ideas. So in microtask crowdsourcing we need to respect the need of a flexible workflow for designers to create designs. However, as a crucial component of software user experience, interface design needs consistency. For example, a good interface design should have one unified color scheme and one integrated interaction logics. So if a large number of distributed designers working through an over-loose workflow, it is hard to ensure design consistency. Thus in microtask crowdsourcing we need a workflow that can provide an elastic creation process, and at the same time, should guarantee consistency across all design parts.

C. Design iterations

Current microtask crowdsourcing workflows usually are linear. It involves the process of sending out microtasks by task owners and receiving results from crowd workers. Meanwhile the large number of workers makes it hard to target the worker of a specific microtask. These characteristics make microtask crowdsourcing a less effective workflow for interface design in two ways. First, interface design requires iterations. For example, it happens a lot that designers restructure their interfaces according to design feedback, work in the original source files, and export new mockups. Second, it is important for interface design to keep source files that indicate design elements, parameters, etc. because without proper documentations, design iteration is impossible. So in microtask crowdsourcing, we need a workflow that helps owners to keep track of design files, and supports designers to iterate on designs.

III. THREE WORKFLOW DESIGN EXPERIMENTS

In order to shed light on potential workflows that could overcome the challenges we discussed, we outline three experiments informing various aspects of a potential workflow.

A. Decomposition by task owners versus by task workers

This experiment will compare two workflows that both decompose the same interface design task. One workflow, as the normal microtask crowdsourcing workflow, allows the task owner to decompose a task into microtasks, and to assign microtasks to a crowd of designers. The new workflow allows potential designers to analyze the project goal together with the task owner, to break down the whole task into smaller parts, and to join parts that they want to work on. We will compare the quality of designs resulting from two workflows. The result of this study is supposed to implicate whether designing and distributing microtasks with potential workers' opinions could bring: (1) a more productive creation process and (2) higher design quality.

B. Balancing flexibility and consistency

This study will compare a normal workflow with a workflow that helps crowd designers to broadcast their work, as different parts of the design they are all working on. The

normal crowdsourcing workflow allows the task owner to present to the crowd and critique the collective final design after everyone finishes his or her own part, and then ask designers to go back and revise their own parts. The new workflow helps to inform designers about outputs from other parts at a higher frequency before they see the overall final result. For example, the new workflow asks designers to share and critique each other's work twice during the time they keep working on their own parts. After two rounds of communications, the task owner will present the collective final design to the crowd and give feedback as normal. Then the task owner will ask designers to go back to revise. The result of this study is supposed to verify whether having crowd designers to communicate earlier and more could bring: (1) a more creative design because they can be inspired by others' outputs and (2) a more consistent design because meanwhile they are informed about what is going on with other parts of the work.

C. Revising own tasks versus revising others' tasks

This study will compare two workflows that allow designers to iterate on designs. One workflow, as the normal crowdsourcing workflow, allows designers to iterate on their own parts after one round of design review from the task owner. The new workflow allows the task owner to collect and redistribute design source files from the first round. A different part from the previous round will be assigned to designers to revise based on the design reviews. We will compare the quality of designs resulting from two workflows. The result of this study is supposed to provide insights into: (1) whether we can accelerate design iteration process through microtask crowdsourcing by collecting and redistributing source files among crowd designers and (2) whether it is effective to revise designs through microtask crowdsourcing without necessarily mapping designs to their original designers.

REFERENCES

- [1] J. Howe, "The rise of crowdsourcing," *Wired*, 14(6), 2006, pp. 1-4.
- [2] A. Kittur, "Crowdsourcing, collaboration and creativity," *ACM Crossroads*, 17(2), 2010, pp. 22-26.
- [3] A. Kittur, J. Nickerson, M. Bernstein, E. Gerber, A. Shaw, J. Zimmerman, M. Lease, and J. Horton, "The future of crowd work," *Conference on Computer Supported Cooperative Work*, 2013, pp. 1301-1318.
- [4] L. Yu, J. V. Nickerson, and Y. Sakamoto, "Collective Creativity: Where we are and where we might go," *Collective Intelligence Conference*, 2012.
- [5] M. Klein and C. Gregorio, "An embarrassment of riches," *Communications of the ACM*, 57(11), 2014, pp. 40-42.
- [6] D. Retelny, S. Robaszkiewicz, A. To, W. S. Lasecki, J. Patel, N. Rahmati, and M. Bernstein, "Expert crowdsourcing with flash teams," *Symposium on User Interface Software and Technology*, 2014, pp. 75-85.
- [7] M. Dontcheva, R. R. Morris, J. R. Brandt, and E. M. Gerber, "Combining crowdsourcing and learning to improve engagement and performance," *Conference on Human Factors in Computing Systems*, 2014, pp. 3379-3388.