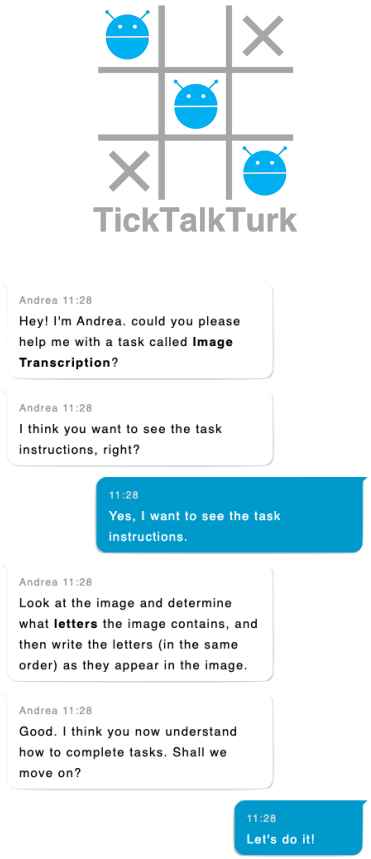

TickTalkTurk: Conversational Crowdsourcing Made Easy

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ABSTRACT

This demo presents TickTalkTurk, a tool that can assist task requesters in quickly deploying crowdsourcing tasks in a customizable conversational worker interface. The conversational worker interface can convey task instructions, deploy microtasks, and gather worker input in a dialogue-based workflow. The interface is implemented as a Web-based application, which makes it compatible with popular crowdsourcing platforms. The tool we developed is demonstrated through two microtask crowdsourcing examples with different task types. Results reveal that our conversational worker interface is capable of better engaging workers and analyzing workers performance.

CCS CONCEPTS

• **Information systems** → **Chat**; **Crowdsourcing**; • **Human-centered computing** → **Empirical studies in HCI**.

CSCW'20 Companion, October 17–21, 2020, Virtual Event, USA

ACM ISBN 978-1-4503-8059-1/20/10.
https://doi.org/10.1145/3406865.3418572

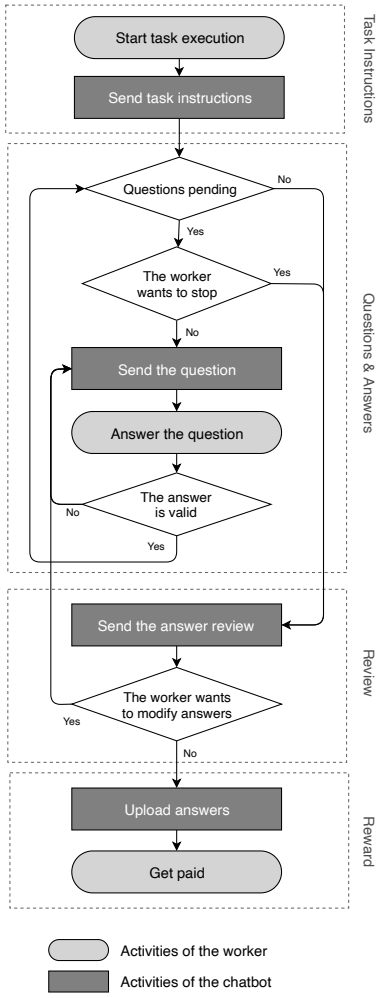


Figure 1: The workflow of the conversational agent for microtask crowdsourcing.

KEYWORDS

Conversational interface; chatbot; conversational agent; microtask crowdsourcing.

ACM Reference Format:
Sihang Qiu, Ujwal Gadiraju, and Alessandro Bozzon. 2020. TickTalkTurk: Conversational Crowdsourcing Made Easy. In *Companion Publication of the 2020 Conference on Computer Supported Cooperative Work and Social Computing (CSCW'20 Companion), October 17–21, 2020, Virtual Event, USA.* ACM, New York, NY, USA, 5 pages. https://doi.org/10.1145/3406865.3418572

INTRODUCTION

Advances in microtask crowdsourcing have enabled the possibility of accomplishing complex tasks by relying on crowd workers. Tasks such as image annotation, sentiment analysis, and speech transcription can be easily accomplished on the online crowdsourcing marketplaces. During this process, the crowdsourcing platform is responsible for worker selection, microtask generation, microtask assignment and answer aggregation, while online workers interact with a crowdsourcing system to accept and execute a microtask using a *worker interface*.

A notable feature of the interaction between crowdsourcing platforms and workers in the majority of prior work, is the use of traditional web-based GUIs to communicate with workers, transmit instructions and gather responses thereafter. In our recently introduced notion of *conversational microtask crowdsourcing*, a conversational agent interfaces online workers with the crowdsourcing platform, facilitating task execution and task completion [1, 4].

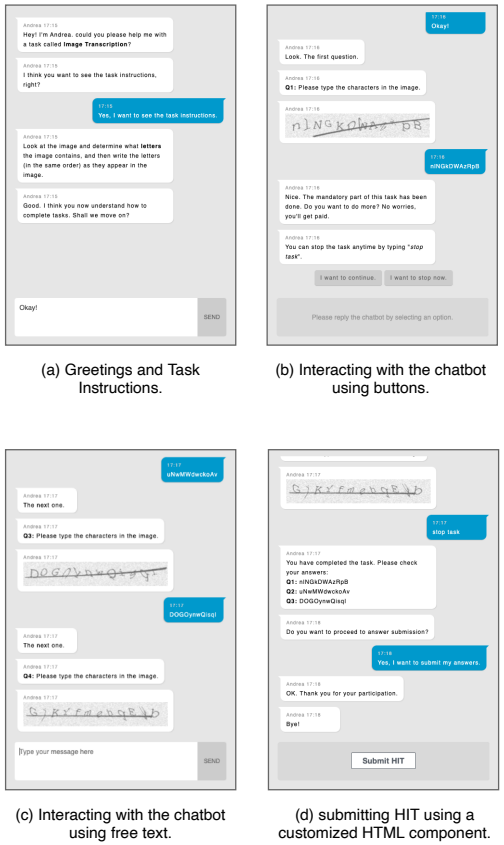
In this demo, we presents a tool for quickly deploying crowdsourcing tasks in a customizable conversational interface, named TickTalkTurk. We will first introduce the logic and workflow of the conversational agent, and then explain the design of the worker interface. We finally use two use cases to highlight the utility of the conversational interface.

This demo is presented for the system described in our previous work [3]. The code is available online for the benefit of the community (https://github.com/qiusihang/ticktalkturk).

CONVERSATIONAL AGENT DESIGN

The traditional web-based user interface of a crowdsourcing task typically comprises of two main parts: task instructions and microtasks. Workers are asked to first read instructions and then execute microtasks accordingly. To realize interaction comparable to web-based interfaces, a text-based conversational agent is designed following four main steps: i) task instructions, ii) questions and answers, iii) review, and iv) reward, as shown in Figure 1.

Task instructions. Simulating the essence of natural conversation, the conversational agent begins the conversation with greetings, and then presents task instructions (optional), as can be seen in Figure



(a) Greetings and Task Instructions.

(b) Interacting with the chatbot using buttons.

(c) Interacting with the chatbot using free text.

(d) submitting HIT using a customized HTML component.

Figure 2: Two interaction types of the conversational interface.

2 (a), via a dialogue with the workers. The goal of this step is to let workers familiarize themselves with the conversational agent and help them understand how to complete the microtasks.

Questions & Answers. The conversational agent asks questions (each question corresponds to a microtask) to workers, and workers can provide responses to microtasks by either typing answers or using customized UI elements (such as buttons).

Review. On the traditional web interface, a worker can easily go back to a question and edit its answer. To realize this affordance in the conversational interface, workers are provided with the opportunity to edit their answers if needed (by typing "edit answer" to enable the answer modification), before submitting the microtasks.

Reward. After reviewing the answers, workers enter the final stage where they can submit their answers and claim their rewards.

TEXT-BASED CONVERSATIONAL INTERFACE

Popular crowdsourcing platforms (such as Amazon Mechanical Turk and Appen) offer web interfaces based on standard technology like HTML, CSS and Javascript. To avoid the need for installing a messaging application – for instance, Telegram, or Whatsapp, where conversational agents are usually deployed, we designed and implemented the conversational interface in HTML/CSS/Javascript, thus enabling easy integration with existing platforms and access to the available crowd workers.

The conversational interface supports any data source that is supported by HTML5, including text, image, audio, and video. Therefore, most common task types such image classification, sentiment analysis, information finding, object recognition, and speech transcription can all be implemented. Our design provides workers with two default means to answer microtasks, as shown in Figure 2 (b) and (c). Workers can either type in the textarea or click a button to send their responses. Furthermore, for some tasks that need special functions, UI elements from traditional web pages (e.g. customized buttons, slide bars, drawing tools, etc.) can also be easily ported into conversational interfaces, as shown in Figure 2 (d). In addition, the conversational interface can record all the activities of the worker (including all keypress events with timestamps) for further analysis if needed.

DEMO HIGHLIGHTS

Improving User Engagement

We deployed batches of different types of crowdsourcing tasks – information finding, sentiment analysis, CAPTCHA recognition, and image classification tasks – on the traditional web interface and three conversational interfaces having different conversational styles (i.e. the agent converses with the worker in different styles).

We conducted experiments to investigate the effect of conversational interfaces on the output quality, compared to the traditional web interfaces. We used two means – worker retention in the batches of microtasks (the number of completed microtasks) and self-reported scores on the short-form user engagement scale [2] – to measure worker engagement. We used the NASA-TLX instrument (https://humansystems.arc.nasa.gov/groups/TLX/) to measure cognitive load after workers complete the tasks.

We found that the workers using conversational interfaces were generally better retained than the Web workers (workers using conversational interfaces completed significantly more microtasks compared to the traditional web interface). We found that a suitable conversational style has the potential to engage workers further in specific task types. Our work takes crucial strides towards furthering the understanding of conversational interfaces for microtasking, revealing insights into the role of conversational styles across a variety of tasks [4].

Analyzing Conversational Styles and Workers Performance

To estimate and analyze workers' conversational styles, we designed a coding scheme inspired by previous work [5, 6] and corresponding to conversational styles based on the five dimensions of linguistic devices that have been examined.

We recruited 180 unique online crowd workers from Amazon Mechanical Turk and conducted experiments to investigate the feasibility of conversational style estimation and worker performance analysis (output quality, worker engagement, and perceived task load) for online crowdsourcing .

Our experimental findings revealed that workers with specific conversational styles have significantly higher output quality, higher user engagement and less cognitive task load while they are completing a difficult task, and have less task execution time in general. The findings have important implications on worker performance prediction and quality-aware task scheduling in microtask crowdsourcing [3].

Summary: The conversational interface used in TickTalkTurk is purely HTML based, elements used in traditional web interfaces can be easily ported into conversational interfaces. With TickTalkTurk, the overheads of designing and implementing conversational interfaces can be easily reduced. Task requesters can quickly deploy and publish their tasks on popular crowdsourcing platforms, to obtain not only high-quality outcomes but also an increase in worker engagement and a better understanding of worker performance.

ACKNOWLEDGMENTS

This work was carried out on the Dutch national e-infrastructure with the support of SURF Cooperative.

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