Accessible Online Tasks for Visually Impaired People

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Abstract

Online work opportunities are important for visually impaired people because they can enable people to work irrespective of transportation or medical issues that necessitate them to stay at home. There are approximately 285 million visually impaired people worldwide, and crowdsourcing has emerged as a new initiative to provide them with new work opportunities.

People who could not get jobs under traditional scenarios can find jobs through crowdsourcing and earn money. Under this initiative, a requester provides a task and the crowd workers finish it to earn rewards. These tasks usually do not require communication among workers or employers; the necessary information is contained in the task instructions.

Crowdsourcing can extend the ways in which people work. Online tasks have been proven to be a promising work option for visually impaired people. Unfortunately, most real-world online tasks are designed for sighted people. Additionally, there are limited studies related to designing online tasks for visually impaired people, which focus only on transcription tasks. However, visually impaired people can perform various tasks using screen readers. This thesis focuses on developing better online task designs and extends visualization degrees and operation complexity of online tasks for visually impaired people, especially for screen reader users.

First, a questionnaire was administered to investigate the working conditions and problems encountered by visually impaired people on Japanese and American crowdsourcing platforms. Accordingly, the problems overcame by visually impaired people were determined along with the differences between the visually impaired crowd workers from different countries. Through this survey, we found that there are limited tasks for visually impaired people on crowdsourcing platforms, such as taking surveys and writing articles. We intend to provide tasks with more media types and higher complexity to visually impaired people; for example, web content and tabular tasks, such as entity matching.

Second, we focused on web content tasks. Some online tasks require workers to view web pages with images. Therefore, if visually impaired people want to work on such tasks, they have to rely on the alt text attached to the images on these web pages to complete their online tasks. However, too many alt texts of unrelated images may increase the difficulty of reading. We found that selecting important images and adding relevant alt text on web pages are important for understanding online tasks. To confirm our hypothesis, we conducted an experiment involving 18 sighted participants (simulated visually impaired participants) and 4 visually impaired participants. In our experiment,

we compared three conditions involving (1) no alt text, (2) only important images with alt text, and (3) all images with alt text in online tasks. Workers are often required to view web pages besides the task instruction page to complete tasks, such as shopping and social networking websites. Twelve tasks related to four fake web pages were designed for the experiment. We observed that the situation involving only important images with alt text could facilitate the comprehension of workers, and the worker performance in this condition was better than that in other conditions.

Third, we focused on audio matrix tasks in which audio clips were placed in a tabular format. This thesis explains our approach, provides theoretical background for improving the consistency in a given task, and presents the results of the experiments conducted with visually impaired people; the work quality of the visually impaired crowd workers improved, and their working time reduced when performing online tasks.

Finally, we discussed the strategies to transform the accessible online tasks. We also concluded this thesis and summarized the future work directions. In this thesis, we found the possible solutions for reducing the working time and improving the performance of visually impaired crowd workers. However, we only focused on two types of online tasks. In the future, more types of online tasks can be considered for visually impaired crowd workers. We plan to explore and construct more types of accessible online tasks, reduce the cost and manage audio matrices without axis consistency.