Social Accessibility: The Challenge of Improving Web Accessibility through Collaboration

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ABSTRACT
There are billions of people who face problems in accessing webpages, including people with disabilities, elderly people, and illiterate people in developing countries. The needs for accessible webpages have become too broad to be left only to Web developers. The wisdom of crowds has become part of a key strategy to combine various skills and knowledge into a community that can address the needs for accessibility. Social Accessibility is one such project for visually impaired people, which has been operating for more than a year, producing findings and new challenges. Based on our experiences, the collaborative approach can work well and be expanded for people with other problems such as poor hearing, aged eyes, and reading problems.

Categories and Subject Descriptors
K.4.2 [**Social Issues**]: Assistive technologies for persons with disabilities; H.3.5 [**Information Storage and retrieval**]: Online Information Services

General Terms
Design, Human Factors.

Keywords
Web, accessibility, crowd sourcing, social computing.

1. INTRODUCTION
One out of every four people use the Internet [1] and the number of users is increasing rapidly. We gain many benefit from Web access in daily activities, but there are billions of people who face problems in accessing webpages because Web accessibility considerations have been ignored. This includes people with disabilities, aging people, and illiterate people and their needs for accessibility are too broad to be left only to Web developers. The "wisdom of crowds" can help address broad accessibility problems. There can be collaborations among disabled users, developers, site-owners, and anyone else with a passion for accessibility and computing technologies.

Social Accessibility [3] is a collaborative project for visually impaired users involving user feedback and the power of volunteers with advanced external metadata technologies such as easy-to-use authoring tools and an open database scheme. There have been several studies on such collaborative approaches. ALT-server [2] was the earliest proposal for collaborative labeling of images in 1997. WebInsight [3] combines social approaches with automatic optical character recognition to make appropriate alternative texts for images. These efforts can be generalized into an approach to collaboratively address various problems for billions of users. There are still big challenges to adapt such approaches for various types of users and to encourage active collaboration. In this paper, future directions for collaborative accessibility improvement are discussed based on our experiences. This may be useful not only for our project but also for other projects that aim to improve accessibility through collaboration.

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2. SOCIAL ACCESSIBILITY
Social Accessibility seeks to improve Web accessibility. Figure 1 shows a typical Social Accessibility interaction. The visually impaired users can report whenever they are facing problems on webpages and then the volunteers can fix the problems by authoring external metadata based on a standard metadata specification [4]. The external metadata allows them to fix problems on webpages without asking the site-owners to modify the content. Also, the specification allows other research programs to join in and add their efforts into the collaborations.

We have run the pilot project for one and half years, and have already published a paper about our experiences [5]. Before starting the project, we believed that encouraging the activities of the supporters might be the most important challenge for the project. Contrary to our expectations, the supporters worked much more effectively, while the target users worked less actively. The results show that almost half of the requests were resolved within 24 hours and volunteers seemed to understand the basic rules for Web accessibility. However, the users found it more difficult than we had expected to make requests. The main reason seems to be that many users are not fully aware of the accessibility problems they are facing. This was revealed in our seminar-style discussions with about 30 blind computer users. Another awareness problem involves the major screen readers that silently skip certain objects, such as unlinked images without alternative texts or Flash movies with the opaque setting. In such cases the users are quite unaware of the objects regardless of their importance. In addition, such problems often appear repeatedly on a website that uses pages with a similar layout. For example, if an article does not have a heading tag, then all pages with a similar layout may lack heading tags. As a result, many users feel uncertain about when to submit requests. This phenomenon is consistent with the results reported by Mankoff et al. [6] in their investigations on the coverage of the errors detected by blind experts.

2.1 Activating Collaboration

In our process model, the starting point of each collaboration is always a request, and therefore to help blind users it is relatively important to enhance the collaboration activities. In order to encourage active participation by the users beyond the problems they are already aware of, it is important to help the users discover the gaps between the visual and non-visual information. For example, accessibility checking functions for end users may help them be aware of some problems and a Flash-access function can allow them to discover opaque Flash movies. Though these functions are small steps, such computing technologies clearly help increase their awareness. Also, the productivity of the metadata authoring tool was a key success factor for the volunteers. After a new and easier-to-use system was released, their activities increased dramatically. Also, the participants who joined after the new tool became available were much more likely to continue contributing to the service.

We are currently trying to involve site-owners in the collaboration. A new advanced function allows them to integrate the external metadata into their webpages by using a simple one-line script to support site-wide metadata. This will dramatically reduce the cost for fixing Web accessibility rather than fixing all of the documents one by one. In one of our preliminary experiments, a volunteer needed only an hour to fix an existing government agency website with 3,500 accessibility validation errors in 82 pages. This involved creating 142 metadata records. Also, the current system doesn't have functions to manage conflicting work from volunteers. We believe that existing techniques from bug tracking systems and wiki-style encyclopedias can be applied to handle such problems, though first there is much to study much about the lifecycles of metadata.

3. COLLABORATIVE IMPROVEMENT

Collaborative Web accessibility improvement can be used for the problems of visually impaired users, but also for general problems in using webpages. For example, hearing impaired people need captions when they are watching videos and there is a service [7] that allows multiple users to collaborate in making video captions. Visually impaired people also need audio descriptions, so social audio description services can also be helpful for them. There are various types of question-and-answer services based on crowd sourcing. Someone posts a question on such a service, and someone with expertise or experience on the topic can answer the question. There are general patterns of collaborative improvement using the expertise and experience of crowds of people. Figure 1 shows a typical process model of social accessibility, but this could be applied to users with other problems.

Although the problems of billions of users must be viewed broadly, we believe problem awareness is a fundamental element of this collaborative approach. Users have to be aware of their problems and developers, volunteers, and site-owners also have to be aware of the actual problems of the actual users. Some technologies to help users appeared in Section 2.1. Other technologies also have high potential to help. An example is reading order visualization [8] to help volunteers detect a hard-to-discern problem of visually impaired users. This visualization shows the order used by a screen reader for the content. Volunteers can adjust the order using an intuitive user interface. As well as encouraging active participation by people, new research on Web accessibility through collaboration is quite important to expand the coverage and to improve the usability and accessibility. We want to invite researchers interested in these goals to contact us.

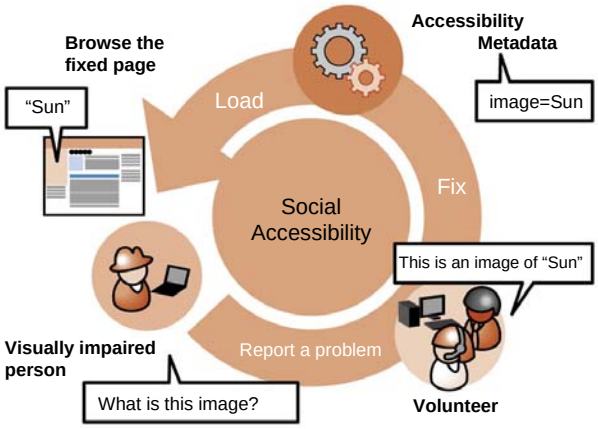

Figure 1. Process of Social Accessibility

4. CONCLUSION

Social Accessibility has revealed challenges for collaborative Web accessibility improvements with visually impaired users and volunteers. There are many kinds of Web services based on crowd sourcing. We hope that these efforts will collectively create new services in the near future to help billions of users who find themselves on the fringes of our information society.

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