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Remote Assistance for Blind Users in Daily Life: A Survey about Be My Eyes

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ABSTRACT

The mobile application *Be My Eyes* connects blind users with sighted volunteers through a video and audio connection. In contrast to previous attempts, *Be My Eyes* has a large number of blind and sighted users. In this paper we report from a survey among 30 blind Be My Eyes users to guide future work in this domain. We describe for which situations blind users find *Be My Eyes* useful and which are challenging. Furthermore, we identify users' concerns and areas for improvements. Finally, we derive directions for future work.

CCS Concepts

•Human-centered computing → Accessibility systems and tools;

Keywords

Visual impairment; remote assistance; mobile interaction

1. INTRODUCTION AND BACKGROUND

People with visual impairments face a large number of challenges that today cannot be addressed by assistive technology alone [7, 3]. Bigham et al. [1] argue that intelligent technology can be made more useful in everyday life by involving human assistance. A number of attempts have been made to connect blind people with remote assistance from sighted persons. *VizWiz* [2], for example, is an audio-based mobile app that provides blind people with descriptions of photographs they took with their smartphone. Multiple workers are recruited for a small amounts of money to answer questions in a short amount of time. Similarly, the mobile apps *Camfind* and *Taptapsee* [4] provide help using both, human operators and matching images to an existing database. *Crowdviz* [5] directly connects visually impaired users with paid and trained sighted persons through a smartphone-based video and audio connection. Recently, the conceptually similar iPhone application *Be My Eyes* became available [1].

Be My Eyes connects blind persons with untrained volunteers through a free of charge service. According to the developers, *Be My Eyes* had almost 25,000 blind and over 300,000 sighted users in December 2015. We believe that blind users' benefits, the challenges they experience, and the services' current limitations can provide important insights for the development of future accessibility tools. Therefore, we conducted a survey among visually impaired users of *Be my Eyes*. In this paper, we provide insights about how the service is used and perceived by visually impaired users aiming to gain a deeper understanding about remote assistance systems. In the following, we first describe the design of the survey and the collected results. Finally, we discuss the findings and conclude with design recommendations for using members of social networks as human assistants to help visually impaired people in solving daily tasks.

2. DESIGN OF THE SURVEY

We conducted an online survey to learn how *Be My Eyes* is used and to identify its qualities and limitations.

In the first part of the survey, we asked participants for what situations they find *Be My Eyes* useful. We provided the following six common situations where visual assistance typically is needed: (1) Reading text, (2) Finding things, (3) Wayfinding and navigation, (4) Shopping assistance, (5) Using ticket machines, (6) Using ATM machines.

Participants rated each of the situations through the statement "I think Be My Eyes is useful when..." on a 5-item Likert scale from 1=totally agree to 5=totally disagree. Furthermore, we asked participants to rate whether *Be My Eyes* was useful when (7) The hands are busy or carrying things using the same Likert scale. We were interested in this question, because blind people are often carrying a cane in one hand and thus, have busy hands. The second part of the survey contained the following five open questions about the application: (1) In which other situations is the application useful? (2) What do you like most about *Be My Eyes*? (3) What do you most dislike about *Be My Eyes*? (4) How do you consider *Be My Eyes* could be improved? (5) Feel free to provide further comments about *Be My Eyes*.

Furthermore, participants were asked how often they use the app and how long each session lasts. Finally, we collected demographic data, including gender, age range, country of residence, and level of visual impairment.

[1]http://www.bemyeyes.org/

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The survey was published using our LimeSurvey server in English, Spanish and German. The survey was spread in social media channels for blind people, including email lists and Facebook. 15 females and 15 males completed the questionnaires. 80% were totally blind, and the others considered themselves as legally blind. 5 participants (17%) were aged between 18 and 25 years, 6 (20%) between 26 and 35, 10 (33%) between 36 and 50 years, and 9 (30%) between 51 and 65 years. 50% of the participants were from the US, the rest were from many countries over the world including Australia, Iran, Germany, and countries in South America.

3. RESULTS

Our results showed that 13% of the participants have used the app only once, 60% of the participants have used the app between 2 and 5 times, and 27% have used the app more often. 50% of the participants used the app in sessions between 1 and 3 minutes, 40% used the app between 3 and 5 minutes, and 10% used the app longer than 5 minutes.

On the scale from 1=useful to 5=not useful, the app was found most useful for reading text (M=2.17, SD=1.28). *Be My Eyes* also received useful for finding things (M=2.60, SD=1.28) and shopping assistance (M=2.79, SD=1.45). For wayfinding the app was rated slightly negatively with a score of M=3.10 (SD=1.24). For helping at ticket machines, the app got a slightly positive rating of M=2.61 (SD=1.37); but helping at ATMs was rated more negatively with a rating of M=3.61 (SD=1.62). Participants agreed with a rating of M=4.03 (SD=1.17) that *Be My Eyes* is not especially useful when the hands are busy or while carrying things.

Qualitative replies were translated to English if necessary. 8 participants found the app useful for working with non-accessible displays like unknown microwave oven panels, diverse electronic devices, and public vending machines. 12 participants appreciated the app to get help for matching clothing and makeup: "*I like it for when I have interviews and need to make sure my clothes match and that I haven't horribly misapplied my makeup.*" Furthermore, participants used the app for verifying the expiration date of food. Although, 10 users found communicating with a human instead of a machine more reliable, 16 participants complained about operators delay and connection issues: "*It only works well with fast wifi*". Two had privacy concerns about showing personal information to strangers. One user suggested that Be My Eyes should have a guideline for these kind of things.

For improvement, one user proposed the app should work at night, two users proposed assistance category settings to inform the operators about the kind of help needed, and three participants suggested to improve the communications skills of volunteers through training.

4. DISCUSSION AND CONCLUSION

We conducted a survey with 30 visually impaired users of *Be My Eyes* to gain a deeper understanding about remote assistance systems. The results show that most participants use the app mainly between 2 to 5 times in short sessions between 1 to 3 minutes. Therefore, our participants might be still in a test period of the app. Alternatively, the low use rate (73% used it 5 times or less) could indicate a high abandoning rate as often observed for assistive technology and especially in the first year of adoption [6]. Our results cannot clearly answer this question, but the comments in the open questions section indicate that the users expect improvements in service reliability.

Users find *Be My Eyes* useful for reading text, finding things, shopping assistance and helping at ticket machines. They found the app useful for dealing with non-accessible displays and for selecting clothing and makeup. The app is found less useful when hands are busy, which is not surprising as the application requires the user holding the device for taking pictures. Wayfinding was judged neutral. Due to the session's duration, we infer that the participants have not used *Be My Eyes* for navigation tasks because it might require more time than the sessions took. Furthermore, users perceived wayfinding tasks to violate privacy, e.g., because they may not want a stranger to know where they go and when. Indeed, prior work on navigation habits of visually impaired people has shown that asking strangers for wayfinding advice has been perceived as risky [8]. The application was also found less useful for using ATMs compared to using ticket machines. This can also be explained by the mentioned privacy issues and concerns about showing personal information to strangers. This is in line with previous findings by Bigham et al. [1].

The qualitative answers showed that participants value talking with real people. Potential areas of improvement are being able to specify the type of help needed and providing training for assistants. The latter is for instance the case in the *Crowdviz* [5] application, which is however not free.

Limited network connectivity was a serious problem. This issue is not in the hands of mobile application developers and not specific for *Be My Eyes*. Such problems should, however, be kept in mind when trying to transfer results from highly controlled lab studies to the real world. Although participants pointed at a number of challenges, they mostly provided very positive comments.

5. REFERENCES

[1] J. Bigham, E. Brady, and S. White. Human-backed access technology. *CHI'11 Workshop on Crowdsourcing & Human Computation*, 2011.

[2] J. P. e. a. Bigham. Vizwiz: nearly real-time answers to visual questions. In *Proc. of UIST '10*, pages 333–342. ACM, 2010.

[3] R. G. Golledge, R. L. Klatzky, and J. M. Loomis. Cognitive mapping and wayfinding by adults without vision. In *The Construction of Cognitive Maps*, pages 215–246. Springer, 1996.

[4] B. Holton. A review of the taptapsee, camfind, and talking goggles object identification apps for the iphone. *AFB AccessWorld Magazine*, July 2013.

[5] B. Holton. Crowdviz: Remote video assistance on your iphone. *AFB AccessWorld Magazine*, Nov. 2015.

[6] B. Phillips and H. Zhao. Predictors of assistive technology abandonment. *Assistive technology : the official journal of RESNA*, 5(1):36–45, jan 1993.

[7] C. Thinus-Blanc and F. Gaunet. Representation of space in blind persons: vision as a spatial sense? *Psychological bulletin*, 121(1):20, 1997.

[8] M. A. Williams, A. Hurst, and S. K. Kane. "Pray before you step out": describing personal and situational blind navigation behaviors. In *Proceedings of ASSETS '13*, pages 1–8, New York, New York, USA, oct 2013. ACM Press.