Development of the BOVINE browser: an application designed to provide access to the Internet for people with low vision

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Abstract

The auDA Foundation provided a grant to the Association for the Blind of WA, in partnership with Curtin University of Technology, to develop a customized web browser interface for people with disabilities, with particular emphasis on people who are blind or vision impaired. The grant was used primarily as a salary component for a software developer/programmer and a researcher/interface designer over a 12 month period. The research established focus groups to identify the difficulties faced by existing web browsers amongst people with low vision, and the programmer endeavored to address these difficulties through the creation of the new web browser. The implementation required the re-rendering of web pages into an accessible format, a forced implementation of selectable style sheets, and a unique interface design to ensure that people with low vision could easily select the browser options. The end result was the creation of the Browser Overcoming Vision Impairment in a Navigation Environment (BOVINE). This presentation focuses on the initial research used to identify the needs of people with low vision, the identification of an effective platform in which to develop the product, the various difficulties and achievements discovered during the development process, and the importance of partnerships between academic institutions and industry partners. The project commenced in November 2006 and was completed in October 2007.

1. Introduction

People with disabilities and in particular people with low vision, face significant difficulties in gaining access to computers and Internet-related technologies. One significant factor that has a profound affect on this issue is the effectiveness of the mainstream web interface.

In order to address this issue, the Association for the Blind of Western Australia and Curtin University of Technology applied to the auDA Foundation for a grant to create an accessible web browser specifically for people with low vision. A grant was provided over a 12 month period to employ a researcher/interface designer to determine the needs of people with low vision, and a software developer/programmer to create the prototype.

2. Establishing the project

The initial objective of the project was to explore which technologies would be best to develop the interface, and to determine from a focus group as to what people with low vision

require from a reentered web interface. Once workspace and resources were allocated for the project, the programmer and interface designer pursued this objective.

The programmer reviewed available programming tools for development of the project and explored several development platforms and programming languages. After considering the benefits of different operating systems and different programming languages, the programmer decided to pursue the initial development of the web interface using the Java runtime environment, the Apache web server and the Tomcat JSP server. It was felt that this provided the best opportunity for a cross-platform interface, and keep the options open as to whether a web portal or standalone browser application would be the best option.

In order to find out what people with low vision require from a web interface, the interface designer investigated a range of popular web accessibility tools and their issues in determining web accessibility difficulties. In addition, the interface designer has created a focus group of people with low vision and has commenced determining the optimal requirements of a web interface. In addition, a regular meeting cycle of all team members has been established with additional meetings scheduled between the programmer and interface designer.

3. Investigation of program development

The following two months saw the programmer creating the user interface based on the feedback from the focus group. However, research into different programming options revealed that Objective C/COCOA APIs were a better tool for the implementation of project source code. In order to easily create a user interface, the Mac OS 10.4 Interface Builder module was selected with the idea that once the interface was effectively developed, it could be ported to another operating system.

The interface designer provided valuable information from the focus group. The group indicated that a product, rather than a portal, would be easier to use despite having to be installed on a particular system. The group proposed a selection of templates which could be easily accessed in the product, re-rendering the webpage according to the type of page that is being viewed. Suggestions included a ‘news’ template, a ‘search’ template and a ‘corporate’ template. Such templates would be implemented according to metadata, but users could also easily be switched by the user.

4. Project Issues

Additional information for low vision users proved difficult to obtain as many of the users in this focus groups used voice in preference to their remaining vision, ironically due to the fact that there was no low vision browser product available. As such, the interface designer had decided to create a second focus group based on people who use their remaining vision to obtain information on effective layout and design of web pages including information such as colours, fonts, text, page layout, image size and limited voice output.

As the programmer did not have sufficient feedback to complete the user interface in the recommended grant timeline, the time was used to undertake additional testing on XML and HTML parsing techniques for storing and retrieving user settings within the browser. There were also some difficulties in compiling the prototype, in that the compiled program did not always work when used on another Mac.

Shortly after this time, the researcher successfully created a second focus group and was successful in identifying the requirements of the browser, with the users indicating that they would like a large space to type the URL, large buttons for each feature and a variety of contrast choices. The users also indicated that they were encouraged by the prototype and looked forward to the completed product.

Based on this feedback, the interface was again refined to accommodate the user requirements. The programmer added a number of style sheet options to the prototype.

5. Completion and project achievements

The efforts of the researcher and programmer produced an effective prototype which met al the required objectives of the project. The Browser Overcoming Vision Impairment in a Navigation Environment (BOVINE) application is currently in use as part of the Cisco Academy for the Vision Impaired (CAVI) project, in which people who are blind or vision impaired are using the BOVINE application to access online curriculum in conjunction with accessibility tools built into Mac OS. The application has also been placed on the Association for the Blind of Western Australia website, at http://www.abwa.asn.au/downloads.htm.

5. Conclusion

Overall, despite difficulties in establishing effective focus groups and programming issues, the final BOVINE application effectively met the needs of people with low vision by providing easier access to information than through the use of conventional web browsing methods. In addition, the ability to access information more effectively significantly improves the independence of people with disabilities.

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Introduction

- People with low vision face difficulties with the interface and web page accessibility of existing web browsers
- auDA Foundation provided $20,000 to the Association for the Blind of WA and Curtin University of Technology to develop an alternative browser
- Researcher conducted focus groups, programmer created prototype

Overview

- Introduction
- Project Objectives
- Commencing the Project
- Initial Progress
- Project Issues
- Identifying and Implementing Features
- Prototype in Action
- The Future and Lesions Learnt
- Conclusion

Project Objectives

- Primary objective:
  - To develop an effective web interface for people with disabilities, and in particular, people who are vision impaired.
- Related objectives:
  - To improve Internet access for people who are blind or vision impaired, and reduce the gap in Australia between people with disabilities and the able-bodied population in relation to Internet access,
  - To convey web information in a format that is intuitive and comfortable for people who are blind or vision impaired, and
  - To promote and distribute the product to people with disabilities, and in particular people who are blind or vision impaired, at the completion of the product creation process.

Commencing the Project

- Focus group established
- Programmer commences work on Java portal
- Researcher investigated current web accessibility issues and trends
  - W3C guidelines
  - Use of Assistive Technology
  - Alternative web browsers

Initial Progress

- Focus group feedback
  - Product better than portal
  - Mac better than PC due to built-in Assistive Technology
  - CSS ‘templates’ for news, corporate, search and user-defined
- Easier to create ‘codeless’ browser template

Project Issues

- New focus group created due to other group primarily using speech software (ironically due to lack of low vision browser!)
- Programmer used time to work on interface features refinement

Product Completion

- Second focus group findings:
  - Large space to type URL
  - Large buttons for each user feature
  - Variety of contrast features
- Programmer implemented requests, user tested with focus group, redefined further, and process continued until completion
- Prototype named Browser Overcoming Vision Impairment in a Navigation Environment (BOVINE)

Prototype in Action

- ABC website in a standard browser:

Future and Lessons Learnt

- BOVINE now used in Cisco Academy for the Vision Impaired (CAVI)
- Future developments for people with disabilities should consider:
  - Current use of Assistive Technology by target group
  - Cross-platform development
  - Greater mix of people with low vision in focus group
  - Plan ahead for future revisions of prototype
  - Prototype download: http://www.abwa.asn.au/downloads.htm

Conclusion

- Successful prototype created to help people with low vision
- Process involved researcher with focus group and programmer to build product
- Product now in use with CAVI project