WebAnywhere: A Screen Reading Interface for the Web on Any Computer

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ABSTRACT

Fulfilling the promise of a web-enabled global community means enabling blind web users to access their information and collaborative web services wherever they happen to be on whatever computer to which they happen to have access. Whether they’re checking their email at a local internet café, using an airport kiosk to connect with a new business contact on a social networking site, or collaboratively editing a document in a hotel business center, blind web users need to stay connected to be successful. While web-enabled computers are everywhere, screen readers are installed on very few. Downloading and installing new software can take a long time and is difficult without a screen reading interface, and many will not allow users to download and install new software at all. Accessible mobile devices are prohibitively expensive. WebAnywhere is a free screen-reading web application capable of making the web accessible to blind users on any web-enabled computer or device, regardless of platform or browser used, without installing new software.

Categories and Subject Descriptors
K.4.2 [Social Issues]: Assistive technologies for persons with disabilities; H.5.2 [Information Interfaces and Presentation]: User Interfaces

General Terms
Design, Human Factors

Keywords
Screen Reader, Web Accessibility, Blind Users

1. INTRODUCTION

People often access the web on computers that are not their own. From terminals in public libraries to the local gym, from Internet cafés to pay-per-use computers at the airport, from a friend’s laptop to a school laboratory; web access is vital for such tasks as checking email, viewing the bus schedule or finding a restaurant. The ease of use of web mail and document editors has not surpassed their desktop analogs, but their popularity is increasing, indicating the rising importance of accessing the web from wherever someone happens to be. Blind web users lack the ability to access the web from all available computers because their access relies on expensive, specialized software programs called screen readers. The WebAnywhere [1] web-based screen reader enables access from any computer with a standard web browser and the ability to play sound.

Popular screen readers such as JAWS¹ or Window-Eyes² are expensive, special-purpose software programs and are seldom installed on public terminals or other computers not normally used by blind individuals. Both the NVDA screen reader³ and the Fire Vox screen reading Firefox extension⁴ are free, but neither is likely to be installed on most systems. Users are rarely given permission to install new software on public terminals and many would be hesitant to install new software on a friend’s laptop. PDA solutions such as Braille Sense⁵ cost roughly $5000. A smartphone with the screen reading software Mobile Speak Pocket⁶ costs about $1000. Many cannot afford or would prefer not to carry such expensive devices. The Serotek System Access To Go (SA-to-Go)⁷ screen reader can be downloaded via a speech-enabled web page, but the program requires Windows, Internet Ex-

¹www.freedomscientific.com
²www.gwtmco.com/Window-Eyes/
³www.nvda-project.org/
⁴www.firevox.cleworld.net/
⁵www.gwtmco.com/Braille_Sense/
⁶www.codefactory.es/
⁷www.serotek.com/
system consists of the following three components: 1) client-side Javascript that supports user interaction, determines which sounds to play and coordinates the other subsystems; 2) server-side text-to-speech generation and caching; and 3) a server-side web proxy that makes web pages appear to come from a local server to overcome cross-site scripting restrictions.

WebAnywhere plays sounds using the SoundManager 2 Flash Object\(^8\). Adobe reports that 98.8% of desktops have Flash installed\(^9\). WebAnywhere also supports embedded sound players for increased compatibility. In a small study over five web pages, the latency of retrieving each new multi-word sound was less than 300 ms on a high-bandwidth connection. The system prefetches sounds based on a model of what users are likely to request be read next, which reduces latency by nearly 20%. The sound files that are retrieved and cached and most sounds previously played can be retrieved immediately. In a survey of 15 public computer terminals in the Seattle area, 14 would have enabled blind web users to access the Internet using WebAnywhere (9 required headphones). The computer on which WebAnywhere did not work had a malfunctioning sound card. More than half of these computers did not let users install new software and one ran the OS X operating system.

WebAnywhere has been developed with consultation of blind web users who have been overwhelmingly enthusiastic about the system. In user evaluation of the system, eight blind participants (4 female) could effectively and independently browse the web using WebAnywhere. During this evaluation, participants were asked to perform four tasks: check a gmail.com email account, find the next arrival time at a particular bus stop, look up the phone number for a local restaurant and complete a survey about WebAnywhere. All of our participants were able to successfully complete these tasks. None of our participants mentioned concerns about the responsiveness of the system, a testament to our aggressive prefetching and caching strategies.

3. FUTURE WORK

Future versions of WebAnywhere will seek to implement more of the features offered by commercially-available screen readers as requested by our users. We also hope to leverage the unique characteristics of WebAnywhere in order to iterate quickly to improve upon what has become the standard screen reading interface. We will release WebAnywhere as a public alpha release in May 2008.

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5. REFERENCES


\(^8\)www.accessibilityisaright.org/

\(^9\)www.schillmania.com/projects/soundmanager2/

\(^10\)www.adobe.com/products/player_census/flashplayer/