

Universal and Ubiquitous Web Access with Capti

Yevgen Borodin
Valentyn Melnyk

Andrii Sovyak
Faisal Ahmed

Alexander Dimitriyadi
Glenn Dausch

Yury Puzis
I.V. Ramakrishnan

Charmtech Labs LLC, Cupertino, CA, 95014-5929
info@charmtechlabs.com

ABSTRACT

In this paper we present Capti – a universally and ubiquitously accessible web browsing application enabling intuitive and usable web access for people with and w/o vision impairments. Capti provides a usable screen-reader interface for web browsing and an accessible listen-to-it-later Playlist (charmtechlabs.com).

Categories and Subject Descriptors

H5.2. Information Interfaces and Presentation: User Interfaces;
H5.4. Information Interfaces and Presentation:
Hypertext/Hypermedia – navigation.

General Terms

Human Factors, Design

Keywords

Capti Web Player, Web Accessibility, Screen Reader, Blind, Universal Access, Mobile, Ubiquitous Access, Charmtech Labs

1 INTRODUCTION

A recent report by Internet World Stats shows that the Web usage has skyrocketed by more than 444% since 2000, and reached almost a third of the global population in 2010 (almost 2 billion people [7]). One of the primary uses of the Web is to obtain information, which we do at home, at work, and on-the-go. The downside to the ubiquitous information proliferation is information overload – there is too much information and there is never enough time to process it. For many people, it is common to encounter appealing articles and have no time to read them.

Compared to sighted people, people with vision impairments (approximately 175 million according to the WHO [12]) have significant limitations in how and on what devices they can access the Web, which further compounds the problem. Blind people usually employ screen readers [6, 9, 13], which convert the Web to speech and generally ignore page layout and graphics, reading all the textual content in web pages out loud. These tools enable blind people to interact with web pages and perform basic online activities; however, while sighted people can quickly find the information they need on any computer or mobile device, people with vision impairments cannot easily locate information or

Permission to make digital or hard copies of all or part of this work for personal or classroom use is granted without fee provided that copies are not made or distributed for profit or commercial advantage and that copies bear this notice and the full citation on the first page. To copy otherwise, or republish, to post on servers or to redistribute to lists, requires prior specific permission and/or a fee.

W4A2012 - Microsoft Challenge, April 16-17, 2011, Lyon, France. Co-located with the 21st International World Wide Web Conference. Copyright 2012 ACM ...\$5.00. ISBN: ISBN 978-1-4503-1019-2

switch between different devices as easily. As a result, the blind spend considerably more time looking for and processing information. At the same time, they have a limited “informational mobility” in that they cannot easily switch between devices.

In this paper, we present “Capti” – a cross-platform web browsing application that solves some of these problems by providing a usable screen-reader interface for accessing web pages, and a universally and ubiquitously accessible listen-to-it-later Playlist interface. We next give an overview of related applications.

2 RELATED WORK

There are a number of commercial and free screen readers used for non-visual access to computers and web browsers in particular. These screen readers, however, provide very basic functionality and do little to help users find information in web pages faster. Arguably, screen readers can be combined with other applications to provide more usable access to information. Readability [10] and Apple’s Reader are some representative examples of applications that help extract main content from web pages. ReadItLater [11], Instapaper [1], and Apple’s Reading List provide the functionality allowing users to compile a list of articles for later reading. Notably, Instapaper relies on human annotators to mark main content in web pages.

Many blind people use these applications to reduce information overload, e.g., by adding the articles they want to read into Instapaper or Apple’s Reading List and then accessing them with their screen reader at a later time. Unfortunately, one of the disadvantages of this approach is a lack of integration, which makes these tools less usable than they could have been. For instance, having compiled a reading list, a blind user still has to manually use a screen reader to listen through the list. Further, these tools have been designed for sighted people, they have not been integrated with screen readers, and they have no way of remembering where the user was reading with the screen reader.

As for sighted users, compiling a reading list does not mean that they will find the time to read it. Sighted people could potentially benefit from screen readers and listen to their reading list on-the-go, but screen readers have been designed for blind people and they are not particularly “user-friendly” for sighted people. And then again, there is a lack of integration with screen readers. Instafetch [5] for Android is the only self-voicing application that can load the content from Instapaper and then use a TTS to voice it. Regrettably, Instafetch has also been designed for sighted people, and it is not a fully integrated solution either.

Another obstacle faced by the users is that few of these tools are platform-independent, which prevents users from easily switching among their devices. Instapaper and ReadItLater provide web interfaces to their reading lists, which could be accessed from any web browser, but, again, they lack integration with screen readers.

In this paper, we present Capti, a platform-independent web application with its own screen-reading functionality on desktop computers. Capti is designed exclusively for web browsing, making it similar to such applications as aiBrowser [8], WebAnywhere [2], and FireVox [4], exceeding them, however, in their capabilities. Borrowing some of the ideas from HearSay [3], Capti uses intelligent algorithms to analyze and process content. Capti has been designed to make web browsing more accessible for blind screen-reader users; nevertheless, the Capti's Playlist interface can also be used by sighted people.

3 USE SCENARIO WITH CAPTI

Mary is legally blind, but she feels completely independent because she is really good with computers. Mary still remembers how she could *only* browse the Web on her laptop computer with her JAWS screen-reader and, to some extent, on her iPhone with VoiceOver. But once she started using Capti, web access became more usable and she became more independent of her devices.

Mary can now browse the Web on her laptop more efficiently, as Capti is helping her find main content, review dynamic changes, and view differences between web pages. It also makes web pages accessible by associating labels with form fields, segmenting web pages, and doing other tricks transparently so that Mary does not need to suffer through inaccessible web pages. But what makes Mary really mobile is the ability to take Capti with her.

Like many people in our busy, information-driven society, Mary gets overwhelmed with volumes of information. Whenever she encounters an interesting story or an online resource that she would like to read, but cannot find time at the moment, she adds it to her Capti's Playlist, which works just like an audio player, except that it narrates the playlist to her. She turns up the volume on her desktop and listens to the news while doing morning exercises. She continues listening to the news from the same spot on her iPhone during her commute. She uses Capti on her iMac at work where she does online marketing, and adds relevant blog-posts to the playlist. She listens to them on her iPod while exercising in the gym. And, in the evening, she reclines in her armchair and picks up reading her favorite book from where she left off the day before. Capti seamlessly synchronizes Mary's reading state (what she was reading, where she was reading, etc.) among her devices so that she can access information anywhere.

4 WEB BROWSING WITH CAPTI

The unique benefit provided by Capti is making web browsing more intuitive and usable for people both with and without vision impairments. Capti can be used to listen to news, blogs, online books, encyclopedias, and other web pages with the convenience of an audio player on-the-go or while relaxing – helping users find information and skip all the clutter.

Capti integrates with existing web browsers, turning them into self-voicing applications. Capti enables users to add web pages to its playlist that is synchronized across devices (currently in Beta) so that a playlist built on a regular computer can be listened to on an iOS device, and then continued from the same place on a laptop online or offline. In addition, Capti enables users to share their favorite articles with other people through social networks.

Capti uses intelligent algorithms to extract main content from web pages and identify articles that span multiple web pages. In the screen-reader interface, Capti helps users find differences in web pages as they navigate from page to page in template-based websites. Capti has built-in web page segmentation to facilitate

page navigation. Capti also uses an algorithm to associate labels with form-fields for more accessible form filling, and it has a number of other tricks to make non-visual browsing more usable.

Capti already runs on Windows, Mac, Linux, and iOS, and will, in time, be made available on other platforms. It is interoperable with other screen readers, and can be used in parallel with them. Screen-reader users can also turn the Capti's self-voicing feature and use Capti with their favorite screen readers instead.

5 FUTURE WORK

In this paper, we presented Capti, a universally and ubiquitously accessible web browsing application for both sighted and blind people. Thanks to intelligent algorithms for content analysis and a usable Playlist interface, Capti can make web browsing more efficient and make blind users more mobile. The Capti team will continue working on new algorithms and approaches to improving web browsing experience for sighted and blind users. Some of the future directions of research and development for Capti will include browsing automation, internationalization, and content summarization. Capti will also have a web-based interface and the ability to import content from other tools such as Instapaper.

6 ACKNOWLEDGEMENTS

Capti has been developed, in part, with support from the Department of Education, using the NIDRR grant number H133S110023. However, the contents do not represent the policy of the Department of Education, and you should not assume endorsement by the Federal Government.

7 REFERENCES

- [1] Arment, M. *Instapaper*. 2011: <http://www.instapaper.com/>.
- [2] Bigham, J.P., C.M. Prince, and R.E. Ladner, *WebAnywhere: a screen reader on-the-go*, in *Proceedings of the 2008 international cross-disciplinary conference on Web accessibility (W4A)*. 2008, ACM: Beijing, China. p. 73-82.
- [3] Borodin, Y., F. Ahmed, M.A. Islam, Y. Puzis, V. Melnyk, S. Feng, I.V. Ramakrishnan, and G. Dausch, *Hearsay: a new generation context-driven multi-modal assistive web browser*, *Proceedings of the 19th Intl. Conference on World Wide Web*. 2010, ACM: Raleigh, North Carolina, USA.
- [4] Chen, C. *FireVox*. 2008 [cited 2012]; Available from: <http://www.firevox.clcworld.net>.
- [5] Instafetch. 2012; Available: <http://www.instafetch.com/>.
- [6] JAWS, *Screen reader from Freedom Scientific*. 2011.
- [7] MiniwattsMarketingGroup. *Internet Usage Statistics: The Internet Big Picture World Internet Users and Population Stats*. 2010; <http://www.internetworldstats.com/stats.htm>.
- [8] Miyashita, H., D. Sato, H. Takagi, and C. Asakawa, *Aibrowser for multimedia: introducing multimedia content accessibility for visually impaired users*, in *Proceedings of the 9th Intl. ACM SIGACCESS*. 2007, Tempe, Arizona, USA.
- [9] NVDA. *NonVisual Desktop Access*. 2009 [cited 2009]; Available from: <http://www.nvda-project.org/>.
- [10] Readability. Available from: <https://www.readability.com/>.
- [11] ReadItLater. *Read It Later*. 2012 [cited 2012]; Available from: <http://readitlaterlist.com/>.
- [12] U.S. Census Bureau. 2003; <http://www.census.gov/>.
- [13] VoiceOver, *Screen reader from Apple*. 2010.