

Web Accessibility Intensification for Differently-Abled People- A Review

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Abstract: WebAID - Web Accessibility Intensification for Differently-abled people, a review paper by the authors for the need of special people to access web. With the fact sheets of the World Health Organization's Disability and health states that "Over a billion people, about 15% of the world's population, have some form of disability", and "the adults between 110 million and 190 million have significant difficulties in functioning.". The web technology needs to be intensified to accommodate the needs of these people but usually this is not the case. Access to the web is increasingly critical for health related information, access to government beneficial and services, interaction and connectivity with friends and family, and broad commercial and social services that directly affect health[2]. Yet elderly and the young generation with disabilities, are at risk of being left behind due to disability-based digital divide. Although today, various tools and techniques are available to help these people. The authors review the technological architecture available and propose the system which will be helpful for the differently abled people to access web with ease.

Keywords: WebAID, Web accessibility, differently-abled, disabilities, web development, inclusion, WCAG, WAI, ARIA.

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I. INTRODUCTION

Disability in the present day and age is just an unfortunate situation. It makes the way of life for the specially-abled people a bit different but the rise in empathy towards them has come a long way in easing their path. They are now at par with the general populace and can lead a dignified life. This is because of the proactive thinking of the law makers and the society. There are several standards, laws and regulations defined by various authorities such as the Americans with Disabilities Act (ADA) 1990 of the USA, Disability Rights Act 1999 of the UK, Persons who have Disabilities, Equal Opportunities, Protection of Rights and Participation in full Act 1995 of India, and so on. There is also a United States Access Board. The Board's Section 508 Standards apply to electronic and information technology procured by the federal government, including computer hardware and software, websites, phone systems, and copiers. This is issued under section 508 of the Rehabilitation Act which requires access for both members of the public and federal employees to such technologies when developed, procured, maintained, or used by federal agencies.[1] Looking at the current trend, it would not be a baseless assumption, that web technology has also evolved to accommodate the needs of these people but sadly this is not the case. Although today, with the human population of the world being 7.6 billion, 15% live with some form of disability, the numbers proving to be higher in nations which are developing, we can count in one hand the number of accessible websites. Apart from the laws mentioned above, there are many other acts and specifications, for example, WAI of the W3C that are yet not very popular among the web development circles.

II. LITERATURE REVIEW

Recent years have seen multiple articles pop up speaking in favour of making the web more accessible to the differently abled. The importance of access to the Internet in modern life cannot be overstated. According to a recent survey of adult men in the United Kingdom, a plurality of respondents (42%) considers web access to be more important than food or shelter (McEntegart, 2013). The Internet is also becoming a significant complement of—and sometimes substitute for—many traditional businesses, with online shopping complementing brick-and-mortar stores in retail or virtually replacing them in modern home-based entertainment delivery. [2].

Web accessibility [3], states that there are eight components on which the accessibility of websites that are dependent on

- i. Natural information such as text, images and sound

- ii. Markup code that defines its structure and presentation.
- iii. The user agents such as web browsers and media players.
- iv. Assistive technologies such as screen readers.
- v. Input devices used in place of the conventional keyboard and mouse, users' knowledge and experience in using the web.
- vi. The web developers, the authoring tools, evaluation tools.
- vii. A defined web accessibility standard, or a policy for individual organization used to evaluate the accessibility.
- viii. The authoring and evaluation tools are used by the developers to create web contents and these are accessed using the user agents and assistive technologies by the end users.

Web Content Accessibility Guidelines (WCAG) is developed through the W3C process in cooperation with individuals and organizations around the world, with a goal of providing a single shared standard for web content accessibility that completes the needs of individuals, organizations, and governments internationally. The WCAG documents explain how to make web content more accessible to people with disabilities.

Web "content"[4] generally refers to the information in a web page or web application, including

- i. Natural information are text, images, and sounds.
- ii. Code or markup that defines structure, presentation.

An investigation conducted by Disability Rights Commission has found that around 81% of the websites fail to provide the most basic web accessibility functionalities. In addition, the results of the evaluations undertaken by disabled users show that they have characteristics that make it very difficult, if not impossible, for people with certain impairments, especially those who are blind, to make use of the services provided. This results both from lack of interest and knowledge on the part of website developers, and from perceived commercial obstacles to accessibility on the part of website commissioners, notwithstanding that anecdotal evidence suggests that this concern is misplaced. [9].

III. IMPLICATIONS FOR PRACTITIONERS

The present study has important implications for practice. First, WCAG 2.0 should be considered not only as an aid for designing Web sites according to the needs of users with disabilities but also as a helpful tool for designing more usable Web sites for nondisabled users. This different framing may motivate practitioners to apply these guidelines more often because of the benefits to nondisabled users while alleviating the financial concerns of practitioners about Web site accessibility. As an implication for the guidelines, positive effects for users without disabilities should be mentioned explicitly as well as the fact that Level AA is of particular importance for such users. Second, the consistent pattern of beneficial effects of Level AA compared to NA is highly relevant for practitioners. Currently, most of the Web sites conform to Level NA (e.g., Gonçalves et al., 2013; Nurmela et al., 2013), which shows that there is much room for improvement. Practitioners should aim for an upgrade from Level NA to AA rather than A, since the latter would not provide noticeable benefits to nondisabled users [5][6][7].

IV. PROPOSED SYSTEM

There are a diverse range of disabilities and it is important that a developer consider these differences while developing a website or web application. The opportunistic part of the human nature by stating the benefits that an accessible website has on the organization. Some of the uncharitable gains as mentioned are given below:

- i. Semantic HTML, which improves accessibility also improves SEO, making your site more findable and marketable.
- ii. Caring about accessibility demonstrates good ethics and morals, which improves your public image.
- iii. Good practices always improve accessibility to makesaccessors site more usable by other people, such as mobile phone users, with low network speed.
- iv. Having a 508 compliant and fully accessible website is a best practice to follow, regardless of whether your organization is legally required to implement 508 compliance. [8].

The web page evaluated isdivided down into four areas:

- i. Validate Code - Check your page for HTML and CSS code validation.
- ii. Section 508 Tests - Perform manual tests that help to check for Section 508 compliance.
- iii. Internationalization - View the language specification and use tools to determine the readability of your page.
- iv. Page Information - Learn information about the page such as download speed, view the generated source, and page properties.

V. TOOLS AND TECHNIQUES

Published in the U.S. Federal Registry on January 18, the information and communication technology covered by the Section 508 amendment to the Rehabilitation Act of 1973, increases the urgency to develop accessible web and mobile applications for all. Although the original amendment mandated that all electronic and information technology developed, procured, or used by the federal government be accessible, the standards failed to keep pace with technological advancements like the growth of the web and the proliferation of smart devices. In fact, Web Content Accessibility Guidelines (WCAG) 2.0, Accessible Rich Internet Applications 1.0 (WAI-ARIA) and HTML 5 have all surpassed the original standards.

Now, some of these newer standards have been used in the Section 508 revision process. As developers acclimate to the new standards, understanding the WCAG 2.0 standard will be key. The Revised 508 Standards apply WCAG 2.0 Level AA requirements to all content, including non-web software and electronic documentation. This may present difficulties for some but resources for guidance through the transition do exist and new tools are being created to help ensure the development process adheres to the new standards of inclusivity.

IBM, for one, recently released two new open source projects on the developerWorks/open community: AccProbe and Va11yS.

Together these projects reduce accessibility roadblocks during agile development, bolster the user experience while adhering to industry standards, and lower costs through effective accessibility features. The ultimate goal is to make it easier for developers to create accessible solutions and services for people with disabilities and the aging population.

1. **AccProbe:** AccProbe, short for Accessibility Probe, is an Eclipse-based accessibility inspection tool that aligns with the 508 revision. It's an application, that is easy-to-use, which tests for accessibility and debugs when appropriate. The open source tool enables access to the Microsoft Active Accessibility (MSAA) and IAccessible2 APIs implemented by applications or rendered documents. It has a combination of functionalities from several accessibility tools which includes inspection, event monitoring, and accessibility API execution. The tool helps in boosting speed and scale in the development of accessible and rich client applications.
2. **Va11ys:** Va11ys, or Verified Accessibility Samples, is a repository of living, breathing code that designers and developers can access to vet assistive technologies. Any developer can interact with these samples using assistive technology like JAWS, VoiceOver, and NVDA screen readers. Additionally, by leveraging open source and the developerWorks community, the project lives in space where developers can access tools, forums, and code to meet the growing demands for accessibility and innovation. Currently, the team is expanding Va11yS code samples to include the W3C Web Content Accessibility Guidelines (WCAG) 2.0 Sufficient Techniques and encourages others to submit new accessible code samples. Democratizing access to the latest tools, applications, and technology is paramount. We must continue to facilitate the process and bolster the community that is working to make accessibility easy and effective for all those who need it.
3. **WebAIM (Web Accessibility In Mind)** provide training, site evaluation, certification, and technical consulting for accessible development. They also provide the free WAVE Web Accessibility Tool, which is an online site checker, and WAVE Evaluation Tool Chrome extension. WebAIM offers complete web accessibility services. Regardless of the type or size of your web site, WebAIM can help ensure that your site is accessible and usable to those with disabilities. While we specialize in developing and retrofitting web content for accessibility, our accessibility approach is one that empowers our clients to maintain that accessibility into the future. Though we are a small team, we have years of experience in accessible web design and can work with you to make your site meet the highest levels of accessibility.
4. **WAVE Accessibility Tool:** The WAVE Chrome and Firefox extensions allows you to evaluate web content for accessibility issues directly within Chrome and Firefox browsers. Because the extension runs entirely within your web browser, no information is sent to the WAVE server. This ensures 100% private and secure accessibility reporting. The extension can check intranet, password-protected, dynamically generated, or sensitive web pages. Also, because the WAVE extension evaluates the rendered version of your page, locally displayed styles and dynamically-generated content from scripts or AJAX can be evaluated.
5. **RampWEB Section 508 Toolbar:** The purpose of the toolbar is to provide a tool that can assist you in the manual process of checking for Federal Section 508 compliance of Web sites and Web applications. This tool is not meant to certify or guarantee compliance but simply to help you in the evaluation process. Learn more about RampWEB's Section 508 compliance certification [10]. RampWEB's Section 508 Toolbar is designed for in-browser accessibility testing for Internet Explorer and Firefox.

6. **Web Accessibility Toolbar:** The Web Accessibility Toolbar (WAT) has been developed to aid manual examination of web pages for a variety of aspects of accessibility. The toolbar provides easy access to functionality to:
 - i. Identify components of a web page
 - ii. Provide access to alternate views of page content
 - iii. Facilitate the use of 3rd party online applications.
7. **Bootstrap Accessibility Plugin** is an extension for the Bootstrap 3 web development framework that makes many of the components of this library accessible for keyboard and screen reader users. This plugin is available on Github under the BSD license. We hope that this extension will make it very simple for website developers who use Bootstrap 3 components to provide great user experience for as many users as possible.

VI. CONCLUSION

The subjective measures along with objective measures of accessibility is a complex concept with different components, such as users, developers, and content. The effects of accessibility guidelines should be both on nondisabled users and people with disabilities rather than focusing on nondisabled users alone. This comparison will allow us to gain a deeper understanding of the relation between accessibility and nondisabled users. The stronger effects of accessibility can be on older or less educated samples because they might be less experienced in using Websites than young students and would benefit more from supportive Web site characteristics. The website samples are compared using assistive technology like JAWS, VoiceOver, and NVDA screen readers. If the websites or web applications is developed using Bootstrap components and want it to be accessible with a minimal development effort, this accessibility plugin may be the perfect solution. By adding the JavaScript plugin in your Bootstrapped HTML pages, you extend the stock components with an additional mark-up and events without modifying the original Bootstrap code. In doing so, we make those widgets keyboard-navigable and introduce the compatibility with screen reader software used by people who are visually impaired.

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