Chapter 2.15

A Service Oriented Ontological Framework for the Semantic Validation of Web Accessibility

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ABSTRACT

The Web serves as the principal mediator for information sharing and communication on a worldwide scale. Its highly decentralized nature affords a scale free growth, where each endpoint (i.e., Web site) is created and maintained independently. Web designers and developers have the onus of making sure that users can interact without accessibility problems. However, coping with users with disabilities poses challenges on how to ensure that a Web site is accessible for any kind of user. When (and if) this is done, designers and developers do it in a post-hoc way, (i.e., verify and tweak Web sites according to guidelines such as WCAG). In this Chapter the authors present SWAF, the Semantic Web Accessibility Framework, a base framework for supporting the integration of accessibility services into Web design and development processes. SWAF affords both tailoring accessibility to user needs and specifying the semantic validation of accessibility guidelines in different application situations.

INTRODUCTION

The increasing adoption of technologies from users puts the Internet in a central spotlight. The Web, as its major application, is accessed and interacted by users at constantly increasing pace, allowing them to

quickly seek information, interact with their peers through social networks, or perform transactions from the comfort of their homes. For this reason, the way information is structured and presented is critical for the success of accessing it.

However, users have their own specific characteristics (e.g., abilities, impairments, preferences, knowledge). Consequently, the accessibility of each piece of information – such as a Web page – can differ significantly from user to user. While often dismissed in the Internet realm and, more specifically, on the Web, people with disabilities are not just a small population minority. If one takes into account people with mild disabilities, the slice of the population that requires some sort of software-based accessibility ramp is of the uttermost importance.

The most important way to mitigate this problem is making sure that information providers (ranging from the individual to large corporations) do not overlook such accessibility issues. Internationally recognized organizations such as the World Wide Web Consortium (W3C, n.d.) play a critical role on helping information providers to cope with accessibility. Traditionally, this goes in the form of specifying accessibility-centric best practices, guidelines, and vocabularies to augment already existing Web languages.

Evangelization of accessibility practices, coped with the progressive intertwining of accessibility features in Web languages has brought Web accessibility more close to information providers. Consequently, each day, Web accessibility is gaining awareness. Guidelines such as WCAG, the Web Content Accessibility Guidelines (Chisholm, Vanderheiden, & Jacobs, 1999), are being followed more often, leading more users with disabilities to have access to information without barriers. In order to be so, these guidelines are presented as straightforward as possible, geared towards the largest set of Web designers and developers. However, mostly due to financial, human resources, and technological expertise problems, several companies (and individuals)

totally dismiss the adequacy of Web sites to the different requirements of accessibility-dependent audiences, despite the fact that legislation is being pushed in several countries, in order to promote the rights of people with disabilities.

The dismissal of accessibility from information providers leverages the fact that such guidelines and standards for accessibility have inherent problems. Since they are specified in such a way that they require manual inspection of their conformance, developers have an increased effort on coping with accessibility issues. Furthermore, by being informally described (i.e., in natural language), they tend to lead to different interpretations from developers and accessibility experts and, for this reason, different and incoherent ways to ensure that a given Webpage is accessible.

When Webpages and Websites require an additional effort of supporting more specific and fine-grained audiences, the development of accessibility-centric solutions becomes cumbersome. Guidelines have an implicit assumption of which audiences they target to (and more often than not, in a very informal and loose way). Typically, these are often geared towards people with visually impairments (e.g., different kinds of blindness). The way users from this audience interact with a webpage is also left implicit, but often assumed to include specific devices (e.g., screen readers). This leads to a lack of understanding what is the role of guideline checkpoints for each user and device characteristic they are tackling, thus posing more difficulties on developers on how to tackle fine-grained accessibility analysis and consequent development of accessible Websites and Webpages. Consequently, software developers need to have a conceptual framework in which to situate disabled-related guidelines, which they often do not have due to lack of experience with disabled people and their technologies.

This Chapter proposes SWAF (Semantic Web Accessibility Framework) as an ontological framework targeted to accessibility-aware Web design and development processes. This will

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