WaaT: Personalised Web Accessibility Evaluation Tool

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ABSTRACT

Our approach introduces an advanced and new personalized Web accessibility evaluation methodology, allowing for Web content accessibility evaluation regarding different selectable disability profiles (impairments, personas) as well as Assistive technologies and devices. We define an evaluation approach based on the Web Content Accessibility Guidelines 2.0 and the Barrier Walkthrough, with the goal of providing support to Web developers and designers to conduct rapid, yet specialized, accessibility assessments focused on different disability types and user preferences for Web applications.

Categories and Subject Descriptors

H.1.2 [**Models and Principles**]: User/Machine Systems; H.5.2 [**Information Interfaces and Presentation**]: User Interfaces

General Terms

Design, Human Factors

Keywords

Web Accessibility, Personalised Accessibility Assessment, Personas, Web Content Accessibility Guidelines

1. INTRODUCTION

The Web is now increasingly being accessed by many people with functional limitations or not. Thus, the great heterogeneity of Web application technologies as well as the provided Web content requires the introduction of accessibility aspects in order to fulfill the *design for All* methodology. For that reason accessibility support at all stages of the design and development process of Web applications should be a solution that appears in the horizon.

Web developers and designers can leverage standards such as WCAG 2.0[1] to ensure the overall accessibility of a given Web application. This type of guidelines devise a set of conformance levels based on how loose or strict is a Web page's support on accessibility issues, independently from any particular disability (i.e., perceived as an overall status). However, each user is different from the next. With an estimate of >10% of the world's population having some kind of disability, the spectrum of user diversity is enormous. However, most of the existing semi-automatic accessibility assessment tools are based on general purpose guidelines and are not flexible enough to evaluate by specific user group or access device [1]. Most widespread accessibility assessment tools include Sheriff Accessibility Module[2], Wave from WebAIM[3], or Lift Machine[4] allowing compliance for several guideline standards including WCAG 2.0. Moreover, if we take into account different types of disability and their inherent distinct usage and accessibility constraints, the dimensions of the puzzle become even more intricate. Related work in this area includes the MAGENTA tool [2] which was developed as a semi-automatic evaluation tool which evaluates a website against a specified set of guidelines. The user can select from individual guidelines from a range of pre-defined guideline sets, and then perform an accessibility evaluation.

Also the accessibility Guidelines Management Framework proposed by [3], serves as a central repository where developers can search for accessibility guidelines (including general web accessibility, as well as those for different application types, end-users and specific user and application type), define new guidelines, and share them with other developers and evaluating them automatically. While the proposed approach does provide answers to personalised Web accessibility, it limits their application for studying richer semantics of personalized Web accessibility assessment (e.g., querying accessibility knowledge both from evaluations and guidelines specification themselves). However, when the environment becomes more complex, the need for additional information becomes imperative. Thus, while the vocabulary for describing user profiles within the proposed framework is limited, our ontology-based personalized approach (barrier walkthrough Harmonized methodology[5]-HAM) has the capability to extend and enhance the expressiveness of the accessibility Guidelines Management Framework. The goal of the resulting framework will allow the implementation of automated assessment systems, enabling, designers, programmers, evaluators, disability group users, etc., to conduct specialized semi-automatic accessibility assessments focused on specific disability types, assistive technologies, platforms and/or contextual conditions. The International Classification of Functioning, Disability and Health, commonly known as ICF[6], are at the core of envisaged HAM.

2. PERSONALISED WEB ACCESSIBILITY ASSESSMENT

Typically, Web accessibility assessment software is developed in a monolithic way: a procedure (or set of procedures) is run against a representation of an HTML page, testing the different validation criteria as specified in a given domain-specific accessibility guideline. However, in the case of the proposed personalised accessibility, only a subset of tests might be run

1 www.w3.org/TR/WCAG20/

2http://www.hisoftware.com/solutions/hisoftware-compliance-sheriff.aspx

[3] http://wave.webaim.org/

[4] http://www.useablenet.com/usablenet_liftmachine.html

5http://www.accessible-project.eu/tl_files/documents/deliverables/ACCESSIBLE_D3.1.pdf

[6]WHO -International Classification of Functioning, Disability and Health.

according to what is specified in the instance semantics rules dimension of the HAM. The input is the URL/local path/source code of the software application that the user wishes to evaluate. The adopted evaluation methodology is personalized, thus allowing the user to select between different set of impairments/disabilities, different set of guidelines and personas (following figure 1).

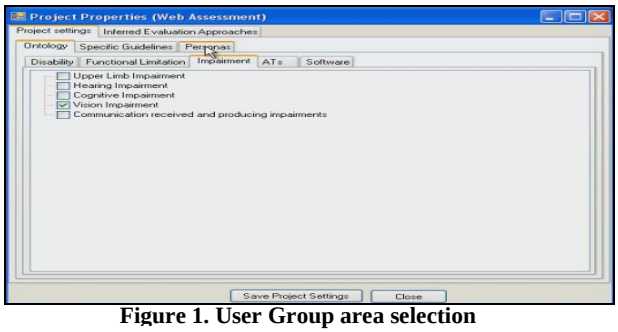

Figure 1. User Group area selection

Thus, selecting different user groups (disabilities, personas, and impairments) the system will result in a different set of guidelines against which the received response from the selected web application will be assessed. As an example the persona "Emma Karlsson" that she suffers from Dysarthria, Expressive language disorder, Conductive hearing loss and Communication disability, the approaches that correspond to the impairments from which the selected persona suffers are presented, as shown in following Figure 2. Thus, a combination of disabilities/impairments is supported by the tool. The integrated CyberNekoHTML Parser[7] uses Groovy scripts[8] in order to parse the web page source code and get the necessary information concerning the desired elements/attributes of the evaluated HTML/XHTML.

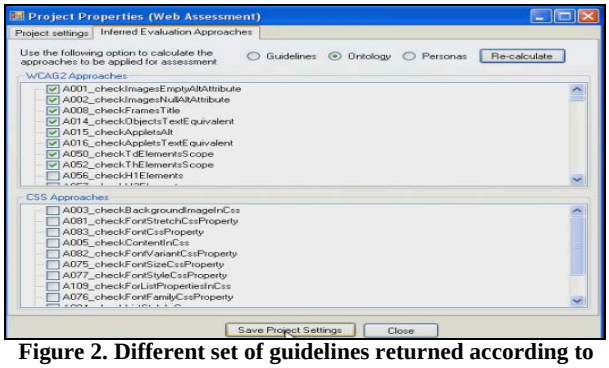

Figure 2. Different set of guidelines returned according to personalised selections

The W3C Markup Validator[9] as well as the W3C CSS Validator[10] to assist Web designers and developers to evaluate Cascading Style Sheets (CSS) has been also integrated into the WaaT tool. The problematic elements in HTML source code or selectors in CSS are presented to the user as well, in order to fully understand where the real problem lies. The output of the evaluation process is a number of errors and warnings concerning the examined Web application, along with assistive tips that provide useful information to the user in order to correct the detected errors/warnings. These results are grouped according to the priority level of each one of the corresponding WCAG 2.0 Success Criterion. The output of the evaluation process is a number of errors and warnings concerning the examined Web application, along with assistive tips that provide useful information to the user in order to correct the detected errors/warnings. These results are grouped according to the priority level of each one of the corresponding WCAG 2.0 Success Criterion.

One of the main functionalities of the tool is also the adoption of a manual selection procedure. By clicking on a detected warning, the assessment tool provides to the user the relevant information concerning the identified warning where the user additionally can decide whether the warning is an error or whether it should be ignored by the Web Assessment Tool. The incorporated EARL Report Generator has the ability to transform the accessibility assessment results into an EARL[11]-based report containing both machine-readable (RDF) and human-readable values (PDF format).

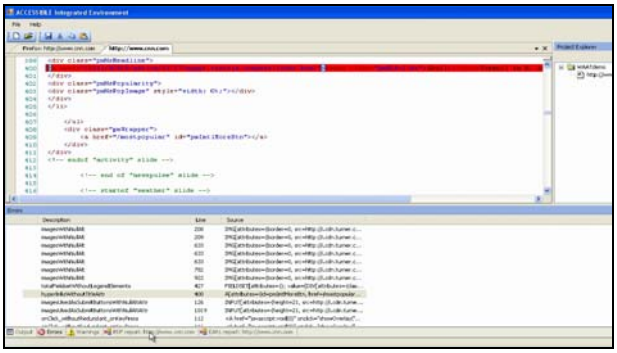

Figure 3. WaaT Evaluation results

A first evaluation has been performed with the participation of 122 end users (accessibility experts, developers, designers). During system's evaluation, the participants were asked to perform Web accessibility evaluation for their favorable Web sites. All of their useful comments, especially for the User Interface implementation and the WCAG 2.0 implemented tests have been taken into consideration while a next evaluation phase will be performed within the next months (with the participation of people with disabilities).

3. FUTURE WORK

Ongoing work is currently being conducted in several fronts, including: (a) Using the evaluation software as a central component in accessibility-aware development environments, to help Web developers and designers create accessible Web applications; (b) Apply this evaluation software on large scale personalized accessibility characterisations of the Web; (c) include more personas and accessibility rules in the HAM.

4. ACKNOWLEDGMENTS

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9 http://validator.w3.org/

[10] http://jigsaw.w3.org/css-validator/

[11] http://www.w3.org/TR/EARL10/

12 http://www.accessible-project.eu