

“Engineering Accessible Design”
W4A – International CrossDisciplinary Workshop on
Web Accessibility 2005
Workshop Report

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ABSTRACT

Previous engineering approaches seem to have precluded the engineering of accessible systems. This is plainly unsatisfactory. Designers, authors, and technologist are at present playing ‘catch-up’ with a continually moving target in an attempt to retrofit systems. In-fact engineering accessible interfaces is as important as their functionality’s and should be an indivisible part of the development. We should be engineering accessibility as part of the development and not as afterthought or because government restrictions and civil law requires us to. Our workshop brought together a cross section of the Web design and engineering communities; to report on developments, discuss the issues, and suggest cross-pollinated solutions.

Conventional workshops on accessibility tended to be single disciplinary in nature. However, we were concerned that a single disciplinary approach prevents the cross-pollination of ideas, needs, and technologies from other related but separate fields. The workshop was therefore, decidedly cross disciplinary in nature and brought together users, accessibility experts, graphic designers, and technologists from academia and industry to discuss how accessibility could be supported. We also encouraged the participation of users and other interested parties as an additional balance to the discussion. Views often bridged academia, commerce, and industry and arguments encompassed a range of beliefs across the design-accessibility spectrum. Our aim was to focus on accessibility by encouraging participation from many disciplines; represented in the following discussion and paper abstracts.

1. DISCUSSION HIGHLIGHTS

1.1 Engineering Client Systems

The participants discussed their experiences of how technologies have evolved to support non-visual browsing of Web pages. This included a test of 11 sites between 1997-2005 concluding that the number of images on pages have increased four times but the number of provided ALT tags has decreased. Focuses of concern included the problem of time taken to read a page. For example, our keynote speaker Chieko Asakawa presented a new tool ‘aDesigner’ which encodes an algorithm to calculate how long it takes for a speech engine to read a page. This is quite useful to make designers realise the problems with long or badly structured Web pages. Participants also discussed that the Web is not now a

document based system but is becoming an ever more visual application environment, with utilities such as interactive maps being created. The question raised was how are we going to support interactivity with these applications in alternative forms (e.g., audio)? Delegates stressed the importance of transcoding systems providing the opportunity to design content once and present it in different ways.

Indeed, two different approaches were presented for transcoding Web pages: (a) an approach based on identifying templates of document types and (b) an heuristic approach for identifying the main content of Web pages. The results of an usability evaluation based on such transcoding systems were also presented. This study was interestingly questioning whether universal usability can ever be achieved: Can a Web page be created that meets the requirements of different user groups?

What's the Web Like if You Can't See It?

Chieko Asakawa

(<http://doi.acm.org/10.1145/1061811.1061813>)

Awareness of the Web accessibility is spreading all over the world among Web designers and developers, due to regulations and various guidelines, such as the US law called Section 508 and W3C WCAG. We now see various Web accessibility adaptations on the Web. For example, we see increasing use of alternative texts for images and skip-navigation links for speed. However, we sometimes find inappropriate ALT texts and broken skip-navigation links, even though they are present. These pages may be compliant, but they are not accessible or really usable. We analyzed such problems and found that some sites only try to comply with regulations and guidelines, but without understanding the needs underlying Web accessibility.

We concluded that Web designers and developers should experience the real problems faced by people with disabilities so they can create truly accessible and usable pages. There was no practical way for them to experience disabilities. In this paper, we first discuss how much and how well the Web accessibility has progressed by analyzing real world improvements to existing sites. We then describe why the "disability experience" helps give a better understanding of the Web accessibility guidelines and regulations. Some tools like Home Page Reader and aDesigner are available to let designers experience blind users' usability. Finally, we consider how visually attractive sites can also be made more accessible.

Do Text Transcoders Improve Usability for Disabled Users?

Giorgio Brajnik, Daniela Cancila, Daniela Nicoli and Mery Pignatelli

(<http://doi.acm.org/10.1145/1061811.1061814>)

Although the potential benefits of text transcoders are multifaceted, at the moment their impact on disabled web users is not clear. This paper describes an experiment aimed at evaluating usability of web pages processed by a text transcoder and used by disabled persons. Results based on subjective and objective data show how usability changes.

AcceSS: Accessibility Through Simplification and Summarization

Bambang Parmanto, Reza Ferrydiansyah, Andi Saptono, Lijing Song, Wayan Sugiantara and Stephanie Hackett

(<http://doi.acm.org/10.1145/1061811.1061815>)

The goal of this project is to make the Web more accessible by providing some of the features naturally available to sighted users to users with visual impairments. These features are direct access and gestalt understanding, which can emerge from simplification and summarization. Simplification is achieved by retaining sections of the web page that are considered important while removing the clutter. The purpose of summarization is to provide the users with a preview of the web page. Simplification and summarization are implemented as a "guide dog" that helps users navigate the entire web site.

Extracting Content from Accessible Web Pages

Suhit Gupta and Gail Kaiser

(<http://doi.acm.org/10.1145/1061811.1061816>)

Web pages often contain clutter (such as ads, unnecessary animations and extraneous links) around the body of an article, which distracts a user from actual content. This can be especially inconvenient for blind and visually impaired users. The W3C's Web Accessibility Initiative (WAI) has defined a set of guidelines to make web pages more compatible with tools built specifically for persons with disabilities. While this initiative has put forth an excellent set of principles, unfortunately many websites continue to be inaccessible as well as cluttered. In order to address the clutter problem, we have developed a framework that employs a host of heuristics in the form of tuneable filters for the purpose of content extraction. Our hypothesis is that automatically filtering out selected elements from websites will leave the base content that users are interested in and, as a side-effect, render them more accessible. Although our heuristics are intuition-based, rather than derived from the W3C accessibility guidelines, we imagined however that they would have little impact on web pages that are fully compliant with the accessibility guidelines. We were wrong: some (technically) accessible web pages still include significant clutter. This paper discusses our content extraction framework and its application to accessible web pages.

1.2 Engineering Guidelines

The participants agreed that having only content accessibility guidelines is not enough to ensure accessibility of Web pages. This is a simplistic approach as it suggests that only designers or content producers are responsible from the accessibility of Web pages. Our keynote speaker Wendy Chisholm stressed the importance of this and presented the interdependent components of Web accessibility. These components include content (the information in a Web page or application), developers (people who create content by using authoring or evaluation tools) and users (people who use user agents to get and interact with the content). Being aware of these components is crucial to promote better engineering solutions to Web accessibility issues. Previously guidelines were feared and not particularly testable but movement is now being made towards having more robust techniques. Moreover, there is an important effort to support people using the guidelines

consistently by providing test cases, concrete examples and success criteria, etc. From the designers perspective education and outreach are important factors for guidelines incorporation. The challenge has moved on from guidelines creation and publication through making designers aware of guidelines and facilitating their use. An activity towards this was presented which shows how guidelines can be formalised for applying them easily and consistently. Another related activity is also presented which shows how these guidelines can be adapted to meet specific needs of different countries.

Interdependent Components of Web Accessibility

Wendy A. Chisholm and Shawn Lawton Henry
(<http://doi.acm.org/10.1145/1061811.1061818>)

The Web is providing unprecedented access to information for people with disabilities. However, we have much work to do: the majority of existing Web content is not fully accessible; browsers, multimedia players and assistive technologies do not yet provide a completely usable and accessible experience; and authoring tools and development environments (including content management systems such as blogging applications) do not produce fully accessible Web content and do not have accessible interfaces. Until people with disabilities are able to both access and contribute to the Web, the Web is not accessible. This presentation will show how Web accessibility depends on several components of Web development and interaction working together. It will also demonstrate the essential relationship between the WAI guidelines: Web Content Accessibility Guidelines (WCAG), Authoring Tool Accessibility Guidelines (ATAG), and User Agent Accessibility Guidelines (UAAG). Engineering accessible design requires all of these pieces to be operating together.

Web Composition with WCAG in Mind

Vicente Luque Centeno, Carlos Delgado Kloos, Martin Gaedke and Martin Nussbaumer
(<http://doi.acm.org/10.1145/1061811.1061819>)

Accessibility should be a part of the Web design process instead of being a post-design repair process. Thus, it should be more integrated within the internal authoring tools' mechanism of generating new Web contents. Web composition, when creating Web pages from data extracted from heterogeneous or external sources, should have accessibility into account in order to guarantee that the final page being constructed is accessible. This paper presents the rules that, in a composition process, a design tool must guarantee in order to create accessible Web pages. We also present WSLs as an accessibility enabled authoring tool that makes this task feasible, and focus in how this tool incorporates accessibility into the process of generating new Web contents.

Forcing Standardization or Accommodating Diversity?: a Framework for Applying the WCAG in the RealWorld

Brian Kelly, Lawrie Phipps, David Sloan, Helen Petrie and Fraser Hamilton
(<http://doi.acm.org/10.1145/1061811.1061820>)

Since 1999 the W3C's Web Content Accessibility Guidelines (WCAG) have provided a solid basis for implementation of accessible Web design. However it is argued that in the context of evaluation and policymaking, inappropriate reference to the WCAG may lead

to serious practical difficulties in implementation and monitoring of an effective accessibility policy. There is a pressing need for a framework that guides appropriate application of the WCAG in a holistic way, taking into account the diversity - or homogeneity - of factors such as context of use, audience and audience capability, and access environment. In particular, the current promotion of W3C technologies at the expense of widely used and accessible proprietary technologies may be problematic, as is the apparent reliance of the WCAG on compliant browsing technology. In this paper, a holistic application of the WCAG is proposed by the authors, whereby the context of the web resource in question and other factors surrounding its use are used to shape an approach to accessible design. Its potential application in a real world environment is discussed.

An Active Step Toward a Web Content Accessible Society

Joonho Hyun, Doojin Choi and Sukil Kim

(<http://doi.acm.org/10.1145/1061811.1061821>)

In this paper, we discuss Korean Web Content Accessibility Guideline 1.0 (KWCAAG 1.0) enacted in late 2004. KWCAAG 1.0 consists of 14 checkpoints that are categorized into 4 principles, similar to WCAG2.0 working draft as of June 2003. Several Priority 1 checkpoints of W3C WCAG 1.0 and guidelines of Section 508 were not included in KWCAAG 1.0, as they were not applicable to Korean circumstances, wherein fancy images and fantastic animation elements are widely used to design web pages.

1.3 Engineering Design

In this session, the participants gained a perspective from those designers present, who's message was that we need to support accessibility without scarifying visual design. As our keynote Eric Meyer highlighted that we are not looking for a complete solution to Web accessibility but with technologies such as CSS we can make a huge step to realise this. The importance of interdependent components of Web accessibility was also highlighted in this session. Although CSS provides a lot of features to support accessibility, some components are still not accessible because assistive technologies do not currently support them.

One of our presenters provided an insight by claiming that assistive technologies work with limited and platform dependent APIs in consequence their support is limited. He also pointed out that assistive technologies will always have the disadvantage of being platform specific unless a platform independent API is created. Furthermore, our participants thought that documents are becoming semantically rich which will eventually provide better accessibility, and that is especially the case if we 'Push mark-up into more semanticity'.

Finally, in this session, the participants discussed the need of having audio browsers rather than screen readers which can do a better job in rendering pages in audio. They concluded that the audio styling of documents is as important as the visual styling for presentation.

Is Accessible Design a Myth?

Eric A. Meyer

(<http://doi.acm.org/10.1145/1061811.1061823>)

In this paper, I examine the historical attempts to create visual designs that are still accessible to handicapped users and assess the current state of accessible design. This is followed by a critical look at current assistive technologies, and a set of recommendations for future work in this area.

Platform Independent Accessibility API: Accessible Document Object model

Andres Gonzalez and Loretta Guarino Reid

(<http://doi.acm.org/10.1145/1061811.1061824>)

This paper addresses the problem of supporting accessibility in applications that run in multiple operating environments. It analyzes the commonalities of existing platform-specific Accessibility APIs, and defines a platform-independent accessibility API, the Accessible DOM. The Accessible DOM encompasses the features of existing APIs and overcomes the limitations of existing APIs to express dynamic, complex document contents. The Accessible DOM can be used to support existing and future platform-specific accessibility APIs. It will also allow the development of platform-independent accessibility clients.

Designing Learning Systems to Provide Accessible Services

Pythagoras Karampiperis and Demetrios Sampson

(<http://doi.acm.org/10.1145/1061811.1061825>)

The need for providing learners with web-based learning content that match their accessibility needs and preferences, as well as providing ways to match learning content to user's devices has been identified as an important issue in accessible educational hypermedia literature. Several initiatives already exist trying to provide accessible web-based learning environments addressing a broad range of access needs and requirements. However, the design and development of web-based learning environments for people with special abilities has been addressed so far by the development of hypermedia and multimedia based educational content that is specially designed for the user targeted group, as well as the use of dedicated infrastructure supporting the delivery of learning content. Such approaches not only prevent their user groups (learners and their tutors) from accessing other available resources, but also keep them dependent from the specific e-learning platform, since the supported hypermedia content and learning scenarios are a-priori designed for the targeted user group. In this paper we address the need for an architectural definition of a web-based learning system that satisfies the design steps and requirements identified following the current state-of-the-art accessibility approaches and techniques, as well as the need to define an accessibility application profile for enabling the formalization of learning object accessibility properties, in order to match learning content with learner accessibility preferences.

Automatic Accessibility Evaluation of Dynamic Web Pages Generated Through XSLT

Andre Freire and Renata Pontin de Mattos Fortes
(<http://doi.acm.org/10.1145/1061811.1061826>)

Web Accessibility has been an increasing research area, and much effort has been spent to develop methods for authoring and evaluating Web pages using accessibility guidelines and standards, like authoring tools and automatic evaluation tools. The evaluation of dynamic Web pages is a problem until unsolved in the field of automatic evaluation tools, since the current evaluators are able only to evaluate static Web pages. Stone and Dhiensa have addressed this problem, and proposed a method for evaluating the accessibility of dynamic Web pages using a generalized page which contains all possible outputs that can be generated by a script. In this paper, we discuss another method for evaluating the accessibility of dynamic Web pages generated using XML and XSLT, which would work by analysing a XSLT using a structure descriptor such as DTD or XSD to determine the different types of XML documents that can be generated. Some examples of the use of this method are shown, and future work are discussed.

1.4 Evaluating Accessibility

In the first half of this session, a conceptual framework was presented for designing pages for cognitively disabled users. This framework discusses issues such as functionality and simplicity and encapsulates a systemic approach to evaluate pages. In the second half, the participants mainly discussed issues regarding semantic mark-up. They agreed that semantic mark-up does not only need to be about describing content but it can also be about storing evaluation results in a semantically reach way to support better usage of these results. Such an approach is presented by the W3C Evaluation and Repair Tools Working Group, which is called 'EARL'.

A Conceptual Framework for Accessibility Tools to Benefit Users with Cognitive Disabilities

Paul Ryan Bohman and Shane Anderson
(<http://doi.acm.org/10.1145/1061811.1061828>)

The authors present a conceptual framework which tool developers can use to chart future directions of development of tools to benefit users with cognitive disabilities. The framework includes categories of functional cognitive disabilities, principles of cognitive disability accessibility, units of Web content analysis, aspects of analysis, and realms of responsibility.

Mozilla Accessibility on Unix/Linux

Louie Zhao, Jay Yan and Kyle Yuan
(<http://doi.acm.org/10.1145/1061811.1061829>)

Web accessibility has been developed in recent years. Mozilla, as the most important open source web browser, has also increased to support web accessibility significantly. Since Mozilla is designed to be cross-platform, accessibility support differs on different platforms (e.g. Unix, Window, Mac). This paper aims at Mozilla accessibility support on

Unix/Linux platforms. This presentation looks at GNOME desktop accessibility first, which is the base of the development of Mozilla accessibility on Unix/Linux platform; Then the accessibility architecture of Mozilla on Unix/Linux is introduced; this paper also analyses the difference of accessibility between Mozilla and other GNOME applications and the difference of accessibility between on Window and on Unix/Linux. At last, this paper presents some suggestion on web developer and some future development.

Semantic Web Enabled Web Accessibility Evaluation Tools

Shadi AbouZahra

(<http://doi.acm.org/10.1145/1061811.1061830>)

Evaluating Web sites for accessibility remains an effort intensive process. Potentially, evaluation tools can significantly improve the efficiency and quality of Web accessibility evaluations but the currently available tool market only provides little or no consistency in the reliability and performance amongst these tools. In fact, in some cases evaluation tools may be confusing or misleading to users with little or no experience in Web accessibility. This paper will highlight how the utilization of Semantic Web technologies in evaluation tools can facilitate the exchange of evaluation data between tools and hence provide new approaches to support designers, content authors, programmers, quality assurance reviewers, project managers, or other users in accomplishing their respective tasks during the development and maintenance of accessible Web sites. Furthermore, this paper will also highlight some additional usages of Semantic Web enabled Web accessibility evaluation tools beyond the scope of evaluation processes.

2. RESEARCH CHALLENGES

The workshop closed with a panel session and free discussion. The panel comprised: Chieko Asakawa, Wendy A. Chisholm, Eric A. Meyer, and Paul Ryan Bohman. This session provided an enjoyable and productive dialogue and the following challenges and views were highlighted:

1. Engineers should confine themselves to quality tool creation to support the author / designer / content producer.
2. Designers also need to know their tools while at the same time knowing the properties of the medium – inevitably this will involve some engineering.
3. Guidelines are important, and so is standardisation, however the participants agreed that it is necessary to use guidelines as part of a range of accessibility measures;
4. The panel concluded that engineers and designers need to talk and educate each other.

Finally, the session identified some future directions and challenges that need to be addressed:

1. Engineering tools can sometimes be a barrier to accessibility. This is because these tools either do not support accessibility or are not implemented in a way so as to encourage the designer to think accessibly. Can these tools do changed or re-implemented to counter this?

2. Advanced Transcoding using templates and filters including CSS and genre based Web-page classification will move the responsibility from Web page designers to tool designers, so the question should be how can we provide supporting tools to aid the design effort?
3. The mobile Web will become important over the next year. How can the device independence angle be leveraged to create accessible mobile and static Web-pages?
4. Is universal design an appropriate model (Usability Engineering)? If not, how can the accessibility community communicate with the design community to eradicate misconceptions from both parties?

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