

Building the Mobile Web: Rediscovering Accessibility?

W4A – International Cross-Disciplinary Workshop on Web Accessibility Workshop Report – 2006

Simon Harper, Yeliz Yesilada, and Carole Goble

University of Manchester,
School of Computer Science,
Manchester. M13 9P
United Kingdom.

Abstract

The Third W4A International Cross-Disciplinary Workshop on Web Accessibility was held on Monday 22nd and Tuesday 23rd May 2006 as part of the Fifteenth International World Wide Web Conference (WWW2006) located at the Edinburgh International Conference Centre. We ran over 2 days, welcomed 73 attendees, and were the biggest workshop at the conference. We accepted 41.6% of all submissions, each paper was peer reviewed by three of our programme committee. We published ISBN'ed proceedings as part of the ACM Digital Library, and eight of our authors have been invited to submit extended papers to the Springer Journal, Universal Access in the Information Society. Comments from our attendees, and our workshop evaluation questionnaires, suggested that they enjoyed the workshop and would be participating again next year. Our social programme also attracted 20 of our delegates. Overall we judge the workshop to be a great success.

Overview

After the launch of the Mobile Web Initiative at the World Wide Web Conference 2005 we are beginning to realise that, today, mobile Web access suffers from interoperability and usability problems that make the Web difficult to use. With the move to small screen size, low bandwidth, and different operating modalities, technology is in effect simulating the sensory and cognitive impairments experienced by disabled users within the wider population of mobile device users. In this our third Workshop we asked the question:

“Is engineering, designing, and building for the mobile Web just a rehash of the same old Web accessibility problems?”

Discussion highlights

We wanted to bring together different communities working on similar problems to share ideas, discuss overlaps, and make the fledgling mobile Web community aware of accessibility work that may have been overlooked. We asked ‘is designing for accessibility and small screened devices really the same thing requiring the same solutions and can we work together to solve these problems?’ What can the Mobile Web learn from the Accessible Web and what resources created to support the Accessible Web can be used by designers in their support of the Mobile Web? To cross-pollinate do we

need to rethink our view of accessibility? Therefore, our workshop brought together a cross section of designers, engineers, and practitioners working on both the Accessible and Mobile Webs; to report on developments, discuss the issues, and suggest cross-pollinated solutions.

Designing for accessibility

How can we assist the design of mobile Web, and therefore accessible Web, applications? Can our technology for supporting designers and re-configuring pages be used to assist the mobile Web effort? These two questions formed the focus for this first session of the workshop. These topics were placed in context by our session keynote, Sarah Horton (Dartmouth College), who ably related accessibility in the virtual to accessibility in the real worlds. By investigating real world solutions we can understand the design processes used by authors, and hopefully assist and support these processes. In brief, our presentations and discussions focused on how to support designers in building semantic information into resources. We focused on concepts such as importance, personalisation, and navigation, while understanding that reverse engineering methods may be necessary to assist the designer in building technically correct pages without changing the visual rendering.

Client-side accessibility

Client-side accessibility is obviously seen as a major topic within the Web accessibility community. With this in mind, we were interested in hearing the views of our second keynote, Aaron Leventhal (IBM), regarding the need for structure, and structural semantics in Web pages, if client-side agents are to interpret structure in any meaningful way. Indeed, this theme continued with work presented on the use of semantics to represent the structure of SVG and graphical components. Finally, we discussed two pieces of work, both looking at user agents from the different angles of voice browsing and Asian language.

Mobile Web/accessibility overlaps

The mobile Web was one of the main focuses of this workshop and so this session was devoted to an understanding of accessibility problems from the viewpoint of device independence. As such our third keynote, Rhys Lewis (W3C Device Independence Working Group), was very well received by our attendees. In discussing the requirements of device independence, the similarities with access technology and problems faced by disabled users started to become apparent. The supporting three papers in this session all built on the mobile theme, and investigated how to convey search results with limited screen real estate, how to process, integrate and deliver RSS feeds to small screen devices, and finally, how to adapt standard presentation onto small screen devices.

Understanding accessibility

Donna Smillie (RNIB) presented our fourth and final keynote by attempting to decide if we, as a community, were just going around the same old loops, she concluded that in reality it was more like a spiral. In this case we may cover similar ground but we learn more from the activity and so begin to focus our research and build better tools and technologies. We also considered techniques for assisting disabled students on the Web,

and semantic frameworks for developing accessibility technology. We concluded this session with a short paper which is one of the first to investigate physical disability and conflate it with temporary physical disability experienced by mobile Web browsers.

Practice-related

Our final technical session was focused on practice, best practice and related topics. Here we looked at the practical interface to research and opened with a presentation concerning an eye-tracking study, which while interesting in its own right, was focused on using visual cues to aid the transcoding of Web pages. We also received a call for less prescriptive Web standards and guidelines and to make sure we tailored our standards to the user, not expect the designer, ergo user, to conform to all guidelines. This dovetailed nicely into a discussion of the bespoke guidelines developed for the Taiwanese government. We concluded this session with an interesting look at how camera technology is assisting users with low writing, and accounting skills to access technology throughout India.

Research challenges

The technical workshop closed with a panel session and free discussion. The panel comprised: Sarah Horton, Aaron Leventhal, Rhys Lewis, and Donna Smillie. This session provided an enjoyable and productive dialogue and the following challenges and views were highlighted:

- (1) We decided that in effect the mobile Web was rediscovering the tools and techniques used in Web accessibility, but that Web accessibility could learn and benefit from the mobile Web. The panel agreed that mobile users were in a similar situation to visually disabled users and users with motor impairments, when using the mobile Web;
- (2) Our participants likewise agreed that the mobile Web could easily become the business case for Web Accessibility, and that by helping to build the mobile Web we could also get enhanced accessibility;
- (3) We found that there are commonalities between the mobile and accessible Webs, and that these commonalities centred around user interaction in constrained sensory and physical modalities;
- (4) We found that there are differences between these 'two' Webs. These are mainly focused on the learnt behaviours, coping strategies and the level of need, to complete a task, experienced by each user group; and finally,
- (5) We felt that due to the similarities lessons learnt and experiences gained from Web accessibility be applied, to great effect on to the mobile Web.

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

- (1) Our forum thought that there was a general trend in joining up the main different Webs, the semantic, the mobile, the accessible, for instance;
- (2) With the conflation of technologies must come the conflation of guidelines and best practice;

- (3) More accessibility researchers need to become part of the guiding bodies for Web technology standards; and that,
- (4) By making our tools and techniques more general we have the ability to build accessibility into the Web while our tools are actually used for assisting business factors, perceived to be more important by companies.

Practice tutorial / working sessions

In this year's workshop, we included a practice focused Tutorial / Working Session divided into three talks. The first was by Julie Howell (RNIB), who explained the new PAS 78 Guide to Good Practice in Commissioning Accessible Websites. PAS 78 is UK centric and gives recommendations for the management of the process of, and guidance on, upholding existing W3C guidelines and specifications. For, involving disabled people in the development process and using the current software-based compliance testing tools that can assist with this. It is applicable to all public and private organizations that wish to observe good practice under the existing voluntary guidelines and the relevant legislation on this subject and is intended for use by those responsible for commissioning public-facing websites and web-based services.

Next Chris Rourke of 'UserVision' spoke to us regarding 'Accessibility beyond the Guidelines'. In this talk he reviewed some of the more common usability barriers for disabled users that are not accounted for by the WCAG, as well as issues that may be introduced by certain interpretations of the guidelines.

Finally, Martin Sloan (Brodies Solicitors) who specialises in the legal issues behind Web accessibility gave us a talk and discussion on law and the Web. Here Martin described how the UK Disability Discrimination Act requires that a service provider must not provide a lower standard of service to a disabled person, compared to that offered to an able-bodied person. Thus, where a retailer offers an ecommerce facility in addition to its high street shop, the Web site must not be inaccessible because then the disabled person will be unable to enjoy the convenience of home shopping and will thus be subject to a lower standard of service, thereby breaking the legislation.

Finally, we moved to the 'Scottish Enterprise Edinburgh and Lothian' offices for a joint event with the Scottish Usability Professional's Association. Here we welcomed speakers from the W3C's Web Accessibility Initiative (WAI), who introduced us to several new resources to help make our Web site accessible.

Acknowledgments

Many people contributed to the success of the program. We would like to thank the programme committee for their exceptional work and dedication in the review process. We would also like to thank the authors for their excellent work and delegates for their participation. Finally, we would like to thank our supporters: ACM SIGACCESS; ACM SIGWEB; IBM Research; ACM SIGMOBILE and the Zakon Group. It is our sincere hope that the W4A will continue to provide an excellent form for researchers and practitioners of the accessibility and design communities to exchange ideas and to help grow this community together.

ABSTRACTS

Designing Beneath the Surface of the Web

Sarah Horton (<http://doi.acm.org/10.1145/1133219.1133221>)

At its most basic, the web allows for two modes of access: visual and non-visual. For the most part, our design attention is focused on making decisions that affect the visual, or surface, layer colours and type, screen dimensions, fixed or flexible layouts. However, much of the power of the technology lies beneath the surface, in the underlying code of the page. There, in the unseen depths of the page code, we make decisions that influence how well, or poorly, our pages are read and interpreted by software. In this paper, we shift our attention beneath the surface of the web and focus on design decisions that affect non-visual access to web pages.

Opening up Access to Online Documents using Essentiality Tracks

Matthew T. Atkinson, Jatinder Dhiensa and Colin H. C. Machin

(<http://doi.acm.org/10.1145/1133219.1133222>)

This paper discusses extensions to the previously developed “essentiality and proficiency” approach to increasing usability and accessibility of websites. The existing approach is introduced, as is a new application in the processing of DocBook XML documents. The current principles are extended to make them more appropriate for increasing the usability of long documents. Techniques for allowing organisations to efficiently disseminate information based on the proposed application are discussed – increasing productivity for both non-disabled and disabled users.

Transforming Web Pages to Become Standards-Compliant through Reverse Engineering

Benfeng Chen and Vincent Y. Shen (<http://doi.acm.org/10.1145/1133219.1133223>)

Developing Web pages following established standards can make the information more accessible, their rendering more efficient, and their processing by computer applications easier. Unfortunately, more than 95% of the existing Web pages today are not “valid” in that they do not follow some of the recommendations (standards) of the World Wide Web Consortium (W3C). Fixing any Web page to make it standard compliant is a major undertaking. There is now an open-source tool called HTML Tidy which will attempt to fix the invalid HTML code automatically. However, Tidy often changes the Web pages appearance after processing. It is not an effective tool to transform existing Web pages to make them standards-compliant. In this paper we report the design and implementation of PURE, a tool that cleans up an HTML document through reverse engineering. PURE starts with the rendering result of a given Web page and generates valid HTML code and CSS automatically to produce the same appearance. It is found to be effective for many existing Web pages. A prototype is now available for public testing and comments.

Personalizable Edge Services for Web Accessibility

Gennaro Iaccarino, Delfina Malandrino and Vittorio Scarano
(<http://doi.acm.org/10.1145/1133219.1133224>)

Web Content Accessibility guidelines by W3C provide several suggestions for Web designers on how to author Web pages in order to make them accessible to everyone. In this context, we are proposing the use of edge services as an efficient and general solution to promote accessibility and breaking down the digital barriers that inhibit users with disabilities to actively participate to any aspect of our society. To this aim, we present in this paper PAN: Personalizable Accessible Navigation, that is a set of edge services designed to improve Web pages accessibility, developed and deployed on top of a programmable intermediary framework. The characteristics and the location of the services, i.e. provided by intermediaries, as well as the personalization and the opportunities to select multiple profiles make PAN a platform that is especially suitable in accessing the Web seamlessly also from mobile terminals.

Structure Benefits All

Aaron Leventhal (<http://doi.acm.org/10.1145/1133219.1133226>)

Accessibility for the Dynamic Web is now possible due to new standards being developed at the W3C and being implemented in Firefox. The technology allows today's web pages to contain additional markup describing semantics. An often-cited benefit of this technology is the ability to describe scripted widgets with dynamic behaviour. However, another major benefit is to differentiate the sections of a web page, via human-readable labels or predefined semantics such as main, contentinfo, navigation and search. Marking the sections of a web page offers significant improvement for users who need access to today's web with a small device or an assistive technology.

Capability Survey of Japanese User Agents and Its Impact on Web Accessibility

Takayuki Watanabe and Masahiro Umegaki
(<http://doi.acm.org/10.1145/1133219.1133227>)

Capabilities of major Japanese user agents, three screen readers and one voice browser, were investigated with the following test files: W3C UAAG 1.0 Test Suite for HTML 4.01, an accessible PDF file, an accessible Flash file, and test files which test Japanese specific issues. Using the UAAG 1.0 Test Suite, 20 out of 48 Priority 1 checkpoints were met by all user agents, while all of the user agents failed to meet 11 of the checkpoints. Test results of all test files were assigned into three categories: capabilities satisfied by almost all user agents, capabilities not satisfied by any of the user agents, and capabilities that were satisfied by some of the user agents only. The test results indicated that 1) two major Japanese user agents do not have enough functions to navigate through a Web page using the structure information of the content, and 2) none of the user agents have enough functions to control multimedia and time-dependent interactions. These results provide an objective evidence to define the Japanese baseline, a set of technologies that a user agent is assumed to support, which is required in the WCAG 2.0 working draft. Accessibility responsibility between Web content and user agents is also determined by the current survey.

Dialog Generation for Voice Browsing

Zan Sun, Amanda Stent and I. V. Ramakrishnan
(<http://doi.acm.org/10.1145/1133219.1133228>)

In this paper we present our voice browser system, HearSay, which provides efficient access to the World Wide Web to people with visual disabilities. HearSay includes content-based segmentation of Web pages and a speech-driven interface to the resulting content. In our latest version of HearSay, we focus on general-purpose browsing. In this paper we describe HearSays new dialog interface, which includes several different browsing strategies, gives the user control over the amount of information read out, and contains several different methods for summarizing information in part of a Web page. HearSay selects from its collection of presentation strategies at run time using classifiers trained on human-labelled data.

GraSSML: Accessible Smart Schematic Diagrams for All

Z. Ben Fredj and D.A. Duce (<http://doi.acm.org/10.1145/1133219.1133229>)

Graphical representations are a powerful way of conveying information. Their use has made life much easier for most sighted users, but people with disabilities or users who work in environments where visual representations are inappropriate cannot access information contained in graphics, unless alternative descriptions are included. We describe an approach called Graphical Structure Semantic Markup Languages (GraSSML) which aims at defining high-level diagram description languages which capture the structure and the semantics of a diagram and enable the generation of accessible and “smart” presentations in different modalities such as speech, text, graphic, etc. The structure and the semantics of the diagram are made available at the creation stage. This offers new possibilities for allowing Web Graphics to become “smart”.

The Meaning of ‘Life’: Capturing Intent from Web Authors

Rhys Lewis (<http://doi.acm.org/10.1145/1133219.1133231>)

Interest in accessing the Web from small, mobile devices, such as cell phones, is increasing rapidly. The challenge of delivering content to such devices is similar in many ways to the challenge of delivering it to users with disabilities. There is a real synergy between these use cases which offers the hope that solutions applicable to one will also be applicable to the other. This presentation will examine the ways in which recent work in standards, being driven by the need to support mobile Web users, may also help to improve accessibility.

Evaluating Interfaces for Intelligent Mobile Search

Karen Church, Barry Smyth and Mark. T. Keane
(<http://doi.acm.org/10.1145/1133219.1133232>)

Recent developments in the mobile phone market have led to a significant increase in the number of users accessing the Mobile Internet. Handsets have been improved to support a diverse range of content types (text, graphics, audio, video etc.), infrastructure investments have delivered improved bandwidth, and changes to billing models offer users much greater value for content. Today large numbers of users are moving away from browsing operator portals and towards off-portal search, leading to a growing need

for mobile specific search engine technologies. In this paper we argue that existing mobile search engines are unlikely to offer an adequate service for mobile searchers. Most borrow traditional query-based search and list-based result presentation formats from Web search and as such are not well optimised for the input and display features of mobile devices. For example, many simply attempt to translate Web content for the mobile space which is not appropriate. In this paper we evaluate an alternative strategy which replaces the usual result snippet with a more economic alternative that is composed of the keywords used in related queries. We argue that this alternative is better suited to the display characteristics of mobile devices, without compromising the informativeness of result snippets.

Use of RSS feeds for Content Adaptation in Mobile Web Browsing

Alexander Blekas, John Garofalakis and Vasilios Stefanis
(<http://doi.acm.org/10.1145/1133219.1133233>)

While mobile phones are becoming more popular, wireless communication vendors and device manufacturers are seeking new applications for their products. Access to the large corpus of Internet information is a very prominent field; however the technical limitations of mobile devices pose many challenges. Browsing the Internet using a mobile phone is a large scientific and cultural challenge. Web content must be adapted before it can be accessed by a mobile browser. In this work we build on the proxy server solution to present a new technique that uses Really Simple Syndication (RSS) feeds for the adaptation of web content for use in mobile phones. This technique is based in concrete design guidelines and supports different viewing modes. Experimentation shows a significant decrease in the transformed content of about 80% in size facilitating cost-effective web browsing.

A Web Browsing System based on Adaptive Presentation of Web Contents for Cellular Phones

Yuki Arase, Takuya Maekawa, Takahiro Hara, Toshiaki Uemukai and Shojiro Nishio
(<http://doi.acm.org/10.1145/1133219.1133234>)

Cellular phones have already been widely used to access the Web. However, most existing Web pages are designed for desktop PCs, and thus, it is inconvenient to browse these large Web pages on a cellular phone with a small screen and poor interfaces. Users who browse a Web page on a cellular phone have to scroll the whole page to find an objective content, and then, have to scroll within the content in detail to get useful information. In this paper, we propose a novel browsing system to break off these burdensome operations by adaptively presenting Web contents according to their characteristics.

Web Accessibility: is it just a “Merry-go-round”?

Donna Smillie (<http://doi.acm.org/10.1145/1133219.1133236>)

While many of the issues that are being raised in relation to mobile web accessibility are similar or the same to those that have been promoted over the past few years in relation to mainstream web accessibility, that doesn't necessarily mean that were simply going over old material. Rather, it provides a jumping off point for mobile web accessibility. In turn,

the differences in emphasis which result from the specific constraints of mobile devices could be crucial in highlighting some aspects of accessibility which, until now, have been neglected.

Automatically Producing IMS AccessForAll Metadata

Matteo Boni, Sara Cenni, Silvia Mirri, Ludovico Antonio Muratori and Paola Salomoni
(<http://doi.acm.org/10.1145/1133219.1133237>)

Accessible e-learning is becoming a key issue in ensuring a complete inclusion of people with disabilities within the knowledge society. Many efforts have been done to include accessibility information in e-learning metadata and the major result consists in the IMS AccessForAll Metadata definition. Unfortunately the complex behaviour managed by this standard could be perceived by authors as a new boring and difficult activity enforcing the idea that the production of accessible Learning Objects (LOs) is too complex to be accomplished. This paper presents a novel component of an authoring and producing software architecture, designed and implemented to automatically create the IMS AccessForAll Metadata description of an accessible LO.

A Semantic-Web based Framework for Developing Applications to Improve Accessibility in the WWW

Christos Kouroupetroglou, Michail Salampasis and Athanasios Manitsaris
(<http://doi.acm.org/10.1145/1133219.1133238>)

One of the biggest issues the World Wide Web (WWW) community has to overcome is accessibility for all. The rapid expansion of the WWW using problematic web authoring practices, together with the dominance of the desktop metaphor in web page design has raised many WWW accessibility problems for people with disabilities. In this paper we present a what may be termed as a "Semantic Web application framework" which allows different applications to be designed and developed for improving accessibility of the WWW. Apart from the architecture, the tools and the technologies that compose the framework, the key idea of the framework is that it aims at promoting the idea of creating a community of people federating into groups each playing a specific role: ontology creators creating concepts using an ontological approach to describe various elements of the WWW, annotators using concepts to annotate specific pages, user-agent developers creating tools based on the framework, and finally end-users (people with disabilities) that use these tools for their benefit. Within the proposed framework, these groups cooperate and interact with each other, having as their ultimate goal the improvement of WWW accessibility.

Physical Usability and the Mobile Web

Shari Trewin (<http://doi.acm.org/10.1145/1133219.1133239>)

Winner of the 2006 Best Paper Award

This paper examines the degree of overlap between good design for physical ease of access on the Web in general, and design for physical ease of use on the mobile Web. There are marked differences in the basic interaction techniques used and usability issues experienced. As a group, people with physical impairments tend to have a broader range of needs. These differences impact Web page design in various ways. Problems can be

addressed in a unified way by designing for device independence. At least for physical ease of access, a unified set of mobile/accessibility best practice guidelines would be mutually beneficial. This approach may be helpful in preventing fragmentation of the Web.

How People use Presentation to Search for a Link: Expanding the Understanding of Accessibility on the Web

Caroline Jay, Robert Stevens, Mashhuda Glencross and Alan Chalmers
(<http://doi.acm.org/10.1145/1133219.1133241>)

It is well known that many Web pages are difficult to use by both visually disabled people and those who use small screen devices. In both cases there exists a problem of viewing a great deal of information with presentation capabilities reduced from the intended formatted large screen colour display. It is pertinent, however, to ask how the presentation of Web pages on a standard display makes them easier for sighted people to use. To begin to answer this question, we report on an exploratory eye-tracking study that investigates how sighted readers use the presentation of the BBC News Web page to search for a link. We compare the standard page presentation with a “text only” version and observe both qualitatively and quantitatively that the removal of the intended presentation alters “reading” behaviours. The demonstration that the presentation of information assists task completion suggests that it should be reintroduced to non-visual presentations if the Web is to become more accessible. Finally, we propose that models derived from studies that reveal how presentation is used to aid task completion can form the basis for annotation and transcoding of Web pages to present pages in a more usable non-visual form.

Contextual Web Accessibility Maximizing the benefit of Accessibility Guidelines

David Sloan, Andy Heath, Fraser Hamilton, Brian Kelly, Helen Petrie and Lawrie Phipps (<http://doi.acm.org/10.1145/1133219.1133242>)

We argue that while work to optimize the accessibility of the World Wide Web through the publication and dissemination of a range of guidelines is of great importance, there is also the need for a more holistic approach to maximizing the role of the Web in enabling disabled people to access information, services and experiences. The persistently disappointingly low levels of usability of Web content for disabled people indicates that focusing on the adoption of accessibility guidelines by content authors, tool developers and policy makers is not sufficient for a truly inclusive Web. This approach fails to acknowledge the role of the Web as an enabler in a broader context and may stifle creative use of Web content and experiences to enhance social inclusion. Using elearning as an example, and describing current metadata developments, we present a framework that will guide Web authors and policy makers in addressing accessibility at a higher level, by defining the context in which a Web resource will be used and considering how best existing or new alternatives may be combined to enhance the accessibility of the information and services provided by the site in question. We demonstrate how guidelines such as those produced by the W3C’s Web Accessibility Initiative have a role to play within this wider context, along with metadata and user profiling initiatives.

2005 Accessibility Diagnosis on the Government Web Sites in Taiwan, R.O.C.

Yui Liang Chen, Yen Yu Chen and Monica Shao
(<http://doi.acm.org/10.1145/1133219.1133243>)

Improvement in web technology and services along with diversity development has caused a high demand of Internet usage. New web technologies and equipment have opened infinite possibilities for global communication, but these possibilities are limited by various factors such as setting the browser version too high, causing limitations to lower version holders, or making faster speed hard-drives producing delays in lower speed hard-drives. However, the most severe factor limiting web communications performing at full potential is accessibility for the both physically and mentally disabled. The Executive Yuan of the Taiwanese Government has recently pushed forward the idea of Web accessibility in Governments websites. Assessment of 35 websites has shown to pass Priority 1 Level Validation (machine recognition/machine review), of which 28 reached the Conformance Level A+. Apart from the checkpoint numbered 1.8 of machine recognition/machine review that had an increase in failed website percentage, the rest presented a decline in the number of failed websites, which suggested improvements in Web accessibility development in the year 2005. The most commonly seen checkpoint errors were similar in 2004 and 2005, and included checkpoint error numbered 5.5 (Provide summaries for tables), 10.6 (Do not use space to separate adjacent links), 4.3 (Identify the language of the text), 3.5 (Use relative sizing and positioning (% values) rather than absolute (pixels)), 3.3 (Use a public text identifier in a DOCTYPE statement), 1.1 (Provide a text equivalent for every image), and 9.3 (Make sure that event handlers do not require use of a mouse). Comparison between Freego and Bobby validation tools using the 58 checkpoints listed in the Web Accessibility Regulations have shown six checkpoints need to be revised. Five checkpoints were different in Priority Level setup, and one checkpoint numbered 9.3 (Make sure that event handlers do not require use of a mouse) was different in the calculation of number of errors. Apart from that, the 90 checkpoints listed in the Web Accessibility Regulations in Freego, none can be compared with checkpoint number 13.1 (Create link phrases that make sense when read out of context) in Bobby. With these results, it was clear that the Freego Validation Tool needs to be improved, and that Web Accessibility Regulations needs to be discussed further.

Position Paper: Mobile Phones may be the Right Devices for Supporting Developing World Accessibility, but is the WWW the Right Service Delivery Model?

Tapan S. Parikh (<http://doi.acm.org/10.1145/1133219.1133244>)

In this paper we detail the synergies we have observed between the features and limitations of mobile phones, and the usability and accessibility requirements of rural developing world users. This includes support for sequential interaction, multimedia input and output, asynchronous messaging and a universally familiar numeric keypad. However, we argue that the WWW as currently conceived may be an inappropriate model for delivering mobile information services in this context. We highlight a number of tensions we have observed between the traditional web model, and the design synergies that we have uncovered. To demonstrate an alternative framework, we describe CAM — a platform for delivering mobile information services in the rural developing

world. Supporting scripted execution, media-driven, tangible interaction as well as an online usage model, CAM is uniquely adapted both to rural accessibility requirements and the inherent capabilities of mobile phones. By learning from the CAM design, we can either improve the design of existing mobile web standards and services, or implement a more appropriate framework altogether.