



The 14th Web for All Conference

Perth, Australia 2017

<http://www.w4a.info/>



#w4a2017

Endorsed by the IW3C2
International World Wide Web Conference Committee



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Forward

The International Web for All Conference (W4A) began in 2004 as a workshop aiming to make the World Wide Web accessible for people with disabilities. Over the next ten years, the workshop grew into the top conference for web accessibility research, attracting a diverse crowd from academia, industry, government, and non-profit organizations. W4A has become the venue for scientists, students, and practitioners from around the world to showcase their latest research, widen their perspectives through discussions with their peers, and establish future research agendas.

W4A is an influential conference that has a growing impact on the research community. According to the ACM Digital Library Bibliometric, each of W4A's 365 papers is downloaded an average 360 times and has 4.20 citations. This data confirm that W4A does not only provide excellent visibility to papers but also enables strong scientific impact.

Every year, we select a theme that reflects emerging trends in web accessibility and encourages researchers to look for innovative solutions that make the Web accessible for all. Inclusive work environments have the potential to greatly improve the ability of people to obtain and maintain meaningful employment. Organisations and employers are also embracing the benefits of being more inclusive in their human resource management. Given the importance of ensuring everyone has a fair chance of employment, the theme of the 13th International Web for All Conference is "The Future of Accessible Work".

This year, we received 32 submissions from thirteen countries showing steady interest of the research community. The submissions covered a wide range of topics including cloud computing, Internet of Things, mobile technologies and standards and guidelines. Five technical papers and sixteen communication papers were selected through a rigorous peer review process.

This year, W4A will feature three keynote speakers. Alastair McEwin, Australia's Disability Discrimination Commissioner; David Masters, Corporate Affairs Manager at Microsoft Australia and Kevin Carey, chair of the Royal National Institution for the Blind (RNIB). The William Loughborough After Dinner Talk will be given by Dr. Scott Hollier.

Many people have contributed to the success of this conference. We would like to thank the program committee for their exceptional work and dedication in the review process. We would also like to thank the authors for their excellent work and thank delegates for their participation. Finally, we would like to thank our sponsors and supporters: Google; IBM; Intuit; The Paciello Group; Microsoft; bankwest; ai; Capti; WebKeyIT; PEAT; Sheridan College; ATutorSpaces; ACM Digital Library, ACM SIGWEB; and WWW 2017.

Chris Bailey and Voula Gkatzidou, March 2017.



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Conference Program

Sunday April 2, 2017

- W4A 2017 Opening (09:00 – 9:30)
- Keynote (09:30 – 10:30)
 - Alastair McEwin - Working together: technology as the foundation for better employment outcomes for people with disability
- Morning Coffee (10:30 – 11:00)
- Session 1: Accessibility in work and employment (11:00 – 12:30)
- Lunch (12:30 – 14:00)
- Session 2: Accessibility Standards, Processes and Approaches (14:00 – 15:15)
- Session 3: IBM People With Disabilities Award: (15:15 – 15:30)
- Afternoon Coffee (15:30 – 16:00)
- Session 4: Google Doctoral Consortium (16:00 – 16:45)
- W4A Dinner (17:30)
- The “William Loughborough” After Dinner Talk (19:00)
 - Dr. Scott Hollier: Technology, Education and Access: A Fair Go For People with Disabilities

Monday April 3, 2017

- Opening (9:00 – 9:15)
- Keynote (09:15 – 10:30)
 - David Masters – Microsoft’s Journey Towards Inclusion
- Morning Coffee (10:30 – 11:00)
- Session 5: Teaching and Learning (11:00 – 12:00)
- WWW/W4A Hackathon: 12:30 – 17:30
- W4A Camp: 12:30 – 17:30
- WWW Welcome Dinner: 19:00

Tuesday April 4, 2017

- Opening and Poster Session (09:15 – 9:30)
- Keynote (09:15 – 10:15)



- Kevin Carey - Employment in the digital age for people with impairment
- Morning Coffee (10:30 – 11:00) Poster Competition
- Session 6: Evaluating and Measuring Accessibility (11:00 – 12:00)
- Session 7: Accessibility for Diverse Users (12:00 – 12:30)
- Lunch (12:30 – 14:00)
- Session 8: TPG Accessibility Challenge: (14:00 – 15:30)
 - Presentation Session
- Afternoon Coffee (15:30 – 16:00) Poster Competition
- Session 9: TPG Accessibility Challenge (16:00 – 17:00)
 - Demonstration Session
- Session 10: Accessibility for Diverse Users (17:00 – 17:35)
- Awards and Closing (17:35 – 17:45)



Conference Information

Publications

Conference proceedings have the ACM ISBN 978-1-4503-4900-0 and include abstracts and notes sections for all our technical, communications, challenge, doctoral consortium and keynote presentations. The conference proceedings will be published as part of the ACM International Conference Proceedings Series and will be available at the ACM Digital Library.

History

W4A was established in 2004 as a cross-disciplinary conference focusing on research in the area of the Web and accessibility, primarily for people with disabilities. Since then, it has become an established part of the accessibility research calendar, taking place alongside the annual WWW conference. Every year, we welcome between 50-70 attendees, who come from a large number of research institutions around the world, including academia, industry, government, and disability support organizations.

Papers have been typically reviewed by at least three of our program committee members with an average acceptance rate of 35%. Papers of our conference are published in ACM proceedings and in various Special Issues of respected journals within the field. We also solicit sponsorship from the ACM SIGACCESS, ACM SIGCHI, ACM SIGWEB, plus organisations including IBM Research, Adobe, Mozilla Foundation, Google, Microsoft, The Paciello Group and Intuit.

Past Conference Locations:

- W4A 2016, Montreal, Canada
- W4A 2015, Florence, Italy
- W4A 2014, Seoul, South Korea
- W4A 2013, Rio de Janeiro, Brazil
- W4A 2012, Lyon, France
- W4A 2011, Hyderabad, India
- W4A 2010, Raleigh, NC, USA
- W4A 2009, Madrid, Spain
- W4A 2008, Beijing, China
- W4A 2007, Banff, Canada
- W4A 2006, Edinburgh, UK
- W4A 2005, Chiba, Japan
- W4A 2004, New York, NY, USA

Lunch and Coffee

The conference lunch and coffee will be held together with the World Wide Web (WWW) conference. The WWW morning coffee break is scheduled for 10:30-11:00, the lunch for 12:30-14:00 and the afternoon coffee break is scheduled for 15:30-16:00.



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Keynotes

Alastair McEwin



Alastair McEwin is Australia's Disability Discrimination Commissioner. He commenced in this role in August 2016.

Alastair's educational background is in arts, law and business administration. Following his undergraduate studies in Adelaide, he spent time in Vancouver, Canada, pursuing postgraduate studies. Prior to moving to Sydney to commence as a consultant with Accenture, a global management and IT consulting company, he worked as Associate to the Hon. Justice John von Doussa at the Federal Court. Alastair has a strong background in working with non-profit organisations. He was the Executive Director of Community Legal Centres NSW, the peak body for Community Legal Centres in NSW. Other roles include CEO of People with Disability Australia and Manager of the Australian Centre for Disability Law.

Prior to commencing in his current role, he was the Chairperson of the NSW Disability Council, the official advisory board to the NSW Government on disability issues. He was also the President of the Deaf Society of NSW and Chairperson of the Australian Theatre of the Deaf. He has also been the coordinator of the World Federation of the Deaf Expert Group on Human Rights and an adjunct lecturer for the Masters of Community Management degree at the University of Technology Sydney.



David Masters



David Masters is Corporate Affairs Manager at Microsoft Australia. He previously worked on Government Business Strategy and as Government Relations Manager at Hewlett Packard Enterprise.

David will be discussing Microsoft's Journey Towards Inclusion, focussing on how Microsoft is evolving its culture to be more inclusive, including growing the diversity of its workforce to include more people with disabilities. This is driving a wave of innovation at the company focused on supporting people of all abilities to achieve more, particularly focused on ensuring that people with disabilities are supported to fulfil their potential in education and work.

Kevin Carey



Kevin Carey is a Member of the Executive Committee of ICEVI and the Chair of the World Blind Union Technology Committee and of the World Braille Council. He is Chair of the Royal National Institute of Blind people and recently chaired the development of its revolutionary policy for Children, Young People, Their Families, Carers and Educators. From 1994-2000 Carey was the Editor of the British Journal of Visual Impairment (BJVI) and before that, during his employment at SightSavers International he developed educational strategies for visually impaired children in the Caribbean, East, central and Southern Africa and established the first computer-driven braille production system (The Africa Braille Centre, Nairobi) outside the OECD.

Carey, who attended a special primary school for blind children was mainstreamed at secondary level, graduated in History from Cambridge, was a Special Student at Harvard and recently obtained an MA in Systematic Theology from King's London. He is a published novelist, poet and Christian commentator, is a lay minister in the Church of England, sings in two choirs and was for ten years a classical music critic.



Dr. Scott Hollier

The William Loughborough After-Dinner Speaker



The life of Dr Scott Hollier is not what you'd call typical. He is well-educated, has a good job, is a husband and father, is legally blind, loves computers and gadgets, goes to church, and enjoys travel, spending time with friends and following his favourite football team. For most people, the atypical part of this description will be 'legally blind', but from Scott's perspective, it's his traitorous support of a football team outside his home state of Western Australia that makes him stand out from the crowd.

Scott's professional achievements relate to his work as a specialist advisor in the field of digital accessibility and is the author of the book 'outrunning the Night: a life journey of disability, determination and joy'.

With a Ph.D. in Internet Studies and project management experience across the not-for-profit, corporate and government sectors, Scott is an internationally-recognised researcher and speaker.

While his commitment to supporting the needs of people with disabilities is well recognised, it's his other pursuits that often highlight his ability to overcome the little things to achieve the everyday things – be it retro gaming, giving back to the community, running with the Olympic Torch or travelling to all seven continents. Scott's combination of determination, the pursuit of education and the power of current and emerging technologies puts Scott in a unique position to provide guidance on how a person with a disability can not only enjoy life but give back to a joyous, generous world.



W4A/TPG Web Accessibility Challenge

The W4A/TPG Web Accessibility Challenge has been generously sponsored by The Paciello Group, and is offered as a medium for researchers, web developers and software engineers to showcase new and innovative technologies in the area of Web accessibility.

The W4A/TPG Web Accessibility Challenge consists of two prizes: the Judges Award and the Delegates Award. The Judges Award is awarded by a panel of recognised experts from a wide range of sectors covering industry bodies and academic institutions. This year, we are grateful to have Jutta Treviranus (Inclusive Design Research Centre/OCAD University, Toronto, Canada), Jonathan Godfrey (Massey University, Turtitea, New Zealand), Sarah Horton (The Paciello Group), and Armin Haller (Australian National University & W3C) act as judges for the Challenge. We would like to take this opportunity to express our thanks to the judges for their valuable contribution to the conference.

The Delegates Award is awarded by all delegates of the W4A Conference by secret ballot on the basis of the authors exhibiting their work both in short presentations and during an extensive demonstration session. This is an interesting and exciting part of the W4A Conference, which allows authors to showcase the impact of their Assistive Technology directly to the delegates, often leading to an outcome different from the Judges' decision, which is based exclusively on a video or audio submission.

Entries to the Challenge can either be submitted directly or as part of an accepted contribution to the main track of the conference. This year we have received a total of 10 high-quality entries from across the globe with representatives from Brazil, Greece, Germany, Italy, Japan, Mexico, Spain, and USA. The contributions focus on different areas of web accessibility, and, when examined as a whole, the solutions provide a collection of innovations that support the needs of a diverse range of users, fitting the ethos of the W4A Conference perfectly.

In general, all authors will receive valuable feedback from the conference attendees, and have the possibility of networking with individuals from industry, academia and regulatory and standards bodies regarding their technologies.

Volker Sorge
March 2017



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W4A Google Doctoral Consortium

The 2017 W4A Conference features the third edition of the W4A Google Doctoral Consortium. As in previous years, we were generously supported by Google sponsoring the event, allowing us to give Doctoral Consortium Awards to talented students. The award provides financial support for students to attend the W4A Conference, present their research and gain valuable feedback from top researchers and practitioners in the field of Web Accessibility.

This year, there were two successful submissions who were allocated their award based on the relevance of their work to W4A, overall awareness of their field, originality of the work and its potential impact.

The W4A Organizing Committee would like to thank the judges for their dedicated effort:

- Prof. Gerard Goggin (University of Sydney)
- Prof. Denise Wood (Central Queensland University)
- A/Prof. Iain Murray (Curtin University)
- A/Prof. Katie Ellis (Curtin University)
- Dr. Ruchi Permvattana (Curtin University)
- Dr. Liddy Neville

For the first time, the Doctoral Consortium session will be held on the first day of the main conference, in a session chaired by Dr. Justin Brown.

Once again, we are most thankful to Google for their generous support, and we look forward to their ongoing involvement in W4A.

Justin Brown and Scott Hollier
March 2017



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WWW/W4A Accessibility Hackathon

We are very excited to announce that this year WWW and W4A are joining forces for an Accessibility Hack hosted by [Bankwest](#) and the [Partnership on Employment & Accessible Technology](#). The Hack combines the expertise of WWW web professionals and W4A accessibility researchers to produce software that can be used by anyone regardless of ability or the technology they are using to access the web.

The aim of the hack is to take a popular product that is being used widely across the Web in workplaces and make it accessible. This venture will combine the expertise of WWW web developers with the expertise of W4A accessibility researchers to produce software that can be used by anyone regardless of ability, and regardless of the technology they may be using to access the Web.

Time & Place

Location: Bankwest Place Podium, 1st Floor, 300 Murray Street, Perth WA 6101.

Date: Monday April 3, from 12:30pm to 5pm (following Session 5 of the main conference; lunch will be provided).

The Focus

This year's W4A theme is *The Future of Accessible Work*. Keeping with this theme, we will focus on [TAO®](#), a leading open source assessment platform used in public sector employment and educational settings. Open Assessment Technologies S.A. is in the process of developing and commercializing the platform.

The TAO platform has an active development community and a growing workplace user base focused on:

- Pre-employment testing
- Online applications
- Employee assessments
- Online learning and training
- Skills assessments and professional certification programs
- Web-based surveys and tests
- Compliance reporting

How it Works

We will distribute participants with different skill sets across groups of five to seven people. Groups will choose a project related to accessibility in an employment scenario, such as:

- Integrating an open source text-to-speech solution
- Implementing accessibility improvements related to the test authoring environment



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- Integrating accessibility-specific reminders, flags, and checks to the test authoring environment

In addition to motivation to improve the accessibility of TAO, a willingness to share your knowledge and learn from others, and a bit of creative energy, participants should bring a laptop, charger, and any mobile devices that would be useful for team collaboration.

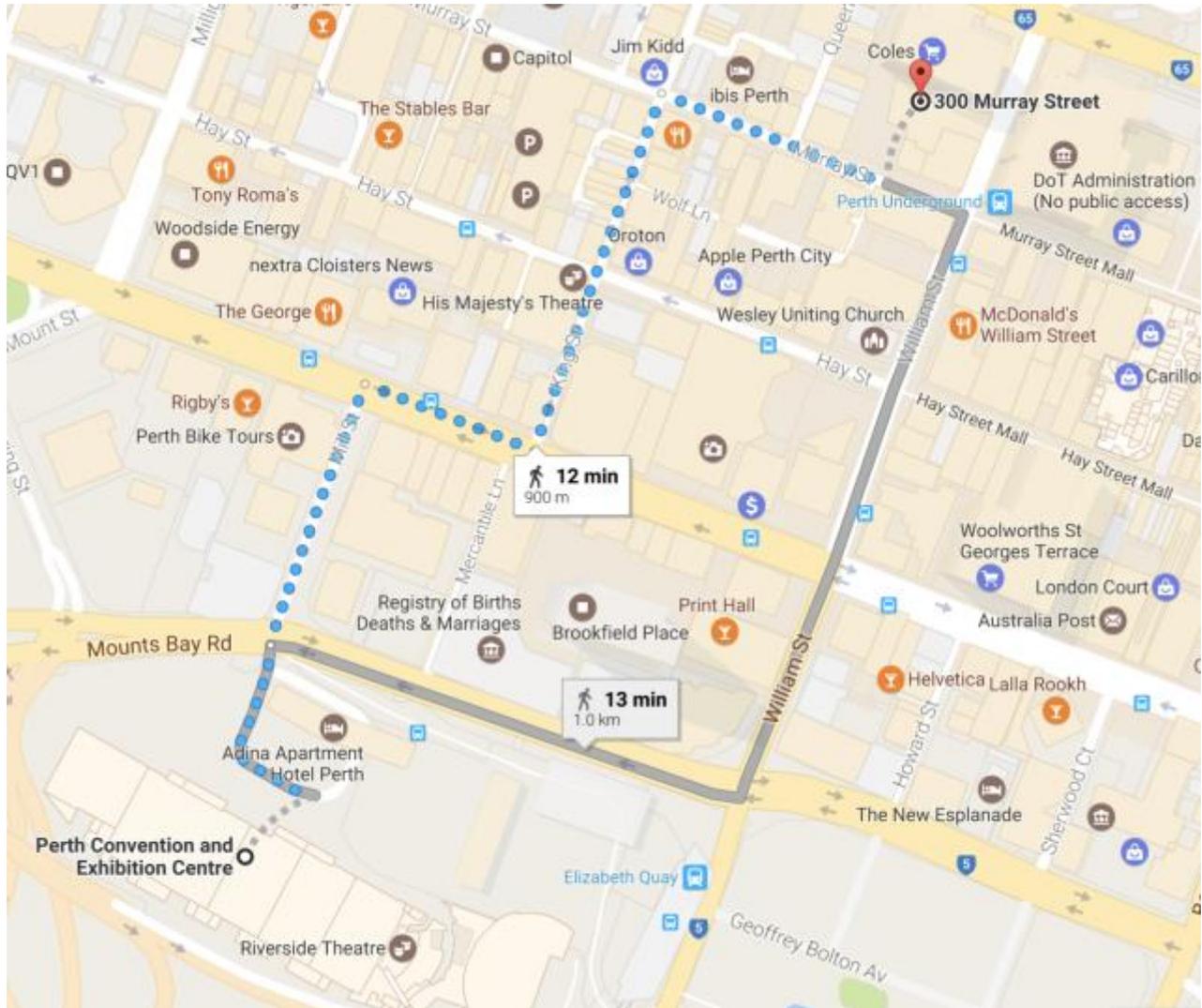
At least one participant from each group will need to [install](#) and [configure](#) a development environment (local or on a remote server) that includes a working version of TAO and a copy of the code pulled from GitHub integrated. The clone should be pulled from the TAO testing code that you have forked into your own GitHub account. Groups that implement accessibility solutions during the hack will be expected to submit a pull request to contribute their work from the hack back to the [main TAO code repository](#). One or more members of each group should also have a screen reader installed for testing and demonstrating your work.

More detailed information will be provided after signup. Please indicate in the [signup form](#) if you can supply a development environment for your group.



Directions to Bankwest Place Podium from Perth Convention Centre

1st Floor, 300 Murray Street, Perth WA 6101.



W4A Camp

For those who are not attending the WWW/W4A Accessibility Hackathon at Bankwest on Monday April 3, W4A Camp is a great alternative.

In 2012, we introduced W4A Camp, a half-day anarchic event to discuss and learn about accessibility research. W4A Camp takes place on the Monday of the conference, following the keynote address by David Masters. It gives delegates an opportunity to discuss any topics they want. It's a great place for discussing work, ideas, research collaborations, demoing projects, giving advice to PhD students, hearing from IBM PwD awardees, discussing papers, or looking at what went wrong with your submission this year!

It will be exciting and productive with just a little structure; you choose the topics, the presentations, and the threads for the camp. During the first day of the conference, delegates will propose themes, join existing themes, or will merge themes which are similar. Then, we decide the general themes – the rest is up to us all together!

How Will We Proceed?

If you are not participating in the WWW/W4A Accessibility Hackathon: before and throughout the conference share ideas using the Twitter #w4acamp hashtag, and during the conference add ideas to the camp post-it wall. If there is enough interest, we will decide on themes and topics. W4A Camp starts after the W4A Keynote on Monday, in parallel with the hackathon.

Remember the W4A Camp is an unconference, so bring your demos, projects, half-baked research ideas, and your sense of inquiry. Don't have a project? No worries; we're looking for collaborators. There will be a wall for post-its and a camp grid over the main W4A conference days and we'll post this on our social channels – so you can turn up even if you are not at the W4A.

W4A Camp is an ad-hoc unconference born from the desire for people to share and learn in an open environment. It is an intense event with discussions, demos and interaction from attendees. Anyone with something to contribute or with the desire to learn is welcome and invited to join. When you come, be prepared to share with W4A Campers. When you leave, be prepared to share it with the world.

No Spectators, Only Participants



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IBM People with Disabilities Award

This is the 3rd year that W4A is able to grant qualifying students the IBM People with Disabilities Award. The awardees will be introduced to the community of W4A researchers and practitioners who are working to make Web, Mobile, and Wearable devices accessible for all. We thank IBM for their generous sponsorship and hope to see more submissions in 2018.

Chieko Asakawa and Yevgen Borodin
March 2017.



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Notes



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Program

Keynote

Working together: technology as the foundation for better employment outcomes for people with disability

Alastair McEwin: Australian Human Rights Commission

The right to work, free from discrimination, is a fundamental human right, but one that is not always enjoyed by people with disability. Labour force participation rates for people with disability in Australia are low and have changed very little over the past two decades. The Australian Human Rights Commission's *Willing to Work: National Inquiry into employment discrimination against older Australians and Australians with Disability* [1] completed in May 2016 found that people with disability face a number of systemic, complex and intertwining barriers to employment that deny them the opportunity to experience the personal, social and economic benefits of work.

Technology can be a great equaliser in ensuring that people with disability can obtain, retain and advance in employment. For people with disability, the digital age represents both an opportunity and a challenge in relation to employment. Electronic networks and new digital media technologies are transforming the ways that people work and collaborate. However, digital barriers can also reinforce rather than break down disproportionately low employment among people with disability.

How can we leverage web accessibility and technology to eliminate the persistent barriers that people with disability face? Effective strategy, policy and processes for workplace accessibility will unlock the immense potential of the 1 in 5 people that have a disability in Australia, ensure that they are able to enjoy the right to work on an equal basis with others and deliver measurable impacts to the Australian economy.



Session 1: Accessibility in work and employment

Scopist: Building a Skill Ladder into Crowd Transcription

Kristin Williams, John Zimmerman & Jeffrey Bigham – Carnegie Mellon University

Audio transcription is an important task for making content accessible to people who are deaf or hard of hearing. Much of the transcription work is increasingly done by crowd workers, people online who pick up the work as it becomes available often in small bits at a time. Whereas work typically provides a ladder for skill development – a series of opportunities to acquire new skills that lead to advancement – crowd transcription work generally does not. To demonstrate how crowd work might create a skill ladder, we created Scopist, a JavaScript application for learning an efficient text-entry method known as stenotype while doing audio transcription tasks. Scopist facilitates on-the-job learning to prepare crowd workers for remote, real-time captioning by supporting both touch-typing and chording. Real-time captioning is a difficult skill to master but is important for making live events accessible. We conducted 3 crowd studies of Scopist focusing on Scopist’s performance and support for learning. We show that Scopist can distinguish touch-typing from stenotyping with 94% accuracy. Our research demonstrates a new way for workers on crowd platforms to align their work and skill development with the accessibility domain while they work.

Notes:



Evaluating the Accessibility of the Job Search and Interview Process for People who are Blind and Visually Impaired

William Grussenmeyer, Jesel Garcia, Eelke Folmer & Fang Jiang – University of Nevada, Reno

There is a 70% unemployment rate for people who are blind and visually impaired in the United States. In order to discover if the accessibility of the job search and interview process plays a role in the unemployment of this population, we interviewed people who are blind and visually impaired about their recent experiences regarding the job search and interview process. We discovered that there are many accessibility issues that can impact success in obtaining a job, including the inaccessibility of job applications, pre- and post-interview tests, and accommodations during the interview. We also found that often the employee onboarding, the process which helps new hires acclimate to a new environment, can be inaccessible to people with visual impairments. Based on these interviews, we developed new guidelines for employers.

Notes:



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Accessibility to Work from Home for the Disabled: The Need for a Shift in Management Style

Rosemary Spark – WordTrack

Working from home provides definite cost-benefit advantages for both employers and employees, including those with disabilities, as long as management implements enlightened flexible working arrangements.

Notes:



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Able to Read My Mail: An Accessible e-Mail Client with Assistive Technology

Horacio Saggion, Daniel Ferrés – TALN, Universitat Pompeu Fabra, Leen Sevens & Ineke Schuurman – Centre for Computational Linguistics, KU Leuven

The Able to Include project aims at improving the living conditions of people with intellectual or developmental disabilities (IDD) in key areas of society. One of its focus points concerns improving the integration of people with IDD in the workplace by introducing accessible Web-based tools. This paper describes one of the tools developed as result of the project: an e-mail client with text simplification and other assistive technologies which makes information transmitted over the Internet more understandable to people with IDD therefore facilitating their labor integration. The accessible Web e-mail client has been developed following a User-Centered Design and tested with people with IDD. The results so far are encouraging.

Notes:



The Crowd Work Accessibility Problem

Saiganesh Swaminathan, Kotaro Hara & Jeffrey Bigham – Carnegie Mellon University

Crowd work is an increasingly prevalent and important kind of work. Because of its flexible nature, crowd work may offer benefits for people with disabilities. Unfortunately, people with disabilities currently lack access to much of this work because the tasks that are posted are often inaccessible. In this paper, we first characterize the accessibility of the tasks posted to a popular crowd marketplace, Amazon Mechanical Turk, by performing manual and automatic checks on 120 tasks from several common types. We then outline research directions that could have positive impact on this problem. Given ongoing and upcoming changes to the world economy and technological progress, we believe it is important to find a way to make sure people with disabilities are able to equally participate in this kind of work.

Notes:



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Session 2: Accessibility Standards, Processes and Approaches

Considerations for Implementing an Holistic Organisational Approach to Accessibility

Chris Bailey – System Concepts & Voula Gkatzidou – Brunel University London

Achieving accessibility and inclusivity within an organisation requires true commitment and consideration of many factors including the various digital and physical touchpoints for specific customer needs. This paper proposes a human-centred model of accessibility that complements existing standards and assists organisations in considering the full range of their user's technical, operational and psychological requirements. An outline practice-based accessibility maturity model is proposed with which organisations can establish current commitment to accessibility and develop a road-map to implement true inclusivity. We also describe a case study which highlights how this model of accessibility can be adapted from an organisational perspective to define specific accessibility requirements for individual products and services.

Notes:



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Creating Accessible Local Government: The Process

Vivienne Conway – Web Key IT & Keith Fitzpatrick – City of Cockburn

In this paper, we examine the process involved in developing an accessible website for a West Australian Local Government authority.

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Web Standards to Enable an Accessible and Inclusive Internet of Things (IoT)

Shadi Abou-Zahra, Judy Brewer & Michael Cooper – World Wide Web Consortium (W3C)

The Internet of Things (IoT) is expected to have an unprecedented impact on our daily lives. In particular, “smart environments” will change how we interact with our surrounding and with each other, including at home, in public spaces, and at the work place.

This provides an opportunity to ensure equal access for people with disabilities. For example, operating doors, windows, and physical objects through voice makes such environments more accessible to people with physical disabilities and inclusive to many more.

Yet there are still many challenges to address, without which the Internet of Things (IoT) threatens to be more of a disabler than an enabler. In particular, the current lack of interoperability makes it hard for assistive technologies to easily tap into IoT systems.

Web standards could extend the open web platform to resolve many of these issues, much as it did on the traditional internet. This Web of Things (WoT) provides a robust application layer for innovation to thrive on the underlying Internet of Things (IoT).

This paper outlines the relevance of IoT for people with disabilities and the specific challenges it currently poses. It then discusses how the Web of Things (WoT) could help address these challenges, and highlights research questions that still need to be tackled.

Notes:



Cross-Cultural Web Design Guidelines

Rukshan Alexander, David Murray – School of Engineering and Information Technology, Murdoch University & Nik Thompson – Curtin University

Adapting web pages to cultural preferences has been shown to improve communication effectiveness. However, the lack of a set of research-based web design guidelines or best practices renders the creation of culturally tailored versions of a website a time-consuming, costly task which is rarely undertaken by designers. This research aims to develop guidelines for cross-cultural web design to overcome these issues. The authors' prior work has provided empirical data showing significant cultural differences in the usage of design web attributes. These are used to determine a relationship between design attributes, cultural factors, and HCI factors. The result is a synthesis of culturally specific design attributes and published theories of culture to create a set of website design guidelines. The development process involved five steps: evaluation of the usage of design elements between cultures, identification of prominent design elements, organisation of cultural factors, organisation of HCI factors, and finally development the cross-cultural design guidelines. It is hoped that these evidence and research based guidelines will ultimately enhance web-site usability for users from different cultural backgrounds.

Notes:



Subjective Evaluation of Website Accessibility and Usability: A Survey for People with Sensory Disabilities

Tahani Alahmadi – Griffith University & Steve Drew – University of Tasmania

A novel subjective evaluation model for accessibility is developed utilising a questionnaire survey approach, with reference to the characteristics of disabled groups and the features of university websites. Measuring accessibility, including through usability evaluations, is an important equity step in assessing and improving the effectiveness and usefulness of online learning and general materials for students with disabilities. The popular uptake of blended and online learning warrants an evaluation of the accessibility of web-based university websites for equity in access to quality learning experiences and outcomes. The model conforms to user-centred design theory and is designed on the basis of usability and accessibility statements derived from contemporary accessibility questionnaires and standards. The model is applied to evaluate Australian university web-based systems. The initial data show that 55% of students with sensory disabilities believe the accessibility of their current website content negatively affects their study, and 70% believe the web pages are not well structured for navigation by learners with sensory disabilities.

Notes:



Session 3: IBM People with Disabilities Award

The W4A Organizing Committee is happy to introduce the 2017 winners:

Dhananjay Bhole
Shantanu Ladkat
Wayne Hawkins
Tan Boon Keong Dickson
William Grussenmeyer

Savitribai Phule Pune University, India
Savitribai Phule Pune University, India
University of Sydney, Australia
National University of Singapore, Singapore
University of Nevada, USA

Notes:



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Session 4: Google Doctoral Consortium

A multi-method evaluation of university website accessibility: Foregrounding user-centred design, mining source code and using a quantitative metric.

Tahani Alahmadi – Griffith University

Accessibility, which includes usability evaluation, is an important equity step in assessing the effectiveness and usefulness of online learning for students with sensory disabilities. A model for accessibility evaluation has been developed on the basis of a multi-method approach as well as with reference to the characteristics of groups with disabilities and the features of university web-based systems.

Notes:



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Keynote

Microsoft's Journey Towards Inclusion

David Masters - Microsoft Australia

David discusses Microsoft's Journey towards inclusion and how Microsoft is evolving its culture to be more inclusive, which is driving a wave of innovation at the company focused on supporting people of all abilities.

The four pillars of Microsoft Accessibility strategy are: 1) to provide accessible and usable products and service, 2) to push the boundaries of what's possible through innovation, 3) to develop partnerships to continue to improve our experiences, and 4) inclusive hiring.

As we develop accessible technology and push the boundaries of what's possible through innovation - it must be done in an inclusive work environment where our employees with disabilities are the experts. Our goal is increase the number of employees with disabilities at Microsoft.

And we believe that is what it means to buy into the Microsoft company mission "to empower every person and every organization on the planet to achieve more".

Notes:



Session 5: Teaching and Learning

Understanding Accessibility as a Process through the Analysis of Feedback from Disabled Students

Tim Coughlan, Thomas Ullmann & Kate Lister – The Open University

Accessibility cannot be fully achieved through adherence to technical guidelines, and must include processes that take account of the diverse contexts and needs of individuals. A complex yet important aspect of this is to understand and utilise feedback from disabled users of systems and services. Open comment feedback can complement other practices in providing rich data from user perspectives, but this presents challenges for analysis at scale. In this paper, we analyse a large dataset of open comment feedback from disabled students on their online and distance learning experience, and we explore opportunities and challenges in the analysis of this data. This includes the automated and manual analysis of content and themes, and the integration of information about the respondent alongside their feedback. Our analysis suggests that procedural themes, such as changes to the individual over time, and their experiences of interpersonal interactions, provide key examples of areas where feedback can lead to insight for the improvement of accessibility. Reflecting on this analysis in the context of our institution, we provide recommendations on the analysis of feedback data, and how feedback can be better embedded into organisational processes.

Notes:



Teaching Accessibility to the Masses

Greg Gay, Naza Djafarova & Leonora Zefi – Ryerson University

Web developers are a key element in creating an accessible web, but few have received formal training on inclusive web design. In this paper, we discuss the challenges of teaching web accessibility online, and the process of creating a public Massive Open Online Course (MOOC) aimed at teaching web accessibility auditing practices to web developers. The outcomes from the Professional Web Accessibility Auditing Made Easy [10] course delivered to two cohorts is presented. The lessons learned from the experience are added to the discussion around the pedagogical culture and the need to better integrate accessibility education into computer science curriculum.

Notes:



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Active learning for Web accessibility evaluation

Mengni Zhang, Can Wang, Zhi Yu, Chao Shen & Jiajun Bu – Zhejiang University

To evaluate the accessibility level of a website, we need to obtain the accessibility evaluation results of the pages in this website. Due to the massive number of pages in a website and possible involvement of human inspection for conformance checking, directly evaluating all the pages is prohibitively expensive. In practice, we usually select a representative sample for accessibility evaluation of the whole site. This makes the evaluation results heavily dependent on the pages selected. Undersampling may lead to a large bias in evaluation. But oversampling will incur high evaluation expense. To address this issue, this paper proposes a semi-supervised machine learning method, called *active-prediction*, to obtain the accessibility evaluation results for all pages in a site. *Active-prediction* casts the website accessibility evaluation into a prediction problem by building learning models for each checkpoint in evaluation and consequently avoids the expensive cost in human inspection. To achieve a higher prediction accuracy with only a small number of training data, *active-prediction* exploits active learning techniques to select the most informative pages to train the models. Experimental results show that the *active-prediction* could achieve a high accuracy on predicting the accessibility results and better reflect the accessibility level of the websites than the existing methods.

Notes:



Keynote

Employment in the digital age for people with impairment

Kevin Carey - RNIB

No technological revolution in recorded history has resulted in a labour surplus; rather the reverse.

Significantly, at the cusp of each revolution there have been gloomy forecasts and defensive strategies to preserve the status quo but these have rapidly been overtaken by events.

Each new industrial revolution requires new forms of training rather than a defensive industrial strategy but it is incorrect to say that anybody can be trained to do anything and this is precisely the problem confronting people with impairment. There are simply some things that they cannot do at all and many things that they cannot do competitively. People with impairment find themselves at an increasing disadvantage trapped between automation at the bottom of the labour market and global competition for skills at the top. A person with an impairment in a factory of a thousand is much less salient than in an SME with 10 people and this is not so much a matter of competence or prejudice but of simple risk aversion. There is hope in the long run but the obstacles are many.

Web accessibility was the right place to begin in the early 90s but it was and is the most difficult digital medium to regulate; originating in the US, WAI based itself on a rights footing which meant that everybody should have access to everything rather than concentrating on forensic objectives with proportionate social gain, but in any case most rights are in conflict with other rights and often with legal duties; WAI was also much more interested in modernist data consumption than in post-modern self-publishing. Even more fundamental was the failure to stage a rational discussion between the impairment sector and industry to stage a rational discussion about the price of accessibility.

Although people with physical and mental impairment have enjoyed an absolute advantage through digital technology, they have suffered acutely from an ever growing comparative disadvantage. The one area of service provision for people with impairment which has proved most difficult is full-time, remunerative, non-sheltered employment. And while the problems for hearing impaired people should not be underestimated the real problems are experienced by people with visual, physical or mental impairment. What is required to overcome problems is a proper analysis of the labour market which will allow us to see opportunities centred round routine operations that cannot be automated and occupations which require a high level of self-publishing. The most extensive opportunities will be centred on creative activity which produces variants on a theme such as can be seen in popular culture.

However, the two most important components of any employment strategy in the digital era will be the establishment of SMEs run and largely staffed by people with impairment and the



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design of highly specified apps to enable them to process and publish at a competitive speed and it just might be that some of these SMEs develop the apps that are required. We cannot turn back the clock; we need to forget just about everything we have done so far and start again.

Notes:



Session 6: Evaluating and Measuring Accessibility

A task assignment strategy for crowdsourcing-based web accessibility evaluation system

Liangcheng Li, Can Wang, Shuyi Song, Zhi Yu, Fenqin Zhou & Jiajun Bu – College of Computer Science, Zhejiang University

Web accessibility evaluation aims to find the interactive barrier for people with disabilities in accessing the contents on the Web. As some of the checkpoints require human inspection for conformance evaluation, evaluating a website will usually incur an expensive cost. To address this issue, crowdsourcing-based system is used in web accessibility evaluation to elicit contributions from volunteer participants. However, some of accessibility evaluation tasks are complicated and require a certain level of expertise in evaluation. This makes the task assignment in crowdsourcing a challenging problem in that poor evaluation accuracy will be resulted when complicated tasks are assigned to inexperienced participants. To address this issue, we propose in this paper a novel task assignment strategy called Evaluator-Decision-Based Assignment (EDBA) to better leverage the participation and expertise of the volunteers. Using evaluators' historical evaluation records and experts' review, we train a minimum cost model via machine learning methods to obtain an optimal task assignment map. Experiments on Chinese Web Accessibility Evaluation System show that our method achieves high accuracy in website accessibility evaluation. Meanwhile, the balanced assignments from EDBA also enable both novices and old hands effective participation in accessibility evaluation.

Notes:



Assessment of Semantic Taxonomies for Blind Indoor Navigation Based on a Shopping Center Use Case

J. Eduardo Pérez, Myriam Arrue – University of the Basque Country (UPV/EHU), Masatomo Kobayashi, Hironobu Takagi & Chieko Asakawa IBM Research – Tokyo

Despite the growing availability of location-based services (LBS) to support pedestrian activities, we know little about the effectiveness of existing geographical web information to assist the indoor navigation of people with special needs such as the visually impaired. To characterize these indoor environments, we surveyed three different specifications about taxonomies for environmental semantic information. Survey results show that even having different scopes, the three studied specifications share considerable environmental semantic information. In order to evaluate the validity of survey results, we created a set of environmental semantic information for a shopping center, and then performed a navigation experiment with 9 visually impaired participants in the same indoor location. A smartphone-based system providing audio navigation assistance based on accurate real-time localization in the shopping center was used to complete navigational tasks. Experiment results show an overall positive assessment from participants about the usefulness of the audio messages used. We present further findings about the assessment of the different audio messages by the study participants.

Notes:



Do Web Users with Autism Experience Barriers When Searching for Information Within Web Pages?

Sukru Eraslan – Middle East Technical University Northern Cyprus Campus, Victoria Yaneva – University of Wolverhampton, Yeliz Yesilada – Middle East Technical University Northern Cyprus Campus, Simon Harper – University of Manchester & Ruslan Mitkov – University of Wolverhampton

Elements related to cognitive disability are given lower priority in web accessibility guidelines due to limited understanding of the requirements of neurodiverse web users. Meanwhile, eye tracking has received a lot of interest in the accessibility community as a way to understand user behaviours. In this study, we combine results from information location tasks and eye tracking data to find out whether users with high-functioning autism experience barriers while using the web compared to users without autism. Our results show that such barriers exist and there is higher variance in the scanpaths of the participants with high-functioning autism while searching for the right answer within web pages.

Notes:



WAEM: A Web Accessibility Evaluation Metric Based on Partial User Experience Order

Shuyi Song, Can Wang, Liangcheng Li, Zhi Yu, Xiao Lin & Jiajun Bu – Zhejiang University

Quantitative accessibility metrics are widely used in accessibility evaluation, which synthesize a summative value to represent the accessibility level of a website. Many of these metrics are the results of a two-step process. The first step is the inspection with regard to potential barriers while different properties are reported, and the second step aggregates these fine-grained reports with varying weights for checkpoints. Existing studies indicate that finding appropriate weights for different checkpoint types is a challenging issue. Although some metrics derive the checkpoint weights from the WCAG priority levels, previous investigations reveal that the correlation between the WCAG priority levels and the user experience is not significant. Moreover, our website accessibility evaluation results also confirm the mismatches between the ranking of websites using existing metrics and the ranking based on user experience. To overcome this limitation, we propose a novel metric called the Web Accessibility Experience Metric (WAEM) that can better match the accessibility evaluation results with the user experience of people with disabilities by aligning the evaluation metric with the partial user experience order (PUEXO), i.e. pairwise comparisons between different websites. A machine learning model is developed to derive the optimal checkpoint weights from the PUEXO. Experiments on real-world web accessibility evaluation data sets validate the effectiveness of WAEM.

Notes:



Session 7: Accessibility for Diverse Users

Producing Accessible Statistics Diagrams in R

Donal Fitzpatrick – Dublin City University, A. Jonathan R. Godfrey – Massey University, Volker Sorge – University of Birmingham

Blind people are at risk of being left behind in the information age if efforts are not made to improve the access to information that is not traditionally conveyed in text, whether that text be accessed in braille, audio, or a computer's screen reading software. Most graphics summarise a scene or some aspect of data that the author hopes will inform their audience; good statistical graphics are commonly used to great effect for the sighted world, but are practically useless to a blind audience. Our work aims to provide an accessible way for blind users to easily, efficiently, and most importantly accurately, explore and query the data contained in diagrams such as bar charts, box plots, time series, and many more. We employ the statistical software environment R to compute rich semantics for these diagrams and make them web accessible by supporting screen reading and interactive exploration.

Notes:



Towards the Prediction of Dyslexia by a Web-based Game with Musical and Visual Elements

Maria Rauschenberger – Universitat Pompeu Fabra, Luz Rello – Carnegie Mellon University, Ricardo Baeza-Yates, Emilia Gomez – Universitat Pompeu Fabra & Jeffrey Bigham – Carnegie Mellon University

Current tools for screening dyslexia use linguistic elements, since most dyslexia manifestations are related to difficulties in reading and writing. These tools can only be used with children that have already acquired some reading skills and; sometimes, this detection comes too late to apply proper re-mediation. In this paper, we propose a method and present DysMusic, a prototype which aims to predict risk of having dyslexia before acquiring reading skills. The prototype was designed with the help of five children and five parents who tested the game using the think aloud protocol and being observed while playing. The advantages of DysMusic are that the approach is language independent and could be used with younger children, i.e., pre-readers.

Notes:



Session 8: W4A/TPG Web Accessibility Challenge - Presentations

Presentation of Entrants to the 2017 W4A Web Accessibility Challenge Award Sponsored by The Paciello Group

Challenge Details for Delegates

This year the W4A/TPG Web Accessibility Challenge will involve two activities:

- A five minute pitch presentation
- A five minute lightning demo

Presentation Session:

During a 5 minute presentation, each Challenge entrant will “pitch” their solution to delegates and articulate the innovative aspects of their technology and how it advances accessibility and usability. Their presentation will define the accessibility issue their technology solves, and describe the innovations one can expect to see during the demonstration session that will follow.

Entries:

1. Extraction of Tabular Data from Document Images: Manolis Vasileiadis, Nikolaos Kaklanis, Konstantinos Votis & Dimitrios Tzovaras – ITI CERTH
2. GazeTheWeb: A Framework to Enable Gaze based Web Access: Raphael Menges, Chandan Kumar, Daniel Mueller, Korok Sengupta & Steffen Staab – University of Koblenz-Landau
3. Math Melodies: Supporting Visually Impaired Primary School Students in Learning Math: Dragan Ahmetovic – Carnegie Mellon University, Valeria Alampi – Università degli Studi di Milano, Cristian Bernareggi, Andrea Gerino & Sergio Mascetti – Università degli Studi di Milano and EveryWare Technologies
4. Sensory Glasses for the Visually Impaired: Michael Barney, Gilmar Brito, Jonathan Kilner, Aida Ferreira & Meuse Nogueira – Federal Institute of Education, Science and Technology of Pernambuco (IFPE)
5. LuzDeploy: A Collective Action System for Installing Navigation Infrastructure for Blind People – Cole Gleason, Dragan Ahmetovic – Carnegie Mellon University, Carlos Toxtlii – West Virginia University, Saiph Savage – National Autonomous – University of Mexico, Jeffrey Bigham & Chieko Asakawa – Carnegie Mellon University
6. Making Real-World Interfaces Accessible Through Crowdsourcing, Computer Vision, and Fabrication: Anhong Guo & Jeffrey Bigham – Carnegie Mellon University



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7. ChattyBooks and ChattyBook Service: Katsuhito Yamaguchi – Junior College Funabashi Campus, Nihon University & Masakazu Suzuki – Institute of Mathematics for Industry, Kyushu University
8. DysMusic: Towards the Prediction of Dyslexia by a Web-based Game with Musical and Visual Elements: Maria Rauschenberger – Universitat Pompeu Fabra, Luz Rello – Carnegie Mellon University, Ricardo Baeza-Yates, Emilia Gomez – Universitat Pompeu Fabra & Jeffrey Bigham – Carnegie Mellon University
9. Able to Read My Mail: An Accessible e-Mail Client with Assistive Technology: Horacio Saggion, Daniel Ferrés – TALN, Universitat Pompeu Fabra, Leen Sevens & Ineke Schuurman – Centre for Computational Linguistics, KU Leuven
10. Closed ASL Interpreting for Online Videos: Raja Kushalnagar – Gallaudet University, Matthew Seita & Abraham Glasser – Rochester Institute of Technology
11. Producing Accessible Statistics Diagrams in R (exhibit only): Donal Fitzpatrick - Dublin City University, A. Jonathan R. Godfrey - Massey University, Volker Sorge - University of Birmingham



Session 9: W4A/TPG Web Accessibility Challenge - Demonstrations

Demonstrations and Voting Forum for the Delegates Award Sponsored by The Paciello Group

Demonstration Session:

To ensure the session can commence on schedule, please return from the break on time.

Delegates will then be given a voting ballot paper, split into groups and assigned a station where they will start the demonstration session. When the bell rings, the presenter at the station will do his or her 5-minute demo of the innovative aspect of their technology. The presenter may or may not allocate time for questions during the session.

After five minutes the bell will ring again, at which time your group will move on to the next demo. This continues until all groups have visited all the demos. "Timekeepers" will be present who will facilitate the rotation between demo stations.

Voting

After your group has visited all the stations, using the ballot page you were given at the first station indicate your 1st (1), 2nd (2) and 3rd (3) choices to receive the Challenge Delegates award. Your decision should be made based on how well the presenter articulated and demonstrated how the technology innovates and advances accessibility and usability for its users'.

Submit your ballot page to the ballot box for counting by the end of the lunch break on the day following the challenge demonstrations (Tuesday 2pm). The Challenge Chair will indicate where and when this will be available. The scoring system for the Challenge is as follows:

- 3 points for each 1st place vote,
- 2 point for each 2nd place vote,
- 1 point for each 3rd place vote.

The technology with the most points will be the Delegates Award Winner. In the event of a points tie, the entrant with the most 1st placed choices will be considered the winner. If there is still a tie, Challenge Judges in attendance at the conference will make the final decision regarding the winner of the Delegates award.



Session 10: Accessibility for Diverse Users

Achieving Practical and Accurate Indoor Navigation for People with Visual Impairments

Dragan Ahmetovic – Carnegie Mellon University, Masayuki Murata – IBM Research-Tokyo, Cole Gleason – Carnegie Mellon University, Erin Brady – Indiana University – Purdue University Indianapolis, Hironobu Takagi – IBM Research-Tokyo, Kris Kitani – Carnegie Mellon University, Chieko Asakawa – Carnegie Mellon University

Methods that provide accurate navigation assistance to people with visual impairments often rely on instrumenting the environment with specialized hardware infrastructure. In particular, approaches that use sensor networks of Bluetooth Low Energy (BLE) beacons have been shown to achieve precise localization and accurate guidance while the structural modifications to the environment are kept at minimum. To install navigation infrastructure, however, a number of complex and time-critical activities must be performed. The BLE beacons need to be positioned correctly and samples of Bluetooth signal need to be collected across the whole environment. These tasks are performed by trained personnel and entail costs proportional to the size of the environment that needs to be instrumented.

To reduce the instrumentation costs while maintaining a high accuracy, we improve over a traditional regression-based localization approach by introducing a novel, graph-based localization method using Pedestrian Dead Reckoning (PDR) and particle filter. We then study how the number and density of beacons and Bluetooth samples impact the balance between localization accuracy and set-up cost of the navigation environment. Studies with users show the impact that the increased accuracy has on the usability of our navigation application for the visually impaired.

Notes:



Closed ASL Interpreting for Online Videos

Raja Kushalnagar – Gallaudet University, Matthew Seita & Abraham Glasser – Rochester Institute of Technology

Deaf individuals face great challenges in today's society. It can be very difficult to be able to understand different forms of media without a sense of hearing. Many videos and movies found online today are not captioned, and even fewer have a supporting video with an interpreter. Also, even with a supporting interpreter video provided, information is still lost due to the inability to look at both the video and the interpreter simultaneously. To alleviate this issue, we came up with a tool called closed interpreting. Similar to closed captioning, it will be displayed with an online video and can be toggled on and off. However, the closed interpreter is also user-adjustable. Settings, such as interpreter size, transparency, and location, can be adjusted. Our goal with this study is to find out what deaf and hard of hearing viewers like about videos that come with interpreters, and whether the adjustability is beneficial.

Notes:



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Awards & Closing:



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The “William Loughborough” After-Dinner Talk

Technology, Education and Access: A Fair Go For People with Disabilities

Dr. Scott Hollier

About the William Loughborough Speech. This has been an annual and eagerly-anticipated part of W4A since 2010, when it was introduced in memory of William Loughborough, a long-time advocate for accessibility and inclusive design. William was a talented technologist and engineer, and an enthusiastic supporter of W4A, regularly providing thoughtful feedback to presenters in his inimitable way. We invited William to speak at the W4A 2010 conference dinner in Raleigh, North Carolina; but sadly he died shortly before the event. So, in William’s honour, every year we invite a well-regarded speaker from the accessibility community to address the conference delegates with a speech that is likely to be provocative, challenging conventions, insightful and humorous—and always one that will give us food for thought.

Find out more about William’s life and work at: <http://media-dis-n-dat.blogspot.co.uk/2010/05/obituary-william-loughborough-pioneer.html>



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- Anle-Marné Pretorius, Practice Manager, Enterprise Solutions WA, Empired Ltd
- David Masters, Microsoft
- Andrew Arch, Accessibility & Inclusivity Lead, Digital Transformation Agency
- Ted Drake, Principal Accessibility Engineer, Intuit

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- Jonathan Godfrey (Massey University, Turtitea, New Zealand)
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