ACCESSIBILITY AND COMPUTING

A Regular Publication of the ACM Special Interest Group on Accessible Computing

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SIGACCESS Newsletter

A regular publication of the ACM Special Interest Group on Accessible Computing

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Who we are

SIGACCESS is a special interest group of ACM. The SIGACCESS Newsletter is published regularly in January, June, and September. We encourage a wide variety of contributions, such as: letters to the editor, technical papers, short reports, reviews of papers of products, abstracts, book reviews, conference reports and/or announcements, interesting web page URLs, local activity reports, etc. Actually, we solicit almost anything of interest to our readers.

Deadlines are one month before publication dates. Submissions may be sent as hard copy (paper), but machine-readable files are preferred. Postscript or PDF files may be used if layout is important, but word-processor files, text files, or e-mail are also acceptable. Ask the editor if in doubt.

Finally, you may publish your work here before submitting it elsewhere. We are a very informal forum for sharing ideas with others who have common interests.

Anyone interested in editing a special issue on an appropriate topic should contact the editor.

Accessibility and Computing

The Newsletter of ACM SIGACCESS

NUMBER 85, June 2006

A note from the Editor

Dear SIGACCESS member:

Welcome to another issue of the SIGACCESS Newsletter and it is a real bumper issue with almost 60 pages of articles.

This issue is also a little different to those that have preceded it. This Newsletter begins with 3 regular articles, but the remainder of the Newsletter is something of a celebration of the diversity of the SIG members. 11 members were selected at random from the database and asked to provide profiles of their research projects, background and motivation for working in this area. The aim of these articles is to help personalise SIGACCESS and give Newsletter readers, especially those who do not have the opportunity to attend the SIG sponsored conferences such as ASSETS, a chance to learn more about other members of SIGACCESS.

About this issue

We begin with a call for participation for the AccessComputing initiative by Sheryl Burgstahler and Richard Ladner of the University of Washington. AccessComputing is an alliance to increase the participation of individuals with disabilities in computing careers.

This is followed by an article on “Challenges and Solutions for Screen Reader / I.T. Interoperability” by Kip Harris of IBM in which he discusses the inherent difficulties in extracting the underlying meaning of interfaces via a screen reader and potential methods for achieving such extraction.

Finally, of the regular articles, Simon Harper, Yeliz Yesilada and Carole Goble of the University of Manchester present a report on the 2006 W4A – International Cross-Disciplinary Workshop on Web Accessibility Workshop Report, sponsored by SIGACCESS.

The remaining articles in this issue are the membership profiles of: Julio Abascal, Joan Francioni, Matt Huenerfauth, Frankie James, Blaise W. Liffick, Edmund LoPresti,

Kathleen F. McCoy, Jessica Paradise Elliott, David Sloan, Andrea Tartaro and Jim Thatcher.

And finally…

This issue finishes with the call for participation for ASSETS 2006. While the deadline for technical papers has passed, there is still time to submit posters and demonstration papers and also to submit entries for the Doctoral Consortium and the all new Student Research Competition. These last two categories include significant funding support for the authors of accepted entries. With funding potentially available for up to 37 students, they offer excellent opportunities for students on a budget to participate in the ASSETS conference.

The ASSETS web-site can be found at:

http://www.acm.org/sigaccess/assets06/

Simeon Keates

Newsletter Editor

An Alliance to Increase the Participation of Individuals with Disabilities in Computing Careers

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Introduction

The goal of the newly established *National Alliance for Access to Computing Careers* (*AccessComputing*) is to increase the representation of people with disabilities in a wide range of computing careers, including those in computer science, information systems, software development, computer engineering, systems management and maintenance, and teaching. The Department of Computer Science and Engineering and DO-IT (Disabilities, Opportunities, Internetworking and Technology) at the University of Washington (UW) lead *AccessComputing*. partners—Gallaudet University, Microsoft, the NSF Regional Alliances for Persons with Disabilities in STEM (hosted by the University of Southern Maine, New Mexico State University, the University of Wisconsin–Madison, and the UW), and SIGACCESS—and collaborators represent education, industry, government, and professional organizations nationwide. This article shares background information on challenges facing individuals with disabilities with respect to computing careers, objectives of *AccessComputing*, and activities in which you can participate.

The need for *AccessComputing*

There is wide recognition that innovation in computing requires a diverse workforce of qualified systems designers, computer scientists, information professionals, software developers, information systems analysts, technology teachers, computing faculty, and other computing professionals. The inclusion of individuals from under-represented groups, including women, racial/ethnic minorities, and people with disabilities, is vital to the success of the computing industry in the United States in a competitive "flat world".

Data from the Computing Research Association shows the number of newly declared computer science majors declined 32% from 2000 to 2004. As reported by a Microsoft executive in the *Chronicle of Higher Education* (May 27, 2005, p. A32), "*It's a major concern for us because we're a company that runs on people. Our hiring has continued to go up, but unfortunately what we're seeing right now is a decline in the potential supply.*" The shortage of qualified professionals in computing fields is due in part to the under-representation of these same under-represented groups.

Individuals with disabilities experience far less career success than their peers without disabilities. They are less likely to complete postsecondary education and to pursue academic studies in science, technology, and engineering; the attrition rate of those who

do is high. People with disabilities who are also racial/ethnic minorities and/or females face additional challenges to pursuing high tech careers. However, the success stories of a few individuals with disabilities in computing fields demonstrate that opportunities do exist for people with disabilities who develop academic, technical, and self-determination skills and successfully overcome the barriers imposed by inaccessible facilities, curriculum materials, computers, scientific equipment, and electronic resources; inadequate academic supports; lack of encouragement; few role models; low expectations; and lack of knowledge about accommodations on the part of educators.

Computing careers are potentially open to individuals with disabilities because of advancements in assistive technology that provide access to computers. However, inaccessible design of facilities and software, web pages, and distance learning courses continues to erect barriers. For example, content embedded in graphical images must be provided in an accessible text format to be usable by individuals who are blind and using text-to-speech systems; although accessibility guidelines are readily available, few web developers, including those in computing departments, are aware of the barriers they erect.

In his keynote address at the 2005 Joint Annual Meeting of broadening participation projects funded by the NSF, Dr. Larry Scadden, retired program officer for the NSF Program for Persons with Disabilities (now called Research in Disabilities Education, RDE) identified four issues to address in order for students with disabilities to fully participate in high tech fields—access to technology, access to classrooms and labs, full participation in existing activities, and attitudes of gatekeepers. Successful student- and institution-based interventions to broaden participation in high tech fields have been identified by NSF-funded projects for racial/ethnic minorities, women, and people with disabilities include:

(a) hands-on STEM experiences;

(b) industry and research internships;

(c) bridge programs between academic levels;

(d) mentor and peer support; and,

(e) professional development of educators and staff.

AccessComputing goals, objectives, and activities

Alliance objectives are:

1. to increase the number of students with disabilities successfully pursuing undergraduate and graduate degrees and lifelong careers in computing fields.
2. to increase the capacity of postsecondary computing departments to fully include students with disabilities in computing courses and programs.
3. to create a nationwide resource to help students with disabilities pursue computer fields and computing educators and employers, professional organizations, and other stakeholders develop more inclusive programs and share effective practices.

AccessComputing will reach project objectives through (A) activities for students with disabilities, (B) activities for faculty, administrators, and employers, and (C) development of a national resource.

A. Activities for students with disabilities

A1. College transition and bridge academies and workshops

– are currently being designed and implemented by *Alliance* at Gallaudet, the University of Southern Maine, New Mexico State University, the University of Wisconsin-Madison, Seattle Central Community College, the University of Minnesota, the University of Southern Florida, the University of Washington, and the University of Southern Connecticut. In these activities, students with disabilities learn about careers in computing and college opportunities; role-play on working with faculty and employers; practice self-advocacy skills; explore options for internships and jobs after college; take computing-related field trips; meet computing professionals, including those with disabilities; learn about resources; interact with peers and mentors; are invited to participate in *Alliance* e-mentoring communities, internships, and other work-based learning activities described below.

A2. Research and industry internships

– within computing fields are offered to postsecondary students with disabilities. The Alliance covers a limited number of participant salaries for cases where a computing professor or other employer has a good research or industry work experience, but does not have funding to pay the student. Project staff work with each supervisor and student to identify appropriate accommodations; this interaction improves the participant's opportunity for success and strengthens the institution's capacity to work successfully with individuals with disabilities.

A3. E-mentoring community

– of high school and college students with disabilities includes computing professors, postsecondary students, and other adult mentors in computing fields; many have disabilities themselves. In the e-mentoring community, staff and volunteer mentors:

- facilitate conversations about opportunities in computing fields and encourage, advise, and assist students with transition between academic levels and from school to work.
- provide psychological support and help protégés develop social, self-determination and self-advocacy skills; positive identity; and a sense of belonging.
- provide students with opportunities for leadership development (e.g., by assisting with a conference exhibit or participating on a panel in a summer program).
- help students identify fields of interest, college funding, and steps toward computing careers.
- invite participation in Alliance academies, workshops and internships.
- encourage participation in existing programs that promote computing careers.
- suggest that students use campus study skills, writing, and other academic support services.

B. Activities for faculty, administrators, employers

B1. Communities of Practice (CoPs)

– share perspectives and expertise and identify practices that promote the participation of people with disabilities in computing fields. Collaborators may request *Alliance* funding for registration fees and publications for conferences for which their *Alliance* presentations/exhibit proposals are accepted, on-campus events, and computing internships for students with disabilities. *Alliance* CoPs are described below.

The *Computing Faculty, Administrator, and Employer CoP* engages computing professionals—faculty and administrators as well as representatives from industry and professional organizations—to increase their knowledge about disabilities and to make changes in computing departments that lead to more inclusive practices. Specifically, they:

- introduce *Alliance* staff to administrators of professional computing organizations so that staff can help these organizations make their websites accessible, their conferences accessible to attendees with disabilities, and their conference programs inclusive of disability-related topics.
- help identify, field test, and validate Computing Department Accessibility Indicators (discussed below) to make computing departments more accessible to students with disabilities.

- help plan, attend and/or recruit others to Alliance events and identify campus/community computing events to which students with disabilities might be invited.
- help staff target articles to computing publications.
- provide connections with computing faculty and industry for internships.

In addition to the Computing Faculty, Administrator, and Employer CoP, there are several other CoP's that have been established:

(i) the *Broadening Participation CoP* is populated with *Alliance* collaborators who administer alliances and projects that serve to broaden participation in computing fields, typically focusing on increasing the representation of women and racial/ethnic minorities;

(ii) the *Disability Services CoP* includes disability service professionals from community/technical colleges, 4-year institutions, and universities nationwide, together with their networks of postsecondary and K-12 schools and parent groups; and,

(iii) the *Deaf and Hard of Hearing CoP* is populated with existing practitioners/ networks that support individuals who are deaf or hard of hearing and are interested in increasing the representation of these individuals in computing fields.

B2. Capacity-building institutes

– draw in other members of relevant stakeholder groups. Participants will meet 1-2 days as a pre-conference session of a relevant conference. The agenda will include presentations by experts followed by discussions in small groups and group reports. Content from Capacity-Building Institutes will be developed for publication to inform Communities of Practice and policy makers. Participants will identify strategies for recruiting and retaining students with disabilities in computing fields, making courses and departments more accessible, including accessibility topics in computing curriculum, implementing faculty training, and identifying directions for research.

B.3. Systemic change indicators

– for postsecondary computing departments are being developed. *Alliance* staff, partners, and collaborators will create, test, and validate *Computing Department Accessibility Indicators* (checklists) to be used for a postsecondary computing department. Draft lists of *Computing Department Accessibility Indicators* (see current draft at www.washington.edu/accesscomputing/equal_access_csd.html) will be reviewed and updated multiple times by *Alliance* collaborators and other stakeholders. *Alliance* staff will create an online pre-post assessment tool within the *AccessComputing* Knowledge Base that administrators can use to track systemic changes toward more accessible computing departments.

C. A nationwide resource

Alliance staff have created and continue to expand a searchable *AccessComputing* Knowledge Base of FAQs, promising practices, and case studies (See Knowledge base link from *www.washington.edu/accesscomputing/*). The Knowledge Base provides educators with strategies for creating more inclusive computing courses programs, where students with disabilities are encouraged to pursue computing fields. It provides a similar resource for employers. It also helps students with disabilities interested in computing fields find e-mentoring communities, internships, scholarships, job listings, undergraduate and graduate school information, and other useful resources. All printed and electronic materials are provided in accessible formats; multi-media will be captioned and audio described for viewers who have sensory impairments.

How you can participate in *AccessComputing*

The *Alliance* assures nationwide, long-term impact because it:

- supports local and regional workshops, academies, capacity-building institutes, and internships to recruit and retain students with disabilities into computing fields;
- helps computing departments, professional organizations, and alliances that serve women and racial/ethnic minorities make their activities and resources accessible to students with disabilities;
- collaborations among individuals with disabilities, computing professionals, faculty, employers, professional organizations, and disability service providers; and,
- collects and publishes research and practice data to support the inclusion of people with disabilities in computing fields.

Consider participating in *AccessComputing*:

- Join a CoP.
- Test Computing Dept Accessibility Checklist and suggest improvements to project staff.
- Work to make your project accessible to people with disabilities (see http://www.washington.edu/doit/Brochures/Programs/design.html for suggestions)
- Refer students with disabilities to us for mentoring and internships.
- Contribute questions or promising practices to the *AccessComputing* Knowledge Base.

If you are interested in participating in these or other ways consult:

http://www.washington.edu/accesscomputing

or send an inquiry to: accesscomputing@u.washington.edu.

Conclusion

AccessComputing outcomes will benefit society by making computing opportunities available to more citizens and enhancing computing fields with the perspectives of people with disabilities.

Challenges and Solutions for Screen Reader / I.T. Interoperability

Kip Harris

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Abstract

The combination of Assistive Technology (AT) and Information Technology (IT) sometimes delivers a flawed end user experience. This is particularly disappointing to technologically savvy users who expect a seamless IT integration experience. The author draws from his experience as both AT and IT practitioner to present his view of the interoperability challenge within the screen reading problem domain.

Introduction

Most of us expect a "plug and play" experience when we install new application programs or devices onto our computer workstation. While such chores are usually uneventful using current technology, a Plug and play experience is not yet realized by screen reader users. Plugging a screen reader (SR) together with information technology (IT) too often results in a barely usable, or even unusable, user interface. Another aspect of this problem is the instability of many SR + IT applications when the workstation configuration changes. Seemingly small updates in one component or another (the SR, the IT, or the base operating system) can wreak havoc on a previously working application.

Colleagues have frequently asked me why SR/IT interoperability is so problematic. In my role as a professional developer of assistive technology (AT), I've gained much first hand insight into the technical issues in this area. I share my views of the root problems in this paper, as well as options for making progress. I believe that a better level of interoperability can be achieved than what we have today. However, I will also argue that the most interesting and important applications cannot be made interoperable without specific, custom programming to bridge AT and the IT application. The final part of this paper will discuss several options for satisfying this need.

Issues in known art

Broadly speaking, interoperability problems originate from two sources. There are engineering deficiencies in handling things that we should know how do to ("known art"), and secondly, there is a need for solutions to problems that we don't know how to solve. We'll begin our discussion by considering the first of these, the problems in known art.

Platform architecture and innovation

An IT application and a SR communicate through the interfaces defined by an accessibility architecture. These architectures are specific to each platform and can be considered as part of the platform API. Consequently, there is one architecture for

Windows, another for Linux, and another for Java. Each architecture defines a formal protocol that specifies the scope and the interpretation of the information that is exchanged. The only information that an assistive technology can obtain about an application is the information which fits into the protocol[1].

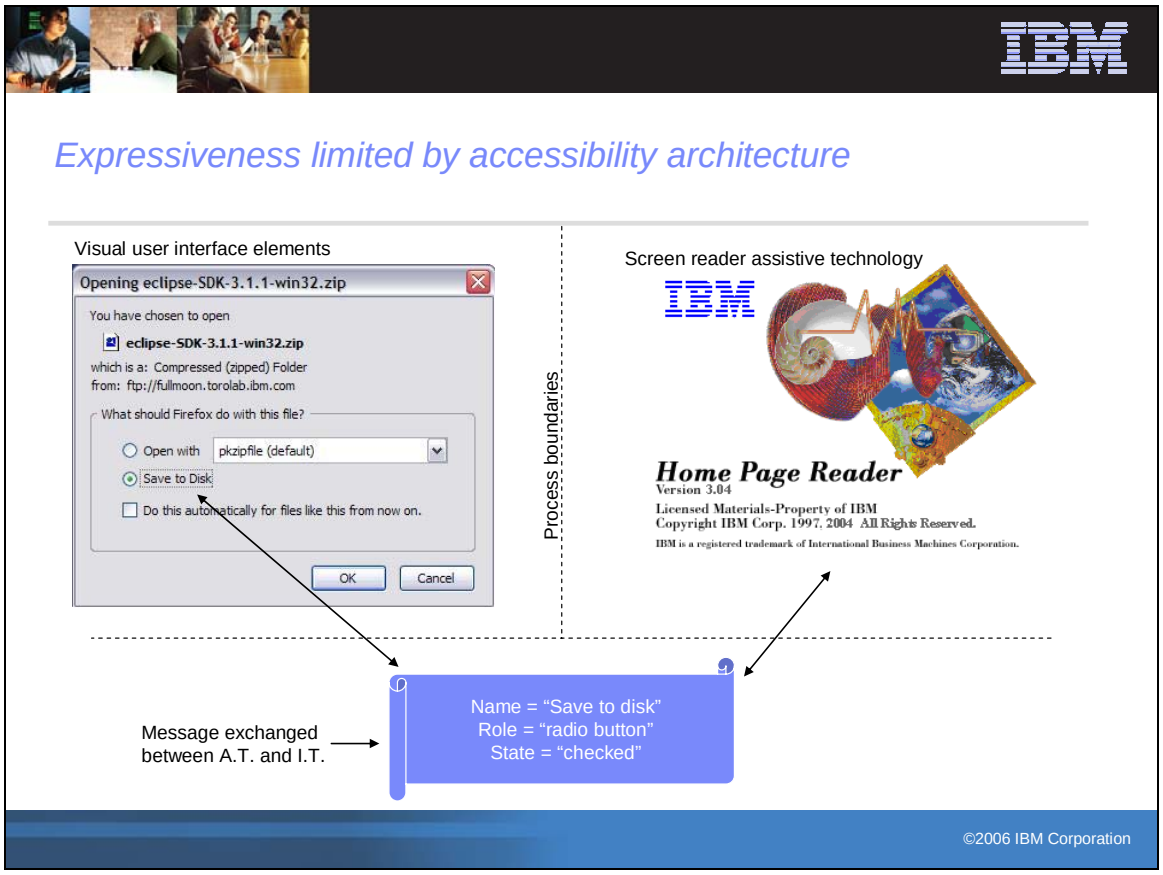

Figure 1: The screen reader and application are well isolated. The SR can only see information that is delivered within the protcol defined by the accessiblity architecture.

Because the SR is limited to describing the application using only information that is available in the protocol, the architecture limits the capabilities of the SR. Figure 1 illustrates this point. A "file download" panel is shown on the left, a screen reader is drawn on the right, and the two are separated by a process boundary. The accessibility architecture will provide the screen reader with a message describing the currently focused UI element, which in this case, is a "Save to disk" radio button selection. The screen reader uses this information to tell the end user about the UI element's name and type. However, because the color of the push button is not part of the architecture, the screen reader cannot present this information.

[1] An AT can sometimes discover additional information about a running application in the presence of a weak security framework.

Microsoft's Active Accessibility specification, which defines the accessibility architecture for Windows, provides a second illustration. The protocol designers did a good job of accommodating descriptions of simple UI elements such as checkboxes and push buttons, but did not make sufficient provisions initially for describing tables. Consequently, SR's sometimes don't recognize tables in application user interfaces.

A well designed architecture will meet most of the needs of commonly used UI's. Meeting all current needs, on the other hand, is probably not achievable, due to vast diversity of user interfaces in more sophisticated applications. Furthermore, new innovation in IT creates new UI paradigms which existing architectures are not prepared to handle. For example, consider the difficulties associated with presenting a flow chart, or a complex mathematical expression, or a logic circuit, or music. The data fields and events defined by today's accessibility architectures may simply not accommodate the information that must be represented in a new subject matter area.

The end result is that interoperability problems appear with the passage of time, and will frequently appear whenever SR's attempt to interpret more sophisticated applications. Such applications are optimized for specific subject matter areas, and frequently employ unique UI paradigms that cannot be expressed in the vocabulary provided by the platform architecture.

Compatibility of implementations

The accessibility architecture is a specification. Working software must be implemented from the specification, by each AT vendor and each application[2]. This task is analogous to the challenge faced by vendors who create networking software: each vendor constructs a unique implementation of a published specification. No matter how well the specification is written, each disparate implementation team will interpret certain operational descriptions in slightly different ways. Interoperability problems result when two such differing interpretations attempt to interoperate.

For example, in the Windows MSAA environment, the text object has a name and a value field. Some application vendors expose static text in the name field, while others use value for the same purpose. Likewise, UI objects are responsible for firing MSAA events when something changes. We have found pervasive problems with inconsistent event behaviors among the UI elements delivered by various vendors.

Other software technologies solve this class of problems by providing more guidance in the architecture / protocol specification, and by devoting significant resources to interoperability testing. Constructing a reference implementation is a formidable task indeed. The correct behavior of at least tens, and perhaps hundreds of common UI elements would need to be documented and standardized. Creative UI designers often create complex widgets by composing simpler widgets into more complex objects[3]. Such UI elements would need to be included in the effort, and consequently, the scope of the

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[2] It is more accurate to say that the specification must be implemented by each UI element author, rather than by each application. Examples: custom controls, PDF, Flash, SWT.

[3] A "calendar" widget is one example of a complex UI object which is composed of simpler, more primitive UI elements

problem is potentially unbounded. Nonetheless, this effort might well be manageable for the small subset of the most commonly used, simple UI elements.

Fragile heuristics

SR's perform their task by monitoring the visual UI and then creating textual descriptions for the end user. SR's rely heavily on heuristic algorithms to infer information that is missing from the architected accessibility interfaces, or where the information in the interfaces might be ambiguous. These heuristics are frequently complex: A representative example of a rule which is associated with a "value change" event might look like this:

```
If
 (a Value Change event has just been delivered) and
 (the event was generated by a text box control) and
 (this is a single line text box) and
 (the text box is associated with a "spinner" control) and
 (a Key Up or Key Down keystroke
          was the last keystroke observed) and
 (the Key Up/Down timestamp is within 150 milliseconds
```

It is not unusual for heuristics to be dependent on a particular sequence of events, or particular spatial arrangements. I use the term event signature to describe the collection of events and attributes that a SR can observe, in order to recognize that a particular action has occurred on a specific type of UI element. The example just presented is the event signature of an option selection change in a Combo Box. An enormous amount of development time is typically spent in discovering the signatures and heuristic rules that will make a SR "work" for a given use case in a given application.

Heuristics are "fragile" because they are commonly based on the incidental, undocumented, internal behavior of particular software components at a given point in time. When a component is patched at a later point in time, the internal behavior frequently changes due to arbitrary internal implementation decisions. However, if a SR's heuristic is an observer of such a component, it will break. Consequently, we frequently see SR / IT solutions break when patches or point releases are introduced into any of the components of the solution – operating system, IT application, or SR.

Applying best practices within the known art

I've described three troublesome areas which cause SR/IT interoperability problems. The root causes of these problems are not unique to the Assistive Technology domain; in fact, these are well known engineering problems in other software disciplines. I believe that the solutions to these classes of problems are known art, and if so, it suggests that we look to existing best practices for guidance.

The first problem area is limitations in the expressiveness of the platform architecture. This is not entirely a problem in known art, and we will return to this issue in great depth

in the latter part of this paper. However, there certainly are many things in this area that we know how to do better. In particular, when a new technology is created, the architects must include a programming model for accessibility [Brunet 2005]. Even in recent times, new technologies are sometimes introduced (e.g. Flash) without any platform architecture support in their initial releases. Once an architecture is defined, the technology owners must remain actively engaged, and evolve the architecture to accommodate community needs and innovation. For example, where an existing architecture is missing an important UI paradigm, the technology owners need to take remedial action and extend the architecture.

We looked at problems which originate from differing interpretations or incompatible implementations of the architectural specification. This is a classic and very well understood IT problem. In other software engineering disciples, this class of problem is addressed by providing more detailed specification guidance, as well as the development of reference implementations and tools for more comprehensive interoperability testing.

The need for heuristics has its roots in both of these first two problem areas. The problems that result from the use of heuristics might be mitigated by the practices which address architectural shortcomings (which would reduce reliance on heuristics).

Current best practices require a manual test of an IT application with the complete IT+SR solution. All use cases must be exercised by a person who does not have access the video display, and the application must be operated exclusively through the UI provided by the SR. This level of development investment often results in a positive end user experience.

This level of test can be expensive. Furthermore, each IT+SR pair is a unique combination from a verification perspective. A successful test of one IT+SR configuration assures us that we've met a level of compliance. However, it does not assure us that a similar solution which substitutes a comparable product for either the IT or the SR will perform equally well.

Obviously, it would be far preferable to develop and test just a single IT+SR combination. Additional guidance in specification implementation, reference implementations, and some tools for interoperability testing may promote this desirable "loose coupling" between IT and SR components. Furthermore, the existing bits and pieces of insight regarding best practices implementation, which might improve the correct and expected use of the data fields and events, is currently distributed among the disparate parties (platform vendors, AT vendors, and application developers). Discovering these low level insights is an ad-hoc activity which is repeated by each development team. Concerted industry effort and leaderships by technology owners is needed to make progress toward more systematic engineering practices.

Interoperability for unique application semantics

The problems that we've explored so far are primarily engineering issues that can perhaps be corrected with better designs, implementations, and practices. We'll now turn our attention to a final problem area that is beyond the realm of known art, and is much more difficult to remedy. This is the realm of human perception and cognitive processing of visual information, which is central to human–computer interaction (HCI).

A visual UI presents visual elements on a display to convey some mental model to an end user. The UI elements themselves have little meaning; we depend on human perception to interpret the visual scene and infer the meaning. The intended meaning of a visual presentation is called the ***semantics***.

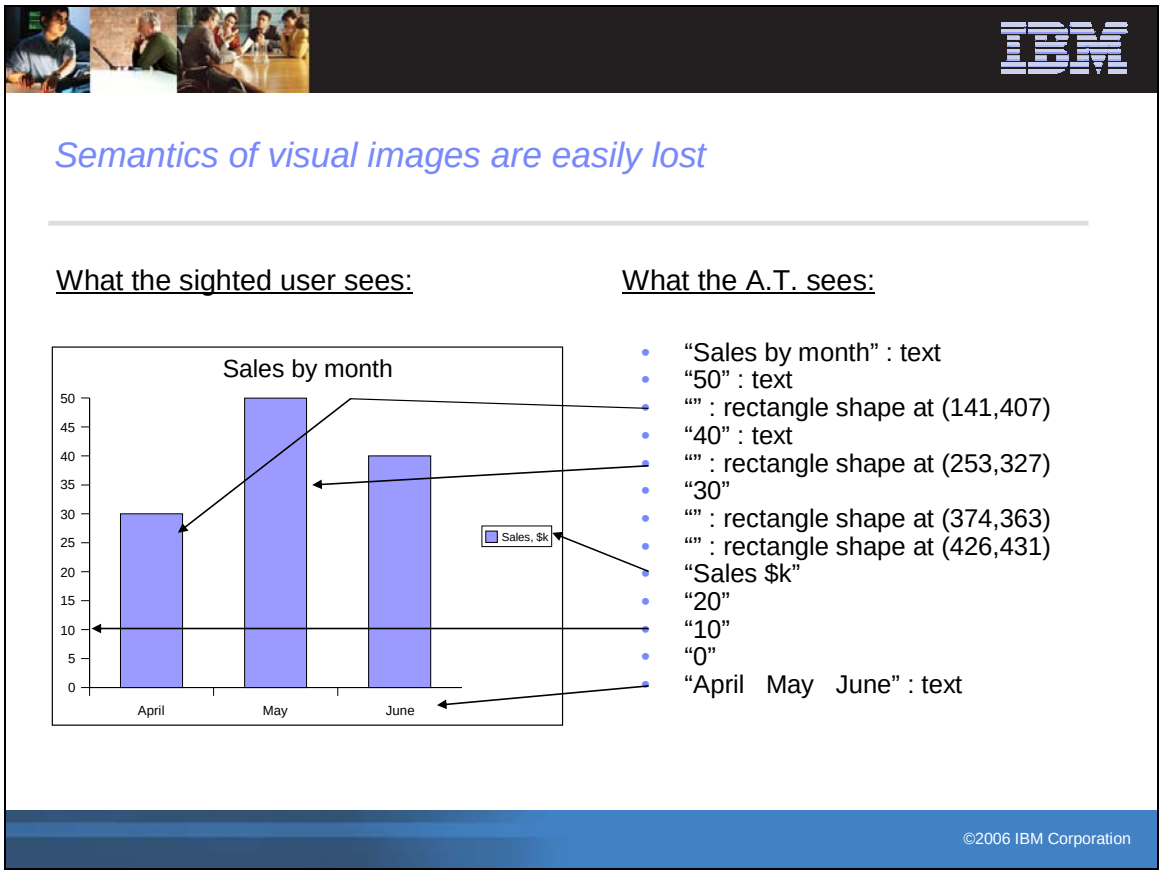

Figure 2: A picture which depicts a common bar chart. The visual appearance of the bar chart is shown on the left hand side, while the "view" of the bar chart which is available to an AT is on the right. Arrows indicate the correspondence between messages seen by the AT and visual UI elements.

For example, consider a graphical user interface that presents a bar-chart from a spreadsheet application, such as the graphic depicted in Figure 2. The visual display is an arrangement of shapes and labels. An SR might inspect this scene, but can only describe the locations and dimensions of the rectangular figures. The SR cannot construct a meaningful text description without some built-in understanding of the semantics of a bar-chart. Access to the information in the spreadsheet behind the bar chart is needed by the SR to construct a truly usable, non-visual UI.

Programs such as Microsoft Excel are well known to ATs, and some have specific algorithms that apply Excel’s semantics. However, in the general case, the AT does not have built-in knowledge about an arbitrary application (imagine a web based spreadsheet

program), and must instead interpret the visual scene from only the visual elements on the display.

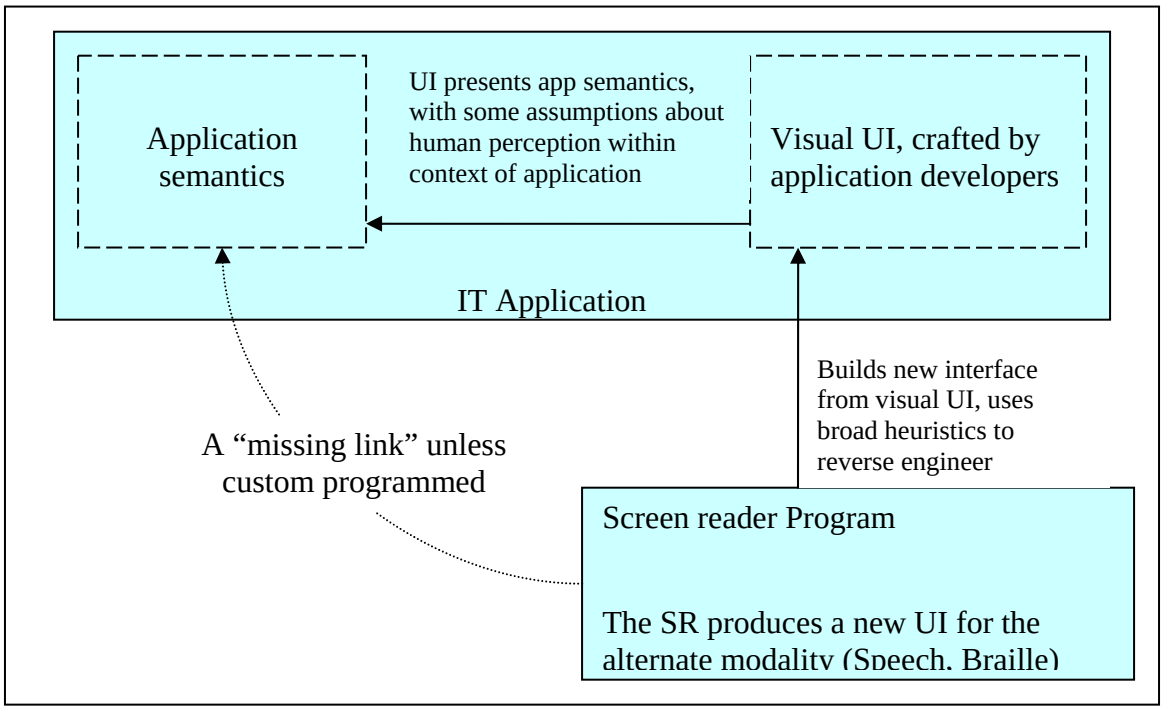

Figure 3: AT's attempt to infer semantics from UI elements. The SR does not have a direct connection to application model unless "bridge" code is specifically developed for that application. This is highly error prone where no such custom connection is provided.

Figure 3 illustrates the situation. Application developers, with deep understanding of the application semantics, craft a visual UI. After the application is deployed, the end user with sight develops an understanding of the underlying semantics through human perception and interpretation of the visual scene.

The AT, on the other hand, uses computer algorithms to create a new UI, based on a machine scan of the visual elements. These algorithms perform a modality transformation from two dimensional visual scenes to one dimensional text strings. There is no "understanding" of the underlying application semantics[4]. In short, we have the AT describing the video scene, rather than the AT describing the application. It should be no surprise that the SR's machine translation loses much of the fidelity to the original application semantics[5].

[4] A SR may recognize and understand Excel and a number of other well known programs, but in the general case, the AT knows nothing about the semantics of an arbitrarily chosen application. Instead, the AT is constructing a UI "on the fly" using only the arrangement of visual elements on the screen.

[5] The problem of capturing the underlying semantics is made even more difficult when one considers that both application UI and human interpretation are sensitive to the context of the problem domain. For example, UI elements are arranged (and interpreted) quite differently in a spreadsheet, as compared to how a UI elements are interpreted in flowchart. Product developers have spent millions of man-hours creating

Toward the encoding of application semantics

I have just argued that the most fundamental problem in SR / IT compatibility is the loss of application semantics in the course of machine translation. Better capture and translation of application semantics will require that they be encoded in machine readable syntax. If such an encoding is achieved, the SR can interpret and translate the information while preserving the meaning that was intended by the original application authors.

I will present several alternatives for accomplishing exactly this. Each approach represents a different mix of prerequisite innovation, cost, and reusability of solution. In particular, we will consider:

- How many UI's must be authored? Traditionally, all applications write a visual UI. Must I write one additional UI for text? One additional UI for each SR?
- Who creates the non-visual UI's? What skills are needed?
- Must I, as an application vendor, interlock with each SR vendor as I develop a new product?

A definition language for user interface components

Today, if an application presents a unique UI that does not conform to common usage patterns, the application vendor must arrange for the development of SR updates to accommodate the application's uniqueness. These updates will understand how to deal with the application's unique semantics. The end user must install these SR customizations before he can operate the new application. Clearly, this is a burden on all stakeholders: application developer, SR vendors, and end user.

Ideally, the application developer would write a single user interface, and release the product without any interlock with SR vendors. The SR would connect to the new application, automatically inspect the application for any special instructions about handling unique semantics, and then present a textual version of the user interface which satisfies the end user. How might we programmatically describe a UI so that an SR could automatically interpret it?

Recent developments in Web UI's show us one possible approach. Some Web applications are using innovative UI widgets which are built from DHTML. These widgets look and feel like familiar controls, but are internally composed from simple graphical elements which are meaningless to SR's. A semantic definition language has been proposed by the W3 Protocols and Formats working group to remedy the problem [3]. The application encodes the intended interpretation of the new widget using XML-based Resource Definition Framework (RDF) technology [4]. When both application and

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visual presentations which are customized for the semantics of a particular problem domain; this results in the superior "ease of use" which distinguishes one product from another. The visual presentation works only because there is a certain amount of human interpretation of the visual arrangement. We humans interpret a visual presentation in the context of the current subject matter, which to some degree relies on real-world experience, judgment, and common sense. These interpretative abilities are absent from the general purpose, machine executable algorithms that the SR executes.

SR use this technology, a SR can build a textual user interface for an otherwise unfamiliar UI.

The DHTML+RDF proposal is sufficiently descriptive to identify well-known controls. For example, a DHTML-based tree view control can be described in this scheme[6]. Can the RDF approach be extended to provide for SR / IT interoperability when the control (or panel) is not well-known? Might some grammar be developed that is analogous to the Web Services Definition Language (WSDL) [5] in the Web services domain, where the description language is sufficiently rich to describe services that have not yet been invented? In the Web services domain, the scope of the problem is limited to the description of message structures. In the Human-Computer Interface domain, there are far more demanding requirements on the description language, because it must be able to describe both behavior and intended meaning, in addition to structure.

The designers of such a "UI Description Language" will have a difficult challenge indeed. The language would have to describe the structure, behavior, and intended interpretation of innovative user interfaces which do not fit within well known paradigms. Because this task is essentially an encoding of arbitrary semantic meaning within an unconstrained problem domain, I will conjecture that this is the same class of problem as automatic machine translation of natural language.

An enormous amount of research and development has been expended on natural language translation, and as anyone who has used such a service knows, much remains to be done. Likewise, a UI Description Language which accommodates non-well known UI patterns is a significant research problem and far beyond known art. However, if some innovation could solve this problem, it would be possible to author a single UI in the UI Description Language, and then generate multiple interfaces for the various modalities from that single definition.

Screen reader customization and scripting

Self-describing user interfaces, through either RDF or some other future user interface definition language, is a future technology. Current technology depends on "scripting" features which are available in the higher performing SR products. Scripting gives us a mechanism for extending the capabilities of the SR by plugging additional algorithms into the Reader. We encode an application's unique semantics in the scripts which we write.

Ideally, script development would be performed by the same UI team that develops the visual interface. This is the team that has the best understanding of the application model and of any UI innovations. It is the team with the best understanding of the technical aspects of the behavior of the new interface. If the application team writes all the interfaces (visual, aural, and Braille), then we eliminate the dependencies and need for coordination between separate IT and AT commercial enterprises. Finally, both visual and non-visual versions of the UI are then simultaneously available, and deployed by the application developer.

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[6] It is the widget-implementer's responsibility to emulate both the structure and behavior of the known control, so we are presuming that both of these are well-known, if not well-documented.

Alternatively, one could point out that extending the SR requires specialized, scarce skills. Also, if the SR does not provide sufficient features for scripting a certain use case, then the customization must be done by the SR vendor himself in the base product.

In summary, under this approach, either the application developer or his proxy must write a plug-in module for the unique UI components of his application. This is only possible when the scripting provides sufficient features to support the innovation. Otherwise, the SR itself must be enhanced to support the new UI component. Either way, an additional, unique UI is being authored for each SR that supports the application: we write "1 + n" unique user interfaces.

Self-voicing

A third option to incorporating application semantics into additional user interfaces is to integrate SR features into the application. This technique is called self-voicing, which alludes to the fact that the application typically provides synthesized speech as an alternate output modality. With traditional screen readers, the technology which provides the alternate input or output modes is bundled into the screen reader. In a self-voicing environment, the I/O mechanisms for the alternate modality (typically speech) are integrated into the application, so the alternate I/O modality is available even if an SR product is not installed. There is no need to integrate the application with other products.

Self-voicing technology has been developed for Java applications, and is perhaps most visible today in some of the newer pervasive devices which exploit speech-enabled browsers. The X+V technology, in particular, provides an environment in which both visually rendered HTML and aurally rendered VHTML can provide a "side by side" interface: one visual and tactile, the other aural (using synthesized speech and voice recognition). The visual and aural interfaces are each a distinct development effort to implement, but if done properly, there may not be a need for further AT integration. So we write twice (once for each modality).

Summary and conclusion

I've argued that interoperability problems are either engineering issues in known art, or alternatively, result from the inherent fallibility of machine translation from a visual mode to text, in absence of some encoding of the application's unique semantics. Engineering issues can be addressed by well known processes which are actively employed in other IT disciplines. In particular, the industry would benefit from availability of reference implementations, improved guidance on specification implementation, and interoperability testing.

The issues associated with machine translation of unique application semantics, where the semantics are inferred by the SR based on visual arrangements of UI elements, is much more difficult to solve.

The premier solution would provide for a "write once" UI which could be interpreted by an SR without requiring any coordination between IT and AT enterprises. A UI definition language would be needed, in which we could encode application-unique structure, behavior, and intended meaning of a UI object. I've conjectured that creating such a

language is roughly as difficult as machine translation of natural languages and is far beyond known art.

A more immediate, tactical solution is found in the scripting capabilities provided by some SR's for extending the reader's capabilities. When this is available, we can manually encode application semantics into the scripts. These capabilities are available today, and are the most practical avenue for solving interoperability problems. That is, recognize that you must create multiple user interfaces for the multiple modalities, and plan for it. However, in taking this approach, you accept that you write an additional UI for each AT with which an IT solution must interoperate. This approach is not an option where the AT is not available for modification, or where existing customization facilities are inadequate.

Self-voiced applications can drive both visual and aural modalities without any need for a SR. However, this too has its drawbacks. Each application is re-implementing the same functions, in keystroke command definitions, audio controls, and preferences settings. Each application vendor would likely implement these features in a different way, which greatly diminishes overall usability. There is also the problem of resource sharing and coordination among the multiple ATs. From an application implementation perspective, we are writing twice, plus the additional burden of coordinating all the various ATs.

Emergence of pervasive technologies which embrace multimodal interfaces may provide the most promising long-term approach. New usage patterns involving mobile users and pervasive devices are making hands-free / eyes-free / multi-modal operation a requirement of the mainstream. New technologies such as X+V, voice-enabled browsers such as Opera and NetFront, and the speech capabilities which are expected to be available in the next major Windows client release, will encourage the construction of user interfaces that can be designed to be equally usable from various I/O modalities. However, even here we must note a caveat. Pervasive applications are usually designed without a requirement for complete operation through just one modality. Instead, there is typically an assumption, for example, that the user can see the device's display.

The need for unique UI development for each modality is common to all approaches. Product developers will continue to be required to deliver usable UI for each I/O modality, and for this, there is no "silver bullet."

References

1. Brunet, P.B., et al. "Accessibility requirements for systems design to accommodate people with vision impairments". IBM Systems Journal, Vol. 44, No. 3, 2005. On the Web at http://www.research.ibm.com/journal/sj/443/brunet.html.

2. Microsoft Active Accessibility Version 2.0. http://msdn.microsoft.com/library/default.asp?url=/library/en-us/msaa/msaastart_9w2t.asp

3. W3 Protocols and Formats, 2005 "Dynamic Accessible Web Content Roadmap". http://www.w3.org/WAI/PF/roadmap/.

4. W3 Resource Description Framework (RDF). http://www.w3.org/RDF/.

5. W3 Web Services Description Language (WSDL) 1.1. http://www.w3.org/TR/wsdl.

Building the Mobile Web: Rediscovering Accessibility?

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

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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 alone 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.

SIGACCESS Member Profile

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Member of SIGACCESS since: 1997

Member of ACM since: 1994

Also member of: SIGCHI

1. How many years have you been working in this area?

I started my first project on technology for Augmentative and Alternative Communication in 1985. Therefore, I have been working in this area for 21 years.

2. What motivates or inspires you to work in this area?

I found that computer science was too much a technology-oriented activity. I wanted to find a more human-oriented application of the technology and I discovered that the Assistive Technology (with a different denomination at that time) area was exactly what I was looking for.

3. Please describe your current research project(s):

Currently I am coordinating a project, called HeteroRed 3, funded by the Spanish Science Ministry, developed in collaboration with the Universities of Seville and Saragossa. HeteroRed 3 aims to design ubiquitous technology to support Ambient Intelligence environments for People with Disabilities and Elderly People living alone. Expected results include adaptive interfaces that enable people to easily interact with diverse smart home services, independently of the supporting technologies.

I also coordinate a project, EvalAccess, aiming to design methods and tools to extend automatic web accessibility evaluation and repairing to accessibility monitoring and maintenance. To this end we defined quantitative accessibility metrics (more accurate than traditional qualitative marks). We also designed "personal accessibility" methods and tools in order to help individuals to find web sites that are accessible for them, even if they are not generally accessible.

4. What is your professional background?

I have a BSc. in Physics (University of Navarra, 1978) and a PhD. in Informatics (University of the Basque Country, 1987). I joined the Department of Computer Architecture and Technology of the University of the Basque Country in 1981, where I taught diverse topics including Computer Architecture, Robotics, Advanced HCI,

Operating Systems, Digital Design, etc. I participated in the creation of the Laboratory of HCI for Special Needs, which has been working (with diverse denominations) from 1985.

5. Please describe any past projects on which you have worked:

IRIS project: "Incorporating Requirements of People with Special Needs or Impairments to Internet-based Systems and Services" was a European IST project, developed from 2001 to 2003, in collaboration with European Dynamics (GR), University of the Aegean (GR), Fraunhofer Institute (D) and the Information Society Disabilities Challenge (ISdAC). IRIS aimed to create a Design Support Environment to enable Web designers and developers to consider the needs of people with disabilities and older people when creating Internet products and services. Our laboratory developed a web service for automatic web accessibility evaluation that can be called from any other web application (see http://sipt07.si.ehu.es/evalaccess/index.html).

COGNIWEB 1 and 2 is a series of projects intended to study cognitive web accessibility for deaf-born people. We have submitted a new proposal, COGNIWEB 3, that aims to study, test and propose cognitive accessibility guidelines for web designers.

The series of projects TetraNauta (Intelligent interface for a smart wheelchair), DomoSilla (Interoperation of a smart wheelchair with a smart home) and Heterorred 1 and 2 (Development of ubiquitous technology based on heterogeneous network interoperation to support Intelligent Ambient environments for people with disabilities and elderly people) were funded by the Spanish Ministry of Science, and developed in collaboration with the Universities of Seville and Saragossa, the Spanish National Hospital of Quadriplegia and SABIA industry.

6. What technology or product would you really like to see developed? Why?

It is very difficult to answer this question because people with disabilities have many basic needs that, in case of being solved would radically change their lives. In some cases it is a matter of time for technology to be able to offer a solution. In other cases I have doubts about the feasibility of a technical solution. For instance, even if I am not working on that field, I would love to see a fully operative artificial hand with a brain-computer interface, but I am quite doubtful about its feasibility in the medium term.

7. Have you participated in any SIGACCESS-sponsored event?

I have frequently served as a Program Committee member but I have not had the opportunity to attend the ASSETS conference yet.

8. What else would you like to see SIGACCESS do?

- To organize or promote training activities (summer schools, tutorials, web courses, etc.) on Assistive Technologies and/or Universal Design for undergraduate students and graduate Engineers.
- To create and maintain a repository of teaching materials (class notes, presentations, videos, laboratories, etc.) to be shared by people wanting to introduce Universal Design in Engineering design standard courses.

- To collaborate with other institutions working in accessibility, to share efforts and experience. For instance, is it possible to profit from WAI experience to extend it to other fields beyond web accessibility (in order to advance in compiling accessibility guidelines, methods and tools for these fields)?

SIGACCESS Member Profile

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Member of SIGACCESS since: 1985

Member of ACM since: 1985

Also member of: SIGCSE

1. How many years have you been working in this area?

I have been working in this area, in one way or another, since 1990. In 2000, we began the Computer Science Curriculum Accessibility Project (CSCAP) here in Winona with funding from the NSF. Since that time, I have worked primarily with undergraduate students with visual disabilities to develop technology and pedagogical strategies supporting accessible computer science education.

2. What motivates or inspires you to work in this area?

My overall mission as an educator is to increase the accessibility of the computer science curriculum for students with diverse learning abilities. In particular, I am interested in making computer science more accessible to students with disabilities and to students in traditionally under-represented groups, i.e., women and minorities. I am motivated in this work in two ways. For one, I believe that the under-representation of certain groups of people among the creators of information technology has serious negative consequences, not only for those whose potential goes unrealized, but also for the rest of us who live in a society increasingly shaped by that technology. Secondly, I enjoy the challenge of figuring out new ways to teach computer science to students. Along with that, I enjoy developing computer technology to help in this challenge.

3. Please describe your current research project(s):

We are working to develop an extended version of Microsoft's *InkAnalysis* tool, called *InkAnalysisPlus* that leverages the power of the Tablet PC to be able to generate **accessible** interfaces to hand-drawn diagrams that are typically used in computer science education. "Accessible" in this case means that a user can traverse the diagram completely with only keyboard commands based on audible feedback about what is in the diagram and where the focus of inspection is on the diagram. Using our tool, the creator of the diagram does not do anything extra for the diagram to be accessible. They simply draw and annotate their diagram on their Tablet PC. Making use of the text-recognition feature of the Tablet, the handwritten text can be automatically converted to ASCII text. Non-sighted users will need to use their screen reader to recognize text but, other than that, the tool will be self-contained.

This project is just beginning. The first phase will be to support traditional computer science diagrams used in programming classes through Data Structures. This includes finite state machines, tables, linked lists, trees, and graphs.

7. Have you participated in any SIGACCESS-sponsored event?

Treasurer of ASSETS 2002 and 2004.

A. C. Smith, J. M. Francioni, M. Anwar, J. S. Cook, A. Hossain, and M. Rahman. Nonvisual Tool for Navigating the Hierarchical Structure of Programs. Proceedings of *Assets 2004*, October 2004.

Smith, Ann C., Francioni, Joan M., and Matzek, Sam D., "A Java Programming Tool for Students with Visual Disabilities," in proceedings of *Assets 2000* , Washington D.C., November 2000.

8. What else would you like to see SIGACCESS do?

I am very proud to be a member of this SIG. SIGACCESS has made wonderful progress over the past 10 years to increase its visibility, participation, and overall impact in the area of assistive technology. As we continue to grow, I hope that we can work to support more research in this area – including undergraduate research – to both advance the field and increase the number of young people exposed to it.

SIGACCESS Member Profile

Matt Huenerfauth

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Member of SIGACCESS since: 2004

Member of ACM since: 2004

Also member of: SIGCSE (Computer Science Education)

1. How many years have you been working in this area?

I've been working in the areas of Accessibility Technology and Natural Language Processing for eight years, and I've focussed on the issue of translating English text into American Sign Language (ASL) animations for the past four years.

2. What motivates or inspires you to work in this area?

I enjoy working in areas of computer science that have a clear social impact and which require researchers to keep the users of their technology in mind during the design process. Having studied ASL for the past several years, I have had the opportunity to better understand the life experiences and culture of the deaf. I saw how ASL animation technology could have useful applications for deaf users with low English literacy. I have found ASL to be a challenging and intriguing language to study from a computational linguistic perspective, and I believe that computationally modelling the visual/spatial properties of the language will ultimately lead to new developments in Natural Language Processing technology (with applications cross-linguistically). I also feel that we have only begun to discover the ways in which computational linguistic technology can have useful assistive/accessibility applications – I find exploring the intersection of these two fields is an exciting area of research.

3. Please describe your current research project(s):

I am currently developing machine translation technology to automatically translate from English text into American Sign Language (ASL) animations. This technology is useful to the many deaf people in the U.S. and Canada who have low levels of written-English literacy. ASL is a natural language with a linguistic structure and word-order that is often different than English, and so many deaf people who are fluent in ASL may have difficulty reading the English text on the web, on closed-captioned television, or on other accessibility devices for the deaf. Technology that converts English text strings into on-screen animations of a virtual human character performing ASL could be extremely valuable to these users.

Because ASL takes advantage of the visual/spatial modality and is performed with various parts of the body in parallel over time, it presents many challenges from a computational linguistic perspective. Traditional linguistic technology designed for

written-languages is not directly applicable to ASL, and so a major theme of my work has been finding new ways to design the components of a natural language processing system to enable the development of English-to-ASL machine translation software. Some of the new technologies developed for this project include: a multi-pathway machine translation architecture, a 3D visualization of the arrangement of objects under discussion during an ASL conversation, an artificial-intelligence planning-based animation generator, and a multi-channel representation of the temporal structure of the ASL animation performance.

I've developed a working prototype system that can translate an initial corpus of English sentences, and I'm conducting a scalability study of the design. An evaluation study began in June 2006, during which native ASL signers critique the animations produced by the system. As a baseline for comparison, the study participants will also see animations produced by recording the movements (with a motion-capture body suit and data-gloves) of a human signer performing ASL. By comparing the animations produced by the system to the animations recorded from the human signer, we can evaluate the output of the system and direct its future development.

4. What is your professional background?

I graduated from University of Delaware in 2001 with a B.S. and M.S. in Computer and Information Science. On a George Mitchell Scholarship, I studied in Ireland during 2001-2002, and I received an M.Sc. in Computer Science from the National University of Ireland, University College Dublin. I entered the Ph.D. program in Computer Science at the University of Pennsylvania in 2002, and I began my work on American Sign Language shortly thereafter. I received a M.S.E. in Computer Science in December 2004, and I expect to graduate with a Ph.D. in Computer Science in August 2006. In September, I will begin as an Assistant Professor of Computer Science at the City University of New York (CUNY), Queens College, where I am establishing a research lab for assistive technology and sign language computational linguistics.

5. Please describe any past projects on which you have worked:

The first accessibility technology project that I worked on was as an undergraduate researcher for Dr. Kathleen McCoy's ICICLE project at the University of Delaware. The system was a writing-assessment and tutorial program designed for deaf children who were working on their English writing skills. The program contained a grammar-checking component that was specially tailored to the types of language errors that were typical of deaf children. This project was my first exposure to ASL and the English-literacy issues that are common among the deaf.

6. Have you participated in any SIGACCESS-sponsored event?

I've participated in the ASSETS conference for the past two years. In 2004, I presented an overview of my Ph.D. dissertation in the Doctoral Consortium; as the winner of the "Best Doctoral Candidate" award, I was invited to present my work during the closing plenary of the conference. The advice and feedback that I received during the conference was extremely valuable while I was developing my dissertation proposal.

Last year, I presented a paper describing a new formalism for representing the timing relationships between parts of an animated character's body during an American Sign Language performance. This representation has enabled my project to encode coordination and non-coordination relationships between elements of the animation output of the system. This paper received the "Best Paper Award" for 2005.

I'm looking forward to serving as one of the publicity chairs for the ASSETS 2007 conference.

SIGACCESS Member Profile

Frankie James

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Member of SIGACCESS since: 1996

Member of ACM since: 1996

Also member of: SIGCHI

1. How many years have you been working in this area?

I've been interested in accessibility since I started graduate school, back in 1992. Unfortunately, in industry, accessibility is raised as a "good citizenship" kind of topic, but resources are not typically invested in it. Therefore, many of the projects that I consider to be related to accessibility (e.g., audio interfaces) have to be framed in other non-disability contexts (e.g., vehicle-based interaction) to motivate the investment. So, I consider myself to have worked "off and on" in accessibility since graduate school, even though many of the topics are relevant for the area.

2. What motivates or inspires you to work in this area?

My reason for entering the field of human-computer interaction in general is that I like the idea that it is a branch of computer science aimed at helping people. Too much of technology is designed in a way that users feel incompetent, stupid, or any number of other bad things. It's nice to be able to say at the end of the day that the work we do in this field has made a positive impact on somebody. Accessibility makes you think about users with some very interesting requirements, and the challenge is really interesting and exciting.

3. What is your professional background?

My major was Computer Science, and my specialization for my Ph.D. was in Human-Computer Interaction (HCI). During my undergrad, I also had a minor specialization in American Sign Language.

I've worked in HCI since I graduated, although my first job was with a group of computational linguists, working on dialogue-based spoken language interfaces. My main foci have always been on non-desktop interactions (for example, audio output, speech input and output, and mobile device interfaces) and accessibility, and I see a strong link between those areas..

4. Please describe any past projects on which you have worked:

My dissertation was about audio interfaces to HTML to support blind users. I conducted several user studies and was able to develop a framework for choosing audio cues to mark document structures, based on user satisfaction data. One of my goals is to

eventually also gather data about memorability and performance effects of structured audio, to prove its applicability more broadly.

I also spent several years working on a project to allow speech input to portal-based desktop applications, where the speech interface was added to pre-existing applications without requiring the applications to be rewritten. My team developed a prototype system that supported voice navigation and data entry, and supported more than one language as well. We conducted several user tests to refine the interaction for navigation and data entry and measure the usability of the system for both disabled and non-disabled users.

5. Have you participated in any SIGACCESS-sponsored event?

ASSETS '98 paper: Lessons from Developing Audio HTML Interfaces (F. James)

ASSETS 2002 paper: Voice over Workplace (VoWP): Voice Navigation in a Complex Business GUI (F. James and J. Roelands)

6. What else would you like to see SIGACCESS do?

I'm not sure if this already exists, but it would be nice to see student SIGACCESS chapters at universities. I think it would be great to get people involved in accessibility early, while they are still students, so that they can have this in mind right from the start of their careers.

SIGACCESS Member Profile

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Member of SIGACCESS since: 1981

Member of ACM since: 1981

Also member of: SIGCSE, SIGCHI

1. How many years have you been working in this area?

Most of my 25 years as a faculty member.

2. What motivates or inspires you to work in this area?

I am motivated by my belief in the inherent worth and dignity of every human being, and a desire to help promote equal opportunities for all, particularly the least advantaged. I am routinely inspired by clients who exhibit a level of perseverance that I can only aspire to.

3. Please describe your current research project(s):

Our current project is the Portable Personal Profiler, a program that runs automatically from a USB drive that allows the user to easily copy their user profile to the drive. When the drive is later plugged into another computer, the system allows the user to duplicate the copied profile to the new machine. This allows users with disabilities to modify any computer they use to fit their accessibility needs – such as monitor, keyboard, and mouse settings – with essentially a single keystroke. This system currently runs on Windows XP and 2000 systems. It is particularly useful for users with disabilities in educational or work settings where they may be expected to use a variety of computers over time.

4. What is your professional background?

I have a BS in computer science from Purdue University, an MS in CS from the University of Pittsburgh, and a Ph.D. in Computer and Information Science from Temple University. Prior to becoming a faculty member at Millersville University, I was a systems analyst at IBM and Eastman Kodak, and Senior Editor at BYTE Magazine.

5. Please describe any past projects on which you have worked:

The “Integrating Assistive Technology into an Undergraduate Computer Science Curriculum from an HCI Approach” project received National Science Foundation funding to develop computer science curriculum on assistive technology and a model laboratory. The result has been a senior-level course “Assistive Technology” at Millersville University, which discusses AT from an HCI perspective.

The Single-Switch Performance Tool (SSPT) is software that allows clinicians to evaluate the performance of users with disabilities to help select appropriate switch types and body positioning of the switch. This program is being distributed free by the AAC Institute (http://www.aacinstitute.org).

MAACKeys is a Mac version of the AACKeys program that accepts input from an AAC device and interprets that input as either commands to the computer or input to the currently running program. This allows AAC device users to control standard computers using their devices rather than a standard keyboard and mouse, using the General Input Device Emulating Interface (GIDEI) serial protocol. This program is being distributed free by the AAC Institute (http://www.aacinstitute.org).

6. What technology or product would you really like to see developed? Why?

The development of a universal interface language. This would allow the development of portable, personalized interfaces to interact with any computerized device. Individuals would carry their own specialized interface with them, rather than having to rely on every device to provide accessibility.

7. Have you participated in any SIGACCESS-sponsored event?

Presented a poster paper “An Adaptive Technologies Course in a CS Curriculum” at the 2005 ASSETS conference.

8. What else would you like to see SIGACCESS do?

Become active in curriculum development.

SIGACCESS Member Profile

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Member of SIGACCESS since: 1999

Member of ACM since: 1999

1. How many years have you been working in this area?

11 years.

2. What motivates or inspires you to work in this area?

I am motivated by a desire to improve people's quality of life, and by the challenge of developing user interfaces that meet diverse needs. I am inspired by people with disabilities who develop their own low-tech, high-tech, and no-tech solutions; and by the unmet needs that remain for many people.

3. Please describe your current research project(s):

Currently I am working on a number of projects which are intended to serve people with cognitive impairments due to traumatic brain injury and other disabilities. Through my company, AT Sciences, I am working on systems to provide task guidance (through a distributed system allowing clinicians and family members to coordinate with the person with a disability) and wayfinding assistance (using rfID and other sensing technologies to determine a person's location indoors). As a member of the RERC on Advancing Cognitive Technologies at the University of Colorado, I am assisting in a project to explore technology needs across the lifespan for people with cognitive impairments. As a member of the RERC on Telerehabilitation at the University of Pittsburgh, I am assisting in the development of a virtual job coach using computer vision to compare user performance with ideal task performance. This work has been undertaken with support from the US National Institutes of Health and Department of Education.

I am also working toward the development of a sensor module for collision avoidance on power and manual wheelchairs. Wheelchair users with barriers to safe driving, including spastic movements or visual impairments, will operate their wheelchairs normally; but a network of low-cost ultrasound and infrared sensors will monitor the environment for obstacles, and over-ride the wheelchair controls to prevent collisions. Prototype wheelchairs have met performance criteria for obstacle avoidance when driven by individuals without disabilities, or autonomously moving about a room. Prototypes have also been successfully driven through a test course by individuals with visual impairments, and through a school setting by a novice wheelchair user with spastic movements. This work has been performed in conjunction with the University of Pittsburgh, with support from the National Institutes of Health.

In conjunction with Koester Performance Research, I am working on a software agent to adapt user interface settings (such as mouse sensitivity, keyboard repeat rate, and scan rate) for users with fine motor limitations. Preliminary research indicates that the software agent can recommend appropriate settings for double-click time and Sticky Keys. Agent-selected settings for mouse sensitivity and keyboard repeat delay have little impact for most users, but can provide significant improvement for select individuals.

4. What is your professional background?

I received a Bachelor of Science in Electrical and Computer Engineering from Carnegie Mellon University in 1996, with a minor in Biomedical Engineering. I received my PhD in Bioengineering from the University of Pittsburgh in 2001.

5. Please describe any past projects on which you have worked:

I have had the opportunity to see two products to which I've contributed make the transition to the marketplace. Software which I originally developed as an adaptive driver for users of head-operated computer controls is now available (with substantial alterations) as the PointSmart driver from Infogrip (http://www.infogrip.com). I've also contributed to Compass (http://www.kpronline.com), software which can provide quantitative measures of computer access skills in order to assist in assistive technology recommendations and outcomes measurement.

6. Have you participated in any SIGACCESS-sponsored event?

I first participated in the ASSETS conference in 2000, when I presented a paper on head-operated computer controls and was honoured to receive the Best Student Paper award. Since then I have presented demos (of computer skills evaluation software in 2002, and task guidance software for people with cognitive disabilities in 2005); and participated in a panel presentation (on technology for people with cognitive disabilities, in 2002). I was also a member of the 2005 Program Committee, a role I will continue in 2006.

7. What else would you like to see SIGACCESS do?

I would like to see coordination between SIGACCESS and the Rehabilitation Engineering and Assistive Technology Society of North America (RESNA), and possibly other societies in the field. Areas of coordination could include dissemination of knowledge in the field, and influencing government policy.

SIGACCESS Member Profile

Kathleen F. McCoy

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Member of SIGACCESS since: Not sure

Member of ACM since: 1994

Also member of: SIGART

1. How many years have you been working in this area?

About 20.

2. What motivates or inspires you to work in this area?

It seems that some things are so difficult for people with disabilities, but they shouldn't be. I would like to find ways of applying knowledge of artificial intelligence and natural language processing to make some of those things easier. I am inspired when I see people achieve incredible things under very difficult circumstances.

3. Please describe your current research project(s):

My projects are primarily involved with communication. I will highlight three projects which fall into two different areas. The first area is Augmentative and Alternative Communication (AAC). This field is concerned with developing systems and techniques for communicating for people whose disability precludes them from speaking in an understandable fashion. Generally such systems allow the user to select some language elements and a voice synthesizer is used to "speak" the desired selection. Often people who use AAC have physical impairments that make selecting language elements very slow; thus communication rate is a serious issue. Challenges exist in trying to speed communication rate while balancing cognitive load and enabling the most natural conversation. Two projects are highlighted in the area of AAC. The second area is in Computer Aided Language Learning systems. In this case, the concern is with teaching English as a second language to people who are deaf and signers of American Sign Language (ASL).

Fringe word prediction and topic modeling. In many AAC systems, developers have provided mechanisms for getting at core vocabulary – that fairly small set of words that appear most often in communication. Mechanisms include abbreviation expansion and encodings such as "minspeak" which enable most common words to be accessed in one to three keystrokes. While individual core vocabulary items do occur with high frequency, are words which individually occur significantly less frequently, but which together account for a large portion of communication. In this project we are concerned with access to this significantly larger "fringe" vocabulary consisting of potentially hundreds of thousands of words. We apply statistical natural language processing

techniques in order to develop mechanisms for predicting these words based on what has already been typed. These methods have attained significant theoretical keystroke savings (60% for a predication window of 6 using a trigram-based language model). A focus of the current work is to improve prediction further by adding "topic modeling" where vocabulary items more on topic are highlighted over non-topic items in an automatic fashion based on the previous conversation. We investigate various methods for modeling and applying topics and find that they provide increased prediction power.

Using prestored text with unfamiliar partners. One way to significantly speed communication rate is to anticipate text needs and prestore full sentences to be called up during a conversation. If this is done, it is inevitable that there will be times when the message that is stored is not exactly what is needed for the current conversation. E.g., the prestored message may contain some irrelevant information, may contain too much or too little information for the purposes of the exchange, or may contain unnecessary repetition because it is actually composed of several messages strung together. This project (undertaken with Jan Bedrosian from Western Michigan University and Linda Hoag from Kansas State) is a research project that looks at the tradeoffs associated with either quickly delivering a message as stored, or taking the time to edit the message so that it better fits the conversation. W measure attitudes of unfamiliar partners in public situations in an information exchange situation (e.g., between a customer using AAC and a clerk at a store). The hypothesis is that the best choices will be different depending on the type of pragmatic mismatch that exists with the current discourse situation and the prestored message. The goal is to identify the relative benefits of various tradeoffs in order to develop future technology that best supports the findings.

The ICICLE Project (Interactive Computer Identification and Correction of Language Errors). The long term goal of ICICLE (a research project in its prototype phase) is a computer-based "grammar" tutor geared toward people who are deaf signers of American Sign Language (ASL) writing in English. Written English is a difficult language for people who are deaf to acquire which is not surprising if one considers the lack of usable input a person who is deaf has in acquiring the language. ASL is a language that is very different from English in terms of its grammatical structure. The goal of ICICLE is to act like an intelligent grammar checker where the errors that are identified are those that are typical of the deaf population (a very different set of errors than would be expected from the native English speaking population). What we want is a system that will point out errors and offer tutoring on those aspects most likely to be helpful to the writer. The system takes research in second language acquisition into account, and will adapt its interactions as the student becomes more proficient in English. Most of the work to date has concentrated on user modeling aspects of the system – modeling a student's grammar of English and how that grammar changes over time so as to effectively point out errors.

4. What is your professional background?

My degrees (BS University of Delaware, MS and PhD University of Pennsylvania) are all in computer science focused on the subfield of artificial intelligence called natural language processing. My studies have always concentrated on an interdisciplinary perspective with heavy doses of psychology and linguistics throughout my academic career.

5. Have you participated in any SIGACCESS-sponsored event?

I have been a member of the ASSETS Program Committee (2006, 2005, 2004) and have presented papers at the ASSETS Conference in 2000 and 1994.

6. What else would you like to see SIGACCESS do?

I think a journal in this area is long overdue.

SIGACCESS Member Profile

Jessica Paradise Elliott

College of Computing/GVU Center

Georgia Institute of Technology

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Member of SIGACCESS since: 2001

Member of ACM since: 2000

Also member of: SIGCHI

1. Please describe your current research project(s):

My thesis work focuses on understanding how to design cognitive supports for families. Families have a great deal of information to remember and share to keep their households running smoothly. As home life gets busier, it becomes increasingly difficult to manage all this information.

I explored current practices of information sharing and how families remember through a mixed-method qualitative study with four families in their homes. I collected many grounded examples of the participants' approaches to remembering a range of household information. These examples show us a number of successful memory strategies and a few areas of challenge for our participant families.

I have also explored the design space through proof of concept demonstrations of the AudioNotes system in Georgia Tech's Aware Home. When a family member is busy, this system would allow them to quickly offload reminders to themselves or messages to a spouse or child though a voice activated audio recording. The message can later be accessed through audio portals throughout the house. These portals may take various forms like touch displays or a toy with embedded speakers. This allows family members to adopt the system in a way that fits their lifestyle and attempts to involve the children in the use of the system by embedding the system into more playful forms. Although reducing memory failures and increasing efficiency are important in any cognitive support, I feel it is equally important to make the design socially and aesthetically balanced.

2. What is your professional background?

I am a Ph.D. student working with Dr. Elizabeth D. Mynatt in the Georgia Institute of Technology's College of Computing. I am a member of the GVU Center, Aware Home Research Initiative and the Everyday Computing Lab. I completed my M.S. in Human-Computer Interaction from the Georgia Institute of Technology in 2001 and my B.S. in Computer Science from Tufts University in 1998. Prior to entering graduate school, I

worked full time as a Software Engineer in a user interface group at NewsEdge Corporation in Burlington, Massachusetts.

3. Please describe any past projects on which you have worked:

As part of a summer internship with Vicki Hanson in IBM T. J. Watson's Accessibility Research group, I worked on a project with Shari Trewin and Simeon Keates exploring the current use of pointing devices in order to create better accessibility utilities. We conducted a study with participants from a range of ages and motor abilities including individuals with Parkinson's Disease and older adults. Participants completed computer sessions that automatically logged movement data as they clicked on targets. In between computer sessions, semi-structured interviews with participants explored their computer and mouse use. In addition to the detailed mouse movement data, this study provided a set of difficulties and strategies that were reported by participants from all groups, not just the older adults or people with motor impairments.

In research that began as my Master's degree project, I explored the potential of computational support to help survivors of traumatic brain injury regain some of their independence lost due to their resulting cognitive impairments. Using a case-study approach, I explored the needs and informed the design of a pacing aid for an individual with a cognitive impairment whose quality of life was negatively affected by her inability to pace herself during her morning routine.

4. Have you participated in any SIGACCESS-sponsored event?

- Presented a paper on "Designing a cognitive aid for the home: A case-study approach" in 2004 at ASSETS.

- Student volunteer at ASSETS in 2000.

SIGACCESS Member Profile

David Sloan

Digital Media Access Group, School of Computing, University of Dundee, Scotland

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Member of SIGACCESS since: 2005

Member of ACM since: 2005

Also member of: SIGCHI

1. How many years have you been working in this area?

7 years.

2. What motivates or inspires you to work in this area?

I grew up thinking I was technologically incompetent, and computer science was the last area in which I thought my career would develop. However, after coming to Dundee to study, I was introduced to the field of inclusive design and technology for disabled people by Alan Newell and Peter Gregor, and my view of technology changed forever. I realised the flaws of much of today's technology stem from systems that are designed by and for a very small, but abnormally capable, sector of society, and I think the task of rectifying this situation is a fascinating and challenging one.

3. Please describe your current research project(s):

I've just (literally!) finished my PhD, titled "The Effectiveness of the Web Accessibility Audit as a Motivational and Educational Tool in Inclusive Web Design". It studied the impact on recipient individuals and organisations of web accessibility audits we've produced for commercial clients over recent years.

4. What is your professional background?

My Honours degree was a Bachelor of Science in Topographic Science from the University of Glasgow, followed by 4 years' work as a Database Cartographer for the UK's leading commercial producer of atlases and maps. I then made the decision to leave and come to Dundee to study for a Masters in Applied Computing in 1998; taking a post as a Research Assistant the following year. I've been here ever since, working as a consultant and researcher, as well as studying part-time for my PhD.

5. Please describe any past projects on which you have worked:

Much of my work has involved providing advice and support on a commercial consultancy basis, and then using that experience to inform my academic work on effective ways of promoting inclusive design. One specific project involved teaming up with a multimedia e-learning production unit to create a web site which supports the creation of accessible multimedia for learning – but also encourages the very use of

multimedia as a way of making the learning experience more accessible. This involved producing ‘how-to’ guides and commissioning case studies to illustrate practical experiences. The resulting site is available at http://www.skillsforaccess.org.uk.

6. Have you participated in any SIGACCESS-sponsored event?

My first academic conference was ASSETS in 2000, in Arlington VA; I also attended CUU 2000 which took place immediately afterwards, presenting papers at both. I also attended CUU in 2003 in Vancouver, but haven’t made it back to ASSETS as yet. I also attended and presented at the W4A Workshop at WWW2006, a little closer to home in Edinburgh.

7. What else would you like to see SIGACCESS do?(E.g. publish a journal, sponsor more conferences, advise government policy, etc.)

All of the above! Take the lead in developing a co-ordinated approach to inclusive design, including making the community more aware of what each of us is doing. Minimise the negative aspects of regional differences in approaches (in particular arguments over what terminology to use and how best to evaluate!), and build on the combined strengths of work going on around the world.

SIGACCESS Member Profile

Andrea Tartaro

Northwestern University

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Member of SIGACCESS since: 2004

Member of ACM since: 2004

Also member of: SIGCHI

1. How many years have you been working in this area?

2 years.

2. What motivates or inspires you to work in this area?

My specific interest in accessible computing is to build innovative computer tools for children with disabilities – tools that respect the children's desire to be like other children, and help them access social and learning opportunities. My inspiration is personal: my older brother was born with Cerebral Palsy. While it is unlikely that his Cerebral Palsy will be cured medically in our lifetime, I believe assistive technology can help make the world more accessible for him and for other individuals with disabilities. Growing up, I watched my brother face both social and learning challenges due to a disability that is primarily physical. It is these challenges I hope my research can address.

3. Please describe your current research project(s):

For my dissertation I am designing, implementing and evaluating the use of a new kind of "authorable" virtual peer that will allow children with autism to learn about reciprocal social interaction, peer collaboration and storytelling by building their own virtual humans and observing how they interact in the world. Children with Autism Spectrum Disorder (ASD) often lack the communication and reciprocal social interaction skills that lay the groundwork for school-based learning of literacy and for later academic and social achievement. However, these same children may spend hours interacting with interactive computer games. Virtual peers are 3D, life-size animated characters that look like children and are capable of interacting, sharing real toys, and responding to children's input. I am developing a new virtual peer that incorporates authoring features, such that the child can control the different communication and social interaction features of the system (such as nonverbal behaviors of the agent: eye gaze, hand gestures, head nods and posture shifts), and observe the effects on interaction. Children with autism will use Authorable Virtual Peer (AVP) in three modes. Children interact with the virtual peer by telling stories with the system. In a second mode, children also control the virtual peer by using an interface to select predefined responses. Finally, in the third mode, children author the virtual peer by using tools to create new behaviors and responses.

These three modes help children with ASD develop communication and reciprocal social interaction skills by rehearsing verbal and nonverbal interaction skills with an indefatigable peer, manipulating the verbal and nonverbal behaviors of the virtual peer and observing the effects on interaction, and constructing their own interaction examples. The target population for this research is children with high-functioning autism (IQ above 80) with verbal abilities, ages 8-13.

A pilot study with an 8-year-old girl with an Autism Spectrum Disorder (Asperger Syndrome), whom we will call Mary, investigated Mary's verbal and non-verbal behaviors in an interaction with an existing virtual peer, Sam. Mary and Sam told two collaborative stories together where they took turns adding to the story, Mary initiated one story with Sam, and then Mary requested that Sam continue telling stories for two stories. Mary engaged with Sam with notable enthusiasm, and exhibited eye gaze and play gestures that illustrated her engagement with Sam. She performed collaborative storytelling acts by elaborating on Sam's stories, facilitating her own story, and responding to Sam. However, we also observed in Mary several areas where an AVP could be used to practice different kinds of interactions that she did not perform, such as role-playing, or making or acknowledging suggestions.

Developing an AVP for children with ASD will add to our understanding of autism itself, and lead to improved interventions to help children take advantage of the social world around them.

4. What is your professional background?

I am currently a PhD candidate in the joint Ph.D. program in Computer Science and Communication at Northwestern University (the program is called Technology and Social Behavior). I also have an M.S. in Computer Science from Northwestern University and an M.A. in Instructional Technology from Columbia Univeristy, Teachers College. My undergraduate degree is in Computer Science from Brown University. After Brown, I worked for two years at Sun Microsystems in Menlo Park, CA as a Software Engineer on the Java 3D project.

5. What technology or product would you really like to see developed? Why?

A virtual peer that can speak Sign Language. Virtual peers have been used to significantly increase typically-developing children's early literacy skills. Perhaps a virtual peer that uses Sign Language can help Deaf children develop literacy skills – literacy is particularly challenging for Deaf children.

6. Have you participated in any SIGACCESS-sponsored event?

I participated in the 2005 ASSETS Doctoral Consortium; my presentation was entitled: Storytelling with a Virtual Peer as an Intervention for Children with Autism. My presentation won the Best Doctoral Candidate Award and was the final plenary presentation.

7. What else would you like to see SIGACCESS do?

Publish a journal.

SIGACCESS Member Profile

Jim Thatcher

Jim Thatcher, Accessibility Consulting

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Member of SIGACCESS since: The beginning

Member of ACM since: (Almost the beginning) 1960

Also member of: None

1. How many years have you been working in this area?

25

2. What motivates or inspires you to work in this area?

I led the development of one of the first screen readers for DOS, IBM Screen Reader, and then the first screen reader for the Graphical User Interface on a PC, IBM Screen Reader/2 for OS/2. Knowing how the assistive technology works and how blind people use that technology puts me in an especially good place to advocate for accessibility of software and the Web. Access is, in my opinion, a civil right, and I want to do everything I can to improve and facilitate that access.

3. What is your professional background?

I worked in the Mathematical Sciences Department of IBM Research starting in 1963 after receiving my PhD in Computer Science from the University of Michigan. My thesis advisor, Jesse Wright, who is blind, joined the Math Department at the same time. He and I worked on mathematical computer science for about 15 years until computer access drew us away from the theoretical work. In 1978 there was a prototype system in IBM called SAID, Synthetic Audio Interface Driver. Developed in IBM Raleigh by Al Overby, this was an IBM 3270 terminal connected to a 12-key telephone keypad and a Votrax Synthesizer the size of a suitcase. With the keypad you could speak the previous, current or next line (1,2,3), word (4,5,6), or character (7,8,9), say all (0), go to the cursor (#) or change form speaking to spelling (*). Jesse used one of these talking terminals that cost the Math Department $13,000. SAID went on to be an IBM product, the Talking Terminal. Around this time the IBM PC was born and our idea was to emulate SAID on a PC, we called the project PCSAID, and thus have a much cheaper talking terminal – about $800. So that is what we set out to do around 1980, to make a cheaper talking terminal. Its first implementation was a “co-resident” application with the terminal emulator, written in BASIC. It ended up being IBM Screen Reader for DOS about 5 years later.

4. Have you participated in any SIGACCESS-sponsored event?

I attended one of the first ASSETS conferences; haven’t been back since.

Call for participation

The Eighth International ACM SIGACCESS Conference on Computers & Accessibility – ASSETS 2006

Embassy Suites – Downtown, Portland, Oregon

23rd-25th October, 2006

URL: http://www.acm.org/sigaccess/assets06/

Introduction

Computer and Information Technologies have redesigned the way modern society operates. In particular, they have identified new avenues to assist individuals with special needs and provided tools and resources to alleviate the traditional barriers encountered by persons with disabilities. For example, speech generation systems have assisted persons with visual disabilities, voice recognition has helped people with motor impairments, multi-modal presentations have been shown to be effective in helping people with learning disabilities understand information.

The ASSETS conference program covers a multitude of topics relevant to assistive technologies and universal accessibility and is structured around technical papers, poster sessions, demonstrations, the doctoral consortium, and the conference reception. A new addition for this year is the SIGACCESS student research competition. This is an exciting opportunity for students to receive subsidised attendance at the conference.

Note: New for this year, American Sign Language interpreters will be provided upon request for all ASSETS technical sessions and events. Requests for an interpreter must be indicated on the conference registration form when registering for ASSETS 2006.

About the call

The ASSETS series of conferences is aimed at providing a technical forum for presenting and disseminating innovative research results that cover either:

1. applications of computing and information technologies to provide assistive systems to persons with disabilities; or,
2. investigation of computing technologies and their use by persons with disabilities.

The ASSETS conferences (to be held this year at the Embassy Suites - Downtown, Portland, Oregon, USA) have been developed with the specific focus of facilitating the sharing of information and exchange of ideas through formal paper sessions, demonstrations, posters, and informal/social events. To this purpose, ASSETS is a single-track conference to encourage group participation and interactions.

Topics

ASSETS is the principal forum for discussions and information exchange between researchers, clinicians, and educators; including rehabilitation personnel who administer assistive technologies; and policy makers concerned with equitable access to information

technologies for people with disabilities. As such we solicit high quality original work that addresses the issues associated with computing/information technology in relation to:

- Hearing, sight and other sensory impairments;
- Motor impairments;
- Memory, learning and cognitive disabilities; and,
- Ageing.

Preference will be given to papers with experimental results, but strong papers presenting new theoretical insights or positions will also be given consideration. Topics should focus on (but are not necessarily limited to) the design, development, evaluation and scientific investigation of technologies to support these individuals as well as practising professionals including:

- User Evaluation, Experience, and Studies;
- System Papers for Assistive Devices and Technologies;
- Social Issues;
- Best Practice;
- Education and Outreach;
- Web / Interface Accessibility;
- Access to Technology;
- Access to the Real and Built Environment (Pervasive and Ubiquitous Systems);
- Multi-Modal Interaction;
- Theoretical / Position Papers;
- System Demonstrations; and
- Poster Submissions.

Submission categories

Technical papers

The deadline for submitting technical papers was 2nd June, 2006.

Posters and demonstrations

The Conference will also offer a session dedicated to poster presentations and demonstrations of research products and tools. Posters and demonstration proposals (i.e. extended abstracts) are limited in length to 2 pages. Extended abstracts will be reviewed, and accepted extended abstracts will be included in the conference proceedings. The deadline for submissions is 14th July, 2006.

Doctoral Consortium

ASSETS 2006 invites doctoral students to apply for the Doctoral Consortium. The consortium provides a great opportunity to doctoral students to share and discuss their research with other students and a panel of established researchers. The consortium has the following objectives:

- Provide a forum for students to present their current research and receive feedback;
- Promote contacts among doctoral students working in similar areas; and,
- Support students with information and advice on their research.

The Consortium will be held on Sunday 22 October 2006 in Portland, Oregon. Approximately 10 students and four faculty members will be invited to attend and discuss each student's work in turn. Students will present their work during a poster session dedicated to the work of the Doctoral Consortium participants that will take place during the main conference.

Please note: the purpose of the Doctoral Consortium is to provide feedback to Doctoral candidates at an early stage of their research, to help guide and shape their research program. Student work that is complete, or near to completion, should be submitted as either a technical paper or poster.

Students submitting papers for the Doctoral Consortium may submit a different (and more complete) piece of work for the Student Research Competition, but may not submit the same work to both the Doctoral Consortium and the Student Research Competition.

Student Research Competition

New for this year is the SIGACCESS student research competition. This is an exciting opportunity for students to participate in an ACM conference and get visibility for their research.

Students wishing to participate submit abstracts of their work, and up to 25 entrants will be selected for the competition. Qualifying research must deal with issues related to computing and information technology to help persons with disabilities. Selected students will receive partial support from ACM to attend the conference. At the conference, entrants will display a poster and make a brief presentation to a panel of judges. A small number of semi-finalists will be chosen by the judges to present their work in a conference session, and of those up to three undergraduate and three graduate students will be designated finalists by the judges, and entered in the Grand Finals of ACM's Student Research Competition.

To be eligible to enter this competition, entrants must be undergraduate or graduate students, and members of ACM. Entrants must be sole authors of their abstracts and posters. Work accepted as a full paper for one of the technical sessions of the conference cannot also be considered for the Student Research Competition. Students having a technical paper, however, are encouraged to submit other research to the Student Research Competition.

Please note that the judges will look more favourably on complete, or nearly complete, work than research which is still in its early formative stages. Students at, or near, the outset of their work in this area are encouraged to submit to the Doctoral Consortium instead.

Student funding

The Doctoral Consortium is supported by the National Science Foundation (NSF). Conference registration and basic travel expenses including airfare, hotel, and some meals will be covered for all students accepted to the Consortium. The ASSETS 2006 conference organizers express their deepest appreciation to the National Science Foundation for its support.

The Student Research Competition is supported by ACM and Microsoft. Bursaries of up to $500 are available to reimburse travel and other expenses (but not conference registration).