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RESEARCH ARTICLE

A Panorama of Web Accessibility

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Abstract --- The paper presents the myth and reality of web accessibility. The survey considers the feature analysis of a few websites which support accessibility. The paper explores the existing ICT facilities for various impairments (VI, HI, CI --- etc.) of differently abled persons particular to web accessibility. The work gives the results of analytical study of the existing web accessibility approaches.

Keywords: Human factors, Accessibility, Differently Abled People (DAP), Information and Communication Technologies (ICT)

1. INTRODUCTION

Nowadays, ICT is used very extensively in fulfilling our routine tasks like bill payments, banking transactions, reservations and many more to the extent that ICT is not a luxury, but necessity today. However, a large section of the society comprising differently abled finds it difficult to use ICT in the same way as normal people do. This includes the visually impaired (fully or partially blind), hearing impaired, cognitive impaired (memory loss, etc.), autism, cerebral palsy etc.

Such people have to be provided with different kinds of assistive technologies either software-based or hardware-based to make ICT accessible to them. A large number of software-based assistive technologies are normally in the form of applications running on desktops which make common desktop applications (office applications, browser etc.) accessible for the disabled person. In [Beats2010], ICT applications for differently abled people were explored on a general front. However, also, Free & Open Source Software (FOSS) tools/techniques play an important role in creating assistive technologies that are free-of-cost, available to all, easily maintainable

etc. for a large portion of population in a country like India. Currently, efforts in this direction include, as specified in [NWmumbai11], those by C-DAC to create awareness about the role of FOSS in developing accessible solutions and demonstrate select FOSS-based assistive technologies.

A need of the time is to devise facilities to provide a platform for promotion and adoption of FOSS in the area of accessibility as well as creating opportunities for all stakeholders to discuss and identify the areas of accessibility that are still untouched.

Today, assistive technology *(also, adaptive technology)* is a well-known term among the science and technology community. In the case of HCI, the relevant subject is known as computer accessibility. It is also called as accessible computing. Further, the subfield of relevance to Internet is known as web accessibility. In this paper, we explore the web accessibility case in context. The remainder of the paper is structured as follows. Section 2 describes Web Accessibility it includes Web Browser Accessibility, A Vast Choice of Applications to Support Integration and Disabilities. In section 3 explains Website Accessibility or Accessible Website and Section 4 explores Web Accessibility Myths.

2. WEB ACCESSIBILITY

2.1 Web Browser Accessibility

Web pages often include images, but many web page visitors cannot see images. Some are blind and use a screen reader, which reads aloud the text on a screen. Others have turned off image downloading because they have a slow Internet connection, or they are working with a handheld device that cannot display images.

Viewing pages without images is addressed when web designers include equivalent text descriptions for images. Called 'alt text', short for alternative text, these text descriptions are:

- Displayed when the mouse pointer hovers over the image (by most visual browsers)
- Displayed when images are not downloaded (by most visual browsers)
- Read by screen readers and voice browsers

The figures below are examples of how alt text is rendered by three different browser configurations. The first is Internet Explorer with images loaded and the mouse hovering over an image, which displays the alt text in a popup:

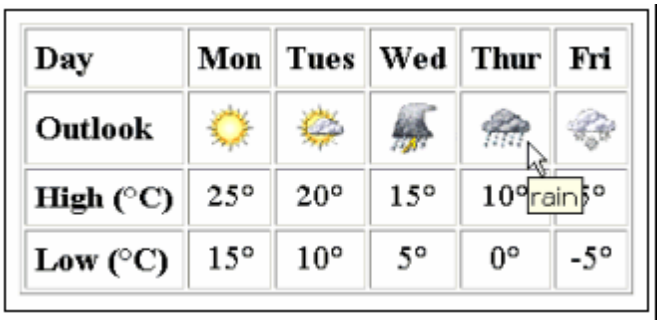

Figure 1

The next figure shows the same page in Opera with images turned off in the browser settings. For images with alt text provided, the alt text is displayed. Where alt text is missing (the middle image), "IMAGE" is displayed.

Day	Mon	Tues	Wed	Thur	Fri
Outlook	sunny	partly cloudy	IMAGE	rain	snow
High (°C)	25°	20°	15°	10°	5°
Low (°C)	15°	10°	5°	0°	-5°

Figure 2

The third figure shows the display of IBM Home Page Reader, a voice browser, set to read images without alt text. The text in the bottom pane indicates what a person using the voice browser would hear. (At the time of the screen capture, it was reading the middle image, thus it is highlighted and the information at the top and bottom of the page is not visible in the bottom text pane.) Notice that it reads the file name of the image that is missing alt text:

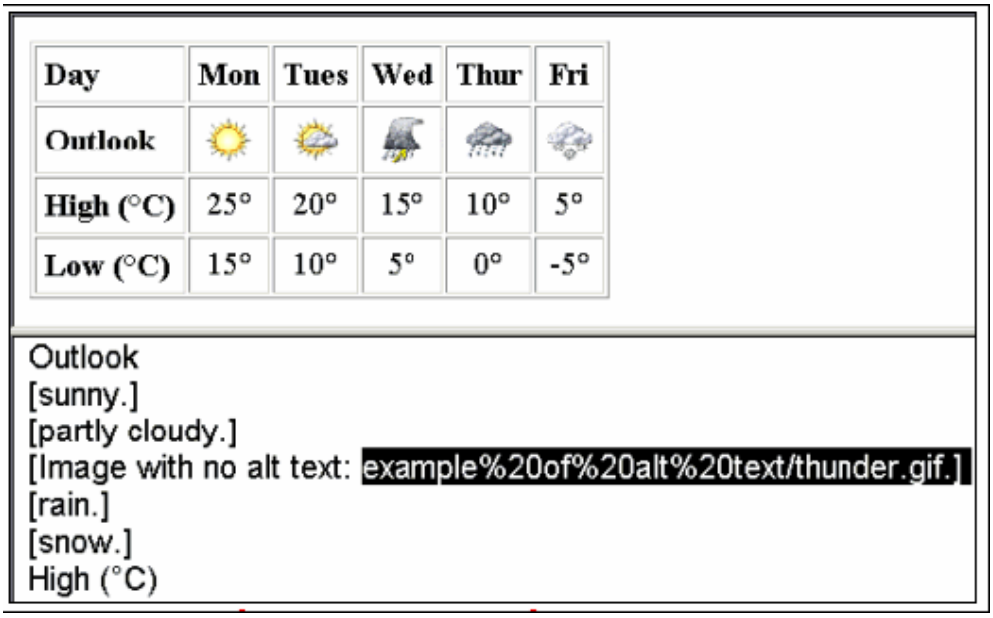

Figure 3

The figures demonstrate that if there is no alt text, the usefulness and usability of the page is dramatically reduced for visitors not able to access images. With equivalent alt text, the page is equally usable with or without images.

Alternative text is primarily discussed in terms of its usefulness to people who are blind and use screen readers. This clearly is an accessibility issue for people with disabilities. At the same time, alternative text can also be useful to people without disabilities, such as those using a handheld device. alt text can also increase usability. Most visual browsers display the alt text for an image as the image is downloading. For long downloads, this helps both with user perceptions and with interactions. That is, users are likely to be less aware of a slow image download because they are getting some information about the content from its alt text. The fact that there are

benefits of accessibility improvements to people without disabilities is one of the complications of distinguishing between usability and accessibility.

2.2 A Vast Choice of Applications to Support Integration

Today, a great variety of solutions and voice applications for the DAP is available which takes advantage of voice synthesis and voice recognition technologies to support the engagement of DAP. Dyslexia software: speech synthesis integrated into software which supports people with dyslexia, enabling learning, even independently, and simulating human interaction.

Voice Synthesis and Voice Recognition systems are the ideal solution for creating voice applications for the disabled.

Web accessibility refers to enabling the differently abled people to use the Web. More specifically, it is about enabling the DAP to perceive, understand, navigate, and interact with the Web. Web accessibility also benefits others, including older people with changing abilities due to aging**.**

Web accessibility aims to address the special needs of DAP [Beats2010] such as Visually Impaired (VI), Hearing Impaired (HI), Motor Impaired (MI), Cognitive Impaired (CI) in the web context. Such needs are detailed as follows from [wikiWWWaccess] (1)Visual: Visual impairments including blindness, various common types of low vision and poor eyesight, various types of color blindness (2.)Motor/Mobility: e.g. difficulty or inability to use the hands, including tremors, muscle slowness, loss of fine muscle control, etc., due to conditions such as Parkinson's Disease, muscular dystrophy, cerebral palsy, stroke; (3.)Auditory: Deafness or hearing impairments, including individuals who are hard of hearing;(4.)Seizures: Photo epileptic seizures caused by visual strobe or flashing effects.(5.)Cognitive/Intellectual: Developmental, learning disabilities and cognitive disabilities of various origins, affecting memory, attention, developmental "maturity," problem-solving and logic skills.

We understand that web accessibility is in terms of web browser accessibility, accessible websites and web document accessibility. In [Beats2010], we presented about document in the case of word documents. For word document accessibility, screen readers such as JAWS are available. It is under exploration to devise accessible web documents.

Disabilities

Disabilities that affect a person's ability to use the Web include:

- Vision
  - Blindness
  - Low vision
  - Color-blindness
- Hearing
  - Deafness
- Motor
  - Inability to use a mouse
  - Limited fine motor control skills
- Cognitive
  - Learning disabilities
  - Inability to remember or focus on large amounts of information

Assistive Technologies

Making Web pages accessible requires creating Web pages that facilitate assistive technologies. Assistive technologies include:

- Screen readers: JAWS (http://www.freedomscientific.com)
- Text enlargers: Zoom Text (http://www.aisquared.com)
- Alternative input devices
  - Adaptive keyboards and mice (e.g. one-handed keyboards)
  - Voice-recognition systems
  - Eye-tracking systems
  - Mouth sticks and other mouth/tongue operated devices

3. WEBSITE ACCESSIBILITY (Accessible Websites)

A website is called an **accessible website** in case all the web pages in the website are accessible. An example accessible website is AICTE website.

4. WEB ACCESSIBILITY MYTHS

- Accessible pages must be written in HTML 2.0
- Accessible pages must cater to the lowest common denominator
- Accessible pages have to be dull, text-only, archaic relics from the Ice Age
- Everyone on the Web uses Internet Explorer, so I don't need to worry about other browsers
- My target audience uses a certain browser with a certain configuration, so I should design for that
- It takes too much time and money to write accessible pages
- The Web is a graphical medium, so I shouldn't worry about text-only users or the blind
- People should view a Web site the way the designer intended

5. IMAGE TO SOUND CONVERSION

It also explores that a system that transforms images acquired with a camera into sounds. The system is designed for the visually impaired people and will convert real time images into sounds, respecting a certain algorithm, to preserve the visual information. The resolution used for images to be conversed is to be found out after some future tests and statistics. The hardware implementation will have to use the capabilities of a portable device, such as a PDA or mobile phone or special built embedded system with microcontroller, and the images will be received though a small web-cam. Actual results obtained by this system configuration are to be evaluated within testing.

6. WEB CONTENT ACCESSIBILITY GUIDELINES

Web Content Accessibility Guidelines 1.0 defined by the World Wide Web Consortium (W3C). These guidelines explain how to make Web content accessible to people with disabilities. The guidelines are intended for all Web content developers (page authors and site designers) and for developers of authoring tools. The primary goal of these guidelines is to

promote accessibility. However, following them will also make Web content more available to *all* users, whatever user agent they are using (e.g., desktop browser, voice browser, mobile phone, automobile-based personal computer, etc.) or constraints they may be operating under (e.g., noisy surroundings, under- or over-illuminated rooms, in a hands-free environment, etc.). Following these guidelines will also help people find information on the Web more quickly. These guidelines do not discourage content developers from using images, video, etc., but rather explain how to make multimedia content more accessible to a wide audience

Text content can be presented to the user as synthesized speech, Braille, and visually-displayed text. Each of these three mechanisms uses a different sense -- ears for synthesized speech, tactile for Braille, and eyes for visually-displayed text -- making the information accessible to groups representing a variety of sensory and other disabilities.

In order to be useful, the text must convey the same function or purpose as the image. For example, consider a text equivalent for a photographic image of the Earth as seen from outer space. If the purpose of the image is mostly that of decoration, then the text "Photograph of the Earth as seen from outer space" might fulfill the necessary function. If the purpose of the photograph is to illustrate specific information about world geography, then the text equivalent should convey that information. If the photograph has been designed to tell the user to select the image (e.g., by clicking on it) for information about the earth, equivalent text would be "Information about the Earth". Thus, if the text conveys the same function or purpose for the user with a disability as the image does for other users, then it can be considered a text equivalent [10].

7. CONCLUSION

The paper presents the myth and reality of web accessibility. The survey considers the feature analysis of a few websites which support accessibility. The paper explores the existing ICT facilities for various impairments (VI, HI, CI --- etc.) of differently abled persons particular to web accessibility. The work gives the results of analytical study of the existing web accessibility approaches.

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