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Accessible Cloud Computing Based E-learning Environment for Disabled People

Meghana Jalgaonkar[1] and Seema Purohit[2]

[1]Department of Computer Science, University of Mumbai, Mumbai – INDIA.
[2]Director, Navinchandra Mehta Institute of Technology and Development, Mumbai – INDIA.

Abstract

Cloud Computing is multiple set of services which provide infrastructural resources using internet as network as interconnecting media, applications and data storage on a service providers server (third party). The basic principle of e-learning is to achieve personal learning goals by acquiring skills and knowledge through computers or other network-enabled systems. It is observed that while some people have ability to use the resources, some other people with disabilities are suffering from it. This discrimination could be wiped out by a proper management and strategy adopted by the Universities or Institutes in the form of a properly implemented and managed e-learning. The paper begin with a brief introduction to cloud computing in e-learning and it explains challenges of e-learning for visual disabilities. Tools for visual disabilities, problems as we see for visual disabled person in e-learning environment. As a solution of this we will suggest an alternative option of cloud computing in the e-learning environment for visually disabled people. In this paper, we present proposed cloud computing e-learning framework for visually disabled people to explore emerging opportunities and challenges to get more "accessible" future for people with special access needs. The existing e-learning frameworks cannot address all categories of users. The research is intended to propose a new effective framework of e-learning based on cloud computing concept, which would be intelligent as well as accessible by all, including people with disabilities.

Keywords: Cloud computing, e-learning, GPII, IaaS, SaaS, PaaS.

1. Introduction

The advent of the Internet has heralded a new age not only of information sharing in general, but of the proliferation of web-based services that serve disabled and non-disabled communities alike.

In addition, the move to cloud computing and the benefits gained from its processing capability for performing complex operations will likely result in substantial improvements in the quality and availability of e-learning environment for visually disabled people. However, it should be noted that access to the cloud via the Internet is a prerequisite for these technologies to become available and mainstream. For persons with disabilities, multi-functional online environments help streamline services and move the status quo away from dependence on single-function, cost-prohibitive and often non-accessible devices. In fact, websites and web applications have a greater impact in improving persons with disabilities' access to socio-cultural, educational and economic activities than any other ICT with the exception of mobile phones' impact on independent living.

This paper explains challenges of e-learning for visual disabilities. Tools for visual disabilities and the problems as we seen in the present e-learning environment while assisting the technology by visual disabled people. It also presents cloud computing options, including its delivery models and deployment methods. Proposed Cloud Architecture for visual disabilities explains the new effective framework for visually disabled people to use e-learning web services on the cloud. Finally, presents conclusions and suggestions for future research.

2. Need of Cloud Based Global Public Inclusive Infrastructure (GPII) for Disabled People

It help users to identify which technologies and features could be of most benefit to them. This will be especially beneficial because it will give students with visual disabilities a chance to experiment—often for the first time—with accessible formats and to learn what works.

Table 2.1

Challenges of e-learning for Visual disabilities	Problems for visual disabled in e-learning environment	Need of cloud in e-learning environment for disabled people
• Reading Tools • Speech synthesizers, Screen Readers • Word prediction tools • Proof Reading programs • Abbreviation expansion • Symbol Learning Tools	• Too many tools • Too many different concepts to learn • Difficult to keep adjusting to different environments • Setting up customization • Needs change over a period	• One login • Multiple tools in one • Customization settings stored in the cloud • Can be extended as per the users requirement • Can be extended beyond the browsing experience

Secondly it allows users to store their preferences, permissions and settings. Some sort of identifier—be it biometric, a USB stick, an NFC tag, or some other technology—will prompt a broadband-connected device to retrieve a user's settings and apply them. Equally important for public devices, the GPII cloud will automatically reconFig. the device for the next user.

3. Proposed Cloud Architecture for Visual Disabilities in E-learning

In this cloud architecture we consider users with Visual disabilities i.e. blindness, low vision and high contrast or color blindness. A blind person is one who cannot use a visual at all. These are users who read Braille displays or listen to speech output (from a screen reader) to get information from their systems. Users with low vision have a wide variety of visual capabilities. Estimates suggest that there are approximately 9-10 million people with low vision [2]. A person with low vision can be considered to be someone who can only read print that is very large, magnified, or held very close. without such descriptive information, blind or low vision users may find it difficult or impossible to interpret unlabeled, graphically labeled, or custom interface objects. Providing descriptive information may provide the only means for access in these cases. As an added selling point to developers, meaningful widget names make for code that is easier to document and debug [9].

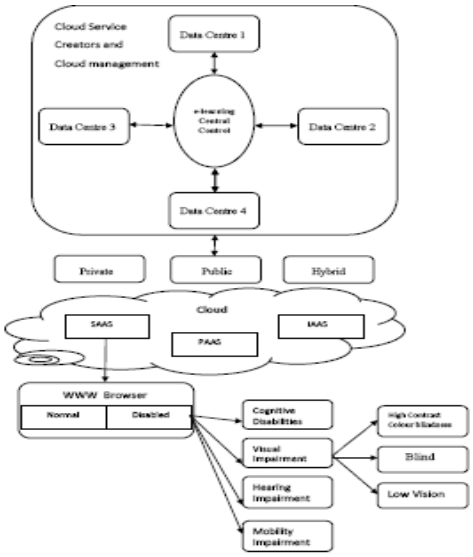

Fig. 1: Cloud Architecture for Visual Disabilities.

Providing a text equivalent for every non-text element and embedded objects (e.g., via "alt", "longdesc", or in element content). This includes: images, graphical representations of text (including symbols), image map regions, animations (e.g., Animated GIFs), applets and programmatic objects, ASCII art, frames, scripts, images used as list bullets, spacers, graphical buttons, sounds (played with or without user interaction), stand-alone audio files, audio tracks of video, and video.

4.1 Blind Users
Designing an e-learning web site that should be relative to blind users is:

4.2 Low Vision & Color Blindness
Our goals of accessible web design relative to low vision users are:

1. Larger font size
The common theme for low vision users is that it is challenging to read what is on the screen. Those who have low vision need the assistance of a hardware or software magnifier to enlarge the text beyond simple font enlargement. In e-education web site use of these screen magnification hardware & software to enlarge their view, performance and image quality are improved if larger font sizes are available prior to magnify. Using the largest font size supported by the browser (the largest is only available when High Contrast mode is turned on).

2. Configurable font size
All fonts, including those in text panes, menus, labels, and information messages, can be easily configurable by users. There is no way to anticipate how large is large enough. The larger fonts can be scaled, the more likely it is that users with low vision will be able to use the software without additional magnification software or hardware.

3. Option of audio
A related problem for users with low vision is their limited field of view. Because of large fonts or magnify the screen through hardware or software, a smaller amount of information is visible at one time. A limited field of view means that these users easily lose context. Events in an interface outside of their field of view may go unnoticed. For these types of users we can use audio cues to corresponding texts and images on e-education websites. In addition, providing redundant audio cues (or the option of audio) can notify users about new information or state changes.

4. Minimize the users' memory load
For persons using screen magnification in software services, the effective size of the computer screen can be very small. Therefore, low vision users must rely on their own memory to integrate portions of a document.

5. Use the High Contrast option in the Accessibility Options section of the Control Panel, restart the browser, and make sure the page is still readable.

6. Minimize Visual Strain, if the websites are more complex in visualizing than the low vision people can not get the correct information as they needed. So we can Use simple visual designs in e-governance web sites and Avoid patterned or complex backgrounds. So that all disabled people can get the information what they needed

7. Resize the browser window larger and smaller to see whether there is any problem with the layout of the page because low vision users using magnification software may have a smaller effective size of the browser window.

4. Conclusion

In this paper we discussed how Cloud Computing can improve the accessibility of e-learning web services based on cloud SaaS service model. The SaaS model of service provision has the potential to become an important sourcing strategy for educational institutes. SaaS is a type of service model to deliver software as a service instead of owning and maintaining software locally. Disabled people may have stronger needs for or benefits from the e-learning services than the general population, but they have a lower usage rate. The main gate to access the e-learning web sites (SaaS) is browsing. As browsing the existing website is designed to cater to only normal people with no disabled people. But here, neither we have proposed cloud architecture for accessing the e-learning web services to visual & cognitive disabilities only nor other disabilities like mobility impaired and hearing impaired. We intend to do so in our forthcoming endeavors.

In conclusion, further research in this direction is needed.

Future studies would investigate several topics: the accessibility, usability and adaptability of e-learning systems on cloud computing,, the customization of user interfaces to personalize the learning experience, the delivery of educational units with different sensorial channels, and the design and creation of new collaborative learning objects and applications.

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