

PROCESS MODEL FOR INFORMATION RETRIEVAL ENVIRONMENT FOR HEARING IMPAIRED

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Abstract

As the Internet usage has exponential increased and the embedding of multimedia content on the Web, some of the Internet resources still remain inaccessible for disable people with disabilities. Mostly, people who are Hard of Hearing or deaf experience inaccessible Web sites because of a lack of Closed Captioning for multimedia content on the Web, there is no sign language equivalent for the content on the Web, and an unsatisfactory evaluation framework for determining that if a Web page is accessible to the Hearing Impaired society. A number of opportunities for accessing web content are needed to be rectified in order to make the Hearing Impaired community to access the full benefits of the information repository on the Internet. This research paper contributes to resolve few of the Web accessibility problems that are being faced by the Hearing Impaired community. The objectives are to generate an automated Closed Captioning for multimedia content the for Web, to develop a framework for the Hearing Impaired community in order to evaluate Web accessibility. Moreover, to build a social network for the deaf community and to embed sign language equivalent for content available on the Web.

Keywords: Gas liberation, flash vaporization, differential vaporization, phase analysis

1. Introduction

Hard of Hearing (HOH) and Deaf people use the Internet and all its associated resources as greatly as those who do not face any hearing impairment. On the other hand, information available on the Internet is not as easily reachable by the Hearing Impaired community.

This paper elucidates the difficulties facade by Deaf and HOH community on the internet, and gives possible way out to rectify the difficulties faced by any affected individual, Moreover, the audio material available online have minimal CC available, as the recommended solution by the W3C [13].

Divisions of the Hearing Impaired Community

Generally the deaf people are not distinguished on the degree of deafness, it is crucial that the different categories should be clarified for the sake of Web development and the understanding of content among the Hearing Impaired community.

It is necessary that the Deaf group of people is uniquely identified and their criteria suitably explained. Their first and prime language is of signed format, and they become accustomed as cultural norms of the Deaf group of people. People in this division generally have very inadequate understanding of written and spoken languages and rely mainly on sign languages as their preferred form of communication.

In the same way for the Hard of Hearing sector, their requirements should be distinctly explained to understand the need for different implementations. They are normally

defined as those who may use devices such as hearing aids, which help in their hearing capability, or those who can have the sense of hearing some environmental sounds without using technological aids. Usually those who are identified as HOH are capable to learn both the written and spoken forms of languages at typical levels.

Problem Statement

The majority of today's resources are accessible on the Internet. Resources such as distance learning, employment opportunities, government applications, news,

entertainment and ecommerce are a few of these resources that daily accessed by many peoples.

People who are Deaf or HOH, accessing different types of information on the Web is not as easy task as those are hearing people. A lot of the audio material is lost by both sectors, and understanding of significant information may be misapprehended by the Deaf community who use sign language as their main method of communicating, and equally for the HOH group of people, the textual type of translation missing significant information from the multimedia content.

This paper is prearranged as follows:

Section 2 investigates the background and related research that are being performed in the related field of Web accessibility. This division not only explores Web accessibility for the Deaf and HOH, but also confers Web accessibility all together, thus make sure a more adequate overview on the topic of accessibility.

In Section 3 we discuss the theoretical approach architecture that give out as the basis of this research. This part spotlight on the criterion those are vital to assess Web accessibility for the Hearing Impaired community. With the aim of implementation of an updated solution to current accessibility trends, it is very important that we have a satisfactory metric to evaluate the deficits in the current development of Web pages.

Finally chapter 4 concluded with on the whole summary, reviews the impact of this research to the academic sector and to the industry, and also discusses future opportunities in this field of research.

.Background and Related Work

Web Accessibility various categories of impairments, and how people with such impairments interact with the Web. These categories include those who have cognitive [7-8] visual [17], motor and hearing impairments [6,10]. In order to ensure that accessibility standards have been met these categories [5] of impairments are addressed for the purpose of Web accessibility, several validation services [17][4] to automatically check for errors or improvements have been used [2] [12].

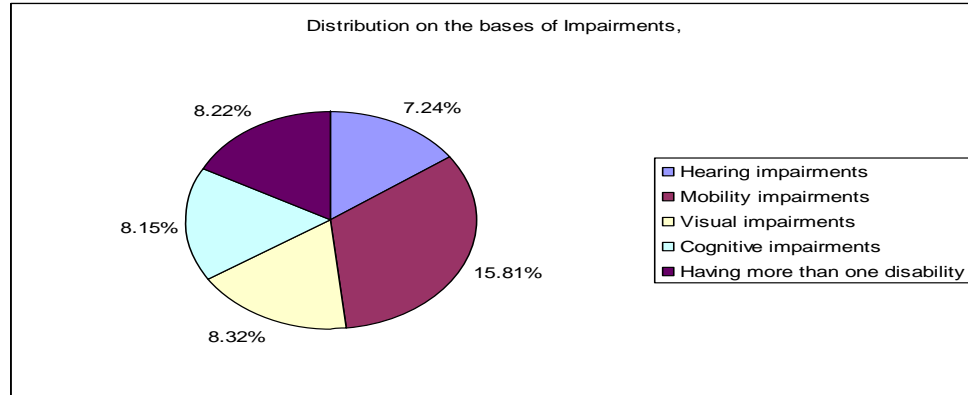


Figure 1: Distribution of Disabilities in the Pakistan [1] [11]

Approaches of Web Accessibility for the Hearing Impaired

As recommended by W3C [13] Closed Captioning has been included as current implementations to render Web pages for those who are Hearing Impaired. According to this recommendation there should be textual equivalent for any audio and video files on the Internet. There are some applications available on the Internet which provides the option for content providers to add clickable text to audio and videos like Veotag [14] etc.

For Hearing Impaired following areas of research have been investigated

a) Avatar

Avatars have been used for a many of reasons. Avatars are related to Web accessibility for the Deaf community and have been implemented mainly for machine translation purposes [4]. Avatar is given some written or coded input and a sign language output may be produced via an avatar.

b) Gesture Recognition

Research relating Gesture recognition attempts to analyze motional movement by an individual. Generally the motional movement of a person generally analyzed with the help of some video capturing device to evaluate the motion of various body parts such as arm movement, mouth movement, facial movement, or the movement of whole body.

c) Emotive Captioning

For the purpose of integrating emotional effects Emotive Captioning (EC) were investigated which not currently produced by traditional captioning [16]. The research of

emotive Captioning promises to portray the six common emotions including: anger, sadness, fear, happiness, Surprise and disgust

d) Automated Captioning

Automated Captioning is a need for the Hard of Hearing community. An implementation has been currently achieved for Broadcast Programs in Japan [15]. The research achieved 95% rates of recognition.

2. Proposed Work and Architecture

The tendency of posting videos online on the Web by individuals, news entities, and corporations has been fast increasing. For Hearing Impaired individuals the majority of these videos have not been accessible, due to the lack of Closed Captioning or any other resource to accommodate persons with hearing impairments. Also, for the Deaf community all contents have not been fully accessible due to language barriers between sign languages and written languages

Framework for Hard of Hearing and Deaf

A novel framework has been proposed in this paper that is to give guidelines for web developers to ensure accessibility of Web for all groups of the Hearing Impaired community. Also this new framework was not previously implemented. In order to successfully evaluate the capability of the Internet this framework proposes several guidelines for both Hard of Hearing sectors and Deaf, to assure Web developers and the other participant (such as interpreters) have a adequate metric for evaluating development and providing satisfactory results for presenting an accessible interface for Web[3]. Figure 2 provides an overview of the requirements for all the Interpreters and Web developers

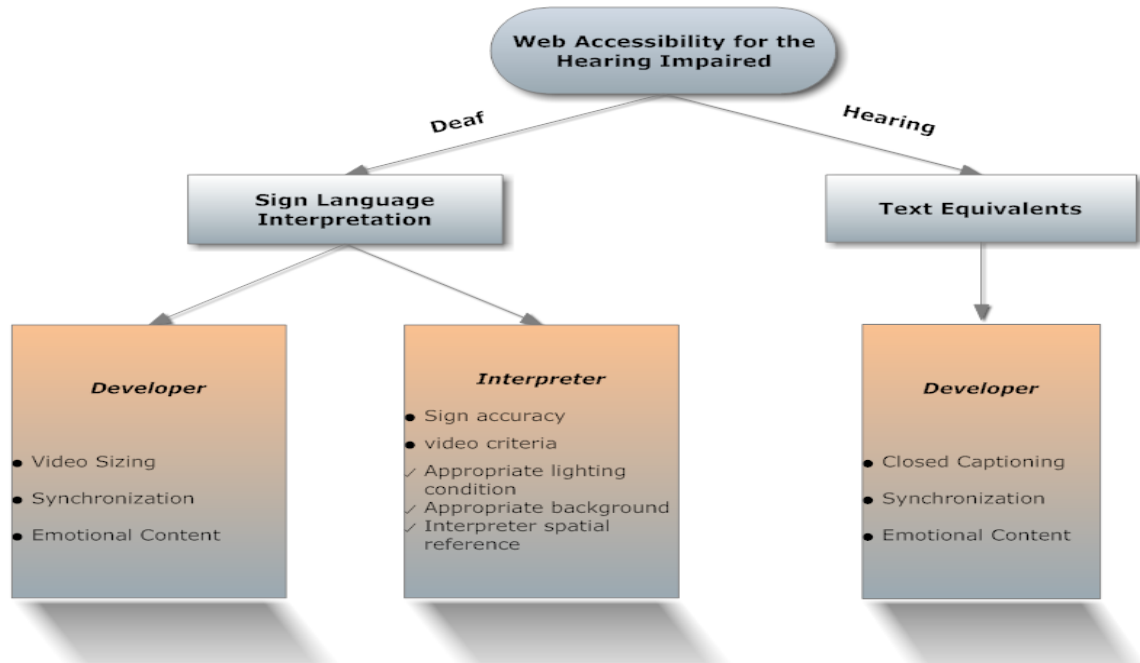


Figure 2: Framework for Hard of Hearing and Deaf

Architecture

Automated Closed captioning have been achieved utilizing Window vista speech recognition device[18], Mozilla FireFox browser, GreeseMonkey which is plug-in for FireFox, youTube-dl,Tomc and a batch File,working all together to produce a caption bar with textual equivalent for audio and video content

First of all, we start from client side where the “Caption Bar” is embedded with the help of Greasemonkey[9] script directly beneath the video on the YouTube page. URL (Uniform Resource Locator) is then parsed by the script in Greasemonkey add-on so that Tomcat can retrieve the required elements from the page on the server side.

A batch file is called on the server side, which invoke several applications essential to complete the automatic Closed Captioning. The first element that is called from batch file is an aural instruction which starts the Windows Speech Recognition System to begin listening. The file start.wav is played, and using Sounder “starts listening.” Sounder is an audio application that plays .wav audio files after it is bring to play from the command line instruction

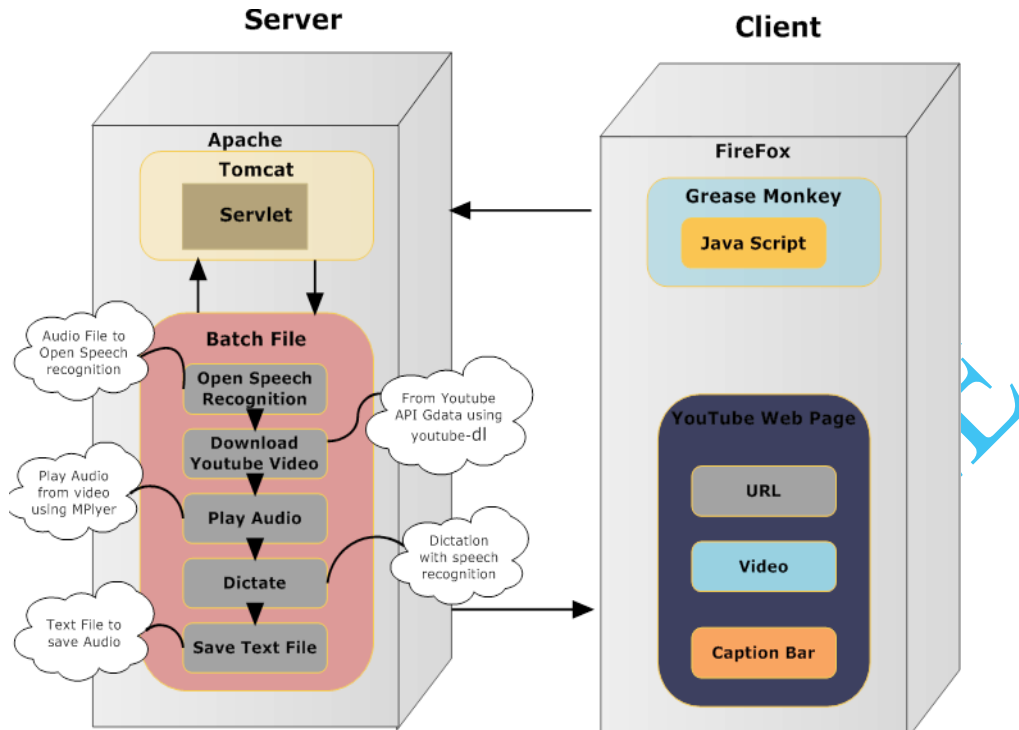


Figure 3: Client server Architecture

In case of sign language implementation the intricacies were less technical for application of manual prototype for video translation. Though, certain applications and tactics still required to be utilized to embed the video directly to the Web page(s) or hosting site. However, by employing the services of a sign language interpreter the audio content is translated to sign content.

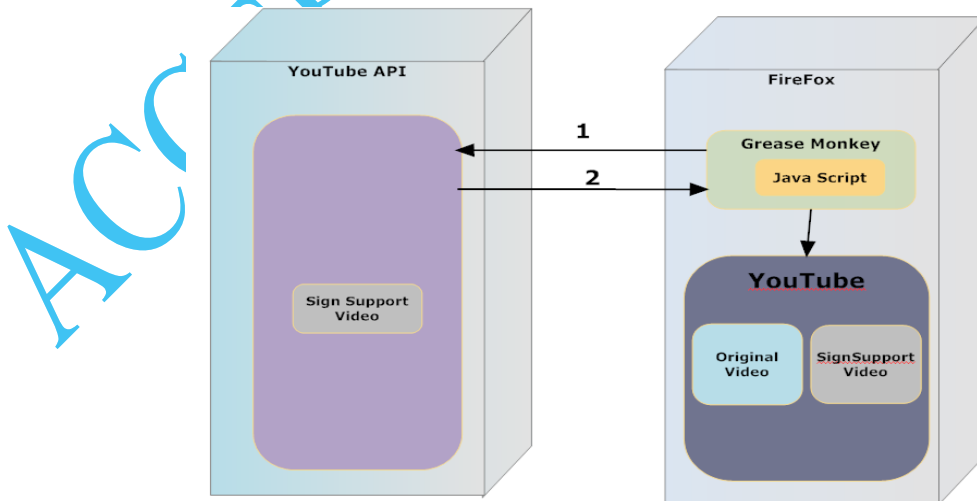


Figure 4: Implementation Signed Translations on YouTube.com

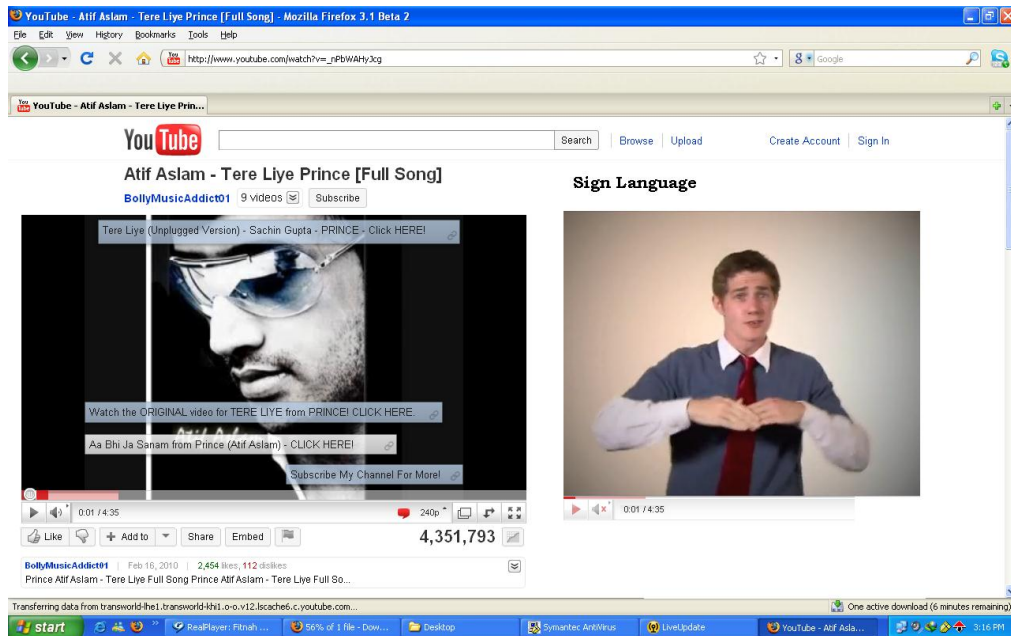


Figure 5: Sign Translation of a Song

At the first stage of the architecture title or name of the video is retrieved name from the YouTube site. When the title / name, has been retrieved "TitleOfVideo", the appendage "SignSupport" is applied by Greasemonkey script the resulting in "TitleOfVideo_SignSupport." The script then gets back "TitleOfVideo_SignSupport" from the API GData of YouTube. In case video is existing, the required video will be embedded in the YouTube site. On the other hand, if the video is not available, the option to upload a Sign Support video is requested from the user.

3. Results

Automated closed captioning achieved recognition rates of 88%;' and attaining individual trained voices for each online loader is a necessity to produce adequate output. The signed translation for the Deaf community has been integrated directly into web pages, with the use of API's. It also ensures that video is embedded in a focal location for the deaf community is imperative, lighting conditions and appropriate background is also critical parts of render ability. Synchronization with the original video is pertinent to rendering background information that otherwise will not be attainable textual formats.

4. Conclusion and Future Work

Achieving web accessibility for the Deaf and hard of hearing requires more than the current recommendations by the W3C of only textual equivalents.

Ensuring closed captioning and sign language interpretation are incorporated into all web sites needs to be investigated further. So both legal and moral issues may be avoided.

There are several opportunities to enhance the various aspects of this research In the existing form the architecture for the automatic Closed Captioning not have some of the important elements to meet the criteria of the Developers Framework I: HOH. Future research should include the synchronization of text with video, and also the addition of emotional content to match the auditory information in the given multimedia other enhancements include providing an automated method for producing signed content in an automated fashion.

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