



Web Accessibility for the Hearing Impaired

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I. Research Overview and Outcome

Problem Statement

The Internet has an abundance of resources, and it is vital that all persons have access to the numerous resources available on the Internet. Unfortunately those who are Hearing Impaired have been limited by what they can access, namely content, videos and audio files. The two main accessibility concerns for the Hearing Impaired include:

- Lack of Closed Captioning (CC) for the Hard of Hearing.
- No Signed translations for content and multimedia for the Deaf

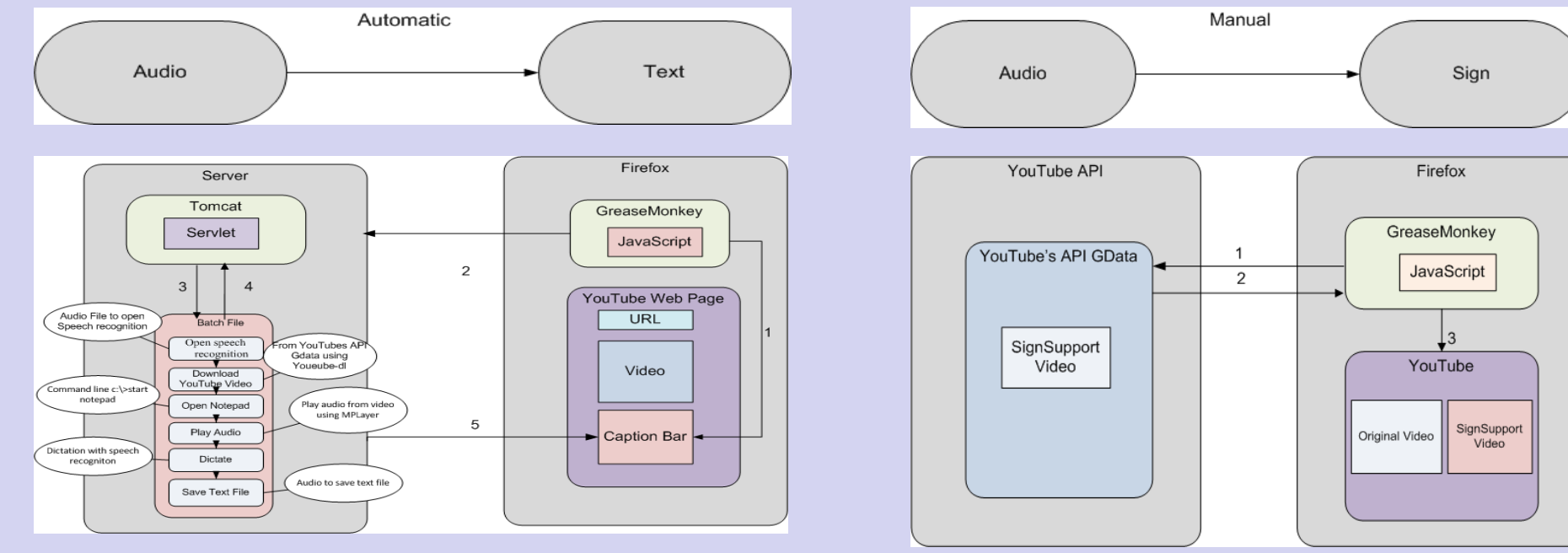
Research Objectives

- Design an automated strategy for producing Closed Captioning (CC) for online videos for the Hard of Hearing sector, therefore permitting a simplified method for producing textual equivalents for all audio material posted.
- Provide signed videos for online content, audio, and video materials posted on the internet. Creating a method to render contextual equivalents of educational, informational, and entertainment content available on the Web.
- Create a framework to evaluate Web accessibility for the Hearing Impaired community.

Background

- Persons who consider themselves Deaf predominately use sign languages as their primary method of communicating.
- Signed languages are not a word for word translation for the written or spoken languages and therefore textual equivalents are insufficient for rendering all online content, and audio materials.
- The average reading level for the Deaf community is of fourth grade level, therefore written languages are not easily digested by the Deaf community.
- A person who is considered Hard of Hearing may or may not be a part of the Deaf culture, this varies depending on schooling (mainstream, or residential), ASL influence in the household, age of hearing loss, and use of ASL.
- Currently Closed Captioning for online videos have not been of common

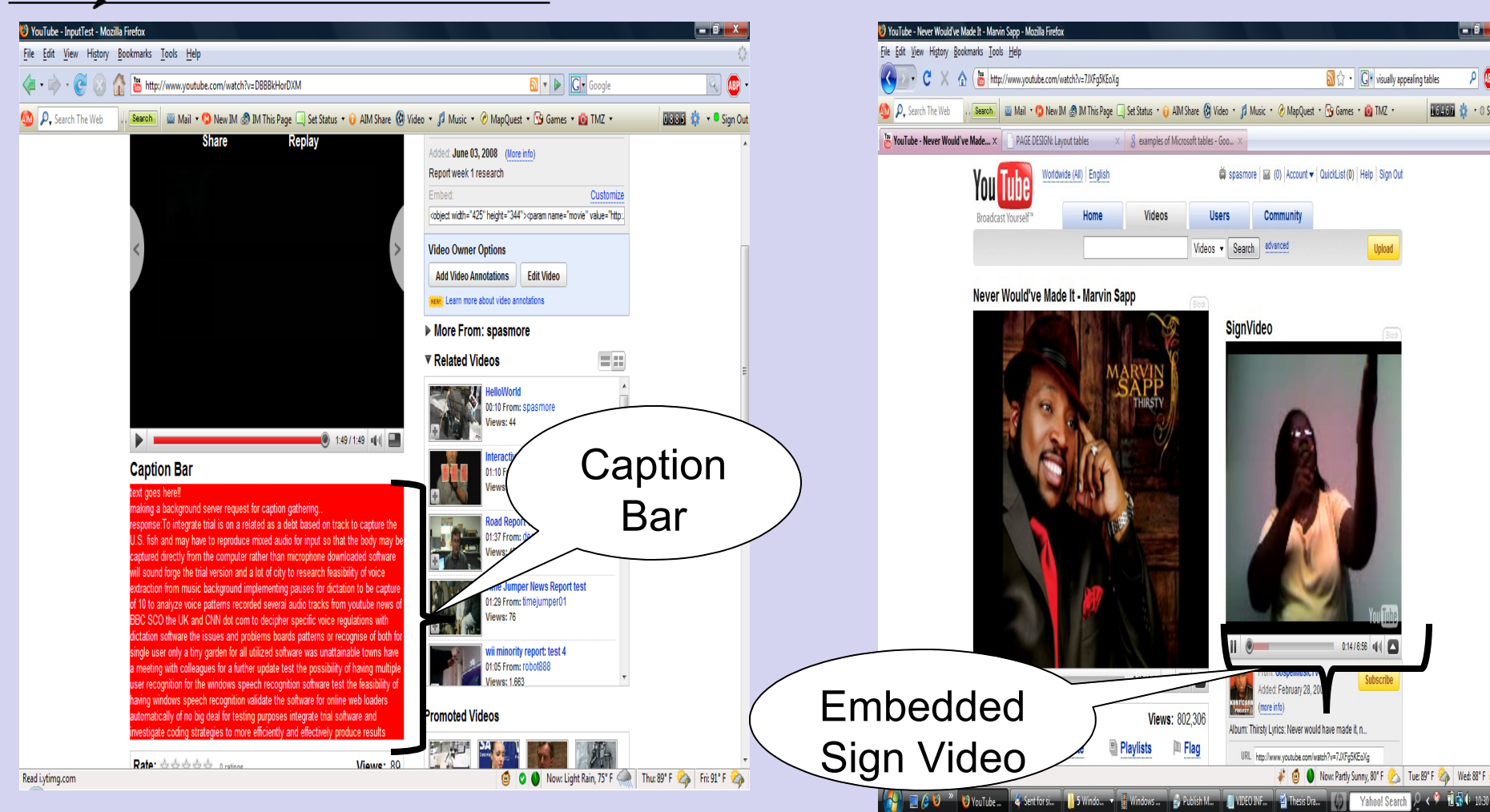
Architecture



Automatic closed captioning had been achieved utilizing Windows Vista Speech Recognition Device, GreaseMonkey, YouTube-dl, Tomcat and a batch file, working all together to produce a caption bar with the textual equivalents for audio and video content.

Signed Interpretation Videos have been implemented using GreaseMonkey, YouTube's hosting site, and YouTube's API gdata to embed a signed interpretation for online videos, and content.

Implementation



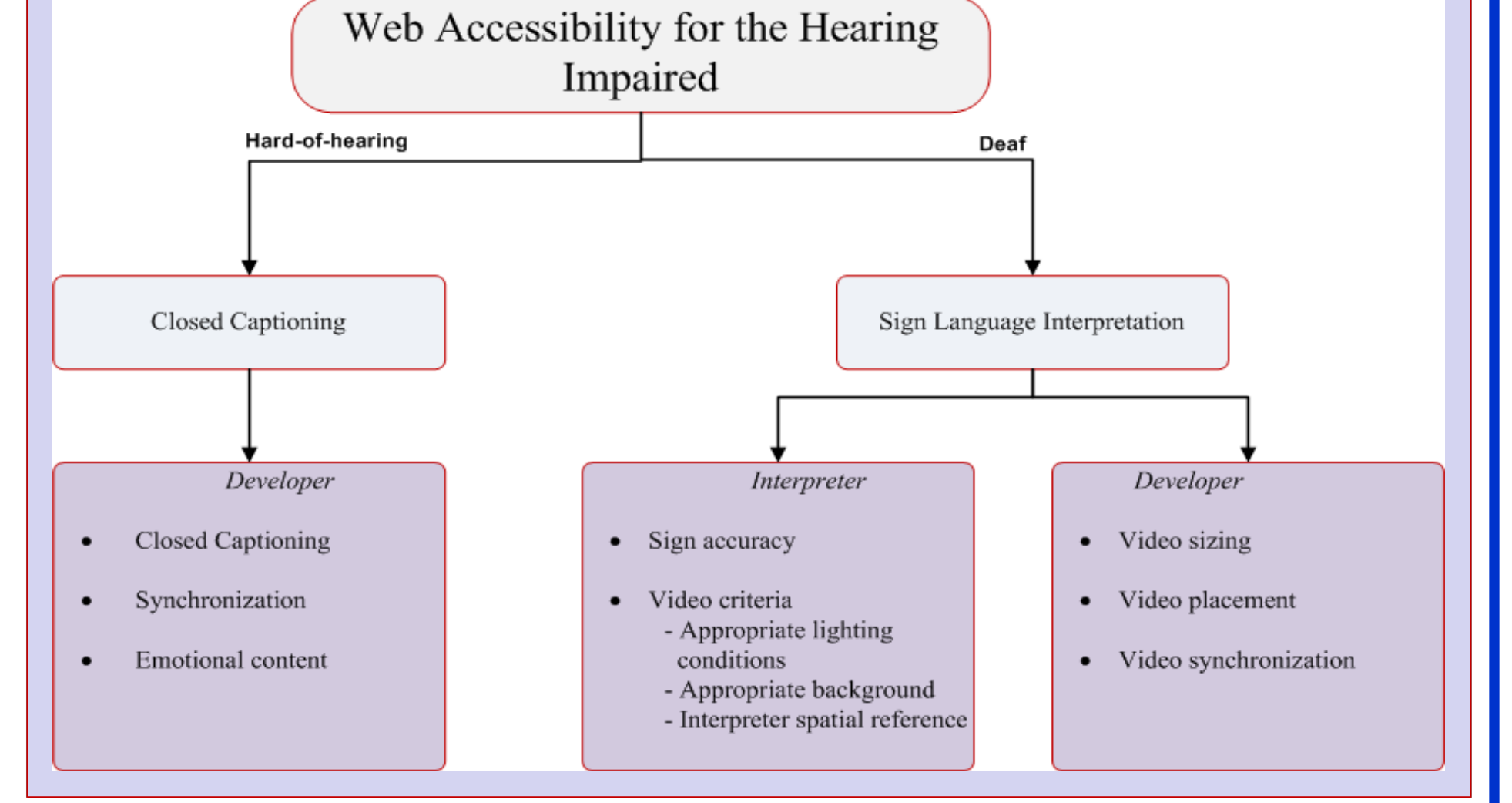
Automatic Closed Captioning

Textual equivalents are directly produced in the "Caption Bar" section of the YouTube Web site. The Bar is located directly below the video to ensure, the viewer has access to the video simultaneously with the text.

Embedded Sign Video

Signed equivalents are rendered by embedding the signed video directly in the YouTube's site next to the original video in a Synchronous manner, ensuring All visual material is captured.

Framework



Results

- Automatic closed captioning achieved recognition rates of 88%.
- Achieving recognition rates of 88% is insufficient for contextual understanding.
- Attaining individual trained voices for each online loader is a necessity to produce adequate output.
- Signed translations for the Deaf community have been integrated directly into web pages, with the use of API's.
- Ensuring video is embedded in a focal location for the deaf community is imperative, lighting conditions and appropriate backgrounds are also critical parts of render ability.
- Synchronization with the original video is pertinent to rendering background information that otherwise will not be attainable in textual formats.

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.
- Future enhancements include providing an automated method for producing signed content in an automated fashion.

practice, therefore creating an automated method, will make these options more adaptable by web loaders and developers.

II. International Experience

Cultural Experiences



Here we are making **Empanadas** with other members of the Lab. Empanadas happen to be a very common lunch menu item. Basically they consist of a pastry with common fillings, including; chicken, beef or vegetables.



Mate drinking occurs everywhere! From business meetings to social gatherings.

Mate is a hot beverage, which consist of Yerba (special dried leaves) served in hot water, and drunken from a special straw called a bombilla.

The interesting part of the Mate is the communal sharing where the Mate is passed among friends, colleagues or even strangers



Dancing the local folk the "**Chacarera**", or traditional "**Tango**", are very important cultural activities of the Argentines.

Here is a photo at the Plaza Italia where several locals were participating in the Chacarera.



Meat is really everywhere, in Argentina, ordering a non-meat item is not an easy task.

However you should note, Argentines are very proud of their meat, and trust that they have good reason to be proud.

Here I am experiencing a local Bar-B-Que, which is an essential cultural experience when in Argentina.



Argentina has some of the best **soccer** players that ever lived. Frequent games are a common practice.

Here is a photo of some team Jerseys, when one sees these jerseys hanging it indicates that there is a game on that day.

Academic fulfillments



I was asked to present the work I was producing while in Argentina.

Approximately 15 interested persons from Lifa were in attendance, all of whom were engaged, and participated throughout the presentation.



Here a professor and members of the lab, were having a group meeting in one of the students assigned cubicles.



This photo was with one of my group members in Argentina, here we were discussing implementation logistics.

You might also note the work area I was assigned for my period in the lab.



This photo depicts a typical lunch with the lab group and professors.

Lunch is usually picked up off campus and we return to the lunch room to partake in our meals as a group.



Here myself and my other group member are brainstorming about possible interface solutions.

University Environment



The University of La Plata made this project a success. Having the opportunity to work with a team of exceptional professors and students enhanced several aspects of the research; namely the design, and integration of various applications. The frequency of meetings, with my local advisor and teammates facilitated the guidance to retrieve the necessary applications and software, update further requirements therefore resulting in an adequate prototype for the fulfillment of this project.

III. Acknowledgement

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