USE OF TECHNOLOGY TO IMPROVE SOCIAL COHESION

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INTRODUCTION

Linguistic pluralism lays the foundation for social cohesion, which is characterised by inclusivity, respect for all,dialogue between all members of society. Linguistic pluralism is just one of several strategies that are required for social cohesion. Therefore technology can be used to overcome the language barrier with speech technology. In Sri Lanka the Sinhalese, make up about 75% of the population [according to 2012 census].

Therefore a mostly Sri Lankan information source comes out in Sinhala Language. In Sri Lanka Tamils and Sinhalese people are living side by side so they can mostly understand other group's language when they listen even if they couldn't read it. Considering this fact, we decided to implement this system as a Sinhala text to speech web browser application. In this stage we are only concentrating on Sinhala language when considering time and project scope. But we could like to mention that a Tamil Text to Speech system is also necessary to improve social cohesion.

There are some Tamil text to speech browser applications in the world but no other functioning Sinhala Text to speech browser application in Sri Lanka**.**

Also there are a considerable number of people who are either visually impaired or totally blind (285 million people are visually impaired worldwide: 39 million are blind and 246 have low vision). Such people find it difficult to benefit from the information sources widely available on the Internet. Western countries and other more technologically advanced countries have tried to remedy this situation by building screen readers that would read out a selected piece of text. However, there are no such portability systems capable of converting text written in Sinhalese language to voice through the web Browser. This project is an attempt to build an open source text-to-speech (TTS) system that will be widely available, platform independent and easy to use. The solution will be implemented as a browser plug-in making it usable by anybody who has access to a browser.

BACKGROUND OF THE PROJECT

The conversion of text to speech, i.e. the process of automatic generation of speech output from computer readable text, is called speech synthesis. TTS systems have been developed for many languages, with a majority of them working with the English language. Sinhalese is a language used by a very limited population of the world. There are only a few attempts that tried building TTS systems especially for Sinhalese language. Those that are implemented function as stand-alone applications that require the user to follow a complex installation procedure. In contrast, this is the first known documented work on a Web Based Sinhala TTS application that has been developed as a plug-in for the Mozilla Firefox Internet browser. This application uses Festival Framework Based Sinhala TTS System. The Festival Speech Synthesis System is an open source, stable and portable multilingual speech synthesis framework developed at the Center for Speech Technology Research (CSTR) of the University of Edinburgh. This framework is considered the most suitable for Sinhala language by the local research community involved in language processing.

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METHODOLOGY

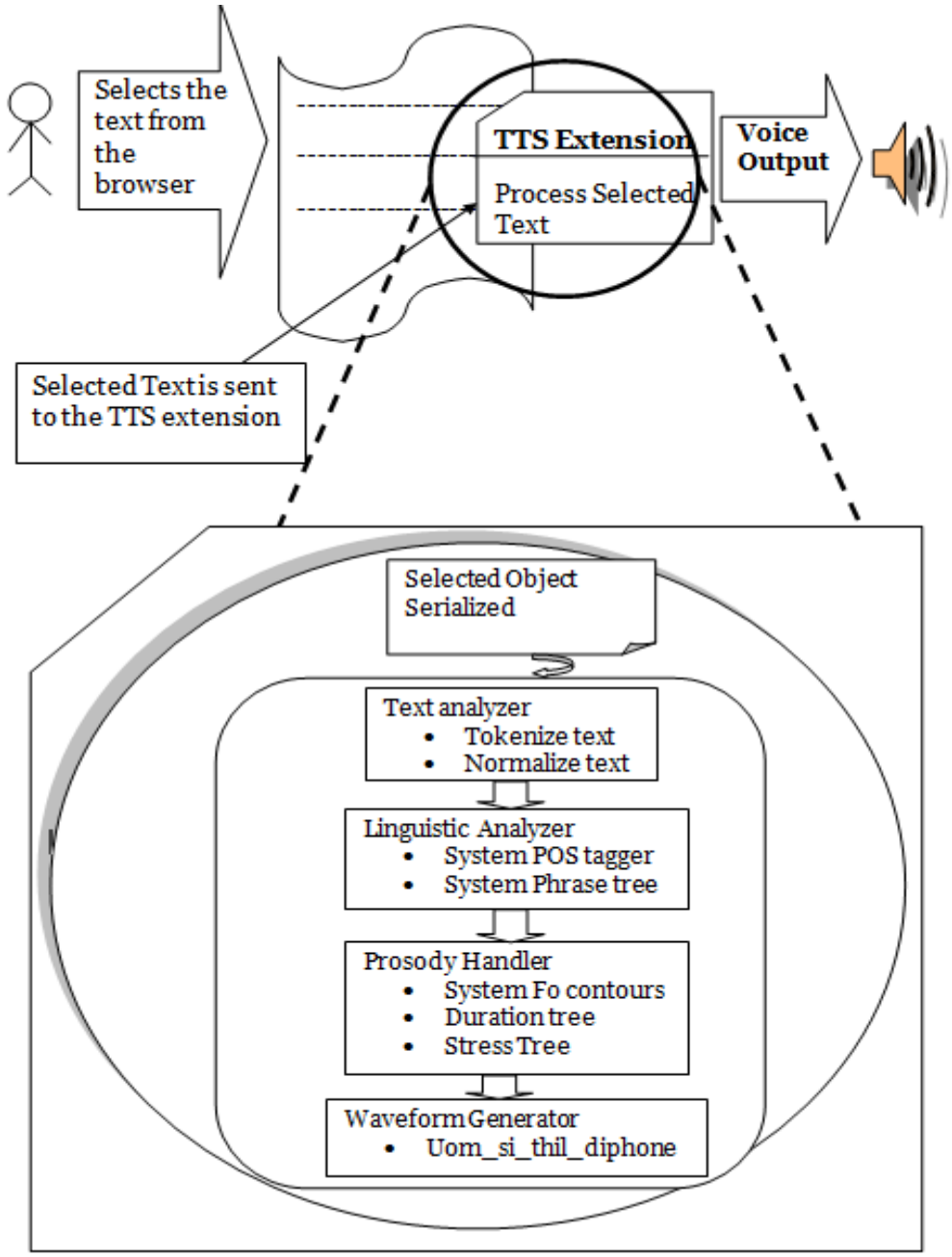

Figure 1 :Overall concept view of the system .

Figure 1 shows the overall system. The user selects the text to listen to from the browser and activates the extension. The extension converts the selected text to speech and plays the output on the computers speakers or other sound producing device. The core of the system consists of Sinhala TTS engine which will be used to generate speech synthesis for Sinhala, it takes phones dictionary from linguistic analyzer and normalised Sinhala Unicode text from text analysis as input and match the letter to sound rules and letter to phone prediction which results in desired phone sequences. Then using the Unit Selection Algorithm, appropriate sound segments for the phone sequences are generated with the help of Speech Database. Finally the Waveform Synthesis mechanism outputs the sound relevant to the wordings. One

of the major parts is the system designing a speech data base. When designing speech data base, prerecorded female voice is used for speech output.

DESCRIPTION OF TECHNOLOGIES USED

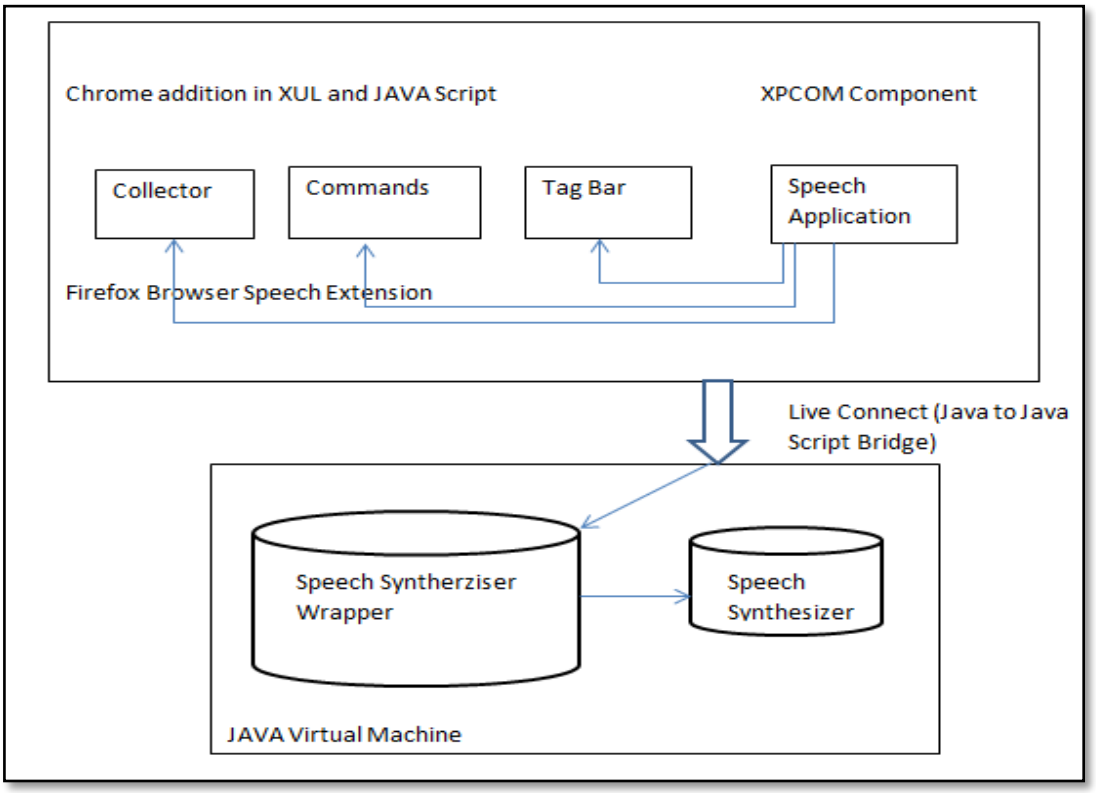

Figure2: Firefox Speech Extension Data Flow Diagram

Implementation and evaluation of the Sinhala TTS browser extension based on festival framework is described in this section. Two core components of the Java Speech API, i.e., speech recognition and speech synthesis have been used as the foundation. The Java platform is the best option to design a speech application given its portability, platform independence and support provided by all major web browsers. Other technologies used in this project include Live Connect, Speech Synthesizer, Chrome, and XPCOM (Cross Platform Component Object module).The Chrome Component located in the Browser extension is able to add features to the Browser and XUL files these are contained in the Chrome Component and helps to design extension's user interface. The XUL file in with the XUL file in the browser, hence the extension adds additional functionalities to the browser. XPCOM is a framework that allows different pieces of the software to be developed independently. It helps integrate JavaScript and the Java component of the software. Live Connect is a feature of Web browsers that allows Java and JavaScript software to intercommunicate within a Web page. From the Java side it allows an applet to invoke the embedded scripts of a page or to access the built-in JavaScript environment. Conversely, from the JavaScript side, it allows a script to invoke applet methods, or to access the Java runtime libraries.

DISCUSSION AND FUTURE WORK

World Wide Web is gaining both revenue and popularity**.** The ease of using this application is one of the main concerns in today's technological world**.**

This system is a browser plug-in that can be installed on any browser supporting Java language. This system is attached to the browser as a plug-in and is currently used with the mouse interface. There are few limitations to this project, this application will not work with any other browser except with Firefox, due to the fact that Mozilla is an open source unlike remaining browser.

Currently the application is implemented in Firefox. This application can be extended to other applications such as mobile browsers (Opera mini, Android Browser, Dolphin Browser). The project can also be further improved by incorporating voice commands thus maximising the usability of the system and also can be customised for fully blind people using keyboards short cut commands.

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