

B. SUMMARY

Title: Development of Computer Software and hardware system for blind persons.

Research Institute: University of Sri Jayewardenepura

Chief Scientific Investigators: Dr. M. K. Jayananda and Dr. Asiri Nanayakkara

Period of Contract: From 31/12/1999 to 31/12/2002

Scientific background and Scope/Objectives of Project:

Among all the physically handicapped people, those who are blind face the highest difficulty when using computers due to their inability to receive feed-back from the computer. The best solution to this problem is the use of a text-to-speech conversion system to guide them through various tasks with the computer. Although there are text to speech systems available in the international market, all of them are in foreign languages such as English, French and German. Due to high commercial value, the technology behind such systems is not published. On the other hand, due to the narrow market for a text-to-speech system in Sinhala, it is unlikely that any company will invest on developing such a system. Therefore, we undertook the task of developing a complete software/hardware system for the use of Sinhala speaking blind people.

Experimental Method:

A Sinhala word processor with all the standard features of a standard word processor was developed using Visual Basic Rich Edit controls. This also included a Sinhala language processing module, developed in the form of a DLL, for choosing the correct Sinhala characters when Sinhala sub characters such as “Ispilla”, “Papilla” are typed along with the main characters. TrueType Sinhala fonts were developed to be used along with this word processor.

Voice feed back required for the blind users to navigate through a document was provided to the word processor by developing a Sinhala text to speech system based on the technique of concatenative synthesis. This system included a database of pre-recorded basic sounds, a

module taking care of pronunciation rules and means of constructing a single sound segment concatenating the basic sounds and then playing it through sound hardware.

An interface software was developed for providing the above speech capabilities to MS Word. In addition to the above mentioned Sinhala language processing module and the Sinhala Voice module, this contained a key monitoring and capturing module implemented as a Virtual Device Drive (VXD) or a Dynamic Link Library (DLL) depending on the operating system used and an interface to MS Word implemented using Active X.

A Braille key board containing 14 keys was developed to be used with the above software. The keys included the standard Braille typewriter keys and some additional keys required for issuing command to the computer. TrueType fonts were developed for printing Braille using a modified dot-matrix printer.

Results and Conclusions:

Under this project a software/hardware system with the following features was developed.

- A Complete Sinhala word processing capabilities with TrueType Sinhala fonts.
- Sinhala text to speech capability with voice feed back for assisting blind users to navigate through a document.
- A module to provide the same text to speech and voice feedback facilities to MS Word.
- A Braille keyboard which can be attached to the computer the same way as a normal computer keyboard.
- *TrueType* fonts with Braille character for Microsoft windows which enable, MS Word documents to be printed as Braille documents.