University of Moratuwa

DSP BASED SPEECH TRAINING OF HEARING IMPAIRED CHILDREN

Submitted to the department of
Electronic & Telecommunication Engineering
in partial fulfillment of the requirements
for the Degree of Master of Engineering

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April 2002

Declaration

The work presented in this dissertation has not been submitted for the fulfillment of any other degree.

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ABSTRACT

A study based on several digital signal processing (DSP) techniques to be used in the development of a computer-based speech trainer for hearing impaired children is presented.

Children with congenital hearing impairments have difficulties in speaking, and even in making the basic sounds associated with speech. Speech therapists use specialized training methods to train such children. The dearth of qualified speech therapists and other facilities hinder the speech development of many children in need of such training in most of the third world countries. The speech trainer described in this dissertation was developed as an alleviation to the above problem.

The training tool developed, will aid a child with initial guidance from an adult, to master the pronunciation of initial sounds taught in a speech therapy programme, in a game-like environment, with only a PC having multimedia facilities.

Three DSP techniques were studied for application to the trainer. The objective was to identify whether an utterance by a trainee was acceptable or not compared to an utterance by a normal person. The three techniques were based on spectral analysis, formant analysis and neural networks. The results with the spectral technique were found to be superior and were selected for use in the development of the training tool.

In its current status, the training tool can guide children in pronouncing the five vowel sounds, the first step in a speech therapy course.

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Acknowledgement

The author is indebted to ....

Dr. Dileeka Dias
for all the valuable guidance, advice, encouragement, inspiration and most of all for proposing this title for the dissertation.

Prof. I. J. Dayawansa
Dr. Nishantha Nanayakkara
for the valuable comments and suggestions provided at the progress review sessions.

Prof. N. Ratnayaka
Director – Post graduate research studies.

Asian Development Bank
for financial support.

Dr. Gihan Dias and the members of the Research Group

Mr. Ruwan Gajaweera

Koojana, Janaka, Namunu and Sankassa

Mr. Jayantha Perera and Mr. Philip Terrence

D.D. Sumanapala and Thushara

My parents, wife, daughter and son.