Chapter 1: Introduction

The area of speech recognition has been vital in the modern communication systems. This study investigates Malay children vowel recognition utilizing **N**eural **N**etworks (NN). Two NN architectures were carefully chosen to be implemented: **F**eed-**f**orward **B**ack**p**ropagation (FFBP) and Elman.

1.1 Problem Statement

The aim of this study is to determine the optimal performance of the networks in terms of hidden neurons number and signal length. This study attempts to answer these questions: How many neurons in the hidden layer of NNs are needed to get the best performance in Malay children vowel recognizers? What is the best signal length to consider in such systems?

1.2 Objectives

1.2.1 Main Objective

The main objective of this study is to find out the accuracies of FFBP and Elman networks in Malay children vowel recognition.

1.2.2 Specific Objectives

- Find out the appropriate hidden neurons number for optimum performance of FFBP and Elman networks in Malay children vowel recognition.

- Determine the suitable signal length to consider in features extraction of vowel signals in Malay children vowel recognition.

1.3 Hypothesis

The accuracy of speech recognizers is highly dependable on the architecture of NNs. Furthermore, using different number of neurons in the hidden layer affects the performance of NNs. Moreover, the length of the signals to be fed to the NNs influences the performance of NNs.

1.4 Scope of the study

This study is speaker independent and considered only samples from healthy Malay children between 7-12 years old. It is mainly focused on Malay vowels (a, ə, e, i, o and u); which means it does not cover consonants or other languages. The implemented NN architectures are FFBP and Elman. One more thing to mention here is that NN processing was done using Matlab® Neural Network Toolbox™.

1.5 Significance of the Study

The applications of speech recognition are enormous. It varies from voice dialing and data entry to speech-to-text processing and preparation of structured documents. Therefore, this study came to investigate in vowel recognition. The findings of this study reveal certain technical parameters that should be considered in Malay speech recognizers to get better performance.