DESIGNING A NEURAL NETWORK BASED AUDIO CLASSIFICATION SYSTEM

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DESIGNING A NEURAL NETWORK BASED AUDIO CLASSIFICATION SYSTEM

A thesis submitted to the Graduate School in partial fulfillment of the requirement for the degree Master of Science (Intelligent System),

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(Northern University of Malaysia)

By

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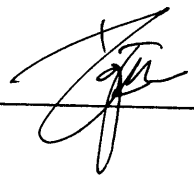
(Signature) : 

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ABSTRACT

Artificial neural networks have found profound success in the area of pattern recognition. The collections of digital music have become increasingly common over the recent years. As the amount of data increases, digital content classification is becoming more important. In this thesis, we are studying content-based classification of digital musical signals according to their musical genre (e.g., jazz, rock, pop and blues) and the features used. The purpose of this thesis is to propose of designing a neural network based audio classification system "*Model*", and analyze the requirements that needed to classifying it. This thesis covers a literature review on human musical genre recognition, neural network technique, signal processing, and related works of research. In addition, the methodology that used in designing audio classification model using neural network is introduced. The method was follow in this thesis is content analysis, and the designing of the model has through several phases: requirements analysis, knowledge representation and model designing. The theory behind the used features is reviewed and the fining from the proposed designing is presented.

Keywords: Neural Network; Digital Audio; Classification System.

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CHAPTER 1

INTRODUCTION

1.1 Overview

Classification of digital audio "*signals*" according to their contents has been a major concern in recent years. There have been many studies on *Audio Content Analysis* (ACA), using different features and different methods. It is a well-known fact that audio signals are baseband, one-dimensional signals (Aksoy, 2002). General audio consists of a wide range of sound phenomena such as music, sound effects, environmental sounds, and speech and non-speech signals.

With the development of multimedia technology, classification is increasingly used in audio applications (Wold, 1996). In general, many research efforts high accuracy audio classification is only achieved for the simple cases such as speech, music discrimination. Pfeiffer (1996) have presented, a theoretical framework and application of automatic audio content analysis using some perceptual features. Saunders (1996), presented a speech music classifier based on simple features such as *Zero Crossing Rate* (ZCR) and short time energy for radio broadcast.

A *Neural Network* (NN) classifier is an artificial intelligent network with parallel processing units working together. The most common neural network model is the *Multilayer Perceptron* (MLP). This type of neural network is known as a supervised network (Haykin, 1999), because it requires a desired output in order to learning. The goal of this type of network is to create a model that correctly maps the input to the

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