COMPUTER-INTERFACING DESIGN FOR REAL TIME SIGNAL CLASSIFICATION USING FUZZY

This project report is presented in partial fulfillment for the award of Bachelor of Electrical Engineering (Honors)

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ABSTRACT

This thesis is aim to classify and display the real time signal in frequency through personal computer (PC). The process involved the used of AI (Artificial Intelligence) technique. Software based on MATLAB Fuzzy Toolbox and MATLAB Simulink will be used to develop the fuzzy logic. The real time input signal based on the ultrasound frequency ranges generated by the signal generator will be insert to the fuzzy logic controller through the computer-interfacing system that will be built and designed based on RS-232 communication. The output will be displayed through the personal computer based on the classification of the frequency signal set in the membership function.

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CHAPTER 1

INTRODUCTION

1.1 Introduction

Signal is an electric current or electromagnetic field used to convey data from one place to another. The two main types of signals are analog and digital. In short, the difference between them is that digital signals are discrete and quantized while analog signals possess neither property [5]. Signals have a property called frequency and wavelength which is inversely proportional to the frequency.

This paper presents the work carried out in classifying the sound signal based on the frequency range. Ultrasound is sound with a frequency greater than the upper limit of human hearing, approximately 20 kilohertz. Some animals, such as dogs, dolphins, bats, and mice have an upper limit that is greater than that of the human ear and thus can hear ultrasound [5]. In general, the range of the frequency is as shown in Table 1.1

Frequency Range	Frequency Spectrum	Symbol
3kHz - 30kHz	Very Low Frequency	VLF
30kHz - 300kHz	Low Frequency	LF
300kHz - 3MHz	Medium Frequency	MF
3MHz - 30MHz	High Frequency	HF
30MHz - 300MHz	Very High Frequency	VHF
300MHz - 3GHz	Ultra High Frequency	UHF
3GHz – 30GHz	Super High Frequency	SHF
30GHz – 300GHz	Extremely High Frequency	EHF

Table 1.1 General division of frequency spectrum

The specified frequency range was then classified using artificial intelligent (AI) technique and display onto a computer via computer-interfacing system.