CHAPTER 1

INTRODUCTION

1.1   Thesis Overview

The title of this project is Fault Detection in Three Phase Induction Motor Using Artificial Intelligence. The monitoring and fault detection of electrical machines have moved in recent years from traditional techniques to artificial intelligence (AI) techniques. Such techniques require a "minimum configuration intelligence" since no detailed analysis of the fault mechanism is necessary, nor is any modeling of the system required. When an AI technique is used, fault detection and evaluation can be accomplished without an expert.

Induction motors play an important role in manufacturing environments, therefore, this type of machine is mainly considered and many diagnostic procedures are proposed from industries. Some work has also been done on converter-fed induction motor drives in order to realize a fault-tolerant drive avoiding shutdown if the load conditions permit faults n failures.

This project is divided into 3 different tasks because it is mainly to do analysis, comparisons and data collections to acknowledge the behavior of the motor condition and determine the causes of the fault occurrence. The main steps of a diagnostic procedure can be classified as follows:

1) Data extraction
2) Fault severity evaluation
3) Develop ANN

1.2   Background:

Artificial intelligence (AI) techniques have proved their ability in detection of incipient faults in electrical machines. In this project, the fault diagnosis of three phase induction motors is studied using AI models and neural networks have been used in the fault diagnosis of induction motors using Radial Basis Function Neural Network (RBFNN) in MATLAB.

1.3   Problem Statement:

The increased in demand has greatly improved the approach of fault detection in polyphase induction motor. Nowadays artificial intelligence is implemented to improve traditional techniques, where the results can be obtained instantaneously after it analyzes the input data of the motor.

Artificial intelligence approached can easily do difficult analysis such as pattern recognition and nonlinear system identification and control. In this project, Radial Basis Function Neural Network is used to train data and analyzes the condition of the motor.

Lastly, monitoring the motor condition in an early stage is crucial to detect any fault to eliminate the hazards of severe motor faults and preventing damage.

1.4   Objectives:

Fault Detection in Three Phase Induction Motor Using Artificial Intelligence is developed with the listed objectives below:

i.   To develop and create a new reliable technique by using artificial intelligence to detect unbalance voltage and stator inter turn faults in three phase induction motor.

ii.   To apply basic knowledge on Artificial Neural Network Tools in MATLAB.

iii.   To train radial basis function to compare output whether No fault, Stator fault or Unbalance voltage for three-phase induction motor.

1.5   Scopes of the Project

i.   Radial Basis Function (RBFNN) approach will be used for Artificial Neural Network training and test.

ii.   This project is use to detect faults in three phase induction motors only. It is the most popular poly phase induction motor in industry.

iii.   Limited to detect unbalance voltage and stator inter turn faults only.