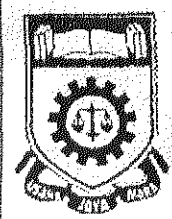


**DETERMINATION OF MANUFACTURING THROUGHPUT
FOR MOUNTING MACHINE BY USING
ARTIFICIAL NEURAL NETWORK**

**Thesis presented in partial fulfillment for the award of the
Bachelor of Electrical Engineering (Honours) of
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ABSTRACT

This thesis presents the application of artificial neural network to determine the manufacturing throughput for a semi-conductor machine. Two types of neural networks have been used, i.e. Back Propagation and Radial Basis Function Network. Both models developed have three layers i.e. input layer, hidden-layer and output layer. To determine the manufacturing throughput, the system behavior was studied based on the machine downtime report.

For both networks, the same sets of data have been used in training and testing process as the data were taken from a monthly downtime report of production from a semiconductor company for a year.

Tests were carried out and the results were compared on the basis of learning rate, momentum and number of hidden nodes. From these results, it was shown that ANN can be used for determining manufacturing throughput. The Radial Basis Function network was more accurate compared to The Back-Propagation Network.

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CHAPTER 1

INTRODUCTION

1.1 Introduction

Artificial neural network (ANN) offers a method for incorporating and processing qualitative knowledge and have the additional advantage of formalizing machine learning in an explicit manner, it aspires to imitate human intelligence. ANN has been applied to a wide variety of problems, ranging from travelling salesman optimization to visions problems. ANN is best at solving classification problems and its also has the added advantage of performing successfully where other methods often fail- recognizing and matching complicated, vague or incomplete patterns [1].

ANN is used to convert text to speech, for natural language processing, for example, for deriving languages rules, recognition of characters and handwriting, image processing and pattern recognition. This line of research has immediate use in banking, credit card processing, and other financial services where reading and recognizing handwriting on documents is crucial [2].

Due to rapid development of ANN methods and tools, ANN has generated tremendous amount of interest for solving manufacturing related problems. ANN is used to address issues relating to manufacturing process planning and process control, manufacturing system design, operational decision making, and resource scheduling [2].

Various methods based on such areas as operations research, statistics, computer simulation, control theory have been developed and applied to solve a wide spectrum of problems in manufacturing. Today's manufacturing environment is characterized by complexity, inter-diciplinary manufacturing functions and ever growing demand for new tools and techniques to solve difficult problems. Neural network offers a new and