

**NEURAL NETWORK PREDICTION
OF SPM ACHIEVEMENT**

A thesis submitted to the Graduate School in partial
fulfillment of the requirements for the degree
Master of Science (Information Technology),
Universiti Utara Malaysia

By
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October 2000

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*To my mom and dad.
You have always been a source of inspiration*

*To Sofea, Hafiz, and Hakim.
Allah blessed me with wonderful kids*

*And to the memory of my beloved husband,
Mohd Zawawi Mat Nor
25th June 1970 – 19th May 1999*

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ABSTRACT (BAHASA MALAYSIA)

Tujuan kajian ini adalah untuk membentuk sebuah model rangkaian neural bagi meramal pencapaian pelajar-pelajar sekolah menengah di Malaysia di dalam peperiksaan SPM. Rangkaian neural yang dibentuk menggunakan perceptron multi aras yang melibatkan algoritma "*backpropagation*" serta tangen sigmoid sebagai fungsi pindahan. Kajian ini bukan sahaja mengambil kira gred yang diperolehi oleh pelajar di dalam matapelajaran teras yang di ambil di dalam SPM tetapi juga mengambil kira jantina mereka. Berdasarkan kepada keputusan yang diperolehi dari model tersebut, prestasi sebenar pelajar boleh diramal. Kajian ini menunjukkan bahawa rangkaian neural boleh dilatih dengan data-data yang berkait dengan pelajar untuk meramal pencapaian mereka di dalam peperiksaan SPM.

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ABSTRACT (ENGLISH)

The purpose of this study is to build a neural network model for prediction of SPM achievement for the students in a Malaysian secondary school. The neural network model uses multi-layer perceptron involving a backpropagation algorithm and the tangent sigmoid as the transfer function. This study does not only consider the students' grades for the core subjects that they take in the SPM but also the student gender. Based on the model results, the real exam performance is to be predicted. This study shows that neural network can be trained with students' data to predict their achievement in the SPM examination.

ACKNOWLEDGEMENTS

I would like to thank my supervisor, Encik Roshidi Din for his help and advice in conducting this study.

Also thanks to the Headmaster of Dato' Wan Ahmad Rasdi Secondary School, Encik Yahya Abdul Rahman and staffs for their help in collecting the application data.

Thanks to my employer, Universiti Teknologi MARA (UiTM), for the financial support which had enabled me to further my studies.

Special thanks are due to my mother, Limah Mat Yaman and father, Sudin Ahmad for their precious loves and endless support.

My kids, Sofea Nabeela 6, Luqman Hafizi 5, and Azmir Nurhakim, 1½, get credit for their patience and understanding – for trying to stay quiet and well behaved while their mom busy with reading and writing.

Finally, I express my gratitude to the memory of my husband, Mohd Zawawi Mat Nor, whose love and spirit will reside inside me and kids forever

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Chapter One: Introduction

1.1. The context of the study

Forecasting, at least intelligent forecasting, is predicting future events based on historical data (Blum, 1992). Predicting for the future is a very common problem in human life. Though, it is a very tough task (Angstenberger, 1996). In spite of that, with neural networks – also called artificial neural networks, or ANN – models, effective predictive applications can be developed (Ding *et al*, 1996).

It has been found from many studies that neural network is capable of forecasting and giving better results compared to statistical and traditional analytical methods (Adya *et al*, 1998; Muzaffer *et al*, 1999; Mahmood *et al*, 1999; Aiken, 1999; and Indro *et al*, 1999). In addition, as stated by Law (1998), what makes a neural network superior to traditional statistical methods in forecasting is that a neural network is better able to recognize the high level features, such as the intra-correlation or serial correlation, of a training set.

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