

**SHORT TERM LAOD FORECASTING AT PULAU
PERHENTIAN USING ANN**

**This is present in partial fulfilment for the award of the requirements for the
Bachelor of Engineering (Hons) Electrical Universiti Teknologi Mara**



**MOHD KHUSAIRI BIN ALI
FACULTY OF ELECTRICAL ENGINEERING
UNIVERSITI TEKNOLOGI MARA
MALAYSIA**

ACKNOWLEDGEMENT

In the name of Al-Mighty Allah S.W.T, The most Beneficent, The most Merciful. It is with the deepest sense of the Allah that gives me the strength and spirit to complete this project. All good inspiration, devotions and prayer are due to Allah who blessing and guidance have helped me throughout the entire project.

I would like to acknowledge and express my sincere gratitude towards my supervisor Miss Dalina binti Johari for his concern, valuable time of consultation, advice, guidance and patience in supervising my project from the beginning until completion of this project thesis.

My deepest appreciation goes to my family for their moral and spiritual support.

Finally, my sincere appreciation also goes to my friends especially I
for their help during completing this project. They have been with me for the time I needed them the most. Thanks for being corporative and your kindness will never be forgotten. Last but not least, I would like to take opportunity to express my appreciation to those that directly or indirectly contributed towards the progress of the thesis.

ABSTRACT

Short Term Load Forecasting is the one of the important thing in power system planning, operation and control. Load forecasting can use the Artificial Neural Network (ANN). This ANN trained based on weather component. Forecasting the load by using ANN will get some value of forecasted load. Firstly, the ANN network had been trained by uses the actual data. This paper presents a research on the short term load forecasting (STLF) at specific place by using artificial neural network (ANN). The scope of this research is analyzing the historical load data and forecast the load at Pulau Perhentian based on the weather and the consumer. The historical load data, weather data and number of consumer will be taken for a day. These data will take until 30 days to analyze the patterns of load demand. The result will be used to develop the ANN model for the next day load forecasting. After that, the network performance of the ANN model will be tested. The forecasting load and the actual load will be compared. There is two methods will be used in this research. The first method is similar-day approach method and seconds the regression method. At the end of this research, the forecasting load demand must be precise to the actual load

TABLE OF CONTENTS

| Description | Page |
|------------------------------------|-------------|
| DECLARATION | i |
| ACKNOWLEDGEMENT | ii |
| ABSTRACT | iii |
| TABLE OF CONTENTS | iv |
| LIST OF FIGURES | v |
| LIST OF TABLES | vi |
| ABBREVIATIONS | vi |
| | |
| CHAPTER 1 | |
| INTRODUCTION | |
| 1.1 Research Background | 1 |
| 1.2 Objectives | 2 |
| 1.3 Scope of Study | 2 |
| 1.4 Structure of Thesis | 3 |
| | |
| CHAPTER 2 | |
| LITERATURE REVIEW | |
| 2.1 Introduction | 4 |
| 2.2 Load Forecasting | 4 |
| 2.2.1 Important Factor of Forecast | 5 |
| 2.2.2 Forecasting Method | 7 |
| 2.3 ANN | 10 |
| | |
| CHAPTER 3 | |
| METHODOLOGY | |
| 3.1 Introduction | 14 |
| 3.2 Literature Review | 16 |
| 3.3 Data Collecting and Analyzing | 16 |
| 3.4 Develop ANN Model | 16 |

CHAPTER 4

RESULT AND DISCUSSION

| | |
|---------------------|----|
| 4.1 Forecasted Load | 22 |
| 4.2 Discussion | 23 |

CHAPTER 5

CONCLUSION AND RECOMMENDATION

| | |
|------------------------|----|
| 5.1 Conclusion | 24 |
| 5.2 Future Development | 24 |

| | |
|-------------------|-----------|
| REFERENCES | 25 |
|-------------------|-----------|

LIST OF FIGURES

| | | |
|------------|---|----|
| Figure 2.1 | Common load profile | 7 |
| Figure 2.2 | Correlation between the actual load and the model | 9 |
| Figure 2.3 | Convergence of the R^2 for the actual load vs the model | 9 |
| Figure 2.4 | Schematic of Back Propagation Technique | 10 |
| Figure 2.5 | Mathematical Model of Neuron | 11 |
| Figure 2.6 | Flowchart for the backpropagation algorithm | 12 |
| Figure 3.1 | Flow chart of the methodology | 15 |
| Figure 3.2 | General Architecture Representation of ANN | 16 |
| Figure 3.3 | ANN training algorithm | 18 |
| Figure 3.4 | Training Performance | 19 |
| Figure 3.5 | ANN testing algorithm | 20 |
| Figure 3.6 | ANN testing result with $r=0.9744$ | 21 |