

Universiti Teknologi MARA

**Classification of Breast Cancer using
Artificial Neural Network**

Nur Aisyah Nabila binti Redzuan

**Thesis submitted in fulfilment of the requirements for
Bachelor of Computer Science (Hons.)
Faculty of Computer and Mathematical Sciences**

January 2017

ACKNOWLEDGEMENT

Alhamdulillah, praises and thanks to Allah because of his His Almighty and His utmost blessings, I was able to finish this research within the time duration given. Firstly, my special thanks go to my supervisor, AP Mazidah Puteh and my CSP650 lecturer, AP Hamidah Jantan for the guidance to complete the project. Special appreciation also goes to my beloved parents Redzuan bin Ab Jalil and Norhayati binti Saleh for all the support and advices during one year of process completing the project. Last but not least, I would like to give my gratitude to my dearest friend for supporting me.

ABSTRACT

The project is about the classification of breast cancer using Artificial Neural Network (ANN). Preliminary and early awareness of diseases is crucial, especially a cancer. Cancer is a disease that happened when an abnormal growth of cells spread in the body. It is also known as malignancy. There are more than 100 types of cancer and one of the most awful and leading causes of death is breast cancer. The National Cancer Institute of the US reviews, 232,340 females and 2,240 male cases of breast cancer reported every year and 39,620 death cases. As a precaution, people go through a screening test. Nevertheless, in view of time and cost, the test does not provide an accurate prediction. An additional imaging test with high costs needed to get the most reliable results. Hence, the project aims to develop a classification system for breast cancer, which is cheaper and portable by using machine learning technique called ANN. ANN is successfully used in many areas. In previous, ANN has proven the ability of predicting and classifying with up to 95% accuracy. The method used for the project are the backpropagation ANN. The system will classify the patient whether they have a benign tumor or malignant tumor. As the result, the project shows reasonable accuracy of the ANN approach for breast cancer classification problem.

TABLE OF CONTENTS

CONTENT	PAGE
SUPERVISOR APPROVAL	ii
STUDENT DECLARATION	iii
ACKNOWLEDGEMENT	iv
ABSTRACT	v
TABLE OF CONTENTS	vi
LIST OF FIGURES	ix
LIST OF TABLES	xi
LIST OF ABBREVIATIONS	xii
CHAPTER ONE: INTRODUCTION	
1.1 Background of Study	1
1.2 Problem Statement	3
1.3 Project Objectives	4
1.4 Project Scope	5
1.5 Project Significance	5
1.6 Research Methodology Framework	7
1.7 Summary	8
CHAPTER TWO: LITERATURE REVIEW	
2.1 Cancer	9
2.1.1 An overview	9
2.1.2 Type of cancer	11
2.2 Breast cancer	13

2.2.1	An overview of Breast Cancer	13
2.2.2	Previous studies of Breast Cancer	14
2.3	Machine learning	16
2.3.1	Overview of Machine learning	16
2.3.2	Genetic algorithm	18
2.3.3	Decision tree	19
2.3.4	Artificial Neural Network	19
2.4	Artificial Neural Network	20
2.4.1	Overview of Artificial Neural Network	20
2.4.2	Basic procedure of Artificial Neural Network	22
2.4.3	Procedure of multilayer neural network	22
2.4.4	Previous studies of Artificial Neural Network	24
2.4.5	Application of Artificial Neural Network	26
2.5	Classification of Breast Cancer using Artificial Neural Network	26
2.6	Summary	27

CHAPTER THREE: METHODOLOGY

3.1	Project Methodology framework	28
3.2	Analysis phase	30
3.2.1	Preliminary study	31
3.2.2	Data preprocessing	31
3.3	Design phase	34
3.3.1	System design	35
3.3.2	Implementation	40
3.4	Result analysis	41
3.5	Summary	42

CHAPTER FOUR: RESULTS AND FINDINGS