

DIABETES MELLITUS FORECAST USING ARTIFICIAL NEURAL NETWORK (ANN)

Project report is represented in partial fulfillment for the award of the
Bachelor of Electrical Engineering (Hons)

Of

UNIVERSITI TEKNOLOGI MARA



SITIFARHANAH BEVTIJAAFAR
2002240304
B.ENG (Hons.) ELECTRICAL
Faculty of Electrical Engineering
UNIVERSITI TEKNOLOGI MARA (UiTM)
Shah Alam, Selangor Darul Ehsan

ACKNOWLEDGEMENT

All praises be to mighty Allah S.W.T, the Merciful and Beneficent for the strength and blessing me throughout the entire research and completion of this thesis.

I would like to express my gratitude and sincere appreciation to my supervisor, Pn. Darmawaty Bt Mohd Ali for her invaluable suggestion, guidance, comments and advice for the completion of this project.

I would also like to thank Dr Ikram Shah from PPUM for his relevant info about diabetes mellitus.

Finally, special thank goes to my beloved family; my father, mother, sister and my brothers for their moral and spiritual supports. Thank you for the encouragement and understanding to make this project very successful.

Last but not least, to my entire friend and those who have directly or indirectly contributed toward the progress of this thesis.

ABSTRACT

This project report presents the application of Artificial Neural Network (ANN) for forecasting the diabetes mellitus. The main objectives of this project are to forecast whether someone is the diabetes sufferer or not. The back-propagation algorithm of ANN has been chosen to train and test the data. Lots of studies carried out by many academia shows the performance of the neural network in predicting clinical outcomes accurately. Inputs of analysis are number of times pregnant, plasma glucose concentration, blood pressure, triceps skin fold thickness, serum insulin; body mass index, pedigree and age. The network with seven inputs is then tested and results obtained are compared in terms of analysis errors, number of inputs, number of layers and learning parameters.

TABLE OF CONTENTS

CHAPTER	DESCRIPTION	PAGE
	ACKNOWLEDGEMENT	
	ABSTRACT	
	TABLE OF CONTENTS	Hi
	LIST OF FIGURES	vi
	LIST OF TABLES	vii
	LIST OF ABBREVIATIONS	viii
1	INTRODUCTION	
	1.0 Background	1
	1.1 Objectives	2
	1.2 Scope of work	3
2	LITERATURE REVTEW	
	2.0 What is diabetes	1
	2.1 Types of diabetes	5
	2.1.1 Type 1 diabetes	5
	2.1.2 Type 2 diabetes	6
	2.1.3 Gestational diabetes	7
	2.2 The symptoms of diabetes	8
	2.2.1 Type 1 diabetes symptoms	8
	2.2.2 Type 2 diabetes symptoms	8
	2.3 Complications	9
	2.3.1 Heart disease	9
	2.3.2 Kidney disease/kidney transplantation	9
	2.3.3 Eye complications	10
	2.3.3.1 Glaucoma	10
	2.3.3.2 Cataracts	10

	2.3.3.3 Retinopathy	11
2.4	Neuropathy and Nerve Damage	12
2.5	Foot complications	13
	2.5.1 Skin changes	13
	2.5.2 Calluses	14
	2.5.3 Foot ulcers	14
	2.5.4 Poor circulation	15
	2.5.5 Amputation	15
2.6	Skin complication	16
	2.6.1 Bacterial infections	16
	2.6.2 Fungal infections	17
	2.6.3 Itching	17
	2.6.4 Diabetic Dermopathy	17
	2.6.5 Necrobiosis Lipoidica Diabeticorum	18
	2.6.6 Atherosclerosis	18
	2.6.7 Allergic reactions	19
	2.6.8 Diabetic Blisters (Bullosis Diabeticorum)	19
	2.6.9 Eruptive Xanthomathosis	19
	2.6.10 Digital Sclerosis	19
	2.6.11 Disseminated Granuloma Annulare	20
	2.6.12 Acanthosis Nigricans	20
2.7	Who is at risk for diabetes	20
2.8	Test used to diagnose diabetes	21

ARTIFICIAL NEURAL NETWORKS

3.0	Introduction	22
3.1	What is ANN	23
3.2	History of Neural Networks	24
3.3	Advantages and disadvantages of ANN	27
3.4	Biological Inspiration	29