

TABLE OF CONTENT

Table of Contents

LIST OF FIGURES.....	VI
LIST OF TABLES	VIII
LIST OF ABBREVIATIONS.....	IX
كلمة شكر	XI
الإهداء.....	XII
المستخلص	XIV
ABSTRACT	XV
1 INTRODUCTION.....	1
1.1 NEURO-FUZZY LITERATURE SURVEY	1
1.2 THESIS OBJECTIVES	3
1.3 THESIS OUTLINE	4
2 THE PHYSIOLOGICAL BASIS OF THE ELECTROCARDIOGRAM (ECG).....	6
2.1 HEART PHYSIOLOGY	6
2.1.1 ECG Deflections and leads	7
2.1.2 ECG arrhythmias	8
3 ECG PRE-PROCESSING	10
3.1 NOISE SOURCES	10
3.2 DE-NOISING TECHNIQUES	11
4 THEORETICAL BACKGROUND OF TECHNIQUES	20
4.1 FEATURE EXTRACTION	20
4.1.1 Discrete Wavelet Transform (DWT).....	20
4.1.2 Principal Component Analysis (PCA)	23
4.1.3 Information theory	25
4.2 CLASSIFICATION	26
4.2.1 Artificial Neural Network (ANN).....	26
4.2.2 Fuzzy systems	33
5 RESEARCH METHODOLOGY	39

5.1	EXPERIMENTAL TOOLS	39
5.2	ECG SEGMENTATION	41
5.3	ECG DE-NOISING	43
5.3.1	<i>Setup</i>	44
5.3.2	<i>Procedure and Results</i>	44
5.4	ECG FEATURE EXTRACTION	48
5.5	NEURO-FUZZY CLASSIFIER	53
6	RESULTS AND DISCUSSION	58
6.1	RESULTS AND DISCUSSION OF ECG SEGMENTATION.....	58
6.2	RESULTS AND DISCUSSION OF ECG DE-NOISING	60
6.3	RESULTS AND DISCUSSION OF ECG FEATURE EXTRACTION	61
6.4	RESULTS AND DISCUSSION OF NEURO-FUZZY CLASSIFICATION	68
6.5	COMPARISON STUDY	69
7	CONCLUSION AND FUTURE WORK	71
7.1	FUTURE WORK	73
8	BIBLIOGRAPHY	74