



Sudan University of Science and Technology
College of Engineering

Biomedical Engineering Department

A rule-based Expert System for ECG analysis

قاعدة النظام الخبير في تحليل إشارة كهربية القلب

**A Project Submitted In Partial Fulfillment for the Requirements of
the Degree of B.Sc. (Honor) In Biomedical Engineering**

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content	Title	Page
	الاية	I
	الاهداء	II
	Acknowledgement	III
	Contents	IV
	List of figures	VII
	List of tables	VIII
	Abstract	IX
	المستخلص	X
1	Chapter One: Introduction	1
1.1	General View	1
1.2	Problem Statements	1
1.3	Objectives	1
1.4	Methodology	2
1.5	Layout	2
2	Chapter two: literature reviews	3
3	Chapter Three: Expert System	4
3.1	Introduction	4
3.2	Definitions	5
3.3	Purpose of the Expert System	6
3.4	Rules of Expert System	6
3.5	Structure of rule based expert system	7
3.6	Algorithms language	9

3.7	Symbolic language	9
3.8	Uses of expert system	9
3.9	Limitations of Expert System	10
3.10	Applications of Expert System	11
3.11	Medical Expert System	12
3.12	Examples of Expert Systems	13
3.13	Difference between ES and other system	14
3.14	Database and Expert system	14
4	Chapter Four: ECG	16
4.1	Use in Medical Device	16
4.2	Basic Background	16
4.3	Basics from ECG	24
4.4	Atrial fibrillation	30
4.5	Sinus Arrhythmia	31
5	Chapter Five: Methodology	33
5.1	Tables	33
5.2	Proposed system	37
5.3	implementation	38
5.4	illustration1	40
5.5	illustration2	41
5.6	Testing and results	43
6	Chapter Six: Conclusion and Recommendations	44

6.1	Conclusion	44
6.2	Recommendations	44
	References	45
	Appendix	46
A	Appendix(A)	46
B	Appendix(B)	82

LIST OF FIGURES

Figure	Title	Page
3.1	Structures of expert system	7
4.1	Normal conductive pathway	17
4.2	Einthoven triangles	18
4.3	Precordial leads	19
4.4	Standard convention reading ECG	21
4.5	Elements of ECG	22
4.6	Variations of QRS complex	23
4.7	Axis of ECG	26
4.8	Equiphaseic	27
4.9	Atrial fibrillation	31
4.10	Sinus arrhythmia	32
5.1	The Proposed System	37
5.2	The diagram of Proposed System	39
5.3	Screen image of the system illustration -1	41
5.4	Screen image of the system illustration -2	42
A.1	Screen image of log in forum	82
A.2	Screen image of main page for experts forum	83
A.3	Screen image of adding new admin (expert) forum	83
A.4	Screen image of adding new user forum	84
A.5	Screen image of adding new disease and feature forum	84
A.6	Screen image of patient's details forum	85
A.7	Screen image of features and abnormalities forum	85

LIST OF TABLES

Table	Title	Page
4.1	Vectors of ECG	20
5.1	PATIENT DETAILS	33
5.2	RULE BASE	34
5.3	P_WAVE	34
5.4	Q WAVE	35
5.5	R_WAVE	35
5.6	S_WAVE	35
5.7	T_WAVE	36
5.8	OTHER WAVES	36
5.9	OTER FEATURES	36
5.10	Results	43

ABSTRACT

This project is developed to overcome this problem that ECG recorded signal that cannot be diagnosed without physicians in this rule-based expert system, patient's heart rate and the wave characteristics of the ECG are considered. With these facts, rules are framed and a rule-base is developed in consultation with experts. An inference engine in the expert system uses these inputs, and the rule-base to identify any abnormality in the patient's heart.

This expert system can support physicians in their diagnosis and decision-making.

CHAPTER ONE

INTRODUCTION

1.1 General View

Heart disease has become the most common disease that affects human worldwide. Each year millions of people die from heart attacks and an equal number undergo coronary artery bypass surgery or balloon angioplasty for advanced heart disease.

Early detection and timely treatment can prevent such event. This would improve the quality of life and slow the progression of heart failure. The first step in the diagnosis is to record the ECG of the patient. An ECG record is a non-invasive diagnostic tool used for the assessment of the patient heart condition.

The features of the ECG, when recognized by simple observations, and combined with heart rate, can lead to a fairly accurate and fast diagnosis.

1.2 Problem Statement

Expert cardiologists have a knowledge that they can use to extract the condition of patient's heart from their ECG.

The knowledge of an expert is confined to him and is not freely available for decision making.

1.3 Objective

Design an expert system that can analyze (ECG signal and heart rate) to help physicians in their diagnosis and decision making.