



UNIVERSITI TEKNIKAL MALAYSIA MELAKA

**A STUDY OF HEART RATE ACCORDING TO AGE
GROUP VIA INTERNET OF THINGS**

This report is submitted in accordance with the requirement of the Universiti Teknikal Malaysia Melaka (UTeM) for the Bachelor of Electronics Engineering Technology (Telecommunications) With Honours

by

MUHAMMAD IKHWAN SHAFIQ BIN ANUAR

B071510048

930128-11-5423

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.....
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.....
Khairul Anuar bin A. Rahman

Alamat Tetap:

Cop Rasmi Penyelia

Blok G4-36,

Desa Tun Hussein Onn,

54200 Kuala Lumpur,

W. Persekutuan

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Signature:

Author : Muhammad Ikhwan Shafiq bin Anuar

Date:

APPROVAL

This report is submitted to the Faculty of Electrical and Electronic Engineering Technology of Universiti Teknikal Malaysia Melaka (UTeM) as a partial fulfilment of the requirements for the degree of Bachelor of Electronics Engineering Technology (Telecommunications) With Honours. The member of the supervisory is as follow:

Signature:

Supervisor: Khairul Anuar bin A. Rahman

Signature:

Co-supervisor: Mohd Erdi bin Ayob

ABSTRAK

Inovasi teknologi dalam bidang pencegahan penyakit dan penyelenggaraan kesihatan pesakit telah memberi kesan kepada pembangunan bidang seperti sistem pemantauan. Sistem pemantauan yang memanfaatkan internet perkara (IoT) sangat penting pada hari ini memandangkan ia sangat baik jika digunakan pada apa pun yang penting. Kadar jantung adalah parameter kesihatan yang sangat penting yang secara khusus dikenal pasti dengan sistem kardiovaskular manusia yang kukuh. Kadar jantung adalah keadaan jantung berdegup seminit, mencerminkan pelbagai keadaan fisiologi, contohnya, beban kerja biologi, tekanan kerja dan tumpuan pada tugas, mengantuk dan keadaan aktif sistem saraf autonomi. Ia cenderung diukur sama ada oleh bentuk gelombang ECG atau dengan mengesan nadi - pengembangan berirama dan penguncupan arteri sebagai darah dikekang melaluinya oleh batasan biasa jantung. Sensor denyutan jantung dibezakan daripada aliran darah yang mewakili jantung mengepam pukulan dalam keadaan apa. Nadi boleh dirasakan dari kawasan-kawasan di mana arteri itu dekat dengan kulit. Kertas ini menggambarkan teknik mengukur kadar denyutan jantung melalui jari dan Raspberry Pi. Ia bergantung kepada pentingnya photoplethysmography (PPG) yang bukan cara mengganggu untuk mengukur pelbagai dalam jumlah darah dalam tisu yang menggunakan sumber cahaya dan pengesan. Walaupun jantung memukul, ia mengepam darah ke seluruh badan, dan itu menjadikan jumlah darah di dalam arteri jari berubah juga. Varians darah ini boleh dikenalpasti melalui mekanisme penderiaan optik di sekitar hujung jari. Isyarat boleh ditingkatkan dan dihantar kepada Raspberry Pi dengan bantuan komunikasi port bersiri. Dengan bantuan penyediaan kadar jantung pengaturcaraan dan pemeriksaan dilakukan.

ABSTRACT

Technological innovations in the field of disease prevention and maintenance of patient health have empowered the development of fields such as monitoring systems. Monitoring systems that utilization internet of things (IoT) are exceptionally significant these days in light of it very well may be utilized at whatever it essential. Heart rate is an exceptionally imperative health parameter that is specifically identified with the soundness of the human cardiovascular system. Heart rate is the occasions the heart beats per minute, reflects diverse physiological conditions, for example, biological workload, stress at work and concentration on tasks, drowsiness and the active state of the autonomic nervous system. It tends to be measured either by the ECG waveform or by detecting the pulse - the rhythmic expansion and contraction of an artery as blood is constrained through it by the normal constrictions of the heart. The sensor of heart beat is distinguished from blood flow which represent heart pumping blow in what condition. The pulse can be felt from those areas where the artery is close to the skin. This paper depicts a technique of measuring the heart rate through a fingertip and Raspberry Pi. It depends on the important of photo plethysmography (PPG) which is non-intrusive method for measuring the variety in blood volume in tissue utilizing a light source and detector. While the heart is beating, it is pumping blood all through the body, and that makes the blood volume inside the finger artery to change as well. This variance of blood can be identified through an optical sensing mechanism put around the fingertip. The signal can be enhanced and is sent to Raspberry Pi with the assistance of serial port communication. With the assistance of preparing programming heart rate and checking is performed.

DEDICATION

I would like to specially dedicate this paper to my Father, my Mother and to all my family.

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TABLE OF CONTENTS

	PAGE
TABLE OF CONTENTS	x
LIST OF TABLES	xvi
LIST OF FIGURES	xvii
LIST OF APPENDICES	xxi
LIST OF SYMBOLS	xxii
LIST OF ABBREVIATIONS	xxiii
CHAPTER 1 INTRODUCTION	1
1.1 Project Background	1
1.2 Problem Statement	2
1.3 Objective	3
1.4 Scopes of Work	3
1.5 Project Significance	4
1.6 Gantt chart	5
CHAPTER 2 LITERATURE REVIEW	6
2.1 Introduction	6
2.2 The important of heart rate	6
2.3 Previous Research Study on Monitoring System	8

2.3.1	Wireless Network for health monitoring: Heart Rate and Temperature Sensor	8
2.3.2	XBee Wireless Sensor Network for Heart Rate Monitoring in Sport Training	10
2.3.3	The Smartphone Accessory Heart Rate Monitor	13
2.3.4	A Heart Monitoring System using IR base Sensor & Arduino Uno	16
2.3.5	Continuous Heart Rate and Body Temperature Monitoring System using Arduino UNO and Android Dev.	17
2.3.6	A General Framework for Heart Rate Monitoring Using Wrist-Type Photoplethysmographic Signals During Intensive Physical Exercise and Feasibility Analysis for Estimation of Blood Pressure and Heart Rate using a Smart Eye Wear	19
2.3.7	Remote Monitoring of Heart Rate and Music to Tune the Heart Rate.	21
2.3.8	Accuracy of Heart Rate Watches: Implication for Weight Management	22
2.3.9	Heart Rate Monitoring System Using Fingertip through Arduino and Processing Software	24
2.3.10	Smart Real-Time Healthcare Monitoring and Tracking System using GSM/GPS Technologies.	25

2.3.11	Mobile Heart Rate Detection (MoHeRDS) for Early Warning of Potentially-Fatal Heart Disease	27
2.3.12	Sensing Heart beat and Body Temperature Digitally using Arduino	28
2.3.13	Wireless Heart Rate Monitoring System using MQTT	30
2.3.14	Respiratory Rate Measurement System from Single Lead ECG	31
2.3.15	An IoT Based Remote HRV monitoring System for Hypertensive Patients.	32
2.3.16	Android Based Health Parameter Monitoring	35
2.3.17	Android Based Heart Rate Monitoring and Automatic Notification System	36
2.3.18	Fingertip Based Heart Rate Monitoring System Using Embedded System.	38
2.4	Summary	49
CHAPTER 3	METHODOLOGY	50
3.1	Introduction	50
3.2	Flowchart Overall Project	51
3.2.1	Project Briefing	52
3.2.2	Selection of Project Title	52
3.2.3	Verify of Project Title	53

3.2.4	Looking for the equipment and components	53
3.2.5	Looking the software	53
3.2.6	Installing the software (computer)	54
3.2.7	Flow chart drawing and making notes	54
3.2.8	Flow Chart showed the Process Implementation Project from the beginning until completed	55
3.3	Block Diagram of Project Development	56
3.4	Flow Chart of the Heart Rate Monitoring	57
3.4.1	Hardware Implementation	58
3.5	Software Implementation	59
3.5.1	Altium Schematic	59
3.6	Configuration using domain server	61
3.6.1	The domain has been purchased on jomhosting.com	61
3.6.2	Configuration on domain server in system internet of things (IoT)	62
3.7	Project Cost	63
CHAPTER 4 RESULT AND DISCUSSION		64
4.1	Result and Discussion	64
4.2	Application Interface	65
4.3	Hardware Setup	66

4.3.1	Hardware Circuit Connection	66
4.3.2	The Final Result of Hardware	68
4.4	Data analysis according to age group via Internet of Things (IoT)	70
4.4.1	Resting Heart Rate and Fitness	70
4.4.2	Normal Resting Heart Rate	70
4.4.3	What is Resting Heart Rate means	71
4.4.4	Resting Heart Rate Charts between men and women	71
4.5	Data collection, analysis and graph represent heart rate according to age group classified by gender	73
4.5.1	For age 18 to 25 years old	73
4.5.2	For age 26 to 35 years old	76
4.5.3	For age 36 to 45 years old	80
4.5.4	For age 46 to 55 years old	84
4.5.5	For age 56 to 65 years old	87
4.6	Discussion	91
CHAPTER 5 CONCLUSION		92
5.1	Conclusion	92
5.2	Recommendation	93
REFERENCES		94

LIST OF TABLES

TABLE	TITLE	PAGE
Table 2. 1:	comparison on previous research journal	40
Table 3. 1:	Table of Project Expected Cost	63
Table 4. 1:	Data has been tabulated from 18 to 25 years old for male's gender	73
Table 4. 2:	Data has been tabulated from 18 to 25 years old for female's gender	75
Table 4. 3:	Data has been tabulated from 26 to 35 years old for male's gender	76
Table 4. 4:	Data has been tabulated from 26 to 35 years old for female's gender	78
Table 4. 5:	Data has been tabulated from 36 to 45 years old for male's gender	80
Table 4. 6:	Data has been tabulated from 36 to 45 years old for female's gender	82
Table 4. 7:	Data has been tabulated from 46 to 55 years old for male's gender	84
Table 4. 8:	Data has been tabulated from 46 to 55 years old for female's gender	86
Table 4. 9:	Data has been tabulated from 56 to 65 years old for male's gender	87
Table 4. 10:	Data has been tabulated from 56 to 65 years old for female's gender	89

LIST OF FIGURES

FIGURE	TITLE	PAGE
Figure 1. 1:	Figure indicate the condition of heart rate based on age group	2
Figure 2. 1:	Figure indicate heart rate characteristic between normal and abnormal	7
Figure 2. 2:	Figure indicate Infrared and red-light wave length	9
Figure 2. 3:	Figure indicate block diagram of the system	10
Figure 2. 4:	Figure show hardware development for Arduino Nano interface with nRF24AP1 and ZigBee@XBee	11
Figure 2. 5:	Figure indicate Block Diagram of the Proposed ECG circuit	13
Figure 2. 6:	Figure indicate Layout of the Android Smartphone Application	14
Figure 2. 7:	Figure indicate flow Chart of the Android Application Developed	15
Figure 2. 8:	Figure indicate Block diagram of the incubator monitoring system including both the transmitting & receiving sections.	17
Figure 2. 9:	Figure indicate pulse detector circuit.	18
Figure 2. 10:	Figure indicate the Reflectance and Transmission PPG	20
Figure 2. 11:	Figure indicate the block diagram of remote monitoring	21
Figure 2. 12:	Figure indicate the block diagram of music to tune the heart rate	22
Figure 2. 13:	Figure indicate the average for both application	23
Figure 2. 14:	Figure indicate schematic diagram for hardware in heart rate monitoring	24

Figure 2. 15: Figure Indicate the flow chart of the project	25
Figure 2. 16: Figure indicate the schematic diagram of Pulse Sensor Amplified	27
Figure 2. 17: Figure indicate a mock patient tested the prototype	28
Figure 2. 18: Table show the characteristic of heart rate	29
Figure 2. 19: Figure indicate pulse sensor monitoring	29
Figure 2. 20: Figure indicate schematic diagram of heart rate sensor	30
Figure 2. 21: Figure indicate the tools to utilizing Electrocardiography ECG	31
Figure 2. 22: Figure indicate the RN-XV WiFly module	32
Figure 2. 23: Figure indicate the Pulse trace for normal person	33
Figure 2. 24: Figure indicate Pulse trace for hypertensive patient	33
Figure 2. 25: Figure indicates the RR interval Histogram on normal person	34
Figure 2. 26: Figure indicates the RR interval Histogram on Hypertensive patients	35
Figure 2. 27: Figure indicate the flow chart of Heart Parameter Monitoring	35
Figure 2. 28: Figure indicate Prototype of Android cased heart rate monitoring and application	37
Figure 2. 29: Figure indicate the block diagram of Fingertips Heart Rate Monitoring	38
Figure 3. 1: Overall Project Development Chart	51
Figure 3. 2: Process of implementation project flowchart	55
Figure 3. 3: Block diagram of the Heart Rate Monitor	56
Figure 3. 4: Flow Chart of the Heart Rate Monitor	57

Figure 3. 5: Schematic Project Connection	58
Figure 3. 6: Overall display in Altium software	59
Figure 3. 7: How to create new file in Altium software	59
Figure 3. 8: How to pick parts from libraries	60
Figure 3. 9: The domain has been subscribed on jomhosting.com	61
Figure 3. 10: The server of jomhosting.com configuration	62
Figure 4. 1: This show the graph that are produced in the ikhwanshafiqsn.com website System	65
Figure 4. 2: User Interface for Raspberry-Pi when entering the PI configuring terminal.	66
Figure 4. 3: The connection of all component in compact circuit	67
Figure 4. 4: The lighting will on if the device charging	68
Figure 4. 5: The device functionality on sensor to transferring data to server	69
Figure 4. 6: Figure indicate the condition of heart rate based on age group	72
Figure 4. 7: Graph show males heart rate variation vs age group from 18-25 years old according to average guideline in their characteristic	74
Figure 4. 8: Graph show females heart rate variation vs age group from 18-25 years old according to average guideline in their characteristic	76
Figure 4. 9: Graph show males heart rate variation vs age group from 26-35 years old according to average guideline in their characteristic	77
Figure 4. 10: Graph show females heart rate variation vs age group from 26-35 years old according to average guideline in their characteristic	79

Figure 4. 11: Graph show males heart rate variation vs age group from 36-45 years old according to average guideline in their characteristic	81
Figure 4. 12: Graph show females heart rate variation vs age group from 36-45 years old according to average guideline in their characteristic	83
Figure 4. 13: Graph show males heart rate variation vs age group from 46-55 years old according to average guideline in their characteristic	85
Figure 4. 14: Graph show females heart rate variation vs age group from 46-55 years old according to average guideline in their characteristic	87
Figure 4. 15: Graph show males heart rate variation vs age group from 56-65 years old according to average guideline in their characteristic	89
Figure 4. 16: Graph show females heart rate variation vs age group from 56-65 years old according to average guideline in their characteristic	90

LIST OF APPENDICES

APPENDIX	TITLE	PAGE
Appendix 1		97

LIST OF SYMBOLS

i	-	current
V	-	voltage
R	-	resistor
l	-	Length

LIST OF ABBREVIATIONS

PPG	plethysmography
BPM	beat per minute
HRC	Heart Rate Characteristic
NEC	Necrotizing Enterocolitis
HR	Heart Rate
CPU	Central Processing Unit
IR	Infrared
PIC	Peripheral Interface Controller
ID	Identity
LED	Light Emitting Diode
RX	Receiver
TX	Transmitter
ECG	Electrocardiogram
ADK	Accessory Development Kit
DC	Direct Current
LA	Left Amplifier
RA	Right Amplifier
I	Current
IC	Integrate Circuit
SDK	Software Development Kit
API	application programming interface

GSM Global System for Mobile communication

LCD liquid crystal display