

ANALYSIS OF HUMAN TEMPERATURE MONITORING SYSTEM USING RFID AND DATABASED

NUR AFIFAH RASYIDAH BINTI SUHAIMI

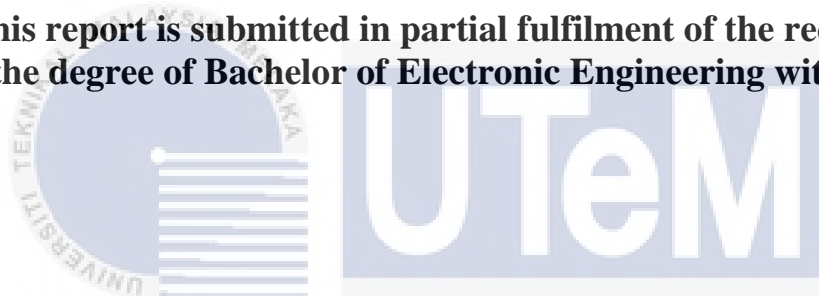


UNIVERSITI TEKNIKAL MALAYSIA MELAKA

**ANALYSIS OF HUMAN TEMPERATURE MONITORING
SYSTEM USING RFID AND DATABASED**

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**This report is submitted in partial fulfilment of the requirements
for the degree of Bachelor of Electronic Engineering with Honours**



**Faculty of Electronic and Computer Engineering
Universiti Teknikal Malaysia Melaka**

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BORANG PENGESAHAN STATUS LAPORAN
PROJEK SARJANA MUDA II

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using RFID and Databased
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DECLARATION

I declare that this report entitled “Analysis of Human Temperature Monitoring System using RFID and Databased” is the result of my own work except for quotes as cited in the references.



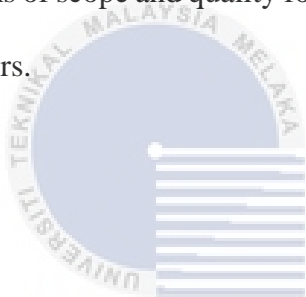
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APPROVAL

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Date : 30 May 2022

DEDICATION

I would like to dedicate the success of this project research especially to my parents which is my father Suhaimi bin Ibrahim and my mother, Zaleha binti Sitam. This report will be dedicated to them because I want to thank that for all the sacrifices that they made for me while I have been studies at this university. Secondly, this dedication is given to my siblings who have helped in terms of advice, finance, and encouragement support to make this report. Next, I would like to express a lot of gratitude to my supervisor, Dr. Afifah Maheran binti Abd Hamid and my friends that give a lot of helped while completing this Final Year Project

ABSTRACT

Surveys of nature show that many scientists expect more and more viruses in our country to come from various types of viruses, so it focuses on human health. Therefore, the analysis of RFID human monitoring system and database is one of the products that can be used to monitor the level of human health. It will explore the development of a temperature monitoring system equipped with sensors to detect body temperature and a database to store all body temperature data automatically. The analysis is also made by comparing the level of accuracy of this project with other thermometers available in the market. The most accurate thermometer is the oral thermometer compared to this product and forehead thermometer. This is because there is no distance between the body temperature and the thermometer. For other thermometers and this project has a distance when detecting body temperature. As a result of this analysis there is also a slight error on this product of 2%. Therefore, the accuracy of this product is 98%. Moreover, this product is produced using several components such as RFID, Arduino ESP32, distance sensor, temperature sensor and LCD as well as 3D printing using polylactic acid material. For the databased used, Google spreadsheet is an option for databased on this project. It can store about 5 million of data.

ABSTRAK

Tinjauan alam semula jadi menunjukkan ramai saintis menjangkakan semakin banyak virus di negara kita datang daripada pelbagai jenis virus, jadi ia memberi tumpuan kepada kesihatan manusia. Oleh itu, analisis sistem dan pangkalan data pemantauan manusia RFID merupakan salah satu produk yang boleh digunakan untuk memantau tahap kesihatan manusia. Ia akan meneroka pembangunan sistem pemantauan suhu yang dilengkapi dengan sensor untuk mengesan suhu badan dan pangkalan data untuk menyimpan semua data suhu badan secara automatik. Analisis juga dibuat dengan membandingkan tahap ketepatan projek ini dengan termometer lain yang terdapat di pasaran. Termometer yang paling tepat ialah termometer oral berbanding produk ini dan termometer dahi. Ini kerana tiada jarak antara suhu badan dengan termometer. Untuk termometer lain dan projek ini mempunyai jarak apabila mengesan suhu badan. Hasil daripada analisis ini juga terdapat sedikit ralat pada produk ini sebanyak 2%. Oleh itu, ketepatan produk ini ialah 98%. Selain itu, produk ini dihasilkan menggunakan beberapa komponen seperti RFID, Arduino ESP32, sensor jarak, sensor suhu dan LCD serta cetakan 3D menggunakan bahan asid polylactic. Untuk pangkalan data yang digunakan, hamparan Google ialah pilihan untuk pangkalan data pada projek ini. Ia boleh menyimpan kira-kira 5 juta data.

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TABLE OF CONTENTS

Declaration	
Approval	
Dedication	
Abstract	i
Abstrak	ii
Acknowledgements	iii
Table of Contents	iv
List of Figures	vii
List of Tables	ix
List of Symbols and Abbreviations	x
CHAPTER 1 INTRODUCTION	1
1.1 Project Background	1
1.2 Problem Statement	2
1.3 Objective of Project	3
1.4 Scope of Project	3
1.5 Significant of Project	4

1.6	Thesis Outline	5
CHAPTER 2 BACKGROUND STUDY		6
2.1	Introduction	6
2.2	Related Work	6
2.3	Human Vital Signs	11
2.3.1	Body Temperature	12
2.3.2	Body Temperature Computation	12
2.3.3	Ambient Temperature Computation	13
2.4	How Human Temperature Monitoring Systems Works	14
2.5	How IR Thermometer Works	15
2.6	Microcontroller	18
2.6.1	Arduino ESP32	18
2.6.2	Arduino Uno	18
2.7	IoT Networking	19
CHAPTER 3 METHODOLOGY		21
3.1	Introduction	21
3.2	Project Planning	21
3.2.1	Project Flowchart	22
3.2.2	Project Schedule	25
3.3	Project Implementation	27

3.3.1	Hardware Development	27
3.3.2	Software Development	31
3.3.3	Prototype Design	37
3.4	Cost of Project	40
CHAPTER 4 RESULTS AND DISCUSSION		42
4.1	Software Operation Result	42
4.2	Prototype Operation Result	43
4.3	Project Analysis	45
4.4	Health and Safety	47
CHAPTER 5 CONCLUSION AND FUTURE WORKS		49
5.1	Conclusion	49
5.2	Environmental and Sustainable	50
5.3	Future Recommendation	52
REFERENCES		54

LIST OF FIGURES

Figure 1: MLX90614 Thermometer Connection	13
Figure 2: Psychometric Chart for Temperature Evaluation	14
Figure 3: How IR Thermometer Work	16
Figure 4: Project Methodology	22
Figure 5: Project Methodology Flowchart in Detail	23
Figure 6: Project Flowchart	24
Figure 7: Pin in/out NodeMCU-ESP32	27
Figure 8: LCD with I2C	28
Figure 9: MLX90614-IR Temperature Sensor	29
Figure 10: RC522-RFID Module with RFID Tag	29
Figure 11: VL53L0X-Time of Flight Distance Sensor	30
Figure 12: Buzzer 5V	31
Figure 13: Arduino IDE Software	31
Figure 14: Setting before start coding	32
Figure 15: Last step before start coding	32
Figure 16: The coding that have been verified	33
Figure 17: Data Stored in Databased	34

Figure 18: Schematic Design of Project	35
Figure 19: PCB Layout of Project	36
Figure 20: Drawing od 3D Casing	36
Figure 21: Connection on Breadboard	37
Figure 22: Solder all component	38
Figure 23: 3D Design	38
Figure 24: 3D Printing Process The Product	39
Figure 25: The user data have been recorded	43
Figure 26: Connect the USB to battery or Powerbank	43
Figure 27: Scan the RFID card that have been registered	44
Figure 28: LCD display body temperature of user	44
Figure 29: LCD display ambient temperature	44
Figure 30: Data from Google spreadsheet	45

LIST OF TABLES

Table 1: Comparison Type of Temperature Monitoring	8
Table 2: Comparison of Temperature Monitoring System by Researcher	10
Table 3: Comparison Microcontroller	19
Table 4: Comparison of IoT Networking	20
Table 5: Project Schedule	25
Table 6: Total Cost of Project	410
Table 7: Component and Price List provided by Faculty	461
Table 8: Temperature with different product of analysis	46

LIST OF SYMBOLS AND ABBREVIATIONS

For examples:

RFID : Radio Frequency Identification

3D : 3-Dimensions

LCD : Liquid Crystal Display



CHAPTER 1

INTRODUCTION



1.1 Project Background

Nowadays, the use of temperature monitoring or thermometer has become a tool that is often used by everyone. It is because our country is hit by various viruses from foreign countries that starting with Covid-19 virus. Therefore, peoples need to constantly monitor and care about the health. There are many types of thermometers either contact or contact-free thermometer, but it must user friendly and practically to store every user temperature which is the thermometer that can stored the data automatically without limitation.

Firstly, the idea of the project is to analyze the Human Temperature Monitoring System using RFID and Database supplied with sensor to detect body temperature and database to automatically store all body temperature data using Raspberry pi with sensor and MLX90614 database. An application that used the MLX90614 sensor uses

a forehead thermometer. As is known, it is used as a forehead thermometer because it is easy to automatically monitor and record the user's body temperature without contacting others. This is to prevent users of the virus that could continue to spread each other. Human temperature monitoring was used because it is more intuitive and easier to automatically log data.

The previous product was implemented using Arduino Wi-Fi and Bluetooth (ESP32) with RFID module, but it has limit in store the data, so this project was upgrade by adding the component which is Raspberry Pi and use with ESP32 and RFID module to store the data unlimited. This system can be used by many users. The prototype started by scanning the ID card or token on the RFID module, then the sensor detects the temperature. Subsequently, the data recorded in the google drive was archived through Arduino to Google spreadsheet. Hope that the final product produced by this project will be useful for users to easily monitor the level of health.

1.2 Problem Statement

Temperature monitoring is commonly used in many places. The system used is not practical. But nowadays our country is affected by various viruses from foreign countries, starting with the covid19 virus. The level of health and hygiene should be emphasized. Currently, the methods used are impractical and could put the virus in danger of continuing to spread. Aside from that, wasting paper can destroy the tree and the environment. Also, the previous temperature monitoring has a limitation to store data using a database. Hence, this product can automatically monitor the temperature and store a lot of data using a database.

Now, new features of the human temperature monitoring system developed by selecting a suitable and cost-effective component such as Arduino ESP32, and a

database. The main objective of this project is to detect body temperature and store all body temperature data automatically. It can be use in the office, in the family home, in the hospital ward or anywhere if the place has internet. Hence, this project is proposed to analysis the human temperature monitoring system using RFID and Database to get reading closely same as existing thermometer and store the data automatically.

1.3 Objective of Project

Objective is a guideline that can prove the project is successful or not. Thus, objectives must be stated before carrying out the project. There are two objectives in this project. The objectives are as follow:

- i. To develop and design temperature monitoring system which provided with sensor to detect body temperature and database to store all body temperature data automatically using databased.
- ii. To identify and analyze the designed system to achieve the optimum design reliability.

1.4 Scope of Project

This project is developing human temperature monitoring system based on Internets of Things (IoT). This system is designed by using radio frequency identification (RFID), Arduino Wi-Fi and Bluetooth (ESP32), IR temperature sensor (MLX90614), liquid crystal display 16x2 (LCD), time of flight distance sensor (VL53L0X), buzzer 5V and polylactic acid for casing of product. This system also involves the storing of data in google spreadsheet through google drive to continuously receives and transmits data via internet access.

The human temperature monitoring system detects body temperature. The data collects will upload and store in cloud and the temperature will be monitor from website which is Google spreadsheet that can store up to 5 million of data. The LCD will display the reading of human body temperature.

The main purpose of this research is to analysis or analyze the human temperature monitoring system using RFID and Databased by comparing the data of result with other thermometers available in market. Besides, this research focusing on analyzing accuracy data with others thermometer. The most accurate thermometer is the oral thermometer compared to this product and forehead thermometer. This is because there is no distance between the body temperature and the thermometer. For other thermometers and this project has a distance when detecting body temperature. As a result of this analysis there is also a slight error on this product of 2%. Therefore, the accuracy of this product is 98%.

The experiment runs for 10 weeks starting from end of October 2021 till early in January 2022 and the system decided place that has internet such as office, hospital home or other. The scope of this project will not include emissions others than mention above from different places. Next, other parameters will not be mattered due to limitations of time, costs, and equipment.

1.5 Significant of Project

This project will analyze the MLX90614 accuracy sensor and temperature with a database. It acts as a monitoring platform to make sure people are in good health. Also, the reading will be displayed on the LCD screen. This system is suitable for health surveillance system. This project of easy installation, compact design, and low cost. On top of that, the design of this project is sustainable and uses no chemicals and does

not harm health or the environment. It is called user friendly as it can store and retrieve data via internet access by users.

1.6 Thesis Outline

This research is divided into five chapters. Chapter 1 briefly describes the background to the human temperature monitoring system study. This section includes the problem statement, project objectives and scope of work. Chapter 2 is a review of the literature that generally discusses previous, current, and similar researchers. The idea of the research, including the types of sensors used, the results and future recommendations, have been concluded in this section as a guide for the next chapter. Chapter 3 will explain more detail the methodologies used in the implementation of the project. This includes project planning, project implementation, project analysis and project cost. The results of the project and the discussions based on the data collected during the evaluation process were covered in Chapter 4. The final section, Chapter 5, will conclude the conclusions and results for the precision sensor and the performance cloud. Future recommendations for this research will also be offered in this section.

CHAPTER 2

BACKGROUND STUDY



2.1 Introduction

In this chapter will discuss the literature review of previous research related to this project. Past projects will inspire ideas and understanding on the development of this project. There are various methods that have been used in the development of a human temperature monitoring system in the country. This chapter will also cover various datasheets for sensors and microcontrollers.

2.2 Related Work

Continuous monitoring of body temperature is one way to detect who is getting sick. Therefore, there are many types of thermometers available in the market, such as digital thermometer, oral thermometer, ear thermometer, forehead thermometer with stand and without stand, app-based thermometer, pacifier thermometer and infrared

thermometer. The normal thermometer can measure temperature and can also spread the virus. There are several ways to measure a person's temperature. A more convenient method of measuring a person's body temperature is by using the thermometer and the memory interface[1]. It can be used to reduce the risk of cross contamination and minimize the risk of disease spread. While generally 37.0°C is considered a "normal" temperature, some studies have shown that the "normal" body temperature can be in a wide range, from 36.1°C to 37.2°C. Human temperature monitoring system for performing routine measurements on the vital signs of the human body. It is important because it provides the necessary data for physicians to assess a patient's condition while developing a diagnosis of the problems faced by patients, as well as for parents for their child's condition when they got fever. Right now, the thermometer is growing rapidly as the system is now unable to provide real-time health updates over a limited distance. The hope of this project is to be able to build a prototype of a functional wireless network and to archive the data automatically. It can update a user's health records no matter when and where they are without limitation[1].

Table 1: Comparison Type of Temperature Monitoring

Type of Thermometer	Explanation
Thermometer and Memory Interface	<ul style="list-style-type: none"> • Thermometer and Memory Interface use infrared sensors of the superficial temporal artery by measured the temperature, which is a branch of the carotid artery. It is also known as non-contact infrared thermometers. This thermometer has no physical contact and store the data of temperature manually. Its readings run around 0.6°C cooler than oral temperature readings[2]. • The reading of Thermometer and Memory Interface is quicks, within several seconds. Its easily and can be used on infants, children, and adults. • It is also can keep the previous record for long time and can monitor easily.
Digital Thermometer	<ul style="list-style-type: none"> • Digital thermometers work by using heat sensors that determine body temperature. It can be used to measure the temperature of the mouth, rectum, or armpits. Note that the armpit (axillary) temperature is approximately 0.6 ° C lower than oral readings when evaluating the readings from a digital thermometer [2]. • The accuracy of digital thermometers in about 1 minute or less.
Oral Thermometer	<ul style="list-style-type: none"> • Oral temperature can be taken by either a digital or mercury thermometer. The average oral temperature reading is 37°C. However, any oral temperature from 36.1°C to 37.2°C is