



**UNIVERSITI TEKNIKAL MALAYSIA MELAKA**

**DEVELOPMENT OF HEALTH MONITORING SYSTEM**

This report is submitted in accordance with the requirement of the Universiti Teknikal Malaysia Melaka (UTeM) for the Bachelor of Electrical Engineering Technology (Industrial Automation & Robotics) with Honours.

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## DECLARATION

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## 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 Electrical Engineering Technology (Industrial Automation & Robotics) with Honours. The member of the supervisory is as follow:

  
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## ABSTRAK

Nama bagi projek ini ialah Pembangunan Sistem Pemantauan Kesihatan. Projek ini menggunakan aplikasi ThingSpeak dikenali sebagai Internet Pelbagai Benda (IPB) untuk merakam semua data dari setiap sensor yang digunakan dalam projek ini. Dengan menggunakan WeMos D1, data yang dikesan oleh sensor akan dihantarkan ke WeMos D1 dan data tersebut akan diterima oleh ThingSpeak melalui internet. WeMos D1 berfungsi sama seperti NodeMCU dan perkakasan yang sama seperti Arduino Uno, tetapi perbezaannya adalah ia adalah gabungan dari modul Wi-Fi Arduino Uno dan ESP8266. Apabila sensor mengesan suhu badan, nadi, dan degup jantung, setiap bacaan akan muncul dalam LCD 2004, dan pada masa yang sama bacaan akan dihantar ke WeMos D1. Dengan menggunakan modul Wi-Fi, data akan dihantar ke ThingSpeak. Semasa di ThingSpeak, setiap data sejarah yang telah direkodkan dapat disimpan dalam sistem atau disimpan dalam format pdf. Selanjutnya, data dapat dipantau melalui komputer riba dan telefon pintar, hanya perlu memuat turun dan memasang aplikasi ThingSpeak. Sistem ini adalah untuk membuat kaedah termudah bagi pusat kesihatan untuk memantau setiap pesakit yang mengalami penyakit kronik yang ingin tinggal dan dipantau dari rumah mereka.

## ABSTRACT

The name of this project is Development of Health Monitoring System. This project using ThingSpeak application whereas known as Internet of Things base to record all data from every sensor that use in this project. By using WeMos D1, the data that was detected by sensor will be transmit to WeMos D1 and the data will be received by ThingSpeak through internet. WeMos D1 functions just like NodeMCU and hardware same as Arduino Uno, but the difference is that it is combination from Arduino Uno and ESP8266 Wi-Fi module. When the sensors detect body temperature, pulse, and heart rate, every reading will be appearing in LCD 2004, and at the same time the reading will be transmit to WeMos D1. By using Wi-Fi module, the data will be sends to ThingSpeak. While in ThingSpeak, every history data that has been recorded can be keep in the system or save as pdf format. Furthermore, the data can be monitor through laptop and smartphone, it just need to download and install ThingSpeak application. This system is to make the easiest way for health center to monitor every patient that having chronic disease that want to be stay and monitor from their home.

## DEDICATION

To my beloved parents,  
Michael Lopest and Lijoi.





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## LIST OF SYMBOLS

<b>D, d</b>	-	Diameter
<b>F</b>	-	Force
<b>g</b>	-	Gravity = 9.81 m/s
<b>I</b>	-	Moment of inertia
<b>l</b>	-	Length
<b>m</b>	-	Mass
<b>N</b>	-	Rotational velocity
<b>P</b>	-	Pressure
<b>Q</b>	-	Volumetric flowrate
<b>r</b>	-	Radius
<b>T</b>	-	Torque
<b>Re</b>	-	Reynold number
<b>V</b>	-	Velocity
<b>w</b>	-	Angular velocity
<b>x</b>	-	Displacement
<b>z</b>	-	Height
<b>q</b>	-	Angle

## LIST OF ABBREVIATIONS

**PCA**      Principal Component Analysis



## LIST OF PUBLICATIONS



# CHAPTER 1

## INTRODUCTION

### 1.1 Background

The project to be developed is the "Health Monitoring System". This system uses sensors such as heart rate sensor, pulse sensor, and body temperature sensor as its main function in order to collecting patient data intelligently predicts the health status of patients and transfers data to physicians using their mobile, laptop and tablet devices that use android. Patients will easily monitor their health care process through their mobile device, enabling them to access information anywhere and at any time.

Internet of Things (IoT) is nowadays the Internet 's new mega-trend. This Internet of Things (IoT) is where several objects over the public figure can sense, communicate, and share information. In this system, all the data will be transfer through database where the doctors can access and monitor the data through ThingSpeak Internet of Things application. By implementing this system, health data for every patient can be monitor easily by the doctors. However, if their patients are in an emergency, the Health Center will take an action.

Health monitoring system has been used a few years ago at China, America, Australia, and more. For example, some of their products are available in the sportswear market which is easy to make some athletes buy their product.

Several types of projects that quite similar with this project which was already being invented and improvised but the implementation in Malaysia was so less and it is expensive for patients to having it. Thus, in this project it will help patients that having chronic diseases which has been discharge from the hospital can be monitor by the doctor day by day.

## 1.2 Problem Statement

In Malaysia, the health monitoring system has never been used between doctors and patients. Furthermore, without this system it will increase the visitors in the hospital and make the condition of the hospital become crowded in visits time. The hospital also will not have enough bed for patients that admitted everyday with different diseases. Moreover, when the percentage admitted patient increase then the other patients with full recover will be discharge but their health still need to be monitor everyday by the doctor. Besides, they need to make an appointment with the doctor for every consultation session. Sometimes, the patient must stick around with the date of appointment in two to three weeks to meet their doctor.

In some cases, some of the patients have chronic diseases and live far from the hospital that need to be monitor every day when they discharge from the hospital. For future usage, any patient data such as heart rate, pulse and body temperature must be held for their record of health history. As a result, the doctor must be very busy to handle all these situations, and this will make the system between the doctor and their patients in the hospital became disrupted.

There were a few names of hospital in Malaysia whereas they either be under private hospital or government hospital. Both of this kind of hospital still not using any

technology for health monitoring system for their patients even though this system had been introduced in 2013 for National Heart Institute (IJN). However, this system was called remote health monitoring system via Merlin.net which is developed by St. Jude Medical Inc, USA.

### **1.3 Objectives**

Based on the problem statement discussed above, the objectives of this project are to:

1. To develop a health monitoring system in any health centre by using Internet of Things (IoT).
2. To monitor every data from patient that staying at home and receive it from the sensor and sends the data via Internet of Things (IoT) to be keep in health centre system for their history record.
3. To analyse the data in health monitoring system that receive from every sensor with Internet of Things (IoT).

### **1.4 Project Scope**

In this project scope, it will focus on:

1. Local patient with chronic disease that need to be monitor from home.
2. Record every history data in the system of any health centre.
3. Project will be tested in indoor condition due to Wi-Fi system.