Faculty of Electrical and Electronic Engineering Technology

Development of Health Monitoring System

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Bachelor of Electrical Engineering Technology (Industrial Automation & Robotics) with Honours

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Development of Health Monitoring System

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A project report submitted
in partial fulfillment of the requirements for the degree of
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I declare that this project report entitled "Development of an IoT-Based Health Monitoring System is the result of my own research except as cited in the references. The project report has not been accepted for any degree and is not concurrently submitted in candidature of any other degree.

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APPROVAL

I hereby declare that I have checked this project report and in my opinion, this project report is adequate in terms of scope and quality for the award of the degree of Bachelor of Electrical Engineering Technology (Industrial Automation & Robotics) with Honours.

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DEDICATION

In this dedication, I would like to thanks to my Parents, fellow friends, supervisor and all the lecturers through whole semester to gives me a lot of learning process in order to complete the Final Year Project task. All the good things came from Allah SWT. and to Him I always pray for the better to increase my passion in completing the task given.

ABSTRACT

This project is proposed to build a health system that can help patients and health officials to observe the level of health of a person. The idea to develop this prototype was because of the problem the patient faced in going to the hospital to see a doctor. This matter is raised because when the patient does not have a vehicle or there is no one can send him to the hospital. In addition, this project can also reduce the burden of doctors when they want to treat patients like this. This is because doctors can only monitor these patients through the portal that has been provided. This portal will display a few things about the patient. The matter is the patient's body temperature and heartbeat. Through these two things, the doctor can analyze and decide whether the patient needs further treatment or whether the patient is in a normal condition. The system uses the Internet of Things (IoT) to connect data to a portal that will be used by doctors. The main material in this project is an Arduino which acts as the brain for this system and is equipped with several sensors to identify the patient's body temperature and heart rate. The sensors used in this project are a pulse sensor and a GY-906 sensor that acts to measure the patient's body temperature. ESP8622 is also used in this project. This tool is intended as a network module for connecting hardware and software.

ABSTRAK

Projek ini dicadangkan adalah utuk membina suatu sistem kesihatan yang dapat membantu pesakit dan pegawai kesihataan untuk memerhatikan tahap kesihatan seseorang itu. Idea untuk mengembangkan prototaip ini adalah kerana masalah yang dihadapi oleh pesakit itu untuk pergi ke hospital untuk berjumpa dengan doktor. Perkara ini di bangkitkan kerana apabila pesakit itu tidak mempunyai kenderaan ataupun tidak ada siapa yang boleh menghantarnya ke hospital. Selain itu juga, project ini sekaligus dapat mengurangkan beban doktor apabila hendak merawati pesakit seperti ini. Ini kerana para doktor hanya boleh memantau pesakit ini memalui portal yang telah disediakan. Portal ini akan memaparkan beberapa perkara mengenai pesakit. Perkara tersebut adalah suhu badan dan degupan jatung pesakit tersebut. Melalui dua perkara ini doktor boleh meganalisis dan membuat keputasan adalah pesakit terseut perlukan rawatan lanjut ataupun pesakit itu dalam keadaan normal. Sistem ini menggunakan Internet of Thing (IoT) untuk menghubungkan data ke portal yang akan digunakan oleh doktor. Bahan utama di dalam projek ini adalah Arduino yang bertindak sebagai otak untuk sistem ini an di lengkapkan oleh beberapa sensor untuk mengenalpasti suhu badan dan degupan jantung pesakit. Sensor yang digunakan di dalam projek ini adalah sensor nadi dan GY-906 sensor yang bertindak untuk mengukur suhu badan pesakit. ESP8622 juga digunakan dialam project ini. Alat ini bertujuan sebagai modul rangkaian untuk menghubungkan perkakasan dan perisian.

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℃ - Celsius

LIST OF ABBREVIATIONS

V	-	Voltage
BPM	-	Heartbeat Per Minutes

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CHAPTER 1

INTRODUCTION

1.0 Introduction

The increased usage of mobile technologies and smart devices in the field of health has had a huge impact on the world. Wellbeing experts are increasingly using the advantages that these advancements provide, resulting in a significant shift in clinical wellness care. Furthermore, innumerable traditional clients benefit from the advantages of portable wellbeing applications and wellbeing treatment boosted by ICT to make advances toward improving their wellbeing.

According to the World Health Organization (WHO) constitutions, a person's right to the highest possible level of well-being is a fundamental right. As we are really propelled by this, we endeavor to propose an imaginative framework that puts forward a shrewd wellbeing checking framework that employments sensors to screen persistent crucial parameters and employments web to overhaul the specialists so that they can help in case of any issues at the most punctual anticipating passing rates.

Health observing utilizing IoT could be an innovation to empower observing of patient’s exterior of customary clinical such as at domestic, which may increment get to care and diminish healthcare conveyance costs. This could essentially move forward an individual's quality of life. It permits patients to preserve autonomy, anticipate complications, and minimize individual costs. This framework encourages these objectives by conveying care right to the domestic. In expansion, patients and their family individuals feel consolation knowing that they are being observed and will be upheld if an issue emerges (Valsalan, Baomar and Baabood, 2020).

1.1 Problem Statement

In today's social welfare framework for patients who stay home throughout post-operational days checking is finished, medical caretaker. This project is to develop of the health monitoring system for medical applications using sensors and Arduino. This monitoring system has been become new wireless support innovation developed for human and provide good access and effective environment. Health is an important part of our lives. We need a healthy body to do daily things or go to work. Therefore, we need to take care of our health by constantly monitoring the level of health of the body. We need someone to monitor our health. However, doctors or health officials do not need to come home or we ourselves go to the hospital for a health check-up. We can do self –examination at home and doctors and health officials can receive such health reports through certain applications to assess our level of health. In this project, Arduino was used as the microcontroller for this project. The Arduino software is a program for controlling and fulfilling the system requirements developed in this project.

1.2 Objectives

In this study, there are a few objectives that will archive.

a) To develop a smart health monitoring system using multi-sensors.
b) To detect pulse and body temperature using pulse sensor and GY-906
c) To analyze the effectiveness of the system using IoT.

1.3 Scope of the study

In order to archive the target of the project, there was many vital criteria that require to think about:

The monitoring system can display the vital parameters of a temperature sensor and a pulse sensor via the Android APP in real-time when a Wi-Fi connection is established. Therefore, nurses or doctors use this app monitoring system through their smartphones. Using ESP8266 as module Wi-Fi and Arduino as microcontrollers.

CHAPTER 2

LITERATURE REVIEW

2.0 Introduction

This section discusses and summarizes the overall development of the health system concept and theory of the project. This chapter will explain past research and existing research. This chapter discussed the theory and concept used to solve this project's problem. Journals, articles, and case studies are the main sources of information. These sources have been selected based on the project scope similarity.

2.1 Review of Current Situation

Nowadays, an ever-increasing number of healthcare professionals are making full use of these electronic devices. Internet of Things (IoT) devices are widely used in the medical field. The scope of this study is almost a health control framework.

Particularly in the provinces for cardiac patients, persistent high blood pressure, hypertension issues, diabetes silence, and so on, because the number of specialists in the provinces is lower than in the city. Therapeutic hardware is not available in the provincial range; nevertheless, government clinics are. As a result, there are more patients than at the government clinic. In many instances, the gear is ended. As a result, if a crisis call is necessary, this equipment gadget will immediately transmit the report to the specialists or helper specialists. Specialists will complete the remaining tasks based on their reports. Among several chronic diseases, hypertension has become a prevalent significant ailment that continues to be the leading cause of cardiac/stroke death. (Kirtana and Lokeswari, 2017).

Web-based or online framework advancements are widely expanded. Nowadays, obtaining true time is critical. When a patient is released from the clinic due to a fundamental condition, he or she must check in at a usual premise. That is why an associate degree IoT-based health monitoring system is that the ideal possibility for a country-wide scale. The Internet of Things (IoT) digital physical resources equivalent to devices, sensors, machines, portals and therefore an organization. It connects individuals to things and objects to people in real-time

(Pathak *et al.*, 2020). A typical IoT network can expand rapidly, resulting in an exponential increase in the variety, speed, and overall amount of data. This knowledge creates opportunities for important esteem development and money generation. However, the key problem for IoT situations is determining a way huge of information from all sources and act in real-time.

2.2 General IoT in Health Management

IoT changes the restorative info into bits of information for an additional intelligent understanding of care. healthcare is presently more automatically progressed and is all around interfacing things together. Hence, IoT is therefore crucial in healthcare. By leverage gadgets like associated sensors and different varieties of things that people will wear all that data are often set inside the cloud, and doctor/caregiver can effectively screen the real-time data of the patient.

IoT can support critical medical applications by gathering information from bedside devices, viewing silent data, and diagnosing the entire structure of an ongoing treatment in real time. Currently, many medical devices are being operated around the world, which leads to information problems, which in turn can lead to errors. To overcome this, the collected information is stored in the cloud.

The caregivers or specialists can effectively screen and oversee the understanding wellbeing and can spare valuable minutes each day. Without having to physically visit each quiet, the caregiver/expert or specialist can deliver an inaccessible conclusion and track the restorative resources. Utilizing the sensors and Wi-Fi, the proper division within the hospital can be found whereas recovering erotic data. IoT within the wellbeing observing framework has given us a huge advantage within the improvement of advanced restorative treatment (Li, Hu and Zhang, 2017).

Due to progress innovation, the sensors have gotten to be littler which has empowered the advancement of wearable arrangements. Due to reliable web network, the gadgets are getting to be more proficient and effective. The IoT are based gadgets continually associated to the web, the patients can be monitor or observed and fundamental measures

can be taken in case of a crisis. IoT are based gadgets can hence give both discovery and crisis reaction administrations.

2.2.1 Sensor on Health Monitoring System

The sensor on health monitoring framework collects data on the patient's health status via an electronic information flag and alerts the quiet via a sound warning. Temperature sensors and heart rate sensors are two of the most used types of temperature sensors.

The majority of health monitoring devices made use of body temperature sensors, heart rate sensors, and temperature sensors. The framework is applicable in both mechanical and household settings. In every instance, the resulting architecture is wire-connected. Making the device remote would increase the framework's flexibility. Based on a keen (ICU) system that captures treatment data in real time. Framework has three layers, which is coherent layer, is physical layer and application layer. The physical layer comprises of the sensors utilized for information purposes.

An information gain from the sensors among the physical layer is ready within the consistent layer. The consistent layer handles the media get to administration assignments and go to the communication device. The applying layer takes activities supported by the prepared information created by the coherent layer. In any case, the condition and behavior of the quiet cannot be set within the checked-on framework because the framework used unimportant information.

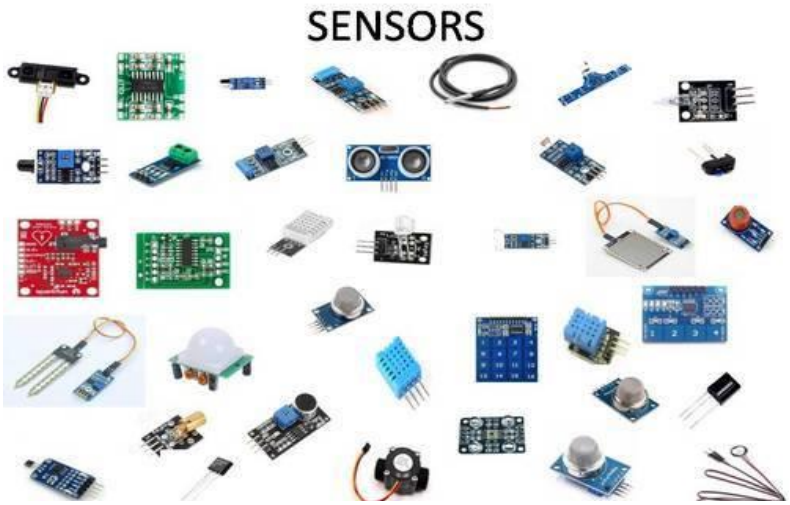

Figure 2.1: Type of Sensors

2.2.2 Microcontroller on Health Monitoring.

Microcontrollers the most widely use devices in health verification frameworks around the world MCUs an exceptionally valuable for quickly processing sensor information. between sensors. Due to the exceptionally small estimate of microcontrollers. It can be used for convenient arrangements. Nowadays, Arduino is one of the most widely used microcontroller-based tiers in wellness verification frameworks.

(Kumar and Sekhar, 2015) provided an Arduino primarily totally based health parameter checking machine controlled with the aid of using a telephone application. All sensor information is in analog format. The information is added to the Arduino Uno board. The obtained analog values are transformed to superior through an incorporated analog to the automatic converter. The received values are sent to a phone via Bluetooth. Framework made use of a Bluetooth module that does not cowl a big area. (Sabbir *et al.*, 2017) created association for diabetes patients. It can be a home surroundings framework. This tool permits a diabetic to screen his or her fitness state, bodily activity, manipulate diets, take measures, and allude to consult professionals.

In any case, the developed structure has not received clinical approval. The smart health testing framework based on the Internet of Things is proposed as a framework for smart health testing. An application framework can be divided into three layers, discovery layer, application layer, and transport layer-these are several parts. In the recognition area, a sensor is used to detect body temperature, and a heart rate sensor is used to detect the heartbeat. The information is sent from the Arduino to the cloud in the Wi-Fi module and the Ethernet expansion board through the transmission layer. Finally, the application layer receives data from the server. In any case, the microprocessor in the Arduino is not enough. So many sensors are used at the same time.

(Desai and Toravi, 5093) developed a wireless sensor network-based smart home and heartbeat monitoring system (WSN). For parallel data computing, the system utilised Spartan 3 with FPGA architecture. All of the sensors are linked to a microcontroller, and an LCD displays the MCU's output. However, the system's components are not all housed in a single device.