Faculty of Electrical and Electronic Engineering Technology

DEVELOPMENT OF IOT HOME AUTOMATED SYSTEM

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Bachelor of Electronics Engineering Technology (Telecommunications) with Honours

UNIVERSITI TEKNIKAL MALAYSIA MELAKA

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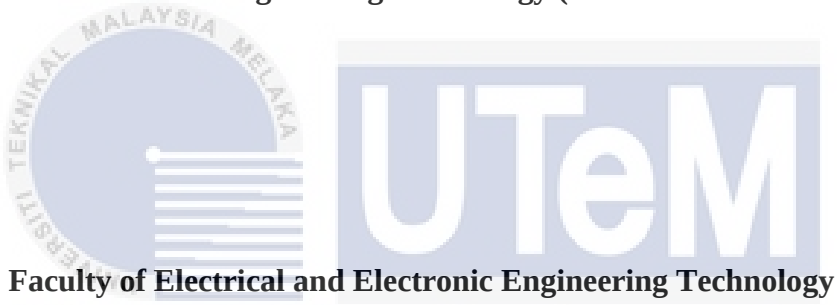
A project report submitted
in partial fulfillment of the requirements for the degree of
Bachelor of Electronics Engineering Technology (Telecommunications) with Honours



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2023

DECLARATION

I declare that this project report entitled DEVELOPMENT OF IOT HOME AUTOMATED 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.

Signature : 

Student Name : MOHAMAD QHAIRUL FITRI BIN HISHAM

Date : 13 JANUARY 2023

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 with Honours.

Signature : 

Supervisor Name : DR MD ASHADI BIN MD JOHARI

Date : 16/01/2023

Signature :

Co-Supervisor :

Name (if any)

Date :

DEDICATION

I dedicate my dissertation work to my family and friends. A special feeling of gratitude to my loving parents, Hisham Bin Nordin and Mahani Binti Mohd Noor whose words of encouragement and push for tenacity ring in my ears. My sister, Quzaitul Izzati Binti Hisham has never left my side and very special.

I also dedicate this dissertation to my friends who have supported me throughout the process. I will always appreciate all they have done, especially Fahmi for helping me develop my technology skills, Harith for the many hours of proofreading, and Afwan for helping me to master the coding process skills. I dedicate this work and give special thanks to my best friend, Faiz for being there for me throughout the entire doctorate program. You have been my best cheerleader.

ABSTRACT

At this era, home automation has become a reality. With just one power, one can accomplish a variety of tasks. Recent advancements in technology can be used to create fully functional home automation systems and operate smart home devices such as lights, fans, and other appliances. The Internet of Things (IoT) is a network of physical objects that includes sensors, software, electric devices, and internet access to improve performance by exchanging data with other connected items. In recent years, the Internet of Things (IoT) has been defined as a network of all internet-connected objects. IoT devices can be accessed remotely and operated using an existing network architecture, enabling direct integration of computing systems with the physical world. Home automation has gained a lot of popularity in recent years, and it has improved people's comfort and quality of life. We use IoT-based devices to signify comfort and automation. We will design and create home automation systems that will allow users to operate household appliances such as fans, lighting, and other devices using mobile and desktop devices.

ABSTRAK

Pada era ini, automasi rumah telah menjadi kenyataan. Dengan hanya satu kuasa, seseorang boleh mencapai pelbagai tugas. Kemajuan terkini dalam teknologi boleh digunakan untuk mencipta sistem automasi rumah yang berfungsi sepenuhnya dan mengendalikan peranti rumah pintar seperti lampu, kipas dan peralatan lain. "Internet of Things" (IoT) ialah rangkaian objek fizikal yang merangkumi penderia, perisian, peranti elektrik dan akses Internet untuk meningkatkan prestasi dengan bertukar-tukar data dengan item lain yang bersambung. Dalam beberapa tahun kebelakangan ini, "Internet of Things" (IoT) telah ditakrifkan sebagai rangkaian semua objek yang disambungkan ke Internet. Peranti IoT boleh diakses dari jauh dan dikendalikan menggunakan seni bina rangkaian sedia ada, membolehkan penyepaduan langsung sistem pengkomputeran dengan dunia fizikal. Automasi rumah telah mendapat banyak popularity dalam beberapa tahun kebelakangan ini, dan ia telah meningkatkan keselesaan dan kualiti hidup orang ramai. Kami menggunakan peranti berasaskan IoT untuk menandakan keselesaan dan automasi. Kami akan mereka bentuk dan mencipta sistem automasi rumah yang akan membolehkan pengguna mengendalikan peralatan rumah seperti kipas, lampu dan peranti lain menggunakan peranti mudahalih dan desktop.

ACKNOWLEDGEMENTS

In the name of Allah, the Most Gracious and the Most Merciful. All praises to Allah and His blessing for the completion of this thesis. I thank God for all the opportunities, trials and strength that have been showered on me to finish writing the thesis. I experienced so much during this process, not only from the academic aspect but also from the aspect of personality. My humblest gratitude to the holy Prophet Muhammad (Peace be upon him) whose way of life has been a continuous guidance for me.

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I offer my special thanks to all my colleagues, Afwan, Shamil, Faiz, Fahmi, Rauf and Harith for their motivation, prayers and their sincere help during my studies. I would sincerely like to thank all my beloved friends who were with me and support me through thick and thin. I also want to extend my thanks to Puan Azien for her helps and supports in the administrative works. May God shower the above cited personalities with success and honour in their life.

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CHAPTER 1

1.1 BACKGROUND PROJECT

Nowadays, people had changed their living standards. Most of them are using technology on daily basis. The same goes for the daily chores. In modern life, people also use technology and machines to do their work. For example, people use voice recognition to open the lamp, television, and fans. Other than that, people also use a robotic vacuum to clean the house.

For information, this project is about an IoT Based Home Automation system. It is a project that is able to control domestic appliances by installing an electronic that is controlled by the internet connection system. Based on other projects that are related, the IoT Based Home Automation system also can be used as a house alarm which is connected to a central hub and remotely controlledby a mobile application.

A Home Automation system's purpose is to make the home functional in neatly order. The benefit of having a smart home is that people can save energy and time to do their house chores. For example, people can relieve their stress or work fatigue by controlling the machines to clean thehouse, wash clothes and many more in a glimpse of eye.

The Home Automation system also can make user feel comfortable by saving up some space in the house. The devices that were installed in the house are not big. So, in that situation, it can give users a nice and spacious view. Besides, this system is so convenient to the users because Home Automation system can automatically turn on and off the programmable devices at certain times.

1.2 PROBLEM STATEMENT OF PROJECT

Home Automation system is increasing in the number of households because of all the benefits it presents. Home Automation system has also been proven to be a tremendous benefit for the elderly and the disabled. The benefits that are given to the elderly and disabled are independence, providing emergency assistance systems, security features, fall prevention, automated timers and alerts. Home Automation System also allows monitoring from family members via an internet connection.

Assistive domestic is a type of Home Automation system which offers a variety of functions that might help persons who have accessibility issues in their houses. For example, for people who would rather stay in their homes than go to an assisted living facility, these technology systems and aiding equipment have become viable options for them. To summarize, it is making a big difference in people's lives every day by depending on the Home Automation system, especially for the elderly and the disabled.

For additional information, this system had been planned in the early 20th century as a feature of science to help people with their problems. But, it had been delayed because of some factors that will affect the people. For example, Home Automation system is very expensive at that time. So, that is why this system cannot be installed in any houses that are low salary at that time. Besides, there are also some complexities to the system. That is why people back then did not want to be complex with machines and technologies.

As a result, this project indicates to introduce people to Home Automation system for all variants of houses through its benefits. Such as low cost, open source system and easy to use. In addition, this system also can provide energy efficiency and safety environment society.

1.3 PROJECT OBJECTIVES

In this project, the objectives that must be achieved for a Home Automation system are :

- To design a user-friendly system, easy to use and effectively controls devices in the household.
- To develop a controlled system that can wirelessly transfer data to an Arduino device.
- To study the system that is related to a cross-platform control.

1.4 SCOPE OF PROJECT

The main target for this project is to develop an affordable, easy-to-use, safe and comfortable household. So, therefore the Home Automation system is introduced because it is a system that works to control the house appliances with one another through the Internet medium. The appliances were installed with sensors that can connect them via WiFi, so users can easily control the appliances from smartphones or tablets.

Based on this project, the Arduino act as a microcontroller for the system by distributing signals to control the appliances. This project will be limited for prototyping purposes so that it can avoid any errors or threats before installing it to the real thing.

CHAPTER 2

LITERATURE REVIEW

2.1 INTRODUCTION

In this chapter, the purpose is to make a review and comparison of the past studies about IoT Based Home Automation System. This chapter will also discuss how Home Automation system can be a control to households that can give protection to lives and investments. For example, this system enables it to be a protective system by converting it into intruder control, fire detection and access control. This project, it focuses on the IoT Based Home Automation system to control and manage the houses from inside or outside.

For information, the automation system is a fact that people nowadays are being controlled by technology and machines because it is an easy way to do work whether wireless or remote method. The concept of automation for household appliances through the Internet from anywhere is to make people life comfortable and feel safe by controlling their houses from smartphones or tablets.

2.2 IOT-BASED HOME AUTOMATION SYSTEM

In modern days, people now are using remotes to control the appliances at home. For example, the television is being controlled by people through wireless connections which are called the infrared medium. So, to be more specific about this project, this IoT Based Home Automation system is to help people by reducing their working time at home and securing their lifefrom any outside or inside threat.

That is why this project is suitable for people nowadays to gain knowledge about this Home Automation system. This system is super cost-effective and it can also give users the ability to control any electronic devices without spending money to buy remotes. This project also can assist the user to control all the appliances at home only from their devices.

2.3 INTERNET OF THINGS (IOT)

The Internet of Things (IoT) is a relatively new technology that connects electronic devices and people over the Internet. The data collected by the devices are saved in the cloud and can be analyzed or studied by the users. With the growth of the Internet of Things, automation systems such as surveillance, fire control, access control and environmental management can now be automated. By using IoT, Home Automation system can be completely automated in a wireless method.

It is possible to monitor and manage household appliances from a distance. The information gathered from cloud-based items. Data from the cloud can be downloaded using several mobile devices for monitoring, controlling, and providing feedback. These operations are currently carried out by Arduino microcontrollers and other microcontrollers.

2.4 RELATED WORK

Based on this paper, it told that Home Automation system is so compatible with variant local housing because it can come out with good features by helping the users control their residences with just a remote control. In this paper, also told that this project is using an Arduino microcontroller to control the house appliances such as lights, garage doors, water pumping systems and smoke detection systems. This is because an Arduino microcontroller is low-cost and precise at controlling the automation system. Next, this project is using Bluetooth module component for transferring the signal via a controller device to the Arduino. This is because the Bluetooth module component is a far-range controller that can easily transfer the signal to other devices. For its input device, this project uses a smartphone that will be installed an application to connect the Bluetooth module. This paper is set to be an idea for helping the elderly and disabled people on working out their house chores and provide a safe life for them [1].

According to this paper, it told that this project uses the IoT-based Home Automation system to save energy and water consumption at home. This project also offers comfortable environments and safe lives. Besides, this paper talked about the benefits of using the Internet of Things (IoT) services in daily life connected to Home Automation system. For example,by using IoT, can provide an enhancement of comfort at home and create a quality lifestyle. It also shows that IoT based Home Automation system is a low-cost project if the users are using sensorsto manage their home appliances where an IP connection is provided. This project also shows that it uses Android-based applications which must be installed in users' smartphones to control the electronic devices at home via the Internet medium. Because this project uses a Raspberry Pi microcontroller to activate the system such as sensors and home appliances [2].

This paper, it has provided an explanation about a Smart Home Automation system thatcan make an easier and simpler lifestyle for people. This is because people nowadays are always dependent on technology and Internet usage. Both things had been an important role in daily life because people have always been with their smartphones or tablets 24 hours per day. In addition, this project also told that it was used as a remote control for a temperature controller, reading humidity percentages and surrounding area detectors such as fire, gas and rain. This project, it uses a lot of components to make this Smart Home Automation system. For example, an alarm for fire detection, a buzzer, a relay component, an Arduino Mega microcontroller for controlling electronic devices, sensors for light, fire, rain, gas, temperature and humidity detection, computersor laptops, and an Ethernet Shield to connect to the microcontroller via the Internet. From this project,it can be concluded that the system used is to alert users to surrounding area phenomena such asheavy rain or gas leaks that could happen [3].

In this project paper, it shows that there are two microcontrollers used which are Raspberry Pi and Arduino to control electronics devices at home. In addition, both microcontrollers mustbe in stable condition to control the appliances at home, so this project has provided a logic converter to control the voltages that flow through those devices. The logic converter component hasa big purpose where it has to convert high-level voltage to pass through Arduino and low-level voltage to pass through Raspberry Pi. In conclusion, this project is a complex build because it usestwo microcontrollers but at the same time, it also can prevent the system from damage because ofthe logic converter component [4].

This Android Based Home Automation using Arduino UNO is also one of the project papers that were referred. The project represents only basic usage of Arduino UNO to controlhome appliances via remote control. It uses Bluetooth medium to connect the input device whichis a smartphone or tablet to the Arduino UNO. This system can provide an increase in work efficiencyand makes life even better at home. It also can make a big difference to the disabled because theyare no longer needed to walk around and do their house chores [5].

This project's documentation outlines the design and prototype implementation of a novel home automation system that connects its component elements via Wi-Fi technology. There are two primary parts to the proposed system. The server (web server), which serves as the system's central processing unit and controls and keeps an eye on users' homes, is the initial component. The project's goal is to develop a sophisticated home automation system using Wi-Fi and a standard web server. Through Wi-Fi, a Personal Computer (PC) may read sensors and turn on/off the devices [6].

They use a self-managed content infrastructure for this paperwork since they have complete control and personalization over the information. The original capital expenditure for the physical infrastructure was very costly and administration was challenging. Key suppliers sought to lower the cost of server rentals by connecting to cloud platforms with dynamic server provisioning through the effective and affordable ESP8266 chip, which was the primary goal for content providers. This article discussed the difficulties in lowering the cost of accessing cloud platforms [7].

In this paper, an ESP8266 Wi-Fi module and Arduino Uno are used to demonstrate a home automation system. With this, you may use a web browser on your PC, smartphone, or other device to control lights, electric fans, and other home appliances. These AC mains appliances will be wired to relays that the Arduino will operate. User will give control commands through a web browser like Google Chrome or Mozilla Firefox, and ESP8266 and Arduino work together as a Web Server. One of the most widely used and reasonably priced Wi-Fi modules on the market right now is the ESP8266 [8].

The ESP8266 Wi-Fi module will be used as a network provider in this project's design and prototype for a home automation system that will link with other appliances. There are two primary parts to the proposed system. The Wi-Fi module's input is managed and controlled by Arduino, which is the first major component. The Wi-Fi module, which may be used to add a web server and enable device control over the Internet, is the second key component. If a server is within range of a Wi-Fi network, it can manage numerous hardware interface modules. It supports a variety of home automation devices, including security and power management components [9].

This paper presents a low-cost flexible and reliable home automation system with additional security using Arduino microcontroller, with IP connectivity through local Wi-Fi for accessing and controlling devices by authorized user remotely using Smart phone application. The proposed system is server independent and uses Internet of things to control human desired appliances starting from industrial machine to consumer goods. The user can also use different devices for controlling by the help of web-browser, smart phone, or IR remote module. To demonstrate the effectiveness and feasibility of this system, in this paper we present a home automation system using Arduino UNO microcontroller and ESP8266-01 as a connectivity module. It helps the user to control various appliances such as light, fan, TV and can take decision based on the feedback of sensors remotely. To control lights, fans and other home appliances which are connected to the relay system, the system offers switching functionalities. It is also used for environmental monitoring by sensing and analyzing data about temperature and humidity. Another notifying feature in this system designed is the intrusion detection which is offered by this system using motion sensor. All these activities are controlled by using Android mobile app-Blynk [10].

The overall architecture of a wireless, low-cost home automation system is shown in this project. It focuses primarily on the creation of a home automation system powered by the Internet of Things (IOT) that can be configured to automatically run based on environmental factors or be used to remotely control a variety of components. The goal of this project is to create smart control firmware that can be successfully automated while requiring the least amount of human input and still maintain the integrity of all the electrical gadgets in the house. Node MCU, a well-known open source IOT platform, was employed in this project to carry out the automation process. To transfer the user's control of the devices through Node MCU to the actual appliance, various system components will employ a variety of transmission modes [11].

This project enables the user to use their smartphone to manage all their electronic devices. Time is a highly precious resource. Everyone strives to save as much time as they can. To save us time, new technologies are being introduced. Introduce Bluetooth-enabled home automation systems to save users time. You can operate your household appliances with this technology from a mobile device. Within Bluetooth's range, you can turn your home appliances on or off [12].

The innovative home automation system that is suggested in this research can increase efficiency and accuracy. It includes electromagnetic relays, an Arduino UNO R3 interfaced with Node MCU (esp8266), a Wi-Fi module used to transfer data over the internet, as well as PIR, DHT11, MQ2, and Flame sensors. This system was built to function whenever there is motion or a flame or gas inside the defined sensor range. It may also be controlled via a mobile application. The Blynk app has been set up in accordance with the system to function smoothly on both iOS and Android devices. The created microcontroller has been set up with the Blynk server to enable remote operation of home appliances, doing away with the requirement for a separate PC server. The system has been successfully constructed, and the functioning prototype has been tested with a variety of test cases. The final prototype is additionally set with Google Assistant so that the relays can be triggered with voice commands as well [13].

The goal of this study was to create a Household Automation System that could operate different home appliances connected to a centralised Wi-Fi server and be accessed via software from anywhere on the Internet. This Internet of Things (IoT)-based system, which can manage and monitor numerous home appliances and sensors, was created using NodeMCU over a Wi-Fi network. The Arduino IDE is used to programme, and the Flask Framework is assumed to connect to a server. With a web-based remote-control application, this solution will not only replace the outdated wall switches but also help save money and electricity [14].

The project aims at enhancing the design and fabrication of an existing SH prototype to utilizing the IoT technology. The proposed system will integrate both technologies; Wi-Fi for local control and the IoT for enabling remote control and monitoring via an IoT platform and check ubiquitously if something is happening. This allows the system to be independent of both user location and mobile provider. NodeMCU acts as a microcontroller and WIFI as a communication protocol. The status sent by the Wi-Fi connected microcontroller managed system can be received by the user on smartphone or computer from any distance irrespective of whether the electronic devices are connected to the internet. The software used to programme the NodeMCU is the Arduino software (IDE). This software helps to write and upload the programme into the chip in the microcontroller. The system then can merged with the switches and sensor of home appliances to prove efficient control. Several sensors will be attached to under controlled household appliances and placed throughout the home to track activities and events, and then send the sensed data wirelessly to a gateway. The system will be integrated with alert devices to detect any threats for safety and security purposes. The proposed system will be an enabler for easier, safer, and more comfortable life especially for elderly and disabled people [15].

TABLE 1 COMPARISON OF PREVIOUS WORK

Title & Writer	Method	Objective Function	Main Result/Contribution	Hardware & software
Home Automation using IoT S. Nirmal Vel, S. Lokesh, S. Pranav, V. Manikandan, K. Elliarasi (2022)	Using WiFi and Cloud Storage to control devices.	- Easy to access. - User friendly. - Simplicity to user home. - Affordable.	To control home appliances via Internet connection.	- ESP 8266 - Relay
Smart Home Security Solutions Based on Internet of Things (IoT) using WiFi Interface Bhavna, Dr. Neetu Sharma (2018)	Using Artificial Intelligent (AI) and Internet connection to control devices.	- Controlling home appliances via applications. - Secure connection channel between application and raspberry pi. - Extensible platform for future use.	Can easily manage to detect something or someone when it trips the sensor.	- Arduino IDE - Arduino UNO - ESP 12 WiFi module - Relay

An IoT Smart Home Security and Home Automation System K. Dhanusree, S. Karunya. R. Sneha (2020)	Using Internet connection to control devices.	- Smarter. - Safer. - Automated.	To control home appliances via Internet connection.	- WiFi connectors
Internet Based and Energy Saving Smart Home Automation System Ramya M S, Priyanka M S (2021)	Using Internet to control the house appliances via Google Assistant's voice recognition.	- Improve security. - Improve intelligence of houses.	To make an energy saving smart home.	- NodeMCU (ESP8266) - Relay - Google Assistant

Voice Recognition Wireless Home Automation System Based on IoT Kavya K S Math, Dr. Basavaraj Mathpathi (2018)	Using voice recognition controller to make the home appliances works.	- To ease people for controlling the appliances at home. - Less effort and save time to do works at home.	To help the disabled and elderly people in making house chores.	- Microphone - Sound card adapter - Raspberry Pi - Monitor
Simulation of IoT Based Home Automation using Arduino Arun Francis G, Sundar V,Gowtham E (2021)	Using Internet to make the appliances works via WiFi.	- Easy to access. - User friendly. - Simplicity to user home.	To control home appliances through Internet connection.	- WiFi module - Relay - Arduino UNO

Internet of Things-Based Home Automation, Energy Management and Smart Security System U. I. Bature, N. M. Tahir, A. K. Abubakar, A. Makama (2021)	Using a website called Zigbee to control the electronics devices at home via WiFi.	- Controlling home appliances via application and Internet. - Secure connection channel between application and website.	Can remotely and wireless control the home electronic devices.	- WiFi module - ATmega16U2 - Zigbee website
An Approach to Smart Home Security System using Arduino Abel A. Zandamela (2017)	Using sensors and microcontroller to control home environment.	- Low-cost system. - Efficient.	To control the temperature and humidity with sensors plus the microcontroller.	- ATmega2560 microcontroller - Sensors - Keypad - LCD

Understand IoT using Smart Home Automation System Franklin Almeida, Samarth Shete, Neha Bargale, Ajinkya S. Shewale (2020)	Using Internet connection to control devices.	- Smarter. - Safer. - Automated.	To control home appliances via Internet connection.	- Raspberry Pi - Sensors - WiFi connectors
IoT Based Home Automation System Mandira Das, Pritam Das,Sandip Das, Esha Biswas (2020)	Using Internet to make the appliances works via WiFi.	- Great communication via WiFi. - Precise in automation and control.	To control home appliances through Internet connection.	- Zigbee website - NodeMCU ESP8266 - WiFi module - Relay

2.5 SUMMARY

A better grasp of the project is to be obtained because of all the literature reviews of the prior project that have been reviewed above. Following that, by comprehending the whole project that will be created soon, a comparison on how to select a better component may be made. Ideas on how to construct a better version of the project may be developed because of the various examinations of the previous project that is related to the current one.

We can see that several efforts have been made to construct an IoT-based project for a Home Automation system by finishing some work. The system has employed a variety of strategies.

CHAPTER 3

METHODOLOGY

3.1 INTRODUCTION

This chapter describes the methodology used to conduct research to ensure that the objectives are achieved. Accuracy and effectiveness are considered two important requirements for users and algorithms through devices. The process consists of flow process software and hardware. The hardware development section is accompanied by an overview of the system applications.

3.2 METHODOLOGY

The arrangement of work must be done carefully and with suitable accuracy for a project to be effective. This project can be implemented in a variety of methods or techniques. All the techniques have been meticulously drafted to ensure that no errors or misleading results are obtained.

3.3 FLOWCHART

A flow chart is a diagram that represents the process or procedure of a project. It demonstrates how to do the task in a step-by-step manner. The project's flow charts, software and hardware used, how the processes work, and how to develop and implement the project will all be covered in detail.

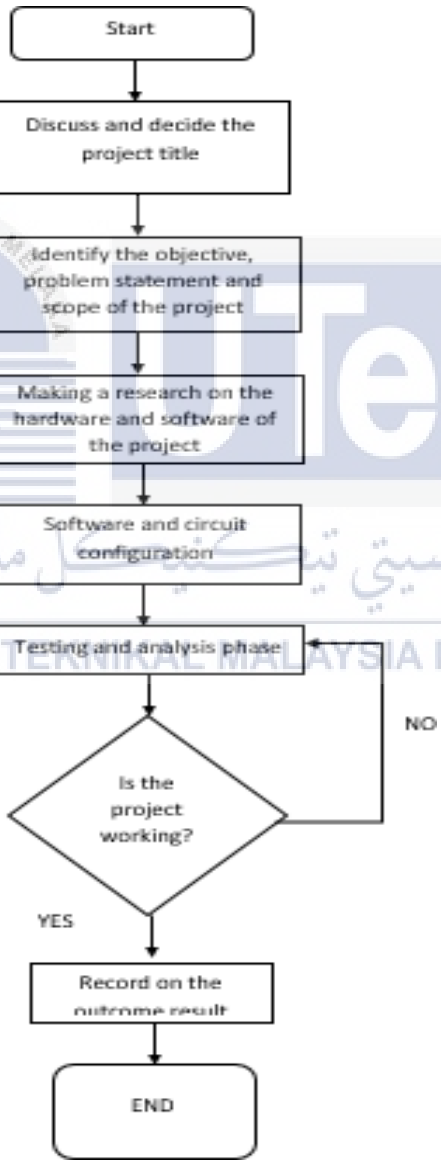

Figure 3.1 : Process flowchart

The procedure is the starting point for this method in the flow chart. The first is to discuss anddecide on a project title to ensure that the project's title is confirmed. The next step is to determinethe project's goal, problem description, and scope. This is the most crucial aspect of the project that must be clear and understood. In addition, conducting research on the project's hardware andsoftware.

To gather further knowledge, this section will require to study more journals or articles. The testing and analysis phase is to ensure that you practice this section to see whether you can solve an issue by trial and error process. Furthermore, if the project is successful, go on to the final product. Repeat the testing and analysis process if the project was not working. Finally, assuming everything went well, make a note of the results and output.

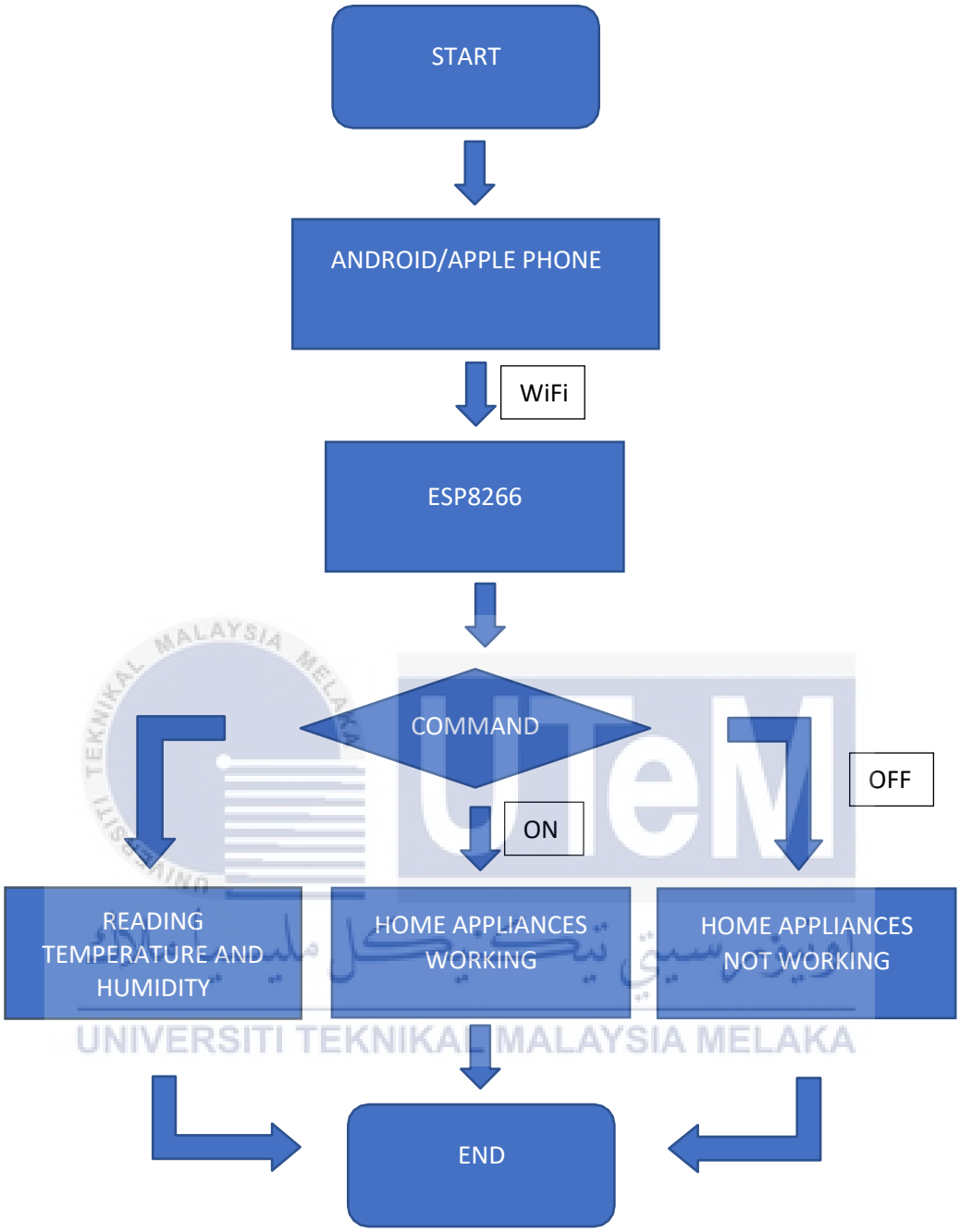

Figure 3.2 : Algorithm flowchart

Figure 3.2 shows the Algorithm flowchart for this project. There are two types of communications used in this project. Both connections are wireless connection (WiFi) and wired connection (controller in the appliances). When the android phone has connected to the WiFi module, the appliances wirelessly will active.

3.4 PROJECT IMPLEMENTATION

First and foremost, the block diagram is the main key to ensure the project is fully setup. The main element in this project is the Home Automation System. The output of the Home Automation System will be control by the Arduino. The program or coding will be set up in the Arduino for the Home Automation System to work perfectly. After that, the output will come out with each parameter of the Home Automation System.

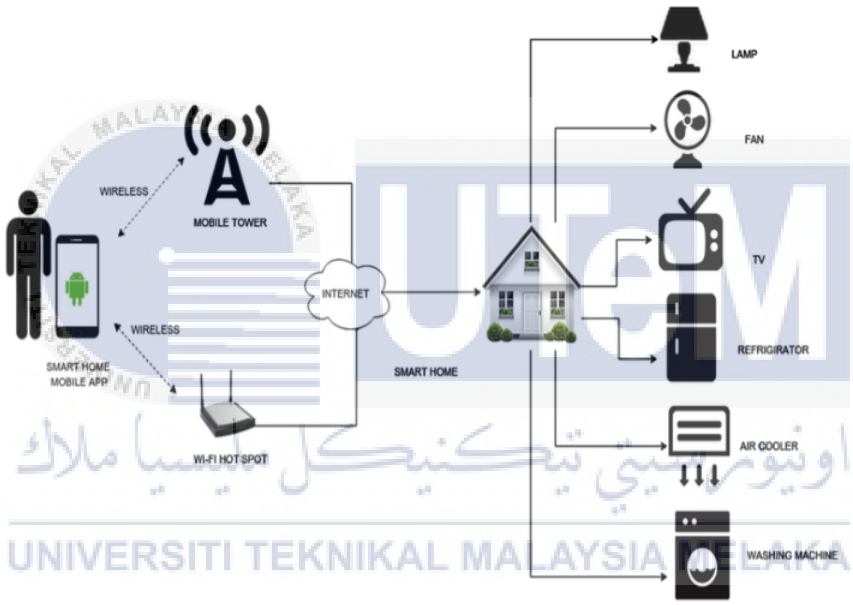

Figure 3.3 : Project Illustration Diagram

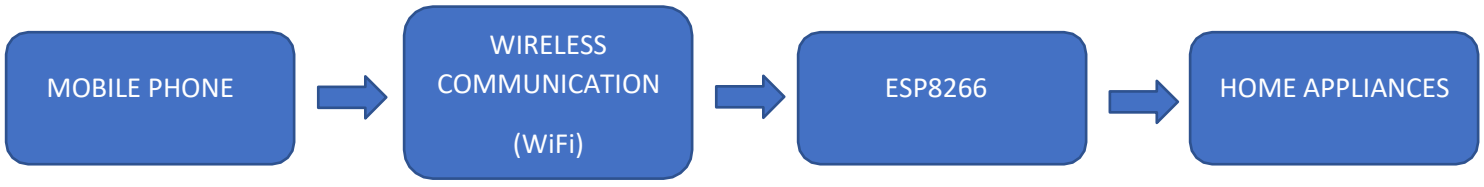

Figure 3.4 : Project Block Diagram

3.5 SOFTWARE DEVELOPMENT

To ensure that the project runs well, the software that will be used must meet the project's requirements. There will be a lot of software used in this project, which is listed below.

3.5.1 ARDUINO IDE

The Arduino IDE is a C and C++-based cross-platform development environment. It's used to program Arduino-compatible boards and other vendor development boards that support third-party cores, as well as to upload them. On an Arduino board, the programming will take place. Transfer the coding to the Arduino board or module once it has been successfully verified. To control the program's operation, the Arduino board will act as a microcontroller.

Figure 3.5 : Arduino IDE Software

3.6 HARDWARE DEVELOPMENT

3.6.1 ESP8266 WiFi MODULE

The ESP8266 WiFi Module is a self-contained SOC that can provide access to the WiFi network to any microcontroller. It also can either be an application or shutdown all WiFi networking activities for separating the application processor. The ESP8266 WiFi Module also is a preprogrammed device with an AT command set of software which enable it to connect to Arduino device and can be function as a WiFi Shield. This device is also cheap. It also supports the APSD for VoIP applications and Bluetooth co-existence interfaces.

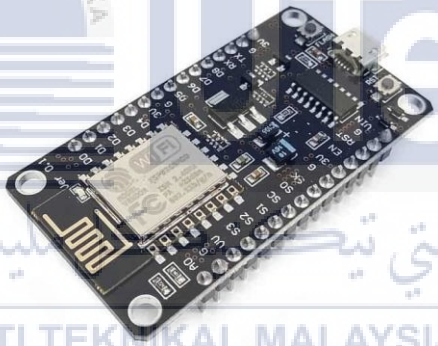

Figure 3.6 : ESP 8266 WiFi Module

3.6.2 DHT 11 SENSOR (TEMPERATURE SENSOR)

A straightforward, incredibly affordable digital temperature and humidity sensor is the DHT-11. It measures the humidity in the air using a thermistor and a capacitive humidity sensor, and it outputs a digital signal on the data pin (no analogue input pins needed).

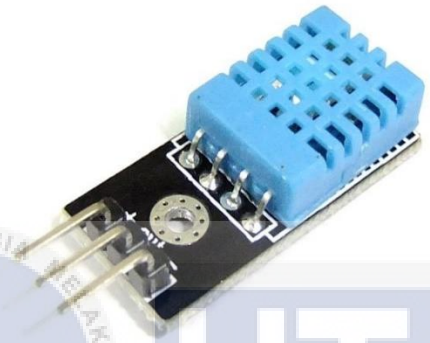

Figure 3.7 : DHT 11 Sensor

3.6.3 16x12 LCD

With a 16x2 LCD, there are 2 lines that can each display 16 characters. Each character on this LCD is presented using a 5x7 pixel matrix. The 224 different characters and symbols that can be displayed on the 16x2 intelligent alphanumeric dot matrix display. The Command and Data registers on this LCD are its two registers.

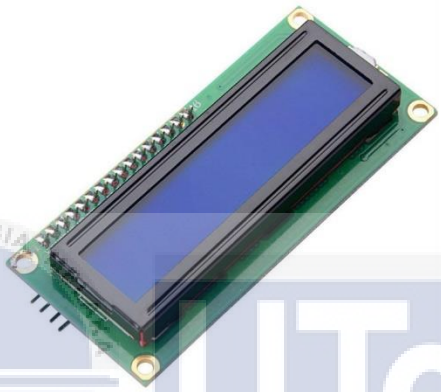

Figure 3.8 : 16x12 LCD

3.6.4 LED

A semiconductor device known as a light-emitting diode produces light when electricity passes through it. Recombining electrons and electron holes in the semiconductor results in the release of energy in the form of photons. The amount of energy needed for electrons to pass through the semiconductor's band gap determines the hue of the light.

Figure 3.9 : LED

3.7 SUMMARY

The process for developing a brand-new, efficient, and integrated system is presented in this chapter. The proposed method sets itself apart by performing a straightforward, less exacting, and efficient estimation so that the findings are no longer significantly inaccurate. The method's objectives include efficiency, usability, and manipulation of the development's practicality rather than attaining the highest level of accuracy.

CHAPTER 4

RESULTS

4.1 INTRODUCTION

This chapter describes the outcomes based on previous research on the same subject to make an educated judgement as to what kind of results should be expected in the future. This is also a formal document that outlines specific project activities, events, occurrences, or subjects to explain project progress up to a specific point in time. At project status meetings, this document is presented and conveyed to clarify what goals, deliverables, and outcomes have been produced, as well as what activities are currently in process. The document will be used to construct the final project report.

4.2 SCHEMATIC DIAGRAM

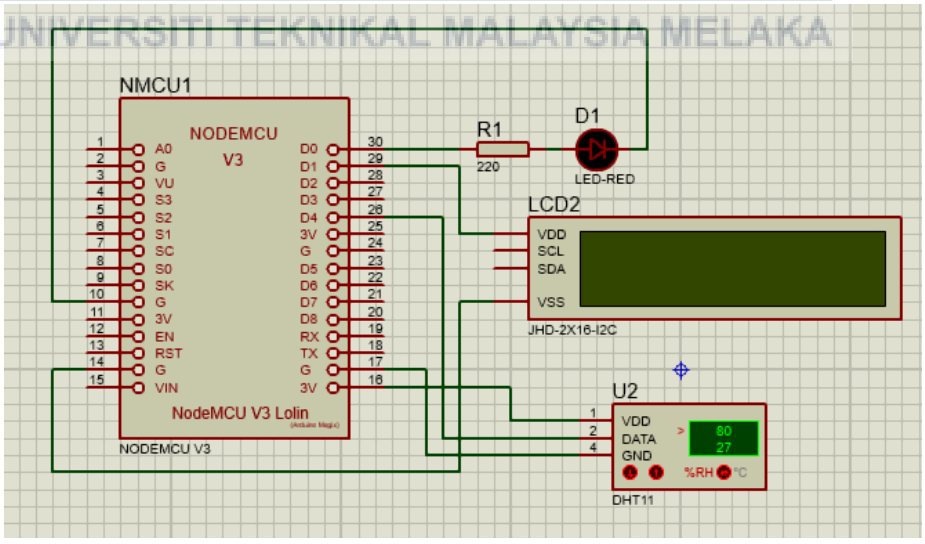

Figure 4.1 : Home Automation System schematic diagram

4.3 RESULTS AND ANALYSIS

Figure 4.2 : Constructed model

Based on Figure 4.2, this is the constructed model of a house for Home Automation system.

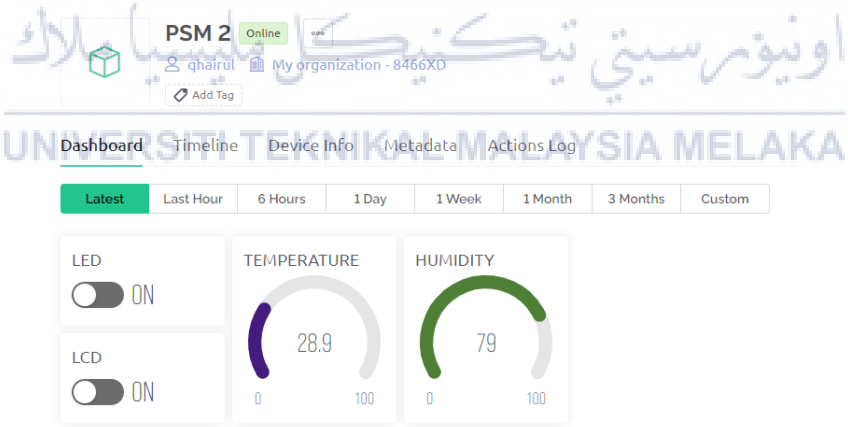

Figure 4.3 : Blynk Application view

Figure 4.3 shows the Blynk Application view in website from laptop for this project. Its show the switches for LED and LCD to turn ON or OFF, and readings from the temperature sensor, DHT 11 Sensor. Based on the DHT 11 Sensor readings, it gave out two output which are temperature and humidity in a room area.

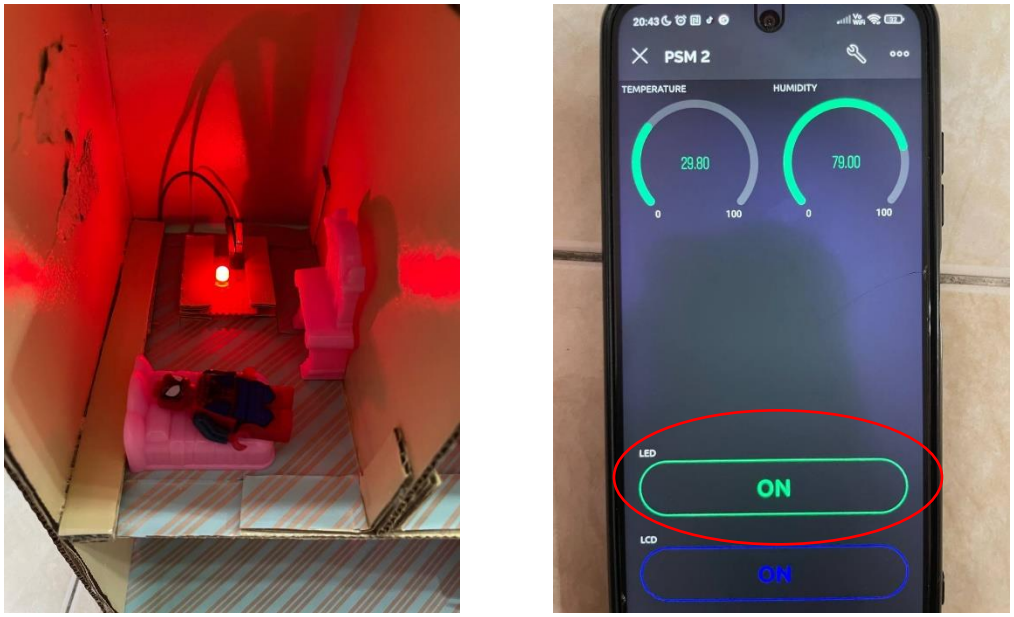

Figure 4.4 : LED Turn ON

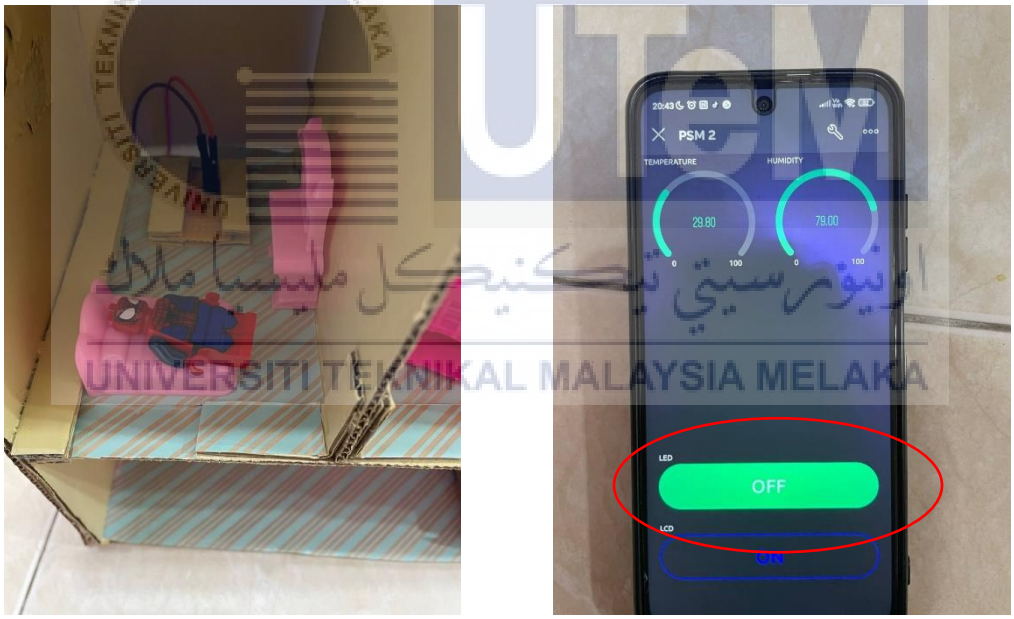

Figure 4.5 : LED Turn OFF

For Figure 4.4 and 4.5, these are the result for this project which is turning the ON or OFF button from a device which refer to a smartphone for light up the LED. The LED is act as a lamp in a bedroom.

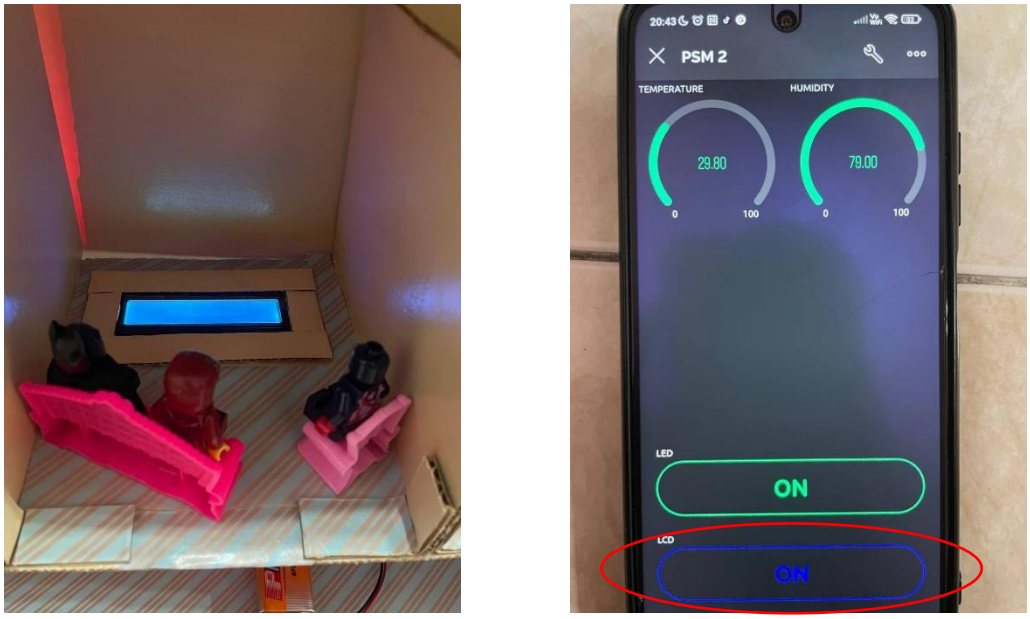

Figure 4.6 : LCD Turn OFF

Figure 4.7 : LCD Turn OFF

Based on Figure 4.6 and 4.7, these are the result for this project which is turning the ON or OFF button from a device which refer to a smartphone for LCD to active. The LCD is act as a television in a living room

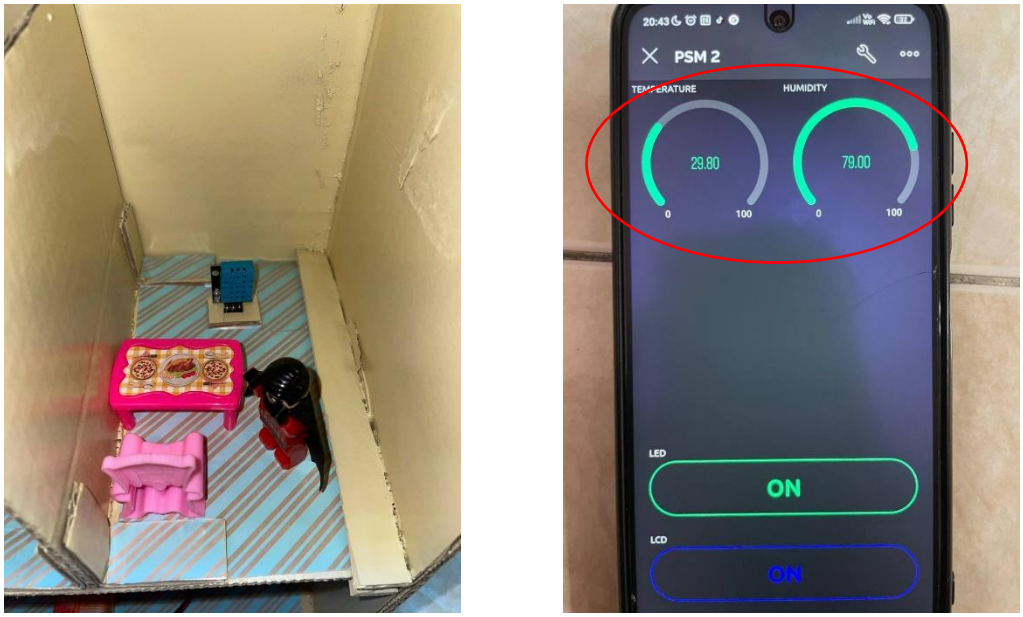

Figure 4.8 : DHT 11 Sensor readings (Temperature and Humidity)

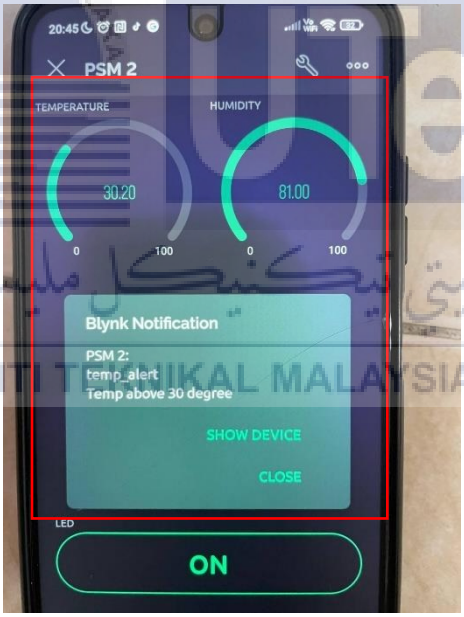

Figure 4.9 : A message if temperature above 30°C

Based on Figure 4.8, that is the result for this project which is reading the values for temperature and humidity in a kitchen area. If the DHT 11 Sensor detected that the reading is above 30°C, it will send out a message to user through Blynk Application based on Figure 4.9.

CHAPTER 5

CONCLUSION

5.1 INTRODUCTION

In this chapter, students need to conclude the chapters that are connected to this project. A conclusion is the final piece of writing in a research paper, essay, or article that summarizes the entire work.

5.2 CONCLUSION CHAPTER 2

In chapter 2, we can conclude that the project is to be obtained because of all the literature reviews of the prior project that have been reviewed. Ideas on how to construct a better version of the project may be developed because of the various examinations of the previous project that related to the current one.

5.3 CONCLUSION CHAPTER 3

This chapter describes the methodology used to conduct research to ensure that the objectives are achieved. The process consists of flow process software and hardware. Overall, this chapter provides a complete overview of the project.

5.4 CONCLUSION CHAPTER 4

This chapter describes the outcomes based on previous research on the same subject to make an educated judgement as to what kind of results should be expected in the future. This is also a formal document that outlines specific project activities, events, occurrences, or subjects to explain project progress up to a specific point in time.

5.5 FUTURE WORK

In future, this project can be a big help and also enhance in different ways for the world such as :

- This technology can be used or installed in other than a residential area. For example, this system can be installed in a building for controlling the fire alarm or air humidity in the area.
- Adding more sensors for this project also can be a great way to indicate the problem or alert on something happening in a certain area.
- Using Bluetooth devices also can help the project control in a bigger area too.
- Using of voice activation system also can reduce the time for the users by tapping the on/off switch button to activate the electronic devices.

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APPENDICES

PSM 2 Gantt Chart

	W1	W2	W3	W4	W5	W6	W7	W8	W9	W10	W11	W12	W13	W14
Doing research														
Meeting with supervisor														
Making Correction in Logbook														
Making Correction for Chapter 1 : Background, Problem Statement, Objectives and Scope of Projects														
Making Correction for Chapter 2 : Literature Review														
Making Correction for Chapter 3 : Methodology														
Making Correction for Chapter 4 : Results														
Making Correction for Chapter 5 : Conclusion														
Research for project coding														
Research for project circuit														
Buying project component														
Making project poster														
Submit Draft Report														
Submit Report														
Submit Logbook														