POLITEKNIK SULTAN SALAHUDDIN ABDUL AZIZ SHAH

SMART SWITCH USING HAND GESTURE DETECTOR FOR DISABLED PEOPLE

NAME	REGISTRATION NO
ASILAH MAISARAH BINTI AHMAD NAZRI	08DEP20F2014

JABATAN KEJURUTERAAN ELEKTRIK

SESI 2 2022/2023

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This report submitted to the Electrical Engineering Department in fulfillment of the requirement for a Diploma in Electrical Engineering

JABATAN KEJURUTERAAN ELEKTRIK

SESI 2 2022/2023

CONFIRMATION OF THE PROJECT

The project report titled "Smart Switch Using Hand Gesture Detector for Disabled People" has been submitted, reviewed and verified as a fulfills the conditions and requirements of the Project Writing as stipulated

Checked by :

Supervisor's name : Pn Nur Hadiana Bt Nasruddin

Supervisor's signature:

Date : 8.06.2023

Verified by:

Project Coordinator name : WAN MOHD ZAMRI BIN WAN AB RAHMAN

Signature of Coordinator :

Date : 10.06.2023

"I acknowledge this work is my own work except the excerpts I have already explained to our source"

1. Signature : 

Name : ASILAH MAISARAH BINTI AHMAD NAZRI

Registration Number : 08DEP20F2014

Date : 5.06.2023

DECLARATION OF ORIGINALITY AND OWNERSHIP

TITLE : SMART SWITCH USING HAND GESTURE DETECTOR FOR DISABLED PEOPLE

SESSION: SESI 2 2022/2023

1. I, **1. Asilah Maisarah Binti Ahmad Nazri**

   is a final year student of **Diploma in Electrical Engineering, Department of Electrical, Politeknik Sultan Salahuddin Abdul Aziz Shah**, which is located at **Persiaran Usahawan,40140 Shah Alam Selangor Darul Ehsan**. (Hereinafter referred to as 'the Polytechnic').

2. I acknowledge that 'The Project above' and the intellectual property therein is the result of our original creation /creations without taking or impersonating any intellectual property from the other parties.

3. I agree to release the 'Project' intellectual property to 'The Polytechnics' to meet the requirements for awarding the **Diploma in Electrical Engineering** to me.

Made and in truth that is recognized by;

a) **ASILAH MAISARAH BINTI AHMAD NAZRI**) .....
(Identification card No: - 020830010522) .....
) **ASILAH MAISARAH BINTI AHMAD NAZRI**

In front of me, Pn Nur Hadiana Bt Nasruddin (Click here to enter text.)) .....
) Pn Nur Hadiana Bt Nasruddin
As a project supervisor, on the date:

ACKNOWLEDGEMENTS

I worked hard on this project. It would not, however, have been feasible without the kind support and assistance of many individuals and organizations. I would like to express my heartfelt gratitude to each and every one of them. I am grateful to Madam Pn Nur Hadiana Bt Nasruddin for their advice and regular supervision, as well as for giving vital information about the Project and for their assistance in finishing it.

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ABSTRACT

Today's world many people are suffering from Physical disabilities and most of the physically disabled patient's dependent on care takers. In extreme cases, the patient may be speech impaired which makes it difficult for him to communicate with others and to express his needs. Providing solution to these inabilities is the prime motive of this proposed work. The physically disabled persons require special assistance from care takers or other persons to lead their normal life and even at home it is not convenient for them to control the home appliances according to their wish. In the modern life, they usually forgot to switch off the lamp after using it can cause electrical waste. This is the one of the major problem facing cities of the world. Because our busy life is a common thing that will happen to waste our electricity. The basic problems faced by disabled people in single day life in their own house to turn ON or OFF the equipment's like lights, fans and difficulty in analyzing switches are observed many times. And the side issue being faced are wasteful use of electricity. The aim in our project is to design smart switch using hand gesture detector for disabled people.

ABSTRAK

Dunia hari ini ramai orang mengalami kecacatan fizikal dan kebanyakan pesakit kurang upaya fizikal bergantung kepada penjaga. Dalam kes yang melampau, pesakit mungkin mengalami masalah pertuturan yang menyukarkan dia untuk berkomunikasi dengan orang lain dan menyatakan keperluannya. Menyediakan penyelesaian kepada ketidakupayaan ini adalah motif utama kerja yang dicadangkan ini. Orang kurang upaya fizikal memerlukan bantuan khas daripada penjaga atau orang lain untuk menjalani kehidupan normal mereka dan walaupun di rumah adalah tidak mudah untuk mereka mengawal peralatan rumah mengikut kehendak mereka. Dalam kehidupan moden, mereka biasanya terlupa untuk menutup lampu selepas menggunakannya boleh menyebabkan pembaziran elektrik. Ini adalah salah satu masalah utama yang dihadapi oleh bandar-bandar di dunia. Kerana kesibukan kita adalah perkara biasa yang akan berlaku membazirkan elektrik kita. Masalah asas yang dihadapi oleh orang kurang upaya dalam kehidupan seharian di rumah mereka sendiri untuk menghidupkan atau mematikan peralatan seperti lampu, kipas dan kesukaran menganalisis suis diperhatikan berkali-kali. Dan isu sampingan yang dihadapi ialah penggunaan elektrik yang membazir. Matlamat dalam projek kami adalah untuk mereka bentuk suis pintar menggunakan pengesan isyarat tangan untuk orang kurang upaya.

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CHAPTER 1

INTRODUCTION

1.1 Introduction

One of the most recent used in communication system in the present world of technology is Global System for Mobile Communications (GSM). It has become very popular and one of the wireless communication system that is reliable to use. In addition, it is also accessible to be used by people and very user friendly. One of the factors that make this system reliable to use is the cost effective which makes it is affordable to be owned by consumers.

People with disabilities, also known as people with disabilities, are an integral part of our society. They are individuals who have various physical, sensory, intellectual, or mental conditions that may affect their daily activities. Although they may face certain challenges and obstacles, they also have the same desires, potential, and dreams as everyone else. It is important for us to understand that disability is a natural part of human diversity. None of us is completely free from the risk or possibility of developing a disability at some point in our lives. Therefore, it is our duty as a society to create an environment that is inclusive, supportive, and provides fair opportunities for all individuals, regardless of their physical or mental abilities. Through an inclusive approach, we can ensure that people with disabilities have equal access to education, employment, health services, and participation in social life. They have the same right to be valued, heard, and respected as productive and meaningful members of our community. An inclusive approach also involves removing barriers that may exist in the physical environment, communication, and culture. By applying universal design and paying attention to individual needs, we can create greater accessibility for everyone. This not only benefits people with disabilities, but also benefits the entire community, because when no one is left behind, we all grow together.

1.2 Background Research

In the world, the statistics state that there are around ten billion people who are either blind, deaf or dumb. One of the challenging tasks is to have a mode of communication between a disabled person and a normal person. So, it becomes an essential task to establish a mode of communication with them. For dumb, deaf and blind people sign language is the best possible way to communicate. It uses patterns, gestures instead of sound to elaborate on their information. It involves the usage of different body parts for sign language such as palm, bending of fingers and hand, arms or body, facial expressions and lip-patterns for conveying the messages. technology has the power to transform lives and create inclusive solutions for everyone. One such innovation is the smart switch with hand gesture recognition, designed specifically to empower and assist individuals with disabilities. This groundbreaking device utilizes cutting-edge technology to enable individuals with limited mobility or physical impairments to control their surroundings effortlessly.

The smart switch with hand gesture recognition revolutionizes the way people interact with their environment by eliminating the need for traditional physical switches or buttons. It harnesses the power of hand gestures to activate and control various devices and appliances, providing a new level of independence and convenience for individuals with disabilities.

1.3 Problem Statement

- Can save electricity from being wasted.
- Various application can be controlled by smartphone.
- Disabled people can live independently.
- Making it easier for people with disabilities to control the switch through a smartphone.

1.4 Research Objectives

There are several objectives that have been outlined in making this system. First, the system need to be developed with several circuit and IoT configuration. Other than that, this project 2 objective is to test the functionality of the system after it is developed. Lastly, the objective for this system is to verify the performance of the developed system.

More specifically the principle objective of this research are:

- To design a smart switch for home application.
- To design a smart switch through wireless control.
- To develop application for controlling.

1.5 Scope of Research

- This project is focusing on solving problems for disabled people.
- To make them more independent and not rely on others.
- The main controller is using Node MCU.

1.6 Project Significance

Smart Switch using hand gesture detector for disabled people project is the basic automatic solution for daily tasks such as turn on/off light, fan other similar functions for disable people. The project is the combination of electronics and information technology and their application for controlling different tasks in the building. Our project will enable the disabled user to use a lamp/ fan based on Internet of Things (IoT). The lamp/ fan is automated through the internet and the home appliances are controlled. The user commands over the internet will be obtained by the Wi-Fi modems.

The creation of the project has some limitations. It can still be upgraded to become an efficient and better product based on user demand. The limitation is, this project works is complete its own remotely and switching on and off any electrical appliances. It does not implement control of multiple appliances or automatic detection of faults in the controlled appliances.

The second limitations are data transmission speed. Depending on the number of systems that are connected, when transferring a large amount of data, the network can become congested and decrease the transmission speed, causing the functions to slow down. The last limitations are ring connection. When the information is connected in the form of a ring, there may be some delay that will also depend on the number of points that are connected to the network, which gives little reliability to the 3 system. Project will be completed within 2 semesters, cost of developing project is RM291.60, hardware resources are available for two months.

1.7 Chapter Summary

In this chapter, I have provided an overview of the upcoming project and detailed the background of the original concept for the beginning of this project, as well as the challenges that are occurring, such as the repairman's difficulty identifying the sensor motion fault. In addition, I presented the project's objectives. The main goal of this project is to assist the repairman in identifying the sensor motion defect at the same time to save time, money, and manpower, and I also remember the project's significance based on the study's objectives. I hope that this project will benefit a large number of people. I have described about the background research of the original idea for the beginning of this project. Then, I have identified the problems that are happening nowadays. In addition, I have demonstrated the objectives in this project and the objective study.

CHAPTER 2

2.0 LITERATURE REVIEW

2.1 Introduction

A literature review is a piece of academic writing demonstrating knowledge and understanding of the academic literature on a specific topic placed in context. A literature review also includes a critical evaluation of the material; this is why it is called a literature review rather than a literature report. It is a process of reviewing the literature, as well as a form of writing. Smart Switch using hand gesture detector for disabled people a project that utility and convenience for disabled people at home. As we know, hand gesture has been made by many people. So, we took the idea from home automation and applied some of it in my project. To illustrate the difference between reporting and reviewing, think about television or film review articles. These articles include content such as a brief synopsis or the key points of the film or programmer plus the critic's own evaluation. Similarly, the two main objectives of a literature review are firstly the content covering existing research, theories and evidence, and secondly your own critical evaluation and discussion of this content

2.2 DEVELOPING OF SMART SWITCH WITH HAND GESTURE FOR DISABLED PEOPLE USING ARDUINO AND OLED

The smart switch includes a sensor that can detect hand movements and translate them into commands for controlling lights, fans, and various other home appliances. When you move your hand from down to up direction in front of the sensor, as shown in Figure, light will switch on and at the same time an up arrow will be displayed on the OLED. If you move your hand from up to down position, the light will switch off and 5 a down arrow will be displayed on the OLED Similarly, when you move your hand from left to right in front of the sensor, the fan will switch on and a left arrow symbol will be displayed on the OLED. If you move your hand from right to left, the fan will switch off and a right arrow will be displayed on the OLED.

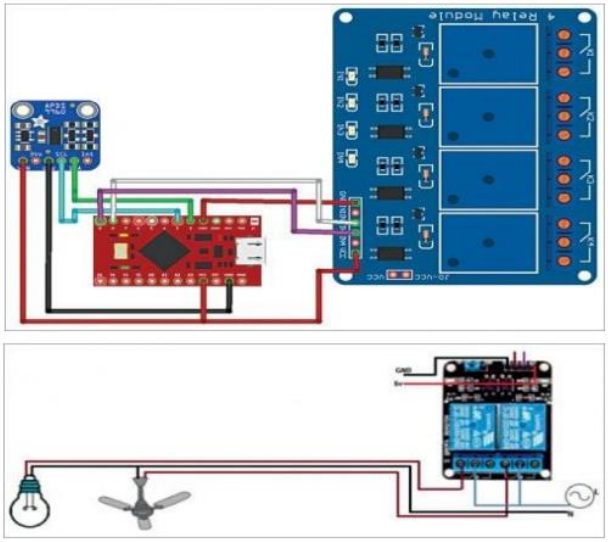


Figure 2.2.1: Developing of Smart Switch with Hand Gesture for Disabled People Using Arduino and Oled.

2.3 Smart Home Design for Disabled People based on Neural Networks

Smart Home system design has the characteristic of automatic control of different areas of the house. Pre- defined timers may be set, according to the users need and throughout adaptive learning, to switch ON/OFF lights, AC, coffee machine, music, TV and all other devices. Also, user defined timers are possible to provide the users with a feeling of control over their house.

2.4 Gesture Controlled Contactless Switch for Smart Home

To avoid the risk of contracting Covid19, it is important not to touch surfaces including switches, doorknobs, and keys that have been frequently used by other people. This project is for a contactless switch that works with hand gestures

2.5 Smart Lighting Prototypes for Deaf Disabled People

People with reduced hearing cannot hear a fire alarm or bell sound when someone comes to their house. This study aims to design a smart light system to provide information to deaf people through lamps. The study methods used are research, analysis and design, as well as implementation of designed tools. The result is to provide information to people who have hearing disabilities to the sound they cannot hear.

2.6 Smart Home Applications for disabled Persons

Facing problems like wastage of time and fuel finding free space around the parking ground when we need to park our car which requires a good amount of lighting and anyone can park anywhere that sometime causes damage to the vehicles while moving out or in the parking lot.

2.7 Chapter Summary

The first section of this chapter focuses on the findings on the problem of identifying the fault of the sensor, with some summary from the research papers regarding the process of development of the project. The second portion reveals information regarding the technical element, including the choice of controller type. This chapter also summarizes the analysis and explanation of the technologies or approaches employed by previous researchers to answer the problem statement. The main controller in this project will be a Node MCU ESP 32.

CHAPTER 3

3.0 RESEARCH METHODOLOGY

3.1 Introduction

The practical "how" of any given piece of research is simply referred to as research methodology. It is primarily about how a researcher designs a study in a systematic manner to produce accurate and trustworthy results that address the research aims and objectives. A very complete approach is being undertaken to actualize this project as a ready- to-use product with safety characteristics. A step-by-step method is followed to ensure that the project is completed on schedule. This includes gathering data from various sensor for the sensor source, and testing and verifying the circuit design.

3.2 Project Design and Overview.

Gesture recognition helps computers to understand human body language. This helps to build a more potent link between humans and machines, rather than just the basic text user interfaces or graphical user interfaces (GUIs). In this project, we are using gestures (by extracting the key points from the library), setting conditions based on the gestures that the code reads and sending data to Arduino to turn the LEDs on/off Block Diagram of the Project. The ESP 32 controller circuit is designed using Proteus software and then converted to a PCB circuit.

3.3 Block Diagram of the Project

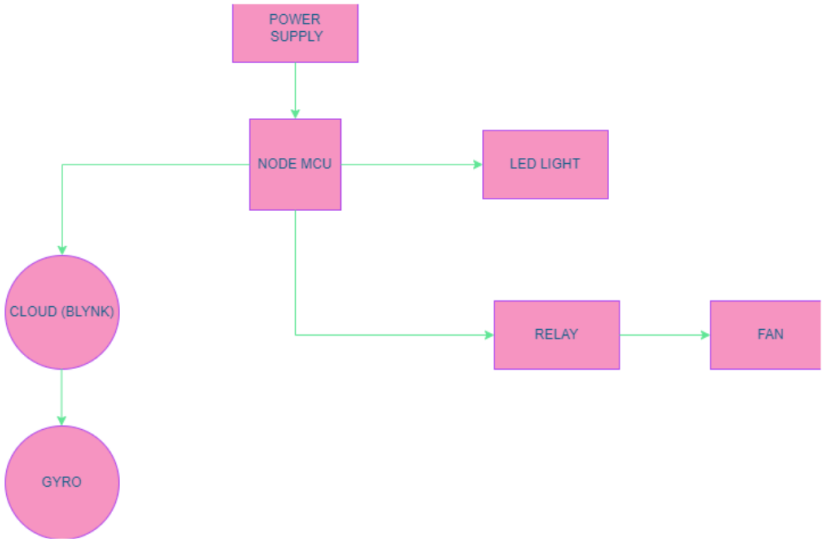


Figure 3.3.1: Block Diagram of Smart Switch with Hand Gesture Detector for Disable People

3.4 Flowchart of the Project 2

A flowchart is a graphical representation of a process, system, or computer algorithm. They are widely used in a variety of fields to document, examine, plan, enhance, and convey frequently complex processes in clear, simple diagrams. Flowcharts, also known as flow charts, use rectangles, ovals, diamonds, and maybe other forms to indicate the type of step, as well as linking arrows to define flow and sequence. They can range from simple hand-drawn charts to detailed computer-drawn diagrams displaying numerous processes and paths. Considering all of the different types of flowcharts, they are one of the most ubiquitous diagrams on the globe, used by both technical and non- technical people in a wide range of professions.

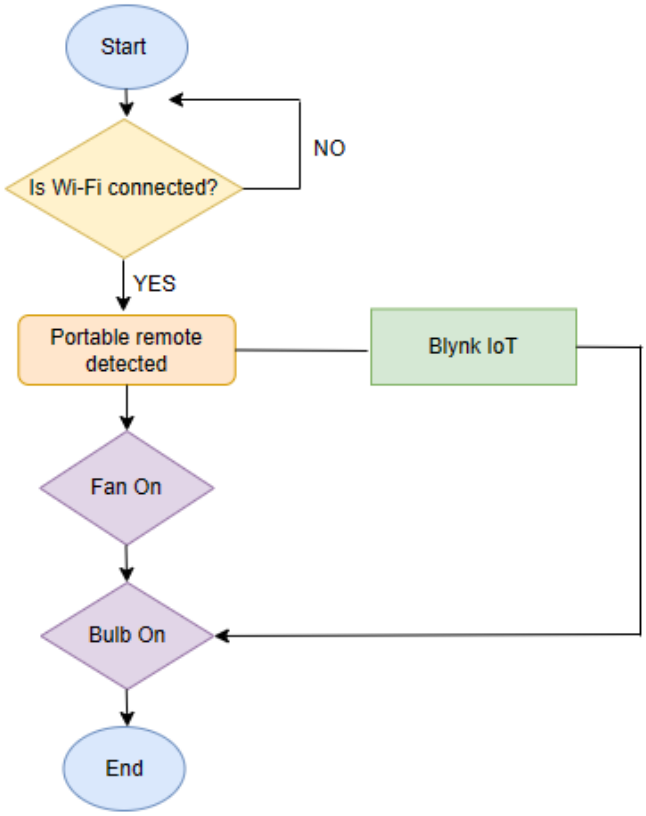


Figure 3.4.1: Flow chart of the system

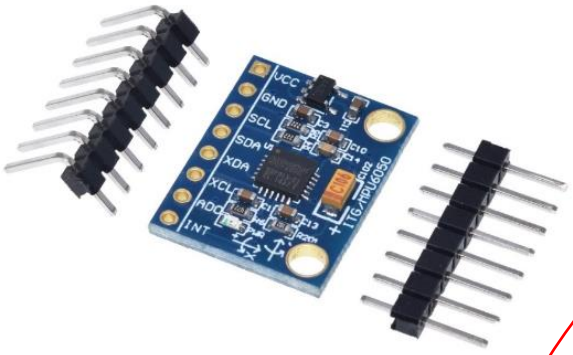
3.5 Project Hardware

Description of Main Component

Node MCU ESP8266

NodeMCU is a low-cost open source IoT platform. It initially included Firmware with runs on the ESP8266 Wi-Fi SoC from Expressive Systems, and hardware which was based on the ESP-12 module. Later, support for the ESP32 32-bit MCUwas added. The prototyping hardware typically used is a circuit board functioning as a dual in line package (DIP) which integrates a USB controller with a smaller surface mounted board containing the MCU and antenna. The choice of the DIP format allows for easy prototyping on breadboards. The design was initially basedon the ESP-12 module of the ESP8266, which is a Wi-Fi SoC integrated with a Ten silica Xtensa LX106 core, widely used in IoT applications.

GYRO SENSOR



Gyro sensors work on the principle of angular momentum. They consist of a spinning rotor that maintains its orientation in space due to the conservation of angular momentum. When the object to which the gyro sensor is attached rotates, the gyro sensor detects the change in angular momentum and measures the rate of rotation. Gyro sensors are often used in conjunction with other sensors, such as accelerometers, to provide more accurate motion sensing capabilities. By combining data from gyro sensors and accelerometers, it is possible to determine the orientation and movement of an object in three-dimensional space, enabling applications like motion tracking, gesture recognition, and virtual reality experiences.

EXHAUST FAN

5V DC fan is a compact and low-power device that provides cooling and airflow in various electronic applications. Its size, airflow capacity, bearing type, and noise levels can vary, allowing users to select a fan that suits their specific cooling needs while considering factors such as power consumption and space constraints.

BULB

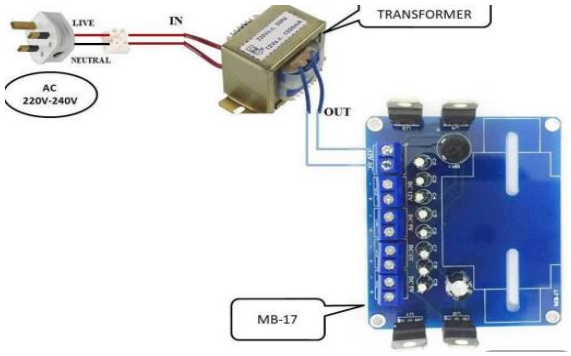
The choice of bulb depends on factors such as energy efficiency, brightness, color temperature, and the specific requirements of the lighting application. It's worth noting that there is ongoing development in lighting technology, and newer options like LED bulbs are becoming increasingly popular due to their energy efficiency and long lifespan.

RELAY MODULE 1 CHANNEL

A relay module is an electronic device that allows you to control higher voltage or current loads using a low voltage or current signal. It is commonly used in various applications to switch on or off devices such as lights, motors, appliances, or other electrical components.

The "1 channel" specification indicates that the relay module has one independent relay circuit. This means it can control a single device or load. If you need to control multiple devices simultaneously, you would require a relay module with multiple channels.

POWER SUPPLY



Power supplies are designed to provide the appropriate voltage and current levels required by the devices they power. They often include protection features like overvoltage protection, overcurrent protection, and short circuit protection to safeguard the connected equipment from damage.

When choosing a power supply, it's important to consider factors such as the required voltage and current ratings, the efficiency of the power supply, the type of connectors needed for the devices, and any specific requirements of the application or system being powered.

3.6 Schematic Circuit

The overall circuit design for this project is shown in Figure 3.6.1. The Node MCU ESP 32 is at the heart of this project. The transmitter and receiver are 2 components that were designed for this project. It has a straightforward connection at the transmitter component, which is built using one LEDs and one exhaust fan. The optical source for this project will be made up of LEDs. The main controller, as mentioned in the previous chapter, is Node MCU ESP 32. The Node MCU processes data from the sensor, and the data is then sent to a Wi-Fi module. It is a Wi-Fi module and one of the major platforms for the Internet of Things. It can send data to the IoT cloud. The Gyro sensor as angular velocity sensors, can detect changes in rotation angle per unit of time. This makes it possible to detect quantities such as the direction of rotation, rotation angle, and vibration.

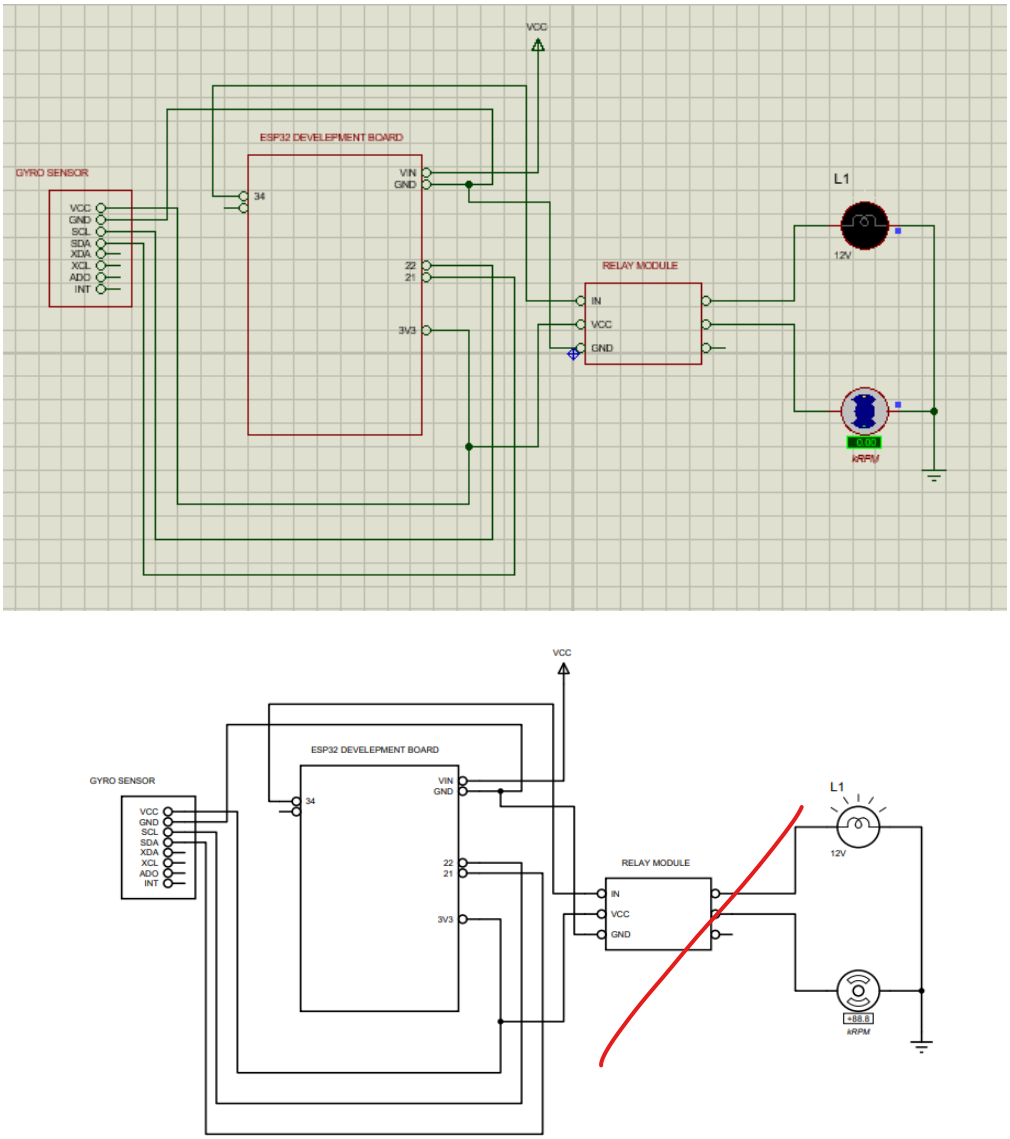


Figure 3.6.1: Circuit Diagram of Smart Switch Hand Gesture Detector for Disabled People

3.7 Prototype Development

A prototype is a look-alike or a copy of a part that illustrates the product features and explores all possibilities before investing in the full creation of the part. A prototype might range from a detailed pen and paper drawing to a fully functional version of the product. As a result, prototype development is just a collection of steps used by the manufacturer to create the prototype.

3.8 Mechanical Design/Product Layout

Diagram 3.8.1 depicts the project's top views, as well as its description. The top perspective of the project reveals that it was designed on a board. The transmitter, receiver, and power supply will all be put on the board. As stated, the transmitter part includes a resistor of 330 ohms, a potentiometer of 1k ohms, LEDs, LCD, and ESP 32, where the potentiometer is used to adjust the brightness of the LEDs, ESP 32 as the project's heart. The multi-output power supply is used in this project. The connection between the Gyro Sensor and the ESP 32 is shown in the top image of the project to allow interface between them.

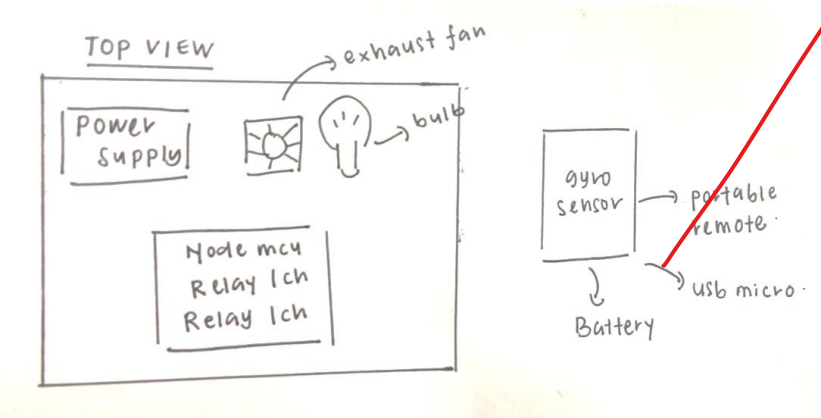


Figure 3.8.1: Top view of Smart Switch using Hand Gesture Detector for Disabled People

3.9 Sustainability Element in The Design Concept

Smart switch with hand gesture for disable people access device that allows people with movement-limiting disabilities to use technology and operate electronic devices. Instead of the person performing complex actions such as turning a knob, adaptive switches will offer easier movement solutions, such as pressing a button. For special needs provide an interface between the technology and the person with the disability. They modify the normal switch to give the person access, and they're designed to suit the person's unique ability. When students with disabilities use such switches, they can work more independently and participate actively at home, at school or in their neighborhood.

Smart switch with hand gesture for disable people devices can sometimes feel almost magical. They allow you to turn on lights without having to touch a switch, answer the front door from your bedroom or a hotel room, and tweak your thermostat with a simple voice command. For many people, those capabilities are a convenience or a luxury. But for those who live with accessibility challenges, smart-home technology can be a powerful enabler, one that allows them to live a more independent and empowered life.

4.0 Chapter Summary

This chapter detailed the project design and overview, including a flowchart of the project and a block diagram of the project. Aside from that, this chapter discusses the component used in this project. The system will have a transmitter and receiver component that will be connected end to end of the sensor. All of the components will integrated from the previous circuit into a single circuit. This project's heart will be the ESP 32.

CHAPTER 4

4.0 RESULTS AND DISCUSSION

4.1 Introduction

Data analysis is the summarization of acquired data. It entails interpreting data acquired using analytical and logical reasoning in order to find patterns, connections, or trends. The outcomes and analysis for this project will be clearly presented and explained in this chapter based on the project's test run progress in 30 minutes. A table detailing the similarities and differences movement to turn lights and fans on and off. I believe that all of the results and discussions contained in this part have met the project objectives outlined previously mentioned.

4.2 Results and Analysis

Figure 4.2.1: Final Product of the Project

	FAN	BULB
Move to right	OFF	ON
Move to left	OFF	OFF
Move forward	ON	OFF
Move backwards	OFF	ON

Figure 4.2.2: Graph for Data Collected on 13 May 2023

4.3 Discussion

A gesture-based fan control system allows people with disabilities to independently operate and adjust the fan without relying on physical switches or remotes. Hand gestures are a natural and intuitive way of interacting with devices. Users can easily control the fan's on/off state by simply making specific gestures, eliminating the need for complex setups or additional accessories. By enabling individuals with disabilities to control the fan using hand gestures, they can maintain autonomy over their environment and make adjustments according to their comfort without relying on external assistance.

Depending on the chosen approach, appropriate hardware components such as cameras, sensors, or depth-sensing devices may be required for gesture recognition. These components should be selected based on their compatibility, accuracy, and reliability. Overall, the development of a fan control system using hand gestures for individuals with disabilities has the potential to enhance accessibility and independence. However, it requires careful attention to hardware selection, gesture recognition algorithms, user training, safety measures, and a user-friendly interface to ensure a reliable and inclusive user experience.

The user view of the Blynk application that I am using in this project is depicted in Figure4, the user can access the data not only by mobile phone, but I have also created a monitoring portal in the Blynk Application website that allows the user to view the data via laptop or PC. The readings displayed on the LCD of this project, as well as their accompanying conditions, will be displayed in the Blynk Application, as seen above. To avoid reading errors, the graph was created every one minute. This demonstrates that the third purpose of this project, which is to allow authorities to monitor and test issues using the Blynk Application and IoT technology, has been met.

4.4 Chapter Summary

The outcomes of this project have been linked to this chapter to illustrate that the aims of the project that were previously set have been effectively attained. The discussion has also been provided based on the project results, such as the description and development of the final project, the specification of the gesture sensor by gyro, the results that have been collected and recorded for 30 minutes, the user view of the Blynk Application, and the limitations of this project and its solution. This project's distance between transmitter and receiver has been measured and demonstrated, as indicated in the results section.

CHAPTER 5

5.0 CONCLUSION AND RECOMMENDATIONS

5.1 Introduction

The conclusion in this chapter is based on the results and discussion from the previous chapter. To see the benefits of the project and to improve it to its maximum potential, the conclusion must be produced to summarize the overall results. This section will also include and discuss suggestions for future work to improve the project's working and operation for another researcher based on the project that has been created and specific in this report. The conclusion also includes the approaches learned throughout the length to create the final product within the time frame given in the Gantt Chart in Chapter 6.

5.2 Conclusion

In summary, based on the results that were attached in the previous section, I discovered that this project fully achieved the three main goals that were mentioned previously, such as being able to develop a project that saves money, manpower, being able to quickly locate the sensor fault, and only the problematic area needs to be drug up in order to check and repair the fault, and allowing authorities to monitor and test issues via Blynk Application.

According to the results and discussion that have been discussed, gyro motion sensor fault detection would make repair work easier and provide the user with accurate results. Because gyro motion sensor is now widely used, in this project, the users can save money, people, and time in maintaining it. Furthermore, using IOT technology, the collected data will be displayed and logged onto the webpage via a Wi-Fi module to accelerate reporting and documentation.

On the benefits side, this research can save organizations time, energy, and money. Depending on the chosen approach, appropriate hardware components such as cameras, sensors, or depth-sensing devices may be required for gesture recognition. These components should be selected based on their compatibility, accuracy, and reliability. Developing the gesture recognition algorithms and software interface is a crucial aspect. Machine learning techniques, such as convolutional neural networks, can be employed to train the system to recognize specific hand gestures accurately. Consider providing options for users to customize gestures based on their comfort and capabilities. This allows individuals to define gestures that are most suitable for their unique physical abilities.

A lot of techniques have been learned and practiced in the time frame to complete this project, such as how to draw and design the project's schematic diagram, flowchart, and block diagram by using

appropriate application or website, allow to create the source code based on the needs, identify and buy the correct and suitable components and sensor for the project, soldering technique, project testing as well as identifying the damage when the system is not working as expected, documentation, and also the presentation. The presenter certificate for EEEiC for this project is shown in Appendix E and F. A user manual has also been designed.

5.3 Suggestion for Future Work

Future research should focus on electromagnetic interference, bandwidth, and the length of data transmission to sensor motion by gyro, which may help users obtain more accurate data during fault detection testing. Furthermore, the design of the sensor that will be used in the project should be modified in order to collect the motion gesture more easily and accurately. Consider how the different types and modes of sensor may affect the project's data accuracy.

Based on the findings of this project, we observed that the condition exhibited in this Blynk Application corresponds to the readings received and that there is a delay after the initial data displayed, which could be due to the coding settings that I performed. To avoid delays in receiving the most accurate results in the future, the coding settings and parameters should be examined.

Other than that, I need to change the design of the portable remote to one that makes it easier for us to know that it has run out of battery, that is by adding an LED to detect if the remote is fully charged, in addition to that by adding a button to make it easier for us to know that it is on or off.

CHAPTER 6

6.0 PROJECT MANAGEMENT AND COSTING

6.1 Introduction

This endeavor includes the cost of sourcing parts and supplies and receiving the majority of the hardware components through online sources in the implementation of hardware expenses. Before purchasing various elements, some surveys were completed at multiple online shops to evaluate pricing, such as on Shoppe. This method will also make things simpler by saving time and money. The total estimated gross expense for this project's execution is RM291.60.

6.2 Gant Chart and Activities of the Project

The Gantt Chart used in this project to show the start and end dates of a project'sterminal items and summary elements. A Gantt Chart also used for project management. It is the most popular and useful methods of displaying activities, task, or events against time. Project plans should include a Gantt Chart, and although complex project planning software is inappropriate to do, where there isonly one worker, a Gantt chart is helpful in visualizing project timescales and taskdependencies.

Diagram 6.2.1: Gantt Chart for Project 1

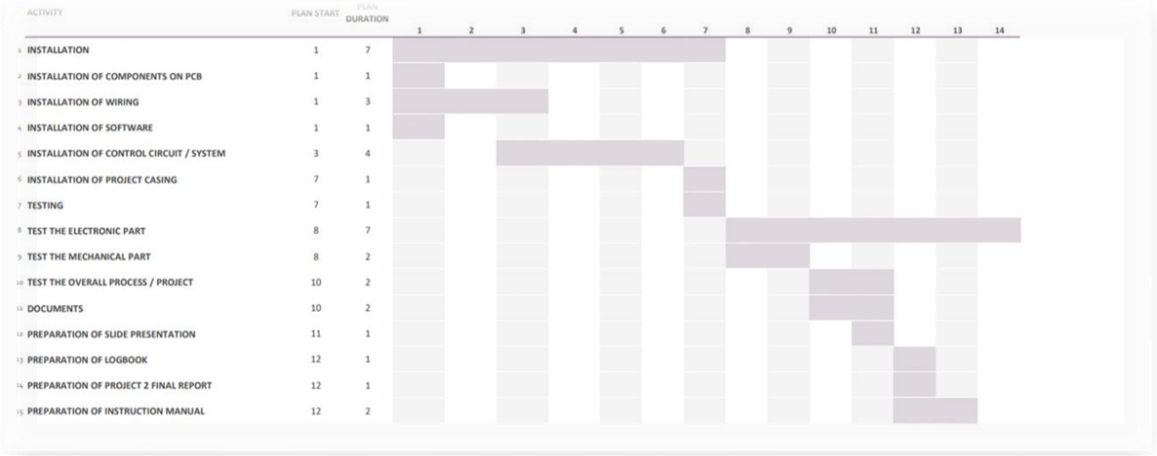


Diagram 6.2.2: Gantt Chart for Project 2

6.3 Milestone

A milestone is a defined moment in a project's life cycle that is used to track progress toward the end goal. Milestones in project management are used to markthe start or end date of a project, external evaluations or input, budget checks, submission of a major deliverable, and so on. A milestone is a reference point inside a project that denotes an important event or a branching decision point. Table 6.3.1 shows the milestone of smart switch using hand gesture detector for disabled people.

Description	Date	Cumulative project completion percentage
Completion of project planning	08.09.2022	15%
Completion of model system	20.10.2022	20%
Completion of project implementation	03.11.2022	35%
Completion of project management and finance	10.11.2022	40%
Completion final proposal report and mini project presentation	01.12.2022	55%
Completion of project programming design	30.03.2023	80%
Completion of project wiring and casing installation	20.04.2023	90%
Completion final report and project presentation	18.05.2023	100%

Table 6.3.1: Smart Switch using Hand Gesture Detector for Disabled People.

6.4 Cost and Budgeting

List of component and materials:

No.	Component and materials	The unit price	Quantity	Total
1	Gyro sensor	RM 30.00	1	RM 30.00
2	ESP32 Node Mcu	RM 21.80	1	RM 21.80
3	Exhaust fan	RM 23.90	1	RM 23.90
4	Bulb	RM 13.50	1	RM 13.50
5	Power supply	RM 15.00	1	RM 15.00
6	Relay	RM 17.60	1	RM 17.60
7	Other Materials	RM 100	1	RM 100
			Total :	**RM 221.80**
	List of other costing			
1	Transportation	RM 5.00	7	RM 35.00
2	Postage	RM 4.90	2	RM 9.80
3	Craft Work	RM 0.10	100	RM 10.00
4	Internet	RM 5.00	1	RM 5.00
5	Application	RM 10.00	1	RM 10.00
			Total :	**RM69.80**
			Overall total	**RM291.60**

6.5 Chapter Summary

The table above already shows all detail in this chapter about the cost of creatingthis product. Nowadays, every client is still concerned with cost when purchasingsomething, so we must create a comparable table to ensure that each of the coststhat must be employed does not overburden the project's development. As a result, the goal of this product is to build a profitable, low-cost, high-quality project. The product is quite affordable, costing less than RM 1,000. Last but not least the concept for this product was created using the most recent design.

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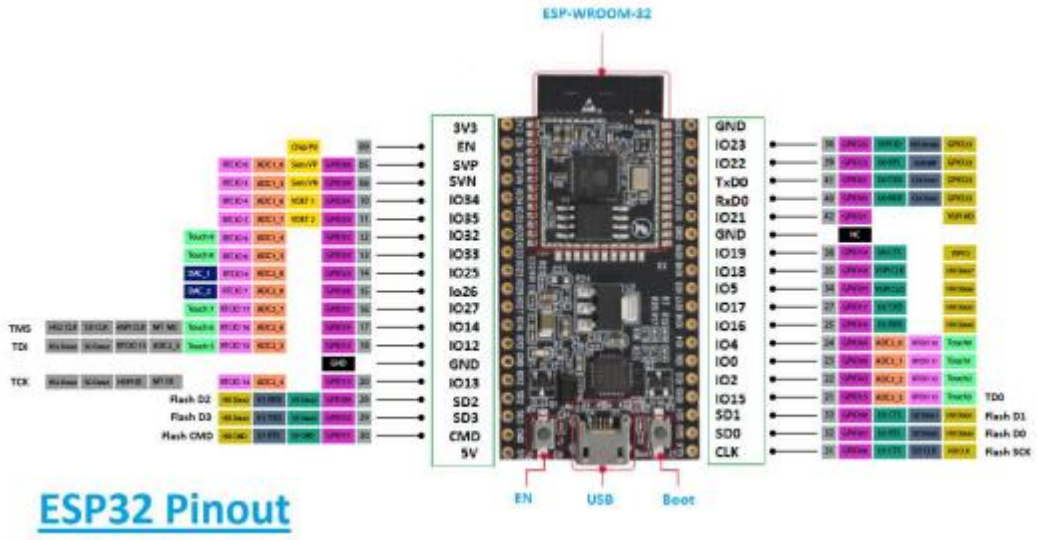
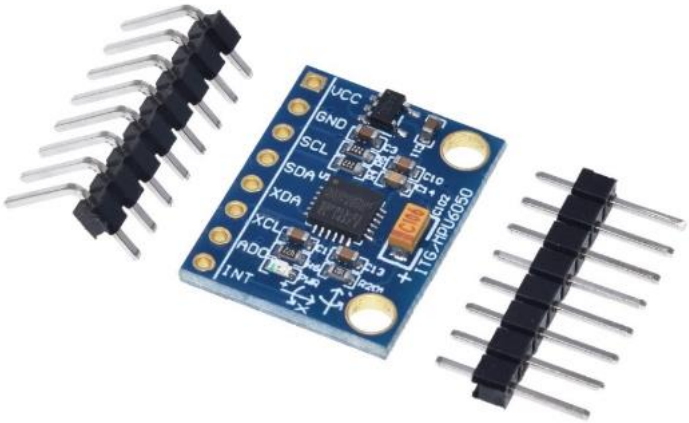
APPENDIX

APPENDIX A- DATA SHEET

1. NODE MCU ESP 32



2. GYRO SENSOR



APPENDIX B- PROGRAMMING

```
extern "C" {
  #include "user_interface.h"
  void app_loop();
}
#include "Settings.h"
#include <BlynkSimpleEsp8266_SSL.h>
#ifndef BLYNK_NEW_LIBRARY
#error "Old version of Blynk library is in use. Please replace it with the
new one."
#endif
#if !defined(BLYNK_TEMPLATE_ID) || !defined(BLYNK_DEVICE_NAME)
#error "Please specify your BLYNK_TEMPLATE_ID and BLYNK_DEVICE_NAME"
#endif
#include "BlynkState.h"
#include "ConfigStore.h"
#include "ResetButton.h"
#include "ConfigMode.h"
#include "Indicator.h"
#include "OTA.h"
#include "Console.h"
inline
void BlynkState::set(State m) {
  if (state != m && m < MODE_MAX_VALUE) {
    DEBUG_PRINT(String(StateStr[state]) + " => " + StateStr[m]);
    state = m;
    // You can put your state handling here,
    // i.e. implement custom indication
```

```
  }
}
void printDeviceBanner()
{
  Blynk.printBanner();
  DEBUG_PRINT("-------------------------");
  DEBUG_PRINT(String("Product:  ") + BLYNK_DEVICE_NAME);
  DEBUG_PRINT(String("Firmware: ") + BLYNK_FIRMWARE_VERSION " (build " DATE
" " TIME ")");
  if (configStore.getFlag(CONFIG_FLAG_VALID)) {
    DEBUG_PRINT(String("Token:    ...") + (configStore.cloudToken+28));
  }
  DEBUG_PRINT(String("Device:      ")  +  BLYNK_INFO_DEVICE  +  "  @  "  +
ESP.getCpuFreqMHz() + "MHz");
  DEBUG_PRINT(String("MAC:      ") + WiFi.macAddress());
  DEBUG_PRINT(String("Flash:     ") + ESP.getFlashChipRealSize() / 1024 +
"K");
  String coreVer = ESP.getCoreVersion();
  coreVer.replace("_", ".");
  DEBUG_PRINT(String("ESP core: ") + coreVer);
  DEBUG_PRINT(String("ESP SDK:  ") + ESP.getSdkVersion());
  DEBUG_PRINT(String("Boot Ver: ") + ESP.getBootVersion());
  DEBUG_PRINT(String("Boot Mode:") + ESP.getBootMode());
  DEBUG_PRINT(String("FW  info:     ")  +  ESP.getSketchSize()  +  "/"  +
ESP.getFreeSketchSpace() + ", MD5:" + ESP.getSketchMD5());
  DEBUG_PRINT(String("Free mem: ") + ESP.getFreeHeap());
  DEBUG_PRINT("-------------------------");
}
void runBlynkWithChecks() {
```

```
  Blynk.run();
  if (BlynkState::get() == MODE_RUNNING) {
    if (!Blynk.connected()) {
      if (WiFi.status() == WL_CONNECTED) {
        BlynkState::set(MODE_CONNECTING_CLOUD);
      } else {
        BlynkState::set(MODE_CONNECTING_NET);
      }
    }
  }
}

class Edgent {

public:
  void begin()
  {
    indicator_init();
    button_init();
    config_init();
    console_init();

    printDeviceBanner();
    if (configStore.getFlag(CONFIG_FLAG_VALID)) {
      BlynkState::set(MODE_CONNECTING_NET);
    } else if (config_load_blnkopt()) {
      DEBUG_PRINT("Firmware is preprovisioned");
      BlynkState::set(MODE_CONNECTING_NET);
```

```
    } else {
      BlynkState::set(MODE_WAIT_CONFIG);
    }
  }
  void run() {
    app_loop();
    switch (BlynkState::get()) {
    case MODE_WAIT_CONFIG:
    case MODE_CONFIGURING:       enterConfigMode();    break;
    case MODE_CONNECTING_NET:    enterConnectNet();    break;
    case MODE_CONNECTING_CLOUD:  enterConnectCloud();  break;
    case MODE_RUNNING:           runBlynkWithChecks(); break;
    case MODE_OTA_UPGRADE:       enterOTA();           break;
    case MODE_SWITCH_TO_STA:     enterSwitchToSTA();   break;
    case MODE_RESET_CONFIG:      enterResetConfig();   break;
    default:                     enterError();         break;
    }
  }

};

Edgent BlynkEdgent;
BlynkTimer edgentTimer;
void app_loop() {
    edgentTimer.run();
    edgentConsole.run();
}
```

APPENDIX C – USER MANUAL

POLITEKNIK MALAYSIA
SULTAN SALAHUDDIN ABDUL AZIZ SHAH

KEMENTERIAN PENDIDIKAN TINGGI
JABATAN PENDIDIKAN POLITEKNIK DAN KOLEJ KOMUNITI

SMART SWITCH USING HAND GESTURE DETECTOR FOR DISABLE PEOPLE

BY ASILAH MAISARAH

smart switch using hand gesture for disable people prototypes are used to make it easier for the disabled people when it is applied at home using hand gesture to on/off the switch and exhaust fan. The switch can be controlled via wifi through smart phone.

Blynk was use to develop an application for control the on & off the switch plug by using wifi connected with an smartphone

NodeMCU is a low-cost open source IoT platform. It initially included firmware with runs on the ESP8266 Wi-Fi SoC from Expressive Systems, and hardware which was based on the ESP-12 module.

BENEFITS

1) can save electricity from being wasted.
2) can be controlled by smartphone.
3) make it easier for disabled people to turn on and off the switch.
4) making it easier for people with disabilities to control the switch through a smartphone

INSTRUCTION MANUAL

1. Turn on the switch.
2. Turn on hotspot.
3. Connect 2 device with hotspot (Portable remote, Arduino Uno)
4. Control the led light using portable remote.
5. Hand movement forward for fan on and back for fan off.
6. Hand movement to the right to turn on the light and to the left to turn off the light.
7. Control the switch on & off using Blynk that was created.

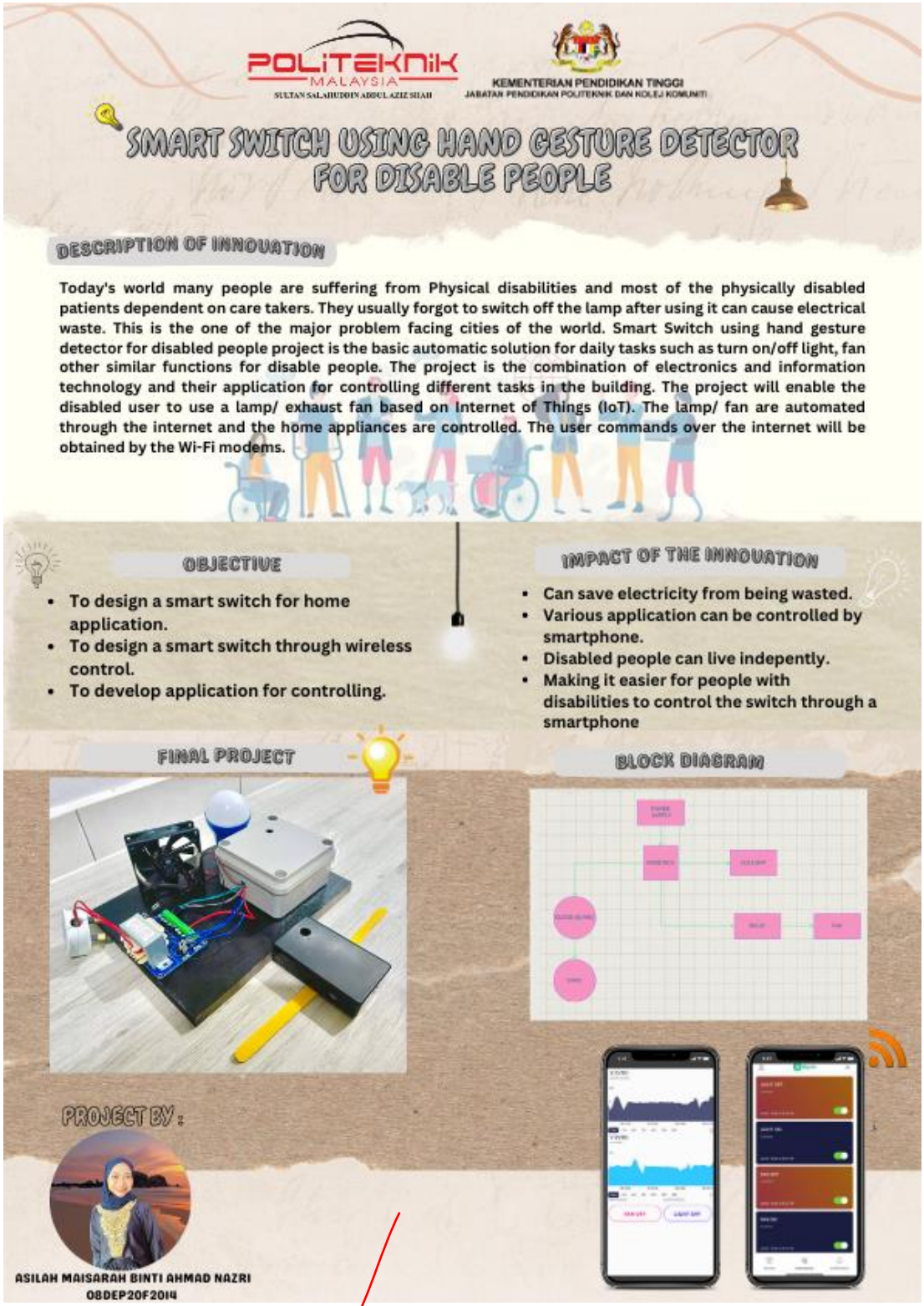
COMPONENTS :

MAIN COMPONENT

- POWER SUPPLY
- RELAY
- NODE MCU
- GYRO
- EXHAUST FAN
- LAMP

AVOID HANDLING THE SWITCH WITH WET HAND

APPENDIX D – EEEiC POSTER AND PARTICIPATION CERTIFICATE



POLITEKNIK MALAYSIA
SULTAN SALAHUDDIN ABDUL AZIZ SHAH

SIJIL

PENYERTAAN

DIBERIKAN KEPADA

ASILAH MAISARAH BINTI AHMAD NAZRI

telah menyertai pameran projek akhir pelajar

ELECTRICAL & ELECTRONIC ENGINEERING
INNOVATION COMPETITION
anjuran
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