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FOREWORD BY DR. NURBAITI WAHID KPP PKE UiTMCTKD

Alhamdulillah, all praise to Almighty Allah who made this possible for the editorial team to complete this publication. The Extended Abstracts of Final Year Projects from UiTM Terengganu Electrical Engineering Diploma students have been published since 2018 and e-ISSN was obtained from Perpustakaan Negara Malaysia in 2019. This year, 2021 witnesses the upgrade of this publication through collaboration with Jabatan Kejuruteraan Elektrik (JKE), Politeknik Sultan Mizan Zainal Abidin (PSMZA). We are very honored to work alongside JKE, PSMZA and we hope that this collaboration can be continued in the future. I would also like to thank and extend my gratitude to the management for approving this project and to all editorial team, as well as the contributing authors for this issue. Hopefully, this publication could benefit all the readers.

FOREWORD BY MR. SAIFUL AZIZI ABDULLAH KJ JKE PSMZA

Alhamdulillah, all praises to Allah, for the successful publication of the Extended Abstracts of Final Year Projects in collaboration with UiTM Terengganu Electrical Engineering and the Department of Electrical Engineering (JKE), Politeknik Sultan Mizan Zainal Abidin, Dungun, Terengganu has finally been realised. I congratulate UiTM Terengganu and the JKE PSMZA editorial team, as well as all parties engaged in this publication. The final projects created by electrical engineering diploma students are featured in this publication which will hopefully serve as beneficial resource for all students, particularly those studying electrical engineering, while they work on their final project. Thank you.



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360 CAMERA SURVEILLANCE USING IOT

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Abstract - The increase cases of theft or burglary often occurred, whether in the city or outside the city. Therefore, most houses have an alarm system or CCTV installed to surveillance the residence in the absence of the owner. However, installing this CCTV will involve high costs. To overcome this problem, a monitoring system using a small camera that rotates 360 degrees using the internet of things (IoT) and can be controlled using a smartphone has been developed. The system uses ultrasonic sensors to detect movement, Arduino Wemos as a microcontroller, a servo motor to rotate the camera, and ESP32-CAM as a camera. With this system, the cost and time management of surveillance application can be reduced.

Keywords - IoT, Arduino Wemos, ESP-32 Camera, Ultrasonic Sensor, Servo Motor

INTRODUCTION

Usually, home surveillance cameras are large, high cost and cannot move automatically. This makes it easy for thieves or robbers to see the position of these CCTV cameras and they can easily close these cameras or damage them before doing their job. Therefore, this 360-degree camera project was developed using a small-sized camera and assisted by internet of things (IoT) technology. This 360-degree camera surveillance system can rotate 360 degrees with the help of a servo motor and is controlled by IoT using the Blynk application that is installed into the smartphone. This Blynk application is used to display images from the ESP-32 camera [1]. There are also ultrasonic sensors used along with this camera that are intended to detect movement. The camera will rotate if there is movement or an object crossing this camera. The coding to give instructions to this project was developed using Arduino IDE software [2].

METHODOLOGY

Figure 1 shows the project block diagram. The project starts when the ultrasonic sensor detects whether there is an object passing through this sensor. When this sensor detects an object, input or data will be sent to the microcontroller. Next, the microcontroller will instruct the MG996R servo motor [3] to rotate the camera mounted on top of this servo motor. The display from this ESP-32 camera can be seen by the user via smartphone.

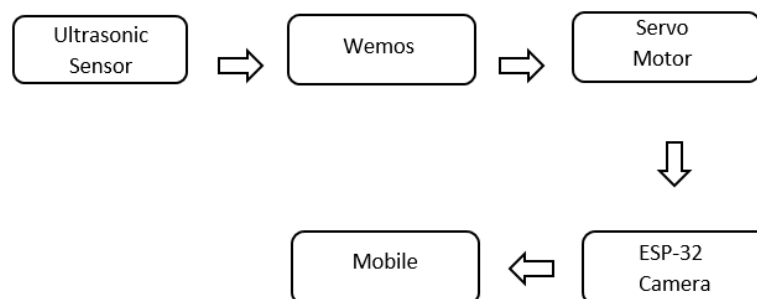


Figure 1: Block Diagram of the Project

RESULT AND DICUSSION

Projects like this will reduce household costs because they can monitor their appliances away from their home. The system also uses a low power supply source to operate. With this camera that can rotate 360 degrees, users can see wider view of surrounding around their home when they are outside.



Figure 2 : The ESP-32 camera shield circuit fabricated on the Printed Circuit Board (PCB).



Figure 3 : Prototype of 360 camera surveillance using Iot.

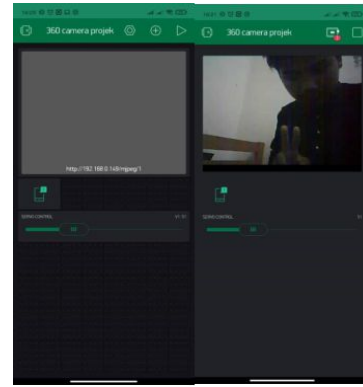


Figure 4: Image displayed on a smartphone using Blynk application.

Figure 2 shows the shield circuit for an ESP-32 camera that has undergone drawing process using Proteus software and an etching process. Figure 3 shows a prototype of “360 Camera Surveillance Using IoT”. This prototype has been built using several materials, including rigid plastic and plastic casing board. Figure 4 shows the image display from the ESP-32 camera on a smartphone using the Blynk application [4].

CONCLUSIONS

In conclusion, all the objectives of this project have been achieved to provide convenience to households to observe the condition of their homes when they are outside. With this project, it will make some changes to daily life and perspective to the community on the importance of maintaining safety and controlling the home environment. This system can provide safety, convenience, and energy efficiency to households. These surveillance cameras can be observed by users via smartphones with the implementation of IoT technology.

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PAPER DRYER BOX

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Abstract - Paper dryer box is an electronic designed to dry the wet documents. It is designed with a medium size and lightweight is very mobile and can be replaced in lecturers' rooms, libraries, classrooms and in suitable places. The project uses components such as WeMOS, 5v adapters, 5v relay modules and USB fans. The main components in this project are WeMOS and 5v relay module. This is because WeMOS is used to process and store the coding. For convenient, hotspot on the phone is activated so that it connects to each other. Hotspot identity and password in the coding is first declared in the coding and it is controlled by blynk application.

Keywords - Paper dryer box, WEMOS, wet documents, blynk, relay modules.

INTRODUCTION

This project describes the design of smart paper dryer which involves the internet of things components such as WeMOS D1, blynk application, 5v adapter, relay circuit and fan. The main function of this project is to dry the important paper document such as certificates or any legal documents. Once the important document is detected wet, they can be put in this dryer box to be dried controlled by the blynk application installed in the smart phone. There are some related works on this topic [1-6], but different with this proposes project.

METHODOLOGY

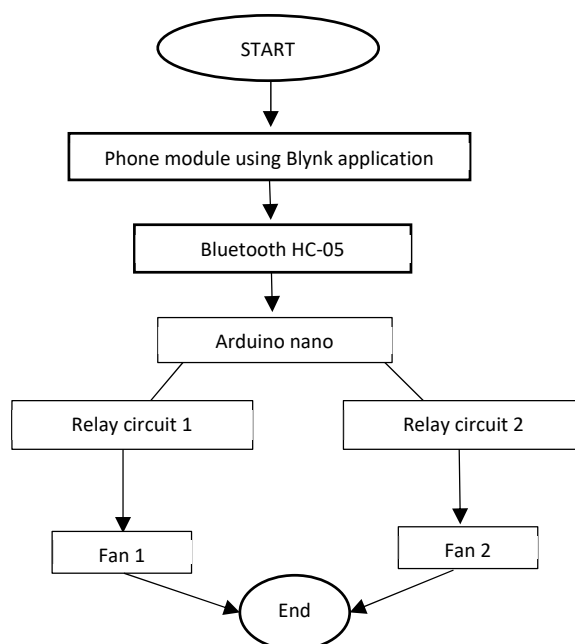


Figure 1: Dryer Box Methodology

Figure 1 shows the flowcharts of this project. To use this paper dryer box, first, the user must put one piece of paper in the middle of the box and activate the blynk application on the smartphone by pressing 'on' button. When the button on is pressed, the two fans will start working and the air circulation from the fan will dry the wet paper. Users may wait until the paper is dried and touch the stop button on the smartphone.

RESULT AND DISCUSSION

Figure 2 shows the connection of the paper dryer box, inside the box and blynk application on the smartphone. WeMos D1 was connected to USB Port. This Wifi- Module will send the values to the server without any delay and without any data loss.



Figure 2: Connection of Paper Dryer Box (left), Inside the Paper Dryer Box (middle), Blynk Application (right)

CONCLUSIONS

As the conclusion, this invention is created to help people to dry the important paper documents conveniently. In the future, we hope that this invention may contribute to recover the important documents in flooding areas or the legal documents in court.

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STREET LIGHT MAINTENANCE USING GSM MODULE

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Abstract -There is even often a waste of electricity where street lights are not turned off during the day. This project called Streetlight Maintenance using GSM Module which will be placed on the lamp post. In the event of a street light damage and it's able to send a brief message to the phone number that has been set up using the GSM module to the authorities in a short time. Its uses IR sensor and LDR sensor. The main function of the sensor is IR sensor used to detect the presence of sample objects such as vehicles. When the vehicle passes the light brightness changes 100%, when there is no vehicle the brightness of the light will change 50%. While the LDR sensor is used to detect day and night, when daytime street lights will be OFF, while when night street lights will be ON. By using this system, we can save almost 10% electricity and can also deal with the problem of road accidents at night caused by lack of light at night

Keywords - GSM Module, sensor.

INTRODUCTION

The driver's vision is limited at night because lack of light can lead to road accidents. It is a very serious matter and needs to be addressed immediately. In addition, the use of street lamps regardless of the need for their use will result in a waste of electricity. **Streetlight Maintance using GSM Module** is built to deal with problems caused by damaged street lights without knowing in the near future and also to overcome the waste of electricity consumption if it is not needed. The project functions as an efficient informer and controller of electricity consumption. Using GSM Module as an intermediary will further enhance the warning system.

METHODOLOGY

Streetlight Maintenance using GSM Module is built using GSM module for the purpose of sending damaging information to registered telephone lines. The use of IR sensors is intended to detect the presence of the vehicle and it controls the brightness of the street lights so that the energy consumption is 100% only when needed and it will be reduced by up to 50% if no vehicle passes through it. Infrared (IR) imaging is widely used in military, medical, and industrial field since it is able LDR sensors, on the other hand, are used to control the street light functioning only when it is dark. Both sensors will ensure a more efficient use of electricity.to create a visual with otherwise non-visible wavelength band to the human eye [1],[2]LDR sensors, on the other hand, are used to control the street light functioning only when it is dark. Both sensors will ensure a more efficient use of electricity. Streetlight Maintenance using GSM Module is highly efficient when compared with the conventional approach and no need human workforce to monitored [3][4]. The flowchart of the methods used to prepare the system is shown in Figure 1.

RESULT AND DISCUSSION

The entire hardware used in this project is depicted in Figure 2. The IR and LDR sensors are used as inputs in this project. The presence of vehicles and lights will be detected. The processor will be an Arduino Wemos. When there is no vehicle passing through, the IR sensor will send a signal, reducing energy consumption by up to 50% and 100% when there is a vehicle. If there is light, the LDR sensor will close the lamp, and it will only be opened

when it is dark. If the street lamp is damaged, information will be delivered straight to the technician's phone number, which was registered via the GSM Module.

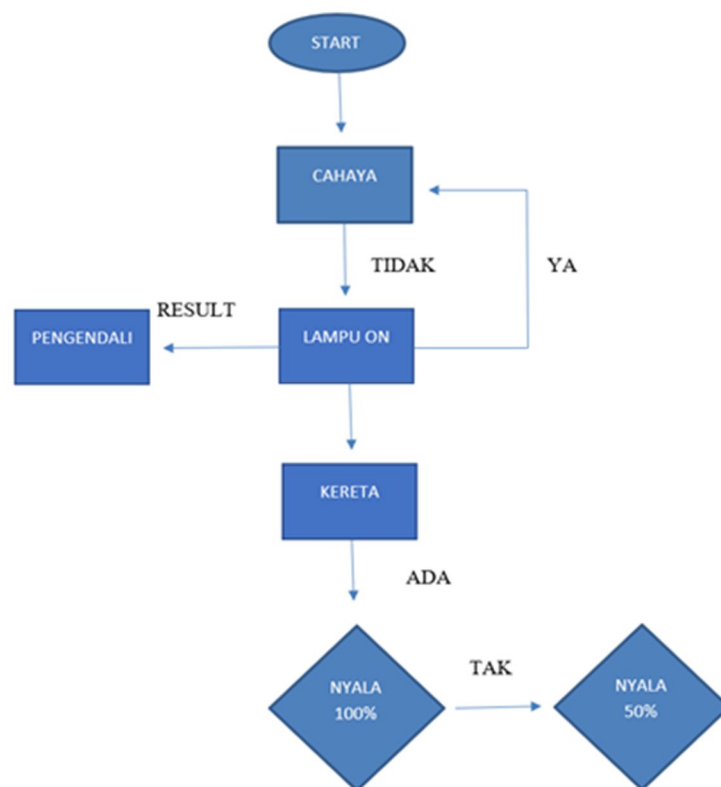


Figure 1: Block diagram of Streetlight maintance using GSM Module



Figure 2: Overall project of Streetlight Maintance using GSM Module

CONCLUSIONS

In conclusion, this project is successful when all the objectives are accomplished. Furthermore, this innovation product has potential for commercialization because it using low cost and reliable system.

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MINI PCB DEVELOPMENT MACHINE

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Abstract - The development process is part of the steps in producing Printed Circuit Board (PCB). During this process, the soft resist is washed away by using the chemical solution known as Sodium Metasilicate Pentahydrate, leaving behind the hard resist. However, the implementation of the manual process done at polytechnic now will pose danger to the safety of students as they must use and manage a special solution that is Photoresist Stripper themselves. Thus, it becomes a necessity for lecturer to ensure their students can build their PCBs quickly and safely. Therefore, this project aims to produce new innovations and investigate the effectiveness of the use of these machines in helping students. The power supply 3.5 Volt is used as an energy source and a NodeMCU as the main control system to automatically activate the machine. This project also implements the Internet of Things (IoT) to control the machine remotely through mobile phone.

Keywords - Development process, safe, quick, IoT

INTRODUCTION

In producing Printed Circuit Board (PCB), among the steps that need to be done is to draw a schematic circuit, print out the schematic circuit on a tracing paper, transfer the circuit onto circuit boards by exposing to Ultraviolet (UV) light, developing, etching, drilling, and soldering. The entire process of completing this circuit board will be time consuming especially the developing and etching process. Moreover, if all processes are done manually. The duration of this process depends on the concentration of the developer solution, the temperature of the solution and the size of PCB board. In addition, the tray swings for the developing and etching process also play a role in determining the time taken to produce a printed circuit board. Mini PCB Development Machine is an electronic project innovation for the PCB manufacturing process so that becomes easier and more efficient. The objectives of this project are to control the tray swing remotely only via telephone, help to reduce time in producing the PCB as it is done systematically automatic and lastly to ensures the safety of the students because this process, especially developing and etching process involve chemicals solution and it is done using a machine. This project has successfully performed the developing process of PCB in less than 10 minutes after the PCB is immersed in Photoresist Stripper solution and swung automatically using a motor. In addition to the efficiency test of this project, the results show that it is 100% successful in producing PCBs that are like those produced manually but in a shorter time.

METHODOLOGY

Figure 1 shows the block diagram of Mini PCB Development Machine. To maintain the voltage of the power source within acceptable limits to prevent damages to the components, a voltage regulator is used. Arduino IDE software is used to program the NodeMCU. It then will control the ON or OFF of the machine that will swing the tray.

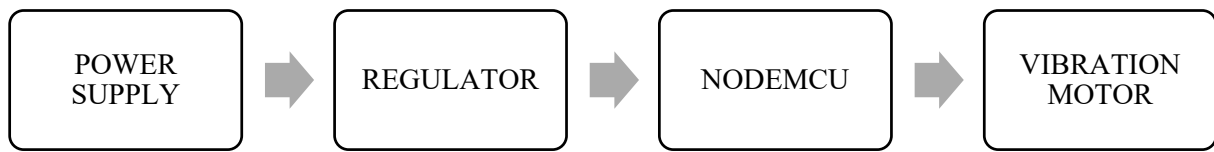


Figure 1: Block diagram of Mini PCB Development Machine

RESULT AND DISCUSSION

The innovation of Mini PCB Development Machine has achieved its objective to perform the PCB developing process in less than 10 minutes after the PCB is immersed into Photoresist Stripper Concentrate with even swaying using vibration motor. In addition, the resulting PCB is similar to the PCB produced by manual method. It also shortens the period of PCB production by polytechnic students compared to the method used now.



Figure 2: Mini PCB Development Machine

CONCLUSIONS

As a conclusion, this project gives a positive impact on students and lecturers since the process of developing PCB is one of essential element in developing student's final year projects. It helps students a lot as this machine can save time, energy, and chemical solutions in producing PCB. At the same time, the development process becomes easier and quicker. The safety of students is more assured because they do not have to be close to the machine during the development process.

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SOLAR BAG

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Abstract - Solar bags are one of the new innovations designed specifically for enthusiasts of extreme activities in general as well as for the use of students and lecturers who take special co-curriculum courses. Each semester, students from first and second semesters are allocated outdoor activities (self-management and self-identity) such as camping. Among the difficulties faced during camping activities is the lack of electricity supply as there is no source of electricity in the forest or camping site. The construction of an innovation known as the solar bag, was created to overcome this problem. This solar bag can be as an alternative source of electricity supply. This solar bag gets the source of sunlight through solar panels. These solar panels convert solar energy into electric energy and are stored in batteries and will be supplied to load. The solar bag is equipped with 3 LED lights capable of running for 8 hours as well as mobile phone chargers of several types. With the product being produced, the enthusiasts can launch camping activities as well as most importantly this product is environmentally friendly.

Keywords - Solar, Outdoor Activities

INTRODUCTION

Camp activities are one of the compulsory activities for students of 1 and 2 semesters for all Malaysian polytechnic students. This activity aims to enhance students' identity in facing of all tests and challenges in terms of mental and physical as well as teamwork spirit. Basic requirements during the camp are particularly important especially water supply, food, and electricity supply [1]. Water and food requirements are not a major problem, but also the need for electricity for telephone chargers, lighting systems, etc [2]. With the result, this solar bag has a useful impact on the activity of this camp. The safety features of this product are no high frequency interference effect, using low voltage/current-guaranteeing consumer safety, energy saving electricity-solar energy consumption (Green technology) and using environmentally friendly technology.

METHODOLOGY

This Solar Bag only requires direct sources of solar energy. As shown in Figure 1, block diagram of Solar Bag depicts existing solar panel serve to receive sunlight and store the charge into an existing battery as a source of supply. And from this, supply will be release to, such as 3 LED Lights, phone chargers suitable for all phones (iPhone, Nokia, blackberry, Samsung and any type of phone).

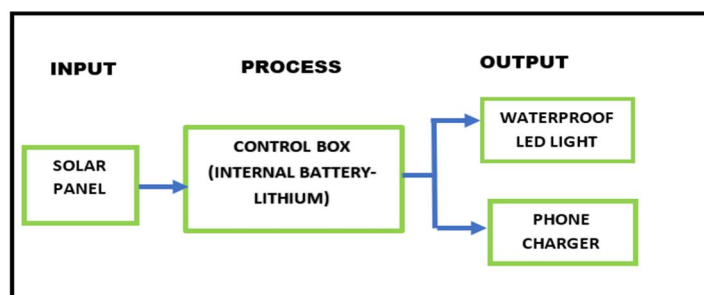


Figure 1: Block diagram of Solar Bag

RESULT AND DISCUSSION

Figure 2 shows the overall hardware used in this project. In this project, the input is solar panel. The Solar Panel can absorb the strongest possible sunlight. The Solar Energy is in charging state when the charging LED light indicator is red. When the charging indicator light turns to green, the Solar Energy is fully charged and ready to use. Once charging is completed (when the LED light indicator is green), the Solar Panel connector is disconnect cable from the control box.

Table 1: Solar Bag capabilities when fully charge

Part	Application	Working time
1	3 pcs LED light	8 hours
2	2pcs LED light	12hours
3	1pcs LED light	24hours
4	Phone Charge	1 hours



Figure 2: Solar Bag Prototype

CONCLUSIONS

In conclusion, the objectives of this project have been achieved that it can facilitate the conduct of extreme and outdoor activities. In addition, this solar bag is environmentally friendly and has no high cost in maintenance.

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MEASURE TO CUT FABRIC ROLL

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Abstract - Measure To Cut Fabric Roll is designed to make it easier for workers in the fabric shops to cut the fabrics with the length selected according to the customer's requirements. With this tool it can save time and simplify the works of cutting the fabrics by simply entering the desired measurement value and then cut using an automatic cutting tool. Previously workers in fabric shops cut the fabrics manually using rulers as length measuring tools and scissors as cutters. It is expected that this Measure To Cut Fabric Roll can provide benefits and convenience to entrepreneurs and employees in fabric shops.

Keywords - Measure, cut, roll, fabric, length.

INTRODUCTION

This project is aimed to fabric shop owners and workers. The workers no longer have to measure and cut the fabrics manually by using this automatic system. It will be easier for workers by pressing the selector switch according to the desired lengths accurately. It has three button switches which prescribed lengths are 0.25 meters, 0.5 meters and 1 meter. The project is operated by a motor circuit that will roll out the fabrics according to the selected fabric length. Then, by simply pressing one switch, another motor works to move the cutter to cut the fabrics. Circuit operation is controlled in the Arduino. Therefore, workers no longer need to use a ruler to measure the length of fabric which likely to be less accurate measurements and no longer need to use scissors to cut fabrics that is likely to be unsafe.

METHODOLOGY

Figure 1 shows flowchart of the Measure To Cut Fabric Roll process. To use this Measure To Cut Fabric Roll, the workers have to press a selector switch to select the length of fabrics required by customers. The switch can be pressed several times according to the desired lengths. The LCD will display the accumulated lengths each time the selector switch is pressed. At the same time, the forward motor works to roll out the fabric according to the length selected. A cutter switch is pressed to operate the forward reverse motor to make a cutter works to cut the fabric.

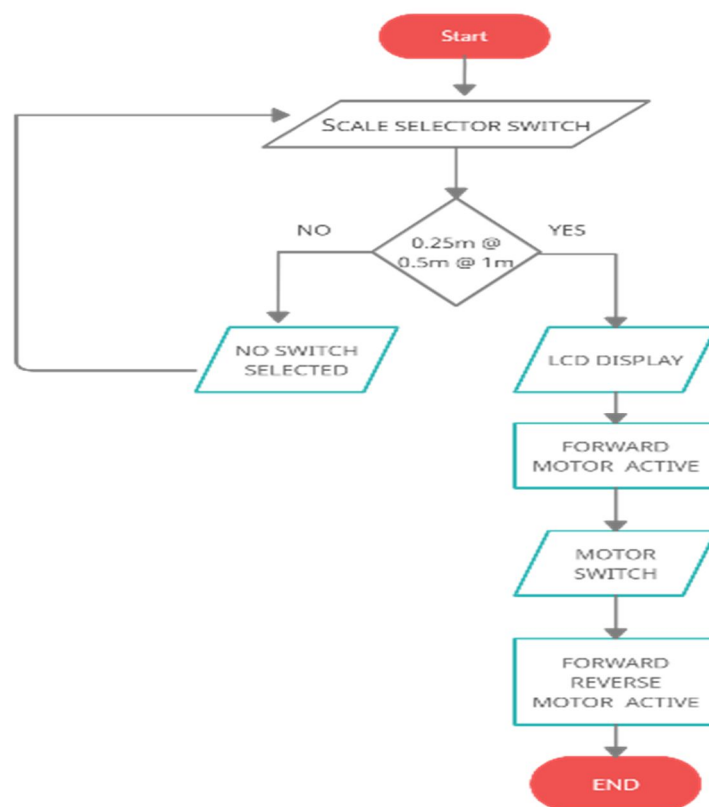


Figure 1. Flowchart of the process Measure To Cut Fabric Roll

RESULT AND DISCUSSION

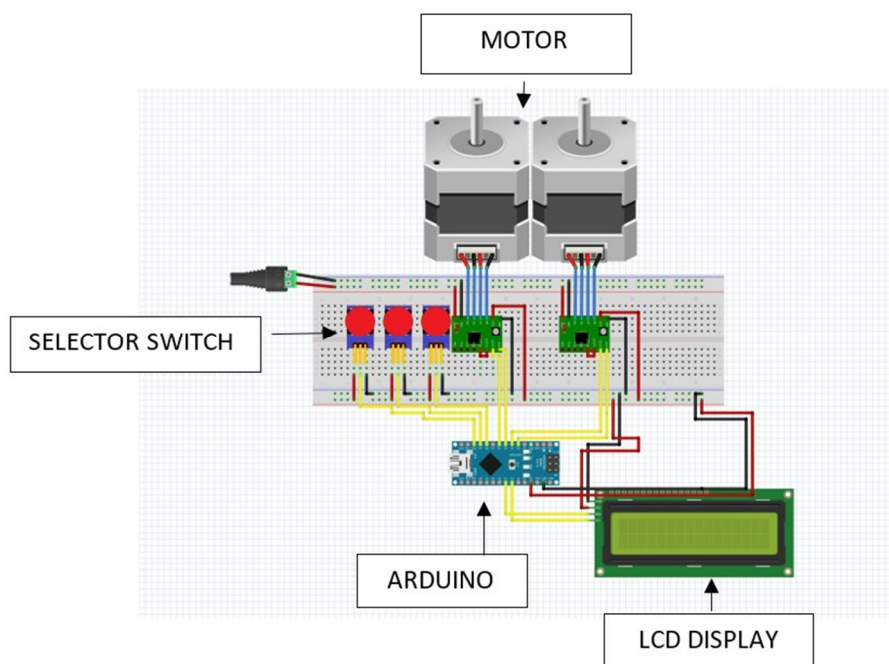


Figure 2. Measure To Cut Fabric Roll circuit diagram

Figure 2 shows the circuit diagram of Measure To Cut Fabric Roll. It consists of three selector switches use to select 0.25 meters, 0.5 meters and 1 meter length of fabric. An LCD display to display the total length of fabric selected. A DC forward motor rotates the fabric roll to rollout the fabric and a forward reverse motor to do the cutting process. The circuit process is controlled by Arduino.

CONCLUSIONS

In conclusion, the objective of this project has been achieved that it can facilitate workers to manage the measurement of fabric effectively. In addition, it can speed up the process of measuring and cutting fabrics in large quantities. Safety is also protected from the use of dangerous cutting tools.

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SMART MIRROR USING RASPBERRY PI (S- MURP)

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Abstract - This project was held to give some add function for existing mirror. As we know mirror is always used by people which is to see their self-reflection from kids to adults. Existing mirrors often only show the user's face. The mirror will become inactive and easily dirty. However, if this mirror slightly modified to add functionality to the mirror, it is possible that is makes this mirror more useful. We can turn regular mirrors into smart mirrors with the help of a system that uses the internet and a Raspberry Pi. The Raspberry Pi is used to provide functions that allow users to receive notifications on the mirror, such as temperature, weather, and time. Furthermore, the LCD includes a mirror that allows us to accomplish everything we desire. Furthermore, the mirror is equipped with a surround.

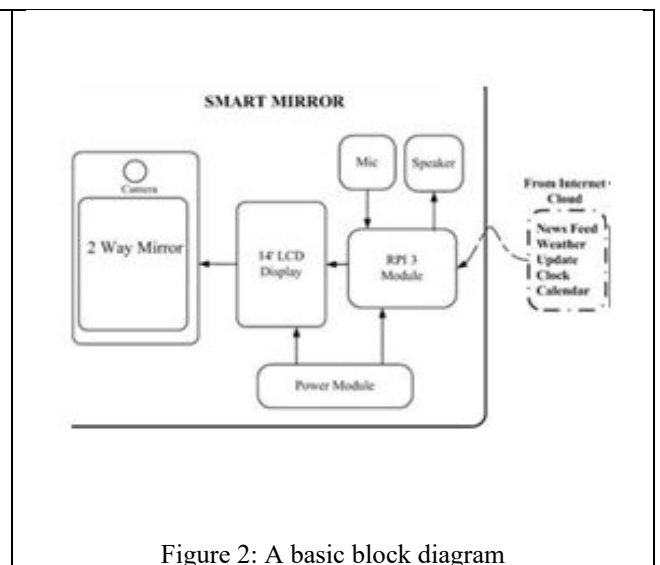
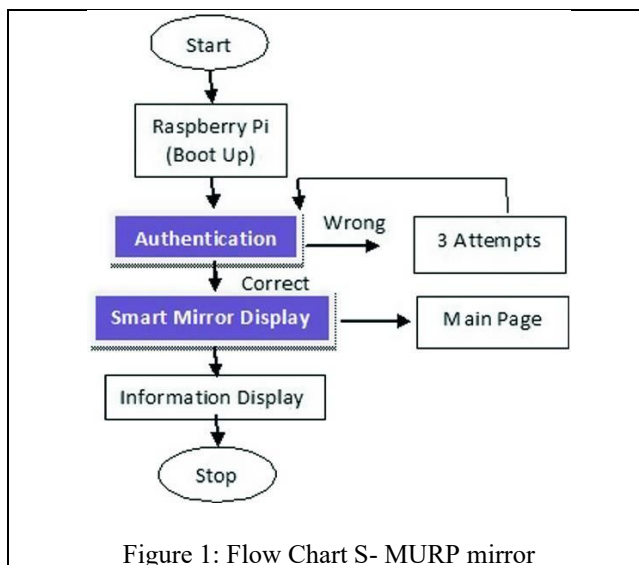
Keywords - Smart mirror, Raspberry Pi.

INTRODUCTION

In daily life, mirror is a something useful for every human being to reflect their face and body. Nowadays, we can notice that people always have one or more mirrors with them everywhere they go. Long, circle, square, and other forms of mirrors are available. Every people love to have mirror for their daily life. The usage of household mirrors to see one's face is a frequent practice. As a result, we innovate by improving its capabilities throughout the twenty-first century to make everything smarter.

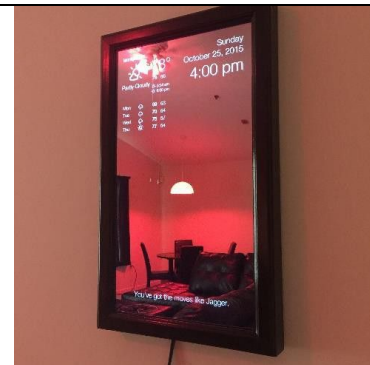
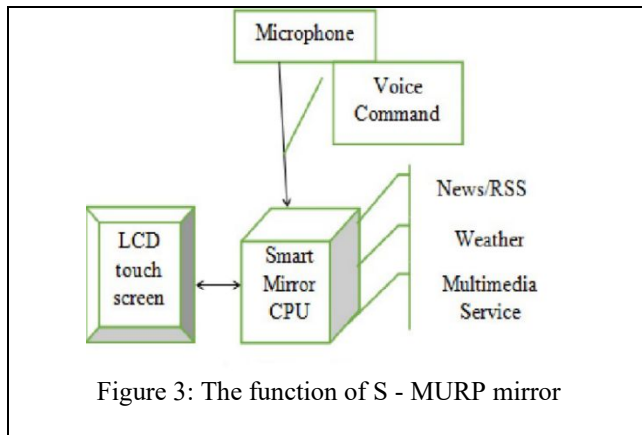
METHODOLOGY

Smart Mirror Using RASPBERRY PI (S- MURP) are the combination between hardware and software project. Smart mirror is a device developed to display data in the form of information on the mirror [1]. Figure 1 shows the flow chart of S- MURP mirror.



This innovation using 2way smart mirror, LCD Display, RASPBERRY PI, microphone, speaker, and power module. The Raspberry Pi Pi 3 B+ is a minicomputer used for this project. It uses Raspbian operating system [2]. Figure 2, a basic block shows the wooden frame will be prepared with LCD display attached behind the glass and the raspberry pi. The power supply is attached to the raspberry pi which will power the LCD display. When the display is on, the mirror will show date, time, and weather. Mirror A two-way mirror is used for the project. It is not like an ordinary mirror painted by an opaque color. It has the property of being reflective on one side and transparent from the others [3].

S - MURP mirror system is a tool that is designed to give fast information without need to be clueless about time, weather, and date. figure 3 show the function for S - MURP mirror was achieving an objective which is user can get the notification shows in figure 4.



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