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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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PREPAID PORTABLE MOBILE CHARGER

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Abstract - This project is focus on designing a prepaid mobile phone charger. The aim is to develop a prepaid mobile charger that can be used in the public area. When any phone user runs out of smartphone's battery, they can simply charge it in the charger station. A controller is used so that the phone will recharge automatically when the user inserts a coin in the coin acceptor. The project involves two parts that are mechanical part and software parts, to control the charging process. As a result, this charger will help many phone users to recharge their phone in public areas.

Keywords - Phone Charger, Portable, Arduino UNO, Prepaid.

INTRODUCTION

Smartphone is a communication tool that becomes human's best friend. Humans will not go anywhere without smartphones. They saved all the personal data in the smartphone [1]. Moreover, in this pandemic era, smartphone is needed to enter any public building such as mall, government office and even a mosque. The most important feature of a smartphone is the battery life of the smartphone. Without a battery, the smartphone is just a load that humans carry everywhere. Unfortunately, the more humans use the phone, it will reduce the battery life of the smart phone [2]. So, humans need to recharge their phones. The problem is when the user is going out where there is no source to recharge the smartphone.

So, the aim of this project is to develop a prepaid mobile charger. This charger can be used in the public area, when any phone user runs out of smartphone's battery, they can simply charge it in the charger station. This charger was designed for any type of phone. Users just need to put some money in the charger, then the charging started. There were four objectives of this project which are to build a charging power supply circuit, to connect coin acceptor circuit to the Arduino circuit, to build a timer and switching circuit using Arduino and to build RFID-Arduino connecting circuit. This charger was designed for any phone with 5V output. This charger is portable and the input voltage for this charger is 240V. According to [1] from Chennai University, India, the increasing use of mobile phones has been a phenomenon over the years and charging mobile phones is something that is indispensable anytime and anywhere. Therefore, Coin Based This Universal Charger is designed and developed in this paper. This device works like a vending machine to charge a phone.

DESIGN METHODOLOGY

Figure 1 shows the flow chart for the Prepaid Mobile Phone Charger. This project was divided into two main components, software, and hardware. For the software, Arduino IDE has been used to program the Arduino UNO. And for the hardware, three circuits were designed to meet the objectives which are power supply circuit to convert AC to DC voltage, the main circuit, and the relay circuit as a contactor of coin acceptor circuit.

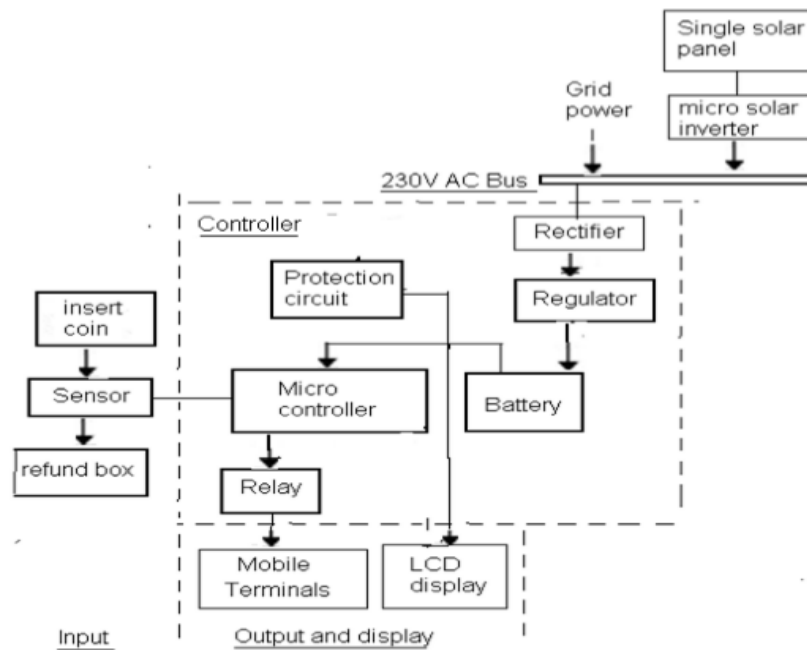


Figure 1: Flow chart of Prepaid Mobile Phone Charger

RESULT AND DISCUSSION

According to the analysis, every different smart phone has its own output value. The test was done to Lenovo A850 model smartphone, which shows that 10% battery recharged in duration 15 minutes. Below is the rating of different chargers.

CONCLUSION

In summary, this project refers based on the research, discussion and testing that we have implemented, we can conclude that the project that we run this Prepaid Public Mobile Charging has been successfully implemented based on the objectives and scope contained in our notes. The selection of this project or idea is based on the existing product. In addition, we focus on safety factors such as product design factors. This is because our products are specially designed to facilitate and convince users to use them. This is because the smart door lock method in our project can fend off user security issues when leaving the mobile phone. This method is quite safe because it only scans the card provided on the RFID Card to open or lock. Therefore, through this project we do it can be concluded that the creation of Prepaid Public Mobile Charging is one of the latest products that have been successfully designed.

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PLANTS WATERING SYSTEM USING SOLAR ENERGY

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Abstract - There are many technologies that have been created to facilitate the watering of plants both for home use and for the agricultural sector. The system for this project includes a source of electrical energy derived from the collection of electrical energy generated from solar panels and stored into batteries. Several processes need to be done to produce this system such as soldering and some wire connections. This system can replace the use of electricity directly from home to the generation of electricity from solar panels as the main source to power this system thus reducing the cost of electricity consumption. Components such as 'Delay Relay' and water pumps are used to set the time when trees are watered and control the rate of water quantity for the watering process. Several experiments were performed to analyze and evaluate the time to water the trees and the quantity of water used. The system is very helpful to users, and it is also easy to use plus low cost.

Keywords - Waterer, solar panel.

INTRODUCTION

Nowadays, many people are interested or have a hobby of planting crops. As we all know, the process of watering a tree is a job that takes a long time and is tiring. The time allotted by the user is not worth it because the rate of time spent watering the tree can be used to do other things. For example, for users who do gardening for fun or hobbies but have other regular jobs such as working outside, they will use the time in the morning to have breakfast and get ready to go to work or for users who are full-time housewives time, they will need early morning time to prepare breakfast, arrange the children's school clothes, tidy the house and so on. In addition, water wastage will occur because some people only water the trees in a careless or original method. Therefore, the quantity of water used to water the trees is erratic or irregular. Sometimes some parts of the tree only get a little water, sometimes some parts of the tree are poured too much water and there are also some parts of the tree that are not exposed to water at all. This sometimes happens unconsciously. With this watering system, all of the above can be overcome easily and more effectively.

METHODOLOGY

This project is one of the ways to make daily life easier for its users. Nowadays many people want to own plants and make this a hobby. To make it easier for users to carry out this planting activity, one of innovation was created to make it easier for users to water the trees every day. This project is called an Automatic Tree Waterer. This product will help users to water the tree on a daily basis with less frequent monitoring. Beside that, it works automatically because it is equipped with a "Delay Relay" which allows the tree watering device to work according to the set time for example the user wants the plants to be watered at 7:30 am. Since the trees planted are only small trees it does not require too much water. The user can set how long the tree is watered as it wants the tree to be watered for 5 seconds. So, when the user sets the time for 5 seconds on the "Delay Relay", the DC pump will move or work for 5 seconds and then turn off again or "OFF". So, the above situation will continue every day because "Delay Relay" is set as "Loop Mode" or when displayed on "Delay Relay" is "P 33".

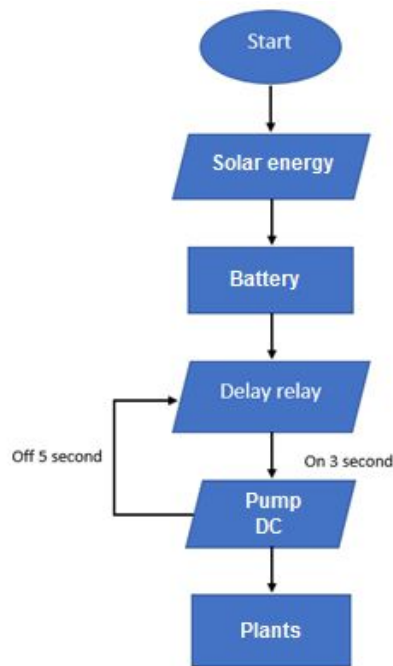


Figure 1: Flow chart of project

RESULT AND DISCUSSION

After some analysis done, it's found that the quantity of water used by this tool to water the tree is approximately 130ml. This happens because the time set on the 'Relay Delay' to turn on the 12V DC pump is 3 seconds. If the time to turn on the DC pump is more than 3 seconds, then the quantity of water to be sucked out is more. However, each time water is sucked out, the quantity is the same as before. The quantity of water sucked out each time the DC pump is turned on is the same if the time it is turned on is not changed. The longer it takes to turn on the DC pump, the greater the quantity of water sucked out.



Figure 2: Overall of the project

CONCLUSION

In conclusion, this project can help many people who are interested or even have a hobby of growing flowers and vegetables or people who work in the agricultural sector. For those who are involved in activities or jobs in the agricultural sector they will get a big impact if this project is developed on a large scale because with this project, they can reap greater results, faster and lucrative.

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WIRELESS HOME APPLIANCES CONTROLLER BY USING ANDROID

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Abstract - This innovation focuses on the production of a home hardware remote control system using “Bluetooth” that is “Wireless Home Appliances Controller By Using Android”. The system was developed using a smartphone software platform ‘Android’ and an interface specially designed to control some home appliances, which is easy to download and user friendly. The development of this system is intended to help individuals who are disabled or incapable as it is difficult for them to go to each switch to turn on the lights and so on. Most home systems nowadays use human labor, and it is a waste of time, as well as people rushing to work, they do not have time to go to every room to check whether the electrical appliances in the house have been turned off or not. The system has been designed to facilitate the daily work of human beings. In addition, the use of electrical cables can also be saved if the system is developed and expanded in the future.

Keywords - Wireless, Home Appliance Control, Bluetooth

INTRODUCTION

Wireless home systems refer to the use of information technology and computer science to control home appliances. Wireless home systems are becoming important, as they provide users with a comfortable and easy to use environment for home appliances. An Android based wireless home system is a system that provides control to all home appliances that use electricity [1]. The Android smartphone is connected to the Arduino’s ‘Microcontroller’ signal and sends data to the Arduino. Upon receiving the signal, it will perform the task of controlling home appliances. This platform requires a high level of interaction and integration between the tools available in the environment. The main objectives of this innovation produced are to facilitate human daily work without using heavy labor and automatically control the home system to ‘ON’ or ‘OFF’ using the “Android” smartphone software platform [2].

METHODOLOGY

Figure 1 shows the instructions from the Android Smart Phone sent to the Bluetooth Module which acts as an intermediary to connect the Bluetooth Module with the Arduino. The instructions given from the phone will be received by the Arduino and send a signal to the relay. Lights and Motor can be controlled.

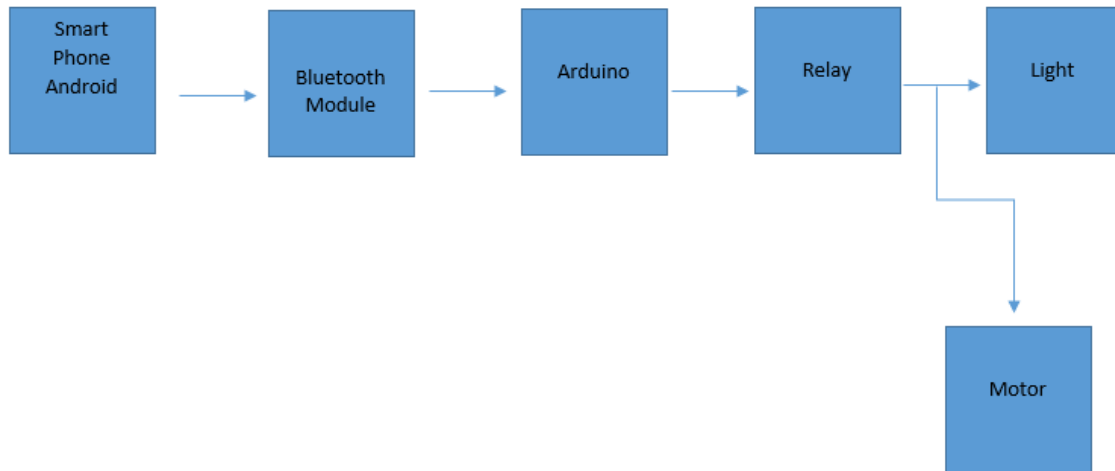


Figure 1: Wireless Home Appliances Controller by Using Android

RESULT AND DISCUSSION

The production of this innovation involves several stages, namely data collection and information on data transmission via Bluetooth (transmit and received). The circuit is as Figure 1 and the program is upload to Arduino microcontroller. The Android interface were build using App Inventor [3]. The end product can be seen as in Figure 2.

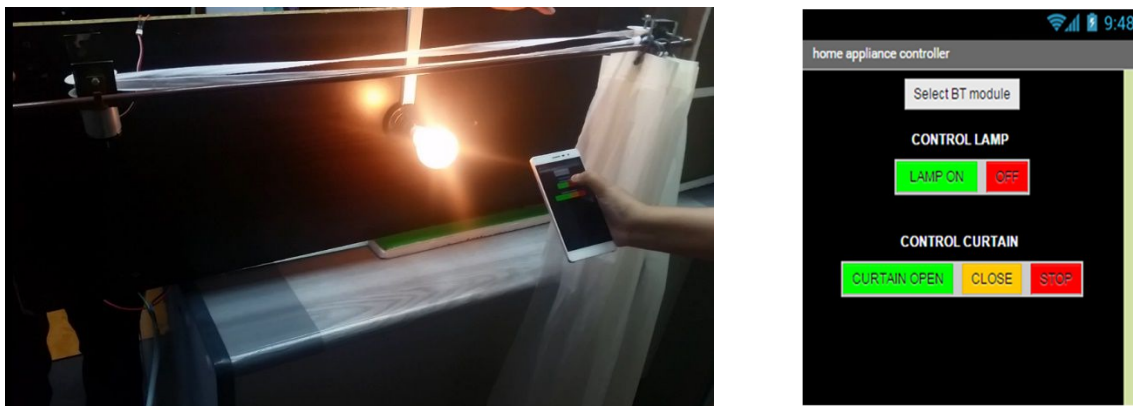


Figure 2: Product picture

CONCLUSION

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.

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CLOTHES DONATION BOX WITH IOT

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Abstract - Clothes Donation Box with IOT is one of practical machines for people to giveaway unneeded clothes. This machine can be a center to gather good condition clothes and a good way to dispose of unwear clothes. Therefore, Clothes Donation Box is proposed to ease consumers and the owner of the machine. The system can inform the owner whenever the box is full of clothes. Owner of the machine does not need to regularly check on the box as the monitoring can be done from other locations. Other than that, the system also displays an indicator to let the clothes donor know the box still has space to insert clothes or is already full. This system basically uses Aurdino Wemos as the processor, to connect the ultrasonic sensor as a detector. If the box is already full, the sensor will detect the clothes nearest to its' location and Aurdino receives the data and sends to Blynk Application at the owner mobile phone. There is also LED display outside of the box with a label to let the donor know either the box is still got space or full already. This project is said to apply to IOT as the monitoring is done through mobile phone.

Keywords - Clothes Donation Box, Aurdino, IOT.

INTRODUCTION

It is a common habit among people to keep buying new clothes. This is because maybe the current clothes are already not fit, outsize and not suitable anymore. When the unneeded clothes are loaded too much at home, people should think how to solve it. Therefore, Clothes Donation Box is developed to help people to reduce the unneeded collection of clothes by donating it instead of throwing it away. This project provides a box as the place for the donor to put their clothes inside. The donor can prepare the clothes in a proper way and insert the clothes through the box, and it is done. There is an indicator to let the donor either the box is still empty or full already. The system itself will inform the owner via Blynk application as if the box is full and requires the owner to clear the space.

METHODOLOGY

Figure 1 shows the block diagram of the Clothes Donation Box with IOT. This project contains Ultrasonic Sensor as the input, Aurdino Wemos as the processor, the LED and the notification at the mobile phone as the output. The ultrasonic sensor is put at the upper part of the box as it functions to detect space available. The system is running continuously if the box keeps receiving clothes. Officially the main operation starts when the ultrasonic detect clothes near it as a notification not too much space already. It will send data to Aurdino and LED will light up as an indicator the box is already full and the Blynk application at owner mobile phone will receive notification stated as the box is full.

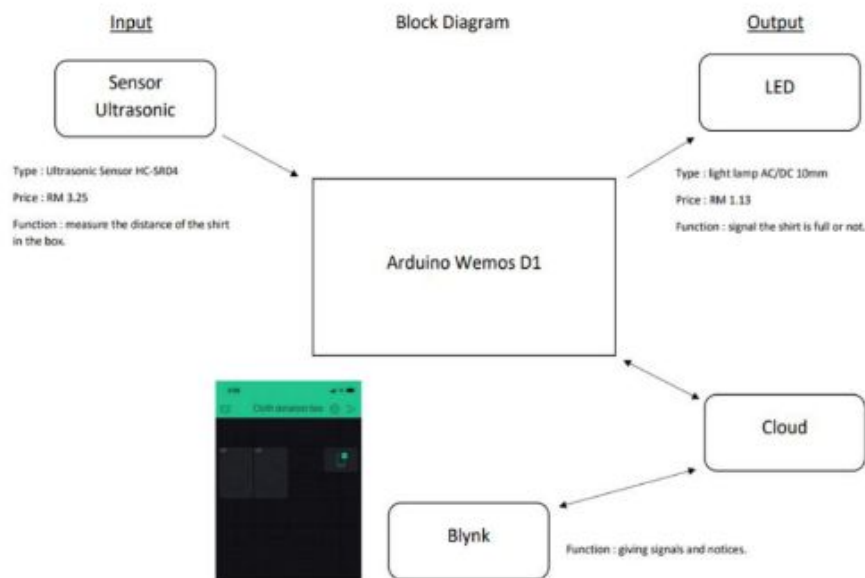


Figure 1: Block diagram of the automated smart hanger system

The following figure is the prototype of the Clothes Donation Box.



Figure 2: Prototype of the project

RESULT AND DISCUSSION

Green LED lights up indicate as the box is still able to receive clothes, while if the Red LED lights up means the box is full and notification will be sent to mobile phone mention as 'KOTAK PENUH'. The following figure shows the result.

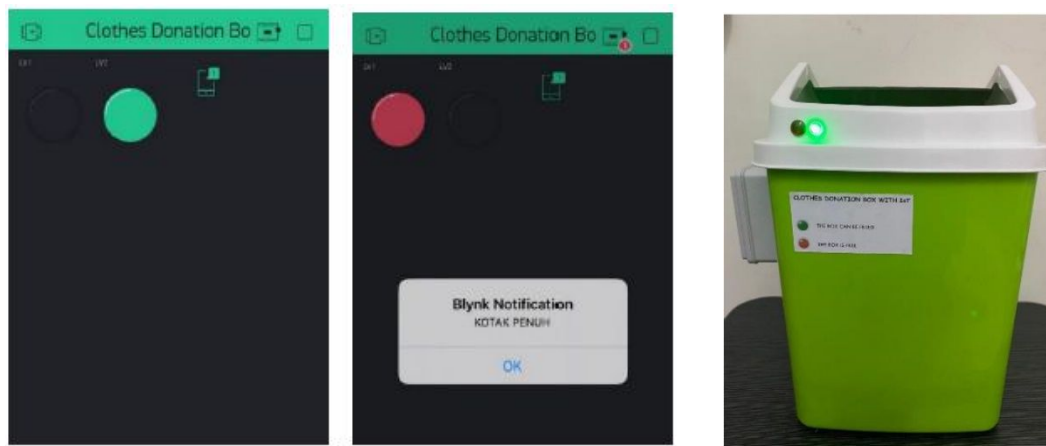


Figure 3: The final product

CONCLUSION

As a conclusion, the objective of this project is achieved to provide space for peoples to dispose unneeded clothes in practical way. Long distance monitoring is the biggest advantages for the owner as not require staying 24 hours near the machine.

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SMART AUTOMATIC HANDWASH

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Abstract - Hand washing is a practice of cleaning everybody's hands of germs. It is now a necessary process after completing any activity. Washing hands can help prevent any infectious diseases that are spread through contact. Every individual needs to apply the practice of hand washing well to get rid of bacteria or viruses on the hands. This hand washing practice involves three important steps which are rinsing, soaping, and drying. The main focus of this paper is to design a convenient automatic hand washer that involves 3 vital steps in a good hand washing practice. Smart Automatic Handwash uses the Arduino NANO micro-controller to receive data transmitted by IR sensors. This machine controls the water and soap automatically according to the prescribed sequence using the micro-controller Arduino NANO. In addition, this paper is also focused on the simulation of the flow rate of water and soap to match the distance of the hand and tap. Smart Automatic Handwash is also an automatically functioning tool that does not require a single touch from the user to operate.

Keywords - Automatic Handwash, Arduino NANO, IR sensor, micro-controller

INTRODUCTION

The practice of hand washing is important because it can prevent the spread of infectious diseases such as Covid-19. To prevent the cause of this virus, it can be done by keeping a distance of at least 1 meter, avoiding going to crowded places, avoiding touching the eyes, mouth, and nose when outside, and cleaning the hands with soap or alcohol-based hand rub [1]. Despite increasing awareness of the importance of hand washing and a range of other hygiene behaviors [2]. A large number of people do not practice hand washing techniques well. While the level of public awareness now of the importance of proper hand washing is increasing, case statistics are also on the rise around the world. This is because bacteria or viruses can survive for hours or days on surfaces such as doorknobs, elevator buttons, stairs, and so on. They can be spread to other individuals through direct or indirect contact. Five important steps need to be followed to have good hand washing practice. The five steps are wet, lather, rub, rinse and dry. Hands should be rubbed well for at least 20 seconds to get rid of germs and bacteria on the hands. The three elements that can get rid of germs on the hands are water, soap and dryer. The design of the automatic hand washing device was created to facilitate the hand washing process more effectively. In addition, smart automatic handwash will effectively remove any germs on the hands and will reduce infections that occur in the community.

METHODOLOGY

The flow chart of the project is shown in Figure 1. Demonstrates the design of the smart automatic handwash container system consisting of block an IR sensor. If the IR sensor senses the motion of hand, it will send data to Arduino. Arduino send data to the relay to activate the water pump. After that, IR sensor detector detects the user's hand, the water goes out for 10 second and the user can use it. IR sensor detector detects the user's hand against, and soap goes out for 2 seconds. The water will then come out for 10 second to give the user a hand wash. This project controls the water and soap automatically according to the prescribed sequence using the micro-control Arduino NANO.

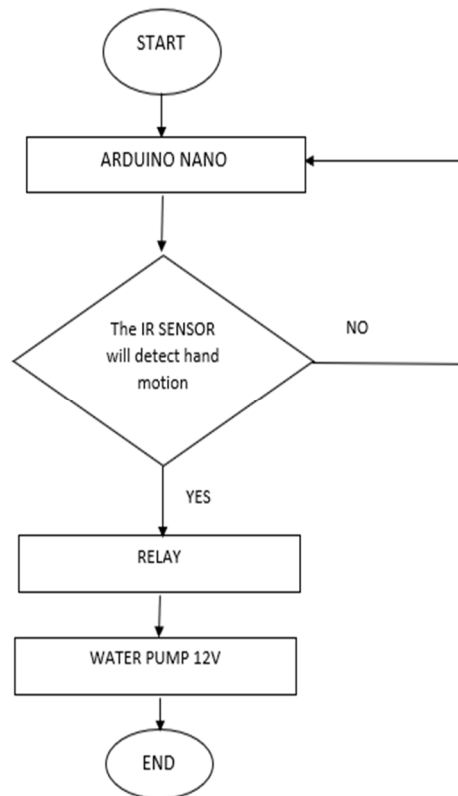


Figure 1: Flowchart of the Smart Automatic Handwash

RESULT AND DISCUSSION

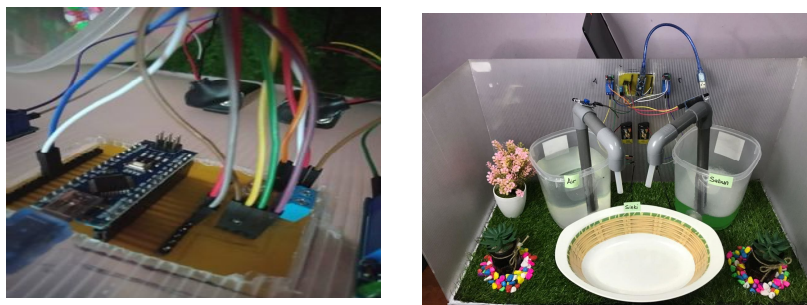


Figure 2 : Prototype of the project

The IR sensor connected with the microcontroller will work automatically detect hand motion within 3cm distance. When the input gets a signal, Arduino send data to the relay to activate the water pump or soap pump. The water or soap will come out automatically through the pump. This can prevent the spread of bacteria's or viruses because there is no need to touch the pump directly.

CONCLUSION

The Smart Automatic Handwash device suggested in this study is intended to help reduce viral infection by providing contactless hand disinfection in public settings. As a result, it can be concluded that the system is capable of operating smoothly and preventing the spread of Covid-19. It is also cost-effective and environmentally beneficial since it reduces trash emissions.

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DOORLOCK SYSTEM BY USING KEYPAD

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Abstract - This project is about a house door control system by using numbered security on the keypad instead of the use of commonly used keys. The Arduino Uno components that have been placed on the door have been programmed and connected with a keypad to open the door and after some period of time the door will close automatically. The system also uses IOT hardware i.e. computers to program project tools that use Arduino Uno as the main source of system control. This project was initiated to prevent the occurrence of the crime of home theft that is rampant at this time. The purpose of this developed project is also to see how the servo motor functions when keywords are entered on the keypad.

Keywords - Keypad, keys, Arduino Uno, security

INTRODUCTION

The project uses the Arduino Uno as the main circuit and keypad to enter the password for the home door control. We will create a number-coded security system for house doors where when anyone wants to open the door must enter the correct password on the keypad. When the password is entered correctly, the door will open automatically. As we know, almost all residential doors use locks to open the doors. This opens up space and exposes strangers or thieves to break in easily by leveraging the locker or using an artificial key. With the development of this project, it can help increase security at the door of the house and further protect the house from being invaded by strangers.

METHODOLOGY

Figure 1 shows the flow chart for this project. To use this system, users are required to enter the correct security number to enable the door to open. If the security number or password entered is correct then the door will open and if wrong the door will remain closed.

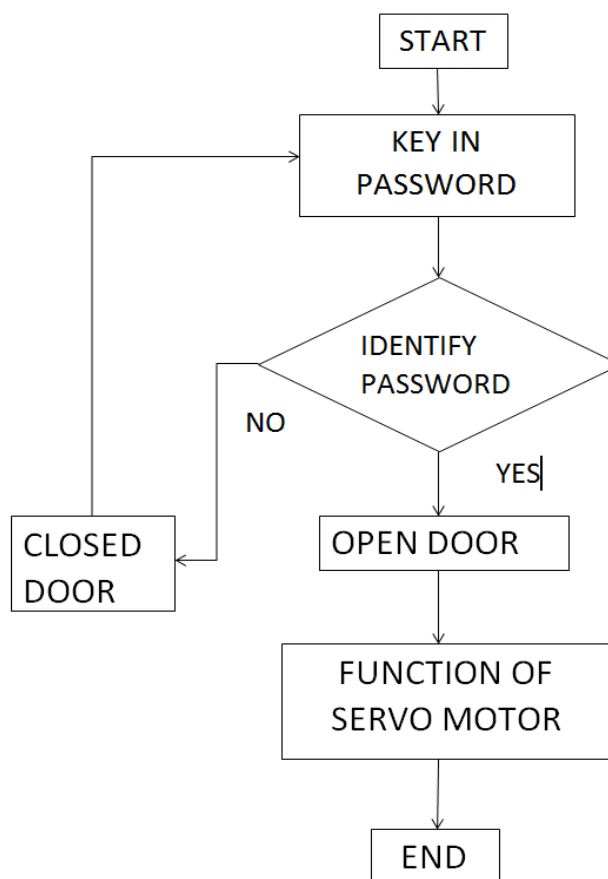


Figure 1: Flowchart Doorlock System by Using Keypad

RESULT AND DISCUSSION

Figure 2 below shows the circuit connection placed on the door of a residential house. The keypad is placed next to the door to make it easier for users to enter the correct number code or password. Servo motors are used for movement to open and close the door of the house. If the security number or password entered is correct then the door will open and if wrong the door will remain closed.

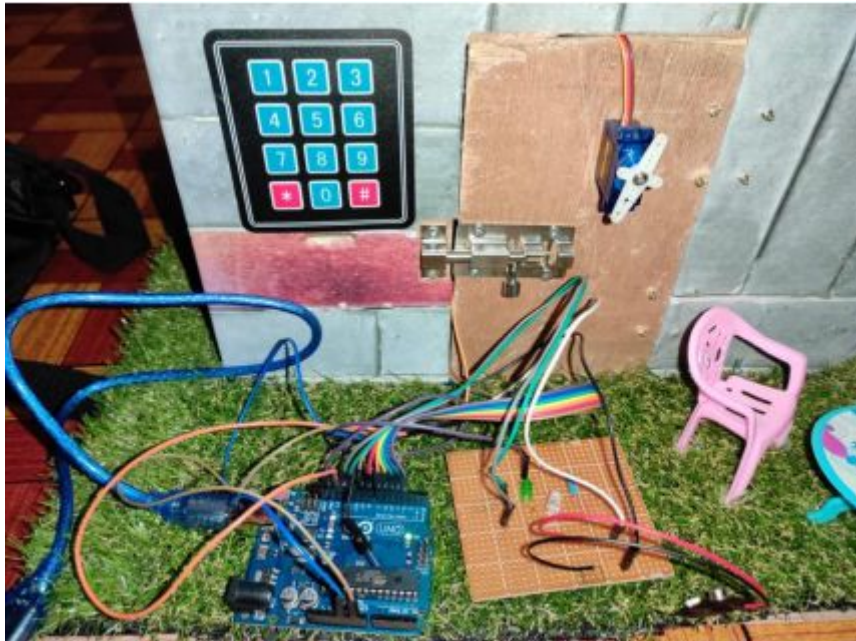


Figure 2 : Doorlock System Connection

CONCLUSION

As a conclusion, we developed a security system using this numbered password is to protect residential homes from the threat of strangers or thieves. If this project can be applied, it will reduce the risk of theft in consumers' homes. In addition, we hope that this safety system can protect the residents of the house and also the loss or damage of property in the house. For future suggestions, can be supplemented with the use of voice recognition codes that can detect the identity of members of the house only at the place of opening the door to protect our residential home.

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