ELECTRICAL ENGINEERING DEPARTMENT (EED)
POLITEKNIK TUANKU SULTANAH BAHIYAH

PEECOM

EED EXTENDED ABSTRACT

2024

EDITOR'S NOTE

CHIEF EDITOR
Dr. Rahimah binti Abdul Rahman

Alhamdulillah to Allah SWT for His grace and mercy. It is with great pleasure that we present the latest edition of PEECOM - EED Extended Abstract. This publication highlights the exceptional research and innovation produced by the final year students of our esteemed department. The Extended Abstracts included in this edition cover a wide range of topics, from cutting-edge technology to creative solutions for real-world problems.

We hope that this edition of PEECOM - EED Extended Abstract serves as a testament to the hard work, dedication, and creativity of our students and faculty.

We believe that the research and innovation highlighted in this publication will make a significant contribution to the advancement of knowledge in their respective fields.

Thank you for your continued support, and we hope you enjoy reading this edition.

What's inside...

ABOUT PEECOM

PEECOM is the abbreviated name for Electrical Power, Electronic, Communication, and Computer Engineering. PEECOM is an annual newsletter published by the Electrical Engineering Department (EED), Politeknik Tuanku Sultanah Bahiyah.

PEECOM shares program information and technical articles produced by lecturers and students.

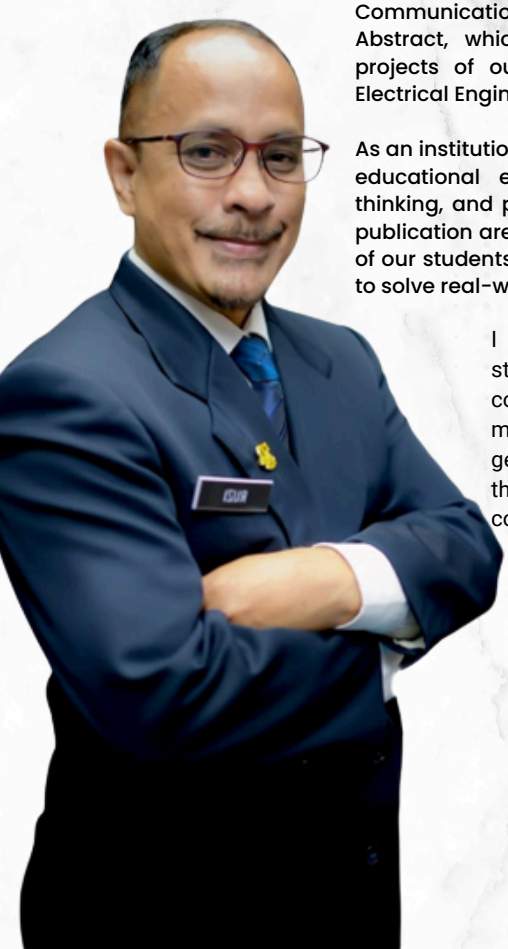
HIGHLIGHT

1. Course Information
2. Final Year Project (FYP) Extended Abstract

PTSB DIRECTOR'S NOTE

TN. HJ. MOHD RUZI B. HAMZAH

DIRECTOR OF PTSB



Alhamdulillah to Allah SWT for His grace and mercy. I am delighted to present to you the Power Electrical Electronic, Communication and Computer (PEECOM) - EED Extended Abstract, which highlights the innovative and insightful projects of our talented students in the Department of Electrical Engineering.

As an institution, we are committed to providing an enriching educational experience that nurtures creativity, critical thinking, and practical skills. The extended abstracts in this publication are a testament to the dedication and hard work of our students, who have applied their knowledge and skills to solve real-world problems.

I would like to express my appreciation to the students, faculty members, and staff who have contributed to the success of this publication. It is my hope that this publication will inspire future generations of students to pursue excellence in their academic pursuits and make valuable contributions to their respective fields.

HEAD OF DEPARTMENT'S NOTE

PN. IDA SAFINAR BINTI AZIZ

Head of EED Department

Alhamdulillah to Allah SWT for His grace and mercy. I am pleased to introduce the latest edition of the PEECOM - EED Extended Abstract, which features the outstanding work of our final year students in the Department of Electrical Engineering (EED). This publication is a testament to the dedication and hard work of our students, as well as the guidance and mentorship of our esteemed EED members.

In this edition, you will find a diverse range of topics, from innovative IOT systems in agriculture to cutting-edge research in renewable energy. These extended abstracts provide a glimpse into the breadth and depth of the work being carried out by our students, and serve as a testament to the quality of education and training that our department provides.

I would like to extend my heartfelt congratulations to all the students who have contributed to this publication. Your hard work and dedication have paid off in producing innovative and impactful research that has the potential to shape the future of our industry.

I would also like to express my gratitude to the lecturers who have supported and guided our students throughout their academic journey. Your unwavering commitment to education and research has inspired our students to achieve great heights of excellence.

I hope that this publication will serve as a source of inspiration and motivation for all of our readers, and that it will continue to highlight the incredible work being done by our students and EED members.

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ELECTRICAL ENGINEERING DEPARTMENT

COURSE INFORMATION

ELECTRICAL ENGINERRING DEPARTMENT

Electrical Engineering Department (EED) is the of the academic departments in Politeknik Tuanku Sultanah Bahiyah (PTSB). It offers an engineering program in electrical and electronics field for diploma level.

EED offers quality efficient education and professional services through a broad-based knowledge within the field of electrical and electronic engineering. The aim is to produce graduates with potential, competent and competitive as well as highly skilled. In order to achieve commendable work, EED is comprised of dedicated professional trainers, with sufficient infrastructure.

EED

PROGRAMS OFFERED

1. Diploma in Electrical Engineering (DET)
2. Diploma in Electronic (Communication) Engineering (DEP)
3. Diploma in Electronic (Computer) Engineering (DTK)
4. Diploma in Electrical and Electronic Engineering (DEE)

PROGRAM SYNOPSIS

DIPLOMA IN ELECTRONIC ENGINEERING (COMPUTER)

The Diploma in Electronic Engineering (Computer) covers the broad discipline of electronics engineering, with specialization in computer technology, which includes electrical and electronic fundamentals, computer fundamentals and programming, semiconductor devices and computer aided design while emphasizing the area of specialization. The specialization courses include microprocessor fundamental, computer architecture and organization, database system, operating system, internet based controller, computer diagnosis and maintenance, CMOS IC design and fabrication and project.

DIPLOMA IN ELECTRICAL ENGINEERING

The Diploma in Electrical Engineering programme covers the broad discipline of electrical engineering which includes electrical and electronic principles, computer fundamental and programming, computeraided design, semiconductor devices, wiring installation, power system, electrical machine and programmable logic controller. The green technology elements are also incorporated in the curriculum to provide awareness toward the importance of the sustainable energy.

DIPLOMA IN ELECTRICAL AND ELECTRONIC ENGINEERING

The Diploma in Electrical and Electronic Engineering programme is designed to cover the broad discipline of electrical and electronic engineering which includes electrical and electronic principles, computer fundamental and programming, computer aided design, semiconductor devices, communication systems, wiring installation, power system, electrical machine and programmable logic controller. The green technology elements are also incorporate in the curriculum to provide awareness towards the importance of sustainable energy

DIPLOMA IN ELECTRONIC ENGINEERING (COMMUNICATION)

The Diploma in Electronic Engineering (Communication) covers broad discipline of electronics engineering, with specialization in communication technology which includes, electrical and electronic fundamentals, computer fundamentals and programming, communication system fundamentals, semiconductor devices, and computer aided design, while emphasizing the area of specialization. The specialization courses include telecommunication network, fibre optic communication system, data communication and networking, wireless communication and microwave devices.

JOB PROSPECT

This programmed provides the knowledges and skills in electrical engineering that can be applied in the broad range of careers in electrical field. The knowledge and skills that the students acquire from the programmed will enable them to participate in the job market as:

DET

Technical Assistant /Specialist
Technical Designer
Production Technician
Self Employed/ Entrepreneur
Electric/Electronic Technician
Assistant Engineer
Electrical/Electronic
Engineering Supervisor
Process Control Technician

DEE

Technical Assistant /Technical Specialist
Self Employed/ Entrepreneur
Production Technician
Network Planner
Electric/Electronic Technician
Assistant Engineer Electrical/Electronic
Engineering Supervisor
Technical Designer
Assistant Network Engineer

DEP

Technical Assistant/ Technical Specialist
Self Employed/ Entrepreneur
Production Technician
RF Engineer Assistant
Network Planner
Electric/Electronic Technician
Assistant Engineer Electrical/Electronic
Engineering Supervisor
Computer Service Technician
Technical Designer
Assistant Network Engineer

DTK

Technical Assistant / Technical Specialist
Self Employed/ Entrepreneur
Programmer/Developer
Production Technician
Network Planner
Electric/Electronic Technician
Assistant Engineer Electrical/Electronic
Engineering Supervisor
Computer Service Technician
Technical Designer Assistant Network
Engineer

LIST OF PAPERS

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DIGITAL VOLTMETER FOR MEASUREMENT SYSTEM

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Abstract – The abstract discusses digital voltmeters (DVMs), covering their types, how they work, and design challenges. DVMs use methods like analog-to-digital converters to turn analog voltages into precise digital readings, crucial for electronic measurements. Switching from analog to digital brings benefits like better resolution, accuracy, and advanced features. Key DVM types are mentioned, considering factors like cost and speed. Design considerations for accurate measurements involve error correction, calibration, and addressing noise and temperature variations. This summary is useful for those seeking basic knowledge on digital voltmeters for various applications.

Keywords –DVM , ESP32 , Blynk.

INTRODUCTION

The introduction of digital voltmeters (DVMs) revolutionized electronic measurement, replacing analog counterparts with advanced technology and analog-to-digital converters (ADCs). DVMs offer precise voltage measurements, improved resolution, and features like digital displays. Various types cater to specific needs, such as dual-slope integrating and successive approximation. This evolution enhances precision, reliability, and adaptability in voltage measurements for diverse applications. The discussion ahead explores DVM types, concepts, and design considerations in contemporary electronic measuring systems.

METHODOLOGY

The digital voltmeter methodology employs ADCs for precise voltage measurements, aligning with study goals. It outlines the research design, sampling plan, and digital components, emphasizing relevant data collection techniques. In brief, it ensures a thorough understanding of the digital voltmeter's operation in the research context.

RESULTS AND DISCUSSION

The result of Digital Voltmeter (DVM) Blynk channel are shown in Figure 1.

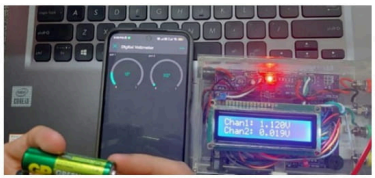

Figure 1 Blynk

My voltmeter testing using blynk (iot) is succeeded but accuracy still needs to be improved. when I want to use Blynk, I need to change the coding to a new one so that the Blynk operation succeeds.

Table 1 Data Analysis

Battery	Result
Battery 1	Manual Channel 1: 1.16V
	Manual Channel 2: 1.16V
	Blynk Channel 1: 1.16V
	Blynk Channel 2: 1.16V
Battery 2	Manual Channel 1: 1.52V
	Manual Channel 2: 1.52V
	Blynk Channel 1: 1.52V
	Blynk Channel 2: 1.52V
Battery 3	Manual Channel 1: 1.46V
	Manual Channel 2: 1.46V
	Blynk Channel 1: 1.46V
	Blynk Channel 2: 1.46V

This digital voltmeter is functions properly, measures the voltage, and is reasonably accurate. Additionally, the findings obtained by sending the voltage via Blynk or the Internet of Things (IoT) match those shown on the display screen.

CONCLUSIONS

In summary, the successful Digital Voltmeter For Measurement System project offers portability and cost-effectiveness. Challenges include circuit and code instability, limited 0V to 6V voltage detection, and slower IoT/Blynk connectivity. To enhance performance, improvements like a larger battery, faster processing through code updates, and an expanded voltage range for laboratory use are needed. Despite challenges, the project stands out for its unique advantages, providing convenience for users both in and outside the laboratory.

ACKNOWLEDGEMENTS

The authors would like to thank to supervisor Dr. Nor Aizam Binti Mohamed Yusof for guiding me throughout this project.

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[2] B. WatElectronics, "WatElectronics.com," 2022.

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ALPHABET RECOGNITION USING DEEP LEARNING

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Abstract – This paper presents researcher going to make alphabet recognition by using deep learning. Deep learning is a subfield of machine learning and artificial intelligence (AI) that focuses on training and building artificial neural networks to learn and make intelligent decisions from vast amounts of data. It works by detecting hand motion and translating it into words. Goal for this project are to make deep learning serve as the basic tool for those who want to learn more about the basic of sign language also develop a system that will recognize static sign gestures and change them to words.

Keywords – Deep learning, image recognition, Alphabet in sign language, Python, PyCharm.

INTRODUCTION

Communication presents a significant barrier for persons with such disabilities. The use of deep learning methods can help to reduce communication barriers. This project proposes a deep learning-based model that detects and recognizes the words from a person's gestures. Deep learning-based Sign Language Recognition is a technology that will aid in the early understanding of sign language. It works by detecting hand motion and translating it into words. One of the benefits of Deep Learning architecture is its ability to incrementally extract high-level characteristics from data. Other than that, Deep learning perform very well on image, audio, and text data.

METHODOLOGY

The experiment were carried out in different brightness for testing. This part also includes details about the data sources, instruments, and techniques used. Three different brightness were used to measured the accuracy of the experiment

RESULTS AND DISCUSSION

The accuracy of the project are shown in Figure 1.

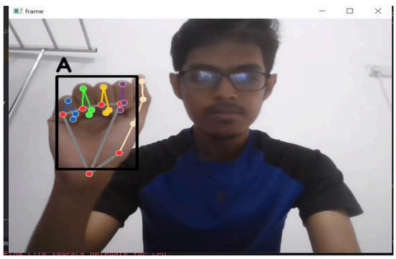

Figure 1: Picture above shown result of the project.

The result shows that the accuracy in normal brightness is higher with 90% succesfully detecting the hand gesture compared with the others brightness.

This project also makes use of PyCharm, which is primarily designed for use on desktop and laptop computers.The process of analyzing data reading results is crucial for making informed decisions, drawing conclusions, and gaining a deeper understanding of the phenomena under investigation. In this project, the experiment obtain 70% of accuracy. To increase it accuracy it required a data collection more than 10,000 photos. .

Table 1: The accuracy of the project based on the environment brightness

Environment Condition	Accuracy
Dim light	50%
Normal brightness	90%
Very Bright	70%

The result shows that the normal brightness are the best brightness to this project based on it accuracy. This shown that the environment brightness also give impact to the missaccuracy for image recognition.

CONCLUSIONS

The project's main conclusion is that by effectively employing deep learning to recognise alphabets, it has accomplished its goal. Additionally, this study properly recognised 24 different alphabet sign languages using data that was learned and the the data were stored.

ACKNOWLEDGEMENTS

The authors would like to thank the project supervisor, for the guidance and anyone who directly or indirectly helped in the production of this project.

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DIGITAL POWER SUPPLY

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Abstract – This paper introduces the Digital Power Supply Control System, employing ESP32 and Blynk, to address challenges in traditional power supply systems for students. With a focus on user-friendly interfaces, real-time monitoring, and remote control capabilities, this innovative solution enhances student engagement and improves understanding and application of digital control principles in educational settings.

Keywords –ESP32, Blynk, user-friendly, educational

INTRODUCTION

Digital power supplies convert AC to stable DC for electronic circuits, providing monitoring data for precise control. With advantages such as higher reliability, cost-effectiveness, and flexible hardware implementation compared to analog counterparts, this introduction explores the benefits of using digital power supplies. The goal is to streamline electrical controls, particularly for Electrical Engineering students relying on power supplies for learning.

METHODOLOGY

This project is carried out by using ESP32 as microcontroller and using PWM control technique to adjust the voltage value and also using Blynk application to monitor and also adjust the voltage for the output.

RESULTS AND DISCUSSION

The digital control interface that are used to control the output are shown in Figure 1.

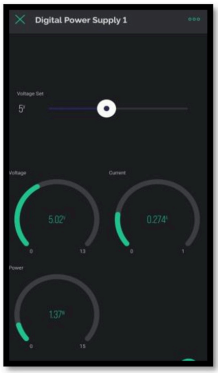

Figure 1: Blynk Control Interface

Table 1: Result Testing

Voltage Set (V)	Voltage Read (V)	Current Read (A)	Power (W)	Voltage Read with multimeter (V)	Current Read With multimeter (A)	Power (W)
0.0	0.000	0.000	0.0	0.00	0.000	0.0
1.0	0.996	0.255	0.25	0.97	0.24	0.23
3.0	3.025	0.265	0.80	3.00	0.24	0.72
5.0	5.044	0.271	1.37	5.02	0.26	1.31
7.0	7.043	0.276	1.94	7.02	0.27	1.90
9.0	9.046	0.281	2.54	9.01	0.27	2.43
12.0	11.973	0.283	3.39	11.95	0.28	3.35

The result shows that the value of voltage set,voltage read,current read and power value.The results is compared to the reading with digital multimeter.

The value shows a very little fluctuation was observed, indicating that the prototype can sustain precise voltage levels in a variety of settings.The observed current values at various voltage settings closely match the expected values, indicating accurate control.The value of power is obtained by using formula $P=VI$.

CONCLUSIONS

The digital power supply project, utilizing ESP32 and Blynk, offers a flexible and remotely accessible solution. The Blynk interface allows users to control and monitor the system, addressing challenges for reliable operation. The ESP32's wireless capability aligns with IoT, paving the way for future integrations. With a modular design and Blynk integration, the project demonstrates effective hardware and software synergy for user-friendly adaptability..

ACKNOWLEDGEMENTS

The authors would like to extend his sincere gratitude to Dr. Nor Aizam Binti Muhamed Yusof, the project supervisor, for her full guidance and insightful suggestions, which greatly facilitated the completion of this project.

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AUGMENTED REALITY BOARD GAME: FOR EDUCATION LEARNING IN FIBER OPTIC CHARACTERISTICS

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Abstract – This project focuses on developing an augmented reality (AR) game that combines art elements with AR technology for a unique gaming experience. The game incorporates 3D visuals and QR Codes, using shapes, colors, and lines to create a nonrepresentational visual language. Augmented reality enhances immersion by placing digital graphics, animations, and visual effects on the physical game board. The interactive experience involves dynamic shapes and colors responding to player movements, providing a novel gaming experience. The AR game aims to engage players visually and sensorially, challenging them to strategize in 3D animation.
Keywords –AR Board Game, 3D Visuals, QR Codes

INTRODUCTION

This AR game combines real-world and digital elements through 3D animation, providing an immersive user experience. Using AR technology, users manipulate 3D objects in their surroundings, creating an interactive learning experience focused on technology and 3D animation within the context of AR board games. Users engage by moving components or smartphones, observing 3D animation behavior, and participating in quizzes and challenges to assess understanding. The game specifically introduces concepts like fiber optic systems, catering to visual learners who may find traditional teaching methods challenging.

METHODOLOGY

This project implements the design techniques used to produce AR games in a simple way. This project uses QR codes provided for users to scan. It also has a game board designed to attract more players to try this game.

RESULTS AND DISCUSSION

This QR code was created to allow users to scan to see the 3D animation that has been created are shown in Figure 1.

Figure 1: QR Code

Through the use of QR codes, players can see 3D animations, interactive features, or additional content by scanning codes with their smartphones or AR devices. This also serves as a bridge between physical components and digital content, expanding the possibilities for engaging gameplay. QR codes can be strategically placed on the game board, linking to relevant information, challenges, or multimedia elements, thereby creating a dynamic and immersive AR gaming environment. This approach encourages users to explore, interact, and discover hidden layers within the game, contributing to a more captivating and enriching gaming experience.

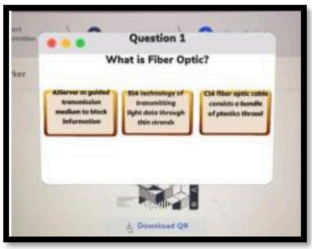

Figure 2: Player animation by scanning QR Code from smart phone

The result shows that the QR Code can be utilized to unlock new 3D Animations characters, or story providing a sense of achievement and progression for players.

CONCLUSIONS

In conclusion, the adoption of the AR game board is a strategic initiative aimed at students' interest and enthusiasm for learning, both in and outside traditional classrooms.

ACKNOWLEDGEMENTS

The authors would like to thank supervisor for the guidance and discussions given to me throughout this project. I greatly appreciate the understanding, encouragement and continuous support given during the completion of this project.

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SMART TROLLEY SYSTEM-AUTOMATED BILLING USING ESP-32

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Abstract – We require an ESP-32 board, an RFID tag, an RFID reader, an LCD display, and a buzzer in order to accomplish this. Next, people may stop supermarkets from defrauding them by not raising the price of their products when they pay for them. The buyer suffers even if only a modest amount is taken. Flow charts serve as a guide for production planning and project testing during the component formation process, which is planned utilizing methodical investigations. Due to the project's completion, the community no longer has to wait in line to make payments at the grocery store, which has considerably saved time.

Keywords –SMART TROLLEY SYSTEM, total the prices of each item, RFID, ESP-32.

INTRODUCTION

Initially, bil dalam format kertas was used to create payments at open markets. To read and modify the code bar,use the bar code scanner.. However, the payment is made to the RFID-enabled smart trolley system, which is a digital payment terminal used for cashiering and sales. Using an elektromagnet, the reader may read or write data to an RFID tag.

METHODOLOGY

All pertinent information regarding the techniques utilized to finish this project will be covered in full in this chapter. In other words, the ESP-32 is turned on and the LCD screens are ready for usage when the power source is connected. After scanning the RFID card, you can add or delete products by pressing the plus or minus buttons, and once payment has been received, you can send the item by pressing the send button. The bill will be entered into the Telegram program.

RESULTS AND DISCUSSION

The result of SMART TROLLEY SYSTEM for totaled itemas are show in Figure 1.

Figure 1: The LCD displays the total items

The picture above shows an LCD display that sums up all the prices of items that have been taken by the user by scanning the RFID card on the item. This has saved the user time when purchasing goods without having to waste time looking for a place to scan the goods provided, as well as not having to queue at a display.

Table 1: Attempt to scan the RFID card

BIL	CARD COLGATE	CARD TISSUE	CARD DETTOL	CARD SHAMPOO	DISPLAY ON LCD	NOTE
1.	√	√	√	√	√	The sensor detects all cards
2.	√	×	×	√	√	Card tissue and dettol are not detected by the sensor
3.	×	√	√	√	√	The colgate card cannot be detected by the sensor
4.	√	×	√	√	√	The tissue card is not detected by the sensor
5.	√	×	√	√	√	The tissue card is not detected by the sensor
6.	×	√	√	√	√	Card dettol cannot be detected by senor well

The aforementioned findings demonstrate an attempt to scan the item card up to six times in order to determine whether or not it was successfully discovered.

CONCLUSIONS

Each project implemented has its own importance and objectives. The same is the case with this "Smart Trolley System" project. Although many weaknesses were identified, the objectives for this project have been successfully achieved. This chapter is the last chapter in the study, and in general, this chapter will discuss in more depth the results of the study for the entire report. These findings are supported by opinions that can strengthen the results of the analysis of the study.

ACKNOWLEDGEMENTS

The author expresses gratitude to Mrs. Fadzilah Binti Hashim for her assistance in preparing this report. And thanks to the PTSB for giving the writer access to resources that helped this endeavor succeed.

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INDOOR AIR QUALITY MONITORING SYSTEM

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Abstract - The scope of this project mainly focuses on the concept of monitoring air properties because the project is designed to be a sensor-based system to monitor the air quality. By using internet of things (IoT), it enables us to monitor the data regarding the air quality online. when the pollutant level increases and exceeds the standard air quality index, the sensor-based system will activate a buzzer to notify us.

Keywords– Air Quality, Sensor-based, IoT, Monitoring

INTRODUCTION

To monitor the air quality of a surrounding, it can be done by installing an air quality monitoring system to always monitor the air quality to make sure the air is not contaminated. This can be achieved by installing certain sensors to monitor the carbon dioxide percentage, temperature, and air humidity and this information can be relayed to the public through the usage of internet in our smartphones. An app in our smartphone allows us to monitor real-time data of the air quality of said place at the time. By implementing this, better quality of life can be obtained. To keep in track of several contamination of the air, I have proposed a design of a project based on IoT system and a few sensors which help us monitor the quality of air.

METHODOLOGY

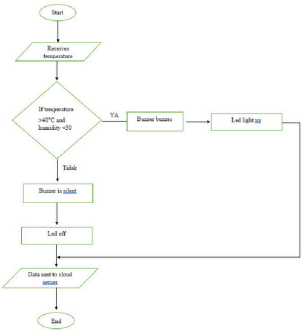

Figure 1: Project Flow Chart

RESULTS AND DISCUSSION

The results show the indoor air quality attributes measured such as temperature, humidity, CO2 level and TVOC with intervals of 10 seconds.

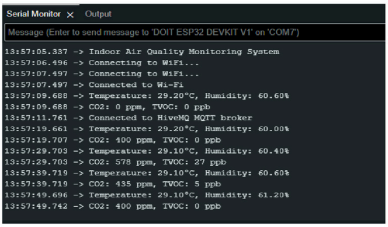

Figure 2: The result display

Figure 2 above shows the result of Temperature, Humidity, CO2 level and TVOC of an indoor room.

Table 1: Results of Air quality in an indoor environment

Air Quality	Readings every 10 seconds				
Temperature (°C)	29.20	29.20	29.10	29.10	29.10
Humidity (%)	60.60	60.00	60.40	60.60	61.20
CO2 (ppm)	0	400	578	435	400
TVOC (ppb)	0	0	27	5	0

CONCLUSIONS

In this project, we can see that the prototype build was successful. This project helps tackle the importance of indoor air quality. In conclusion, the Indoor Air Quality Monitoring System achieved its objective to help make monitoring air quality easier to its user.

ACKNOWLEDGEMENTS

The author extends gratefulness to teachers and parents who aided with financially and guided to complete this project. Also special thanks to friends who helped with making this project a success.

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SOLAR LEARNING KIT

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Abstract – This project Solar Learning Kit for educational purpose. Solar power trainer owned by PTSB is not enough and the price for solar power models is expensive because the cost of solar power models produced in the market is expensive. To solve the problem,the project will develop a solar power model for educational purposes that can measure the reading values of current, voltage and even light intensity will automatically be displayed on the LCD display. In this project using 20wp (Watt Peak) Solar panels to convert light energy into electricity. The project has three sensors namely current, voltage and light sensors. The components used are ina219 sensor to measure current output, voltage sensor to measure voltage output generated by solar energy and LDR sensor module to measure light intensity. To monitor the measurement, it uses the LCD display to directly observe the measurement of the display output.

Keywords –measure reading values of current, voltage and light sensors, LCD display, the measurement of the display output.

INTRODUCTION

In this project, the real-time grid assistance kit from low-power direct current to high-power alternating current is modeled as a solar education training kit for early education exposure to understand about the sustainability of solar energy processes. The system consists of a light detection system, a voltage indicator and a switching system combined with a Programmable Integrated Circuit (PIC). Solar modules are the main components in solar power generation systems that convert sunlight into electricity, where the electricity produced is in the form of voltage and DC current.

METHODOLOGY

The project is designed with a standard form. ESP32 is the main component in this project as operation for readings from light sensor, voltage sensor and current sensor. From the readings, it will be possible to monitor the readings from the LCD display (liquid crystal display).

RESULTS AND DISCUSSION

The following are the results obtained which are displayed on the LCD display showing the values of output voltage, current and light intensity are shown in Figure 1.

Figure 1: Output result for 25 cm distance between solar panel and led lamp

Table 1: Output results of voltage, current and light intensity at each distance

Distance	Voltage	Current	Light Intensity
25 cm	11.62V	116.60mA	LDR: 90%
50 cm	11.58V	47.90mA	LDR: 82%
100 cm	8.81V	18.20mA	LDR: 65%
150 cm	5.45V	10.50mA	LDR: 47%
200 cm	3.89V	6.80mA	LDR: 33%

The result shows that the analysis obtained will be in accordance with the objectives and obtained in accordance with the theory of the subject DET30053-Power System that is the closer the distance between the solar panel with the light test, the more the value of the current and voltage that can be generated and the intensity of light is also higher.

CONCLUSIONS

This kit Model will be successful if the LCD display displays accurate results including voltage, current and light values. In addition, the project will be successful if solar energy works according to the theory expressed in solar power, the more light and the higher the output value of the current and voltage to be generated.

ACKNOWLEDGEMENTS

The authors would like to thank a lot supervisor, other lecturer and also to friend.

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EARTHQUAKE DETECTOR AND EARLY WARNING SYSTEM

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Abstract – This project is designed to solve the problems that arise in existing earthquake detectors to ensure the safety of valuable property and lives this project is divided into two main parts, namely hardware and software. Main components ESP32 and SW-1801P and Bylnk displays graph and indicator values not exceeding 100% and not less than 0%. Further investigation on other earthquake in ESP32 should be undertaken, in order to find the suitable filler that potentially for this project. This project to give early warning for users.

Keywords –Eearthquake detector, Blynk, ESP32, SW-1801P.

INTRODUCTION

Tremors has been examined for quite a while, and endeavors have been taken to keep away from this from being more regrettable. Quakes happen because of the arrival of energy in the earth because of the contact of structural plates that can prompt different catastrophes like torrents. quake locators that can inform clients or known as Seismic tremors Identifier and Early Admonition Framework decidedly affect clients by giving early alerts to occupants, saving lives, lessening property harm, and assisting geologists with understanding seismic tremor designs. Seismic tremor finders generally tracked down in regions in danger of getting effects, for example, high rises and resorts near mountains. Innovative improvement assumes a significant part with various more delicate purposes that permit tremors to be identified all the more precisely and rapidly.

METHODOLOGY

System for the developed this project. It is a project use one input vibration sensor SW-1801P, ESP32 as microcontroler and Output three type of LED green,yellow and red and Buzzer and connect to blynk server, user can use using phone to monitor also can check past vibration value using ThingSpeak.

RESULTS AND DISCUSSION

Results from the vibration received by SW-1801P are shown in Figure 1.

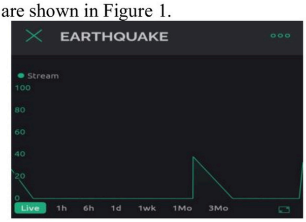

Figure 1:Graph Display through the Blnyk application

This graph functions as a reading indicator capable of storing vibration data in the form of a graph. The reading from the graph can be read from 0%-100% and the graph data can be viewed for up to 3 months.

Table 1: Alarm testing

Activities	Respond
SW-1801P detects vibration less than 15%	No Sound
SW-1801P detects vibration more than 15% and less than 70%	Repeated beeps
W-1801P detects vibration more than 70% and less than 100%	prolonged beep

Alarm testing aims to find out whether the alarm can sound when there is a vibration detected with a certain percentage. Testing is done with the SW-1801P sensor vibrated with a specific vibration

CONCLUSIONS

This can also help and raise the progress of preparedness technology in our country. In this regard, with the advancement of disaster preparedness technology, the country can set an example or be emulated by other countries and help the country's economic activities in a more advanced direction in the future.

ACKNOWLEDGEMENTS

Alhamdulillah, I am grateful to God for the abundance of grace and grace of time and blessed by God with a healthy body, I can also complete this project assignment to successfully complete the Electrical Engineering Diploma. I might want to commit my most extreme appreciation to my Madam Hartini for showing great direction and giving time in making this venture from only a plan to turning into a reality.

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BACKUP POWER SUPPLY WITH UPS SYSTEM

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Abstract – This project introduces a comprehensive Backup Power Supply system tailored for mini-house applications. It aims to maintain steady-state operation during pre-fault conditions with a UPS (Uninterruptible Power Supply) system, ensuring resident convenience and safety. Utilizing the ESP 32 microcontroller, the system seamlessly switches between a 12V 7AH Lead Acid Battery, DPDT relay, E27 Bulb (5W), and ESP32 for monitoring with Telegram notifications. The automated switching enhances power system reliability, offering a stable power supply, simplifying daily activities, and minimizing disruptions for mini-house residents.

Keywords – Overview of Uninterruptible Power Systems (UPS)

INTRODUCTION

Uninterruptible Power Supply (UPS) can provide power when the primary power source is temporarily disabled of supplying high quality electrical power to a load. Manufacturers of electric power supplies provide reliable and high-quality power flow for sensitive electrical load equipment. disruptions can cause serious harm to sensitive electrical equipment especially during the critical processing or production stages of an operation.

METHODOLOGY

Suitable brand of lead acid battery such as TH1270 7Ampere hours, SP4000 12V DC to 220V AC power inverter for UPS system that meets these requirements and ensure compatibility with the home's power infrastructure.

RESULTS AND DISCUSSION

Observe the receiver output of implemented power system model during pre-fault condition with Telegram apps.

Figure 1: Monitoring receiver output main supply

This project employs the Telegram application as an output to relay information to the home owner.

Using the ESP32 microcontroller and Arduino IDE, the system monitors the power supply status.
In the events of a main supply power failure, it sends a Telegram message notifying the home owner with "MAIN SUPPLY FAILURE - UPS ACTIVARED!!!" and, upon power restoration, sends another message stating "MAIN SUPPLY ACTIVATED - UPS DEACTIVATED.". This real-time communication through Telegram enhances the home owner's awareness of the power status, ensuring prompt information about any disruption and their resolution.

Table 1: Project component testing verify

Components	NOTES
ESP32	verify the ESP32's ability to monitor the power status
Dpdt relay	switching between the main and backup power
Power inverter	converting DC power from the backup battery to AC
AC plug	ability to facilitate the flow of power
Bulb	efficiently and consumes the expected power

The UPS system consumes 6.25W (5W for the bulb and 5V x 0.25A for ESP32) with a total current of 0.25A from the ESP32. Featuring a 7Ah battery, it offers a 28-hour backup duration, ensuring reliable power during outages. These metrics highlight the UPS system's efficiency and endurance, making it a robust solution for uninterrupted power in mini-house applications.

CONCLUSIONS

Lead Acid battery UPS is a viable and sustainable solution for mini-house backup power. Prototype development, data analysis, and sustainability show a well-rounded approach to addressing power outage challenges. It is functional and efficient, and it has long lifespan battery. Ongoing refinement of alternative energy solutions will contribute to a more sustainable future.

ACKNOWLEDGEMENTS

The author would want to express sincere gratitude to Madam Hartini for guidance and patience in great helping transform this project from a simple idea into a reality.

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ROAD POTHOLE LOCATION DETECTION SYSTEM

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Abstract – This project aims to enhance road safety by employing ultrasonic sensors for real-time pothole detection. The system, driven by an ESP32 microcontroller, identifies potholes exceeding 7 cm in depth. Upon detection, GPS coordinates are transmitted to an email address, facilitating swift action. The primary focus is on proactive driver alerts and efficient pothole identification, addressing safety concerns and minimizing vehicle damage. By mixing sensor technology with immediate email notifications through platform Thinger.io.

Keywords – ESP32, ultrasonic sensors, real-time pothole detection, email notification, Thinger.io.

INTRODUCTION

IoT technology, such as Thinger.io, is revolutionizing transportation in Malaysia by addressing road safety issues. Pothole detection, a critical application, aims to prevent accidents caused by poorly maintained roads. The "Road Pothole Location Detection System" employs sensors to identify potholes, sending their locations via a GPS module to Thinger.io. This innovative system contributes to safer and more comfortable roads, mitigating the impact of poorly maintained infrastructure and enhancing overall transportation safety in the country

METHODOLOGY

The project development process involved using microcontrollers (ESP32), Two ultrasonic sensors that measures depth of potholes and obstacle detection, L298N motor drive and DC motor that drives motor movement. Then, the buzzer used to generate sound when a pothole is detected and GPS/GSM Module sends location information to email and dashboard Thinger.io platform.

RESULTS AND DISCUSSION

The display on the email that user will receive when pothole is detected will show the reading value from ultrasonic sensor and the location value from GPS Module NEO-6M as shown in Figure 1.

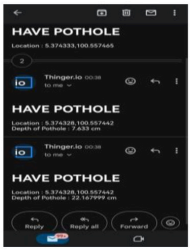


Figure 1: Email Notification

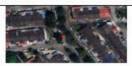
	Depth collected	Depth hole	Latitude	Longitude	Location Google Map	Buzzer
1	8.23cm	1.73cm	6.0900	100.3400		ON
2	17.56cm	11.06cm	5.3743	100.5574		ON
3	7.94cm	1.44cm	5.3842	100.5777		ON
4	10.50cm	4.00cm	5.3759	100.5556		ON
5	16.83cm	10.33cm	5.3762	100.5554		ON

Table 1: The result of pothole information

The result shows that the data collection for the depth of pothole found and the success of GPS data transmission as shown in Table 1, The height of the small car is 6.5 comfort a result, the height of the pothole must be subtracted from its depth. The mini car height is 6.5 cm. Thus, Depth of pothole that collected need to minus its height

CONCLUSIONS

The study of the Road Pothole Location Detection System on the tracking location of potholes and its depth has been investigated. The addition of this project will send email notification to users through platform Thinger.io.

ACKNOWLEDGEMENTS

The author thanks their parents and supervisor for their financial support and guidance. A particular thanks go out to friends and other lecturers at Polytechnic Lecturers for helping in various ways to complete this project.

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SMART COOLER TEMPERATURE PHONE USING IOT SYSTEM

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Abstract – This project is themed "Smart Cooler Temperature Phone using IoT System". This system is created from a combination of software and hardware that has been programmed. The program software used is ESP32 software. The objective of this project is to cool the smartphone in a certain period of time and maintain the temperature for a smooth and optimal performance for the user. Users can also adjust the fan speed of the cool temperature smartphone by using the application according to the user's convenience. The system is designed to be user friendly and energy efficient. This project uses the DHT11 temperature sensor as the main sensor.

Keywords –ESP32,DHT11 sensor,Blynk.

INTRODUCTION

In this highly sophisticated and technological era of globalization, most users have a smartphone as a daily necessity. "Smart Cooler Temperature Phone using IoT system" is an additional requirement for phone users to maintain performance and smoothness. This is because most users use smartphones as a necessity to complete tasks. After the spread of Covid-19 which resulted in the use of smartphones in daily life more significantly and almost to all sectors of learning and work only from home. As the need for smart phones is increasing, this tool is also in line with the development technology of today's world, and the system developed is an Internet of Things (Iot) system.

METHODOLOGY

The beginning of this project process is to detect the temperature, analyze the temperature to determine the fan speed and other processes.

RESULTS AND DISCUSSION

The results of a survey through google forms on the problems faced by smartphone users as shown in figure 1 below

Figure 1: Google forms question and the percentage of respondents who answered.

The results from google forms show that the answer "YES" is the answer with a high percentage which is 62.5% representing a total of 15 people while the answer "NO" is 37.5% representing a total of 9 people. Here we can see that the user's smartphone often experiences the problem of 'overheating' or heats up quickly at uncertain times

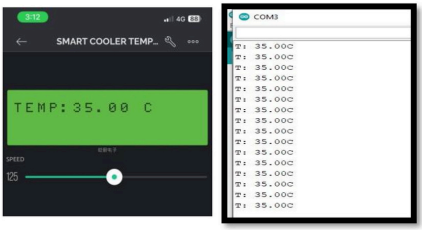

Figure 2: Temperature reading displayed on the blynk application

Based on the analysis of Figure 2, it is found that the temperature sensor will detect the phone's temperature level, and it will display the temperature reading on the Blynk application display so that the user can adjust the fan speed accordingly.

CONCLUSIONS

Based on observations and studies to complete this project, the researcher is confident that this project can overcome the problem of smartphone overheating due to its extreme usage time and can control the temperature for smooth and optimal performance for smartphone users.

ACKNOWLEDGEMENTS

The researcher would like to thank his comrades, family and supervisors for their advice, help and support throughout the completion of this project.

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CHILD DETECTION SYSTEM USING IOT

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Abstract – The "Child Tracking System using IoT" project aims to address the issue of missing children, especially in crowded places. Using an OLED Display, a GPS Module and an ESP32 microcontroller with WiFi capability, parents can track their child's location through the Telegram application, which is displayed on GoogleMaps. This project offers a practical solution to reduce the risk of missing children in public spaces. Suggested improvements include the use of the Blynk app for a more ergonomic design, improving tracking convenience for parents and caregivers.

Keywords: OLED Display, GPS Module, ESP32, Telegram application, GoogleMaps

INTRODUCTION

Child location tracking using technology such as GPS and mobile applications aims to improve the safety and protection of children. It allows guardians to monitor children's movements in real-time, reducing the risk of abduction or loss. While providing great benefits, the use of this technology needs to be ethical and respect children's privacy. Ethical and privacy issues need to be carefully considered, and use should be wise and responsible to ensure children's lives are safer and more prosperous.

METHODOLOGY

ESP32 has been used in this project as the main controller. It has controlled the full circuit in many ways. Also, there are one input and one output in this project. GPS Module is input and Telegram application are input in this project.

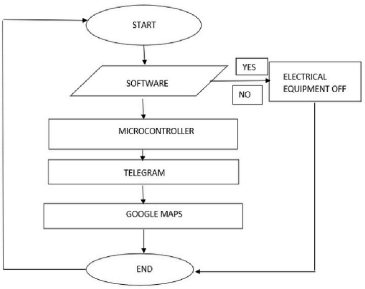

Figure 1: Project Flowchart

RESULTS AND DISCUSSION

In Figure 2, it shows the location of Google Maps in Telegram application.

Figure 2: Location in Telegram application.

CONCLUSIONS

In conclusion, the development of the "Child Detection System using IoT" project proves the author's ability to apply new knowledge from scientific studies and circuit construction skills. This project provides facilities for parents to monitor and locate children remotely through smartphones. The entire objective of the project has been achieved, including the functionality of accessing satellite readings and user locations directly with the condition of an internet connection.

ACKNOWLEDGEMENTS

The researcher would like to say thank you for the guidance and help from parents and supervisors in completing this project. The researcher also appreciates the help received from friends and the Polytechnic College in completing this project.

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SMART LECTURER AVAILABILITY SYSTEM

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Abstract – The Lecturer Availability System employs RFID technology with RC522 modules and keychains to track lecturers' presence. Lecturers scan their RFID keychain upon entering and leaving their rooms. An Arduino processes the data and updates an external LCD display, indicating whether the lecturer is "IN" or "OUT." This system prevents congestion, saves students time, and enhances overall efficiency in managing lecturer availability.

Keywords–tracks lecturers' presence,RFID keychain,LCD display,Arduino Nano

INTRODUCTION

The Smart Lecturer Availability System addresses the issue of students searching for lecturers without prior notice, leading to congestion and wasted time. By having lecturers scan RFID keychains upon entering and leaving rooms, the system displays "IN" or "OUT" status on a screen outside. This "win-win" solution enhances efficiency and privacy, making it suitable for both higher education institutions and schools. The user-friendly RFID technology ensures widespread adoption without complications, offering a practical way to manage lecturer availability and maintain a conducive environment for academic discussions.

METHODOLOGY

This project works by scanning the keychain to the RC522 RFID reader. Then, the Arduino Nano will process the data and will be sent to the LCD display. If it cannot be scanned correctly, it needs to be scanned again. After scanning, the "OUT" status will change to "IN" on the LCD display along with the lecturer's name.

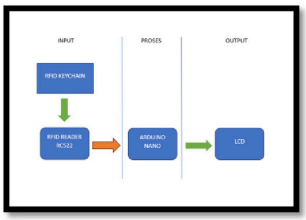

Figure 1: Project Block Diagram

RESULTS AND DISCUSSION

Analysis of the results to test the functionality of the project can be recorded in the following table 1.

Lecturer name	The state before the RFID keychain is scanned	The state after the RFID keychain is scanned
Lecturer 1	OUT	IN
Lecturer 2	OUT	IN
Lecturer 3	OUT	IN
Lecturer 4	OUT	IN

Table 1: Analysis of data results

The analysis that can be made based on table 4.1 is that the state of existence of the lecturer will be in the 'OUT' state before the RFID keychain is scanned. The status of the lecturer will change after the RFID keychain is scanned at the RFID reader RC522. The 'OUT' status will change to 'IN' indicating that the lecturer is was in the office at the time.

CONCLUSIONS

The project addresses the issue of students not knowing a lecturer's availability in their room, aiming to prevent congestion and save students time. By implementing an easy-to-use technology, such as RFID, students can quickly check whether the lecturer is present or not. This practical solution is applicable not only in higher education institutions but also in schools, providing a user-friendly method for both students and teachers to manage and communicate lecturer availability efficiently.

ACKNOWLEDGEMENTS

The writer would like to express his sincere appreciation to the project supervisor, for the guidance and discussion provided throughout the duration of this project. This appreciation is also given to anyone who either directly or indirectly helped in the production of this project.

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LEARNING TYPES OF TRAMSMISSION MEDIUM USING AR BOARD GAME

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Abstract – Augmented Reality (AR) blends real and virtual worlds, creating an immersive experience. Enhancing visual effects in animations, I'll use a quiz for added excitement. The game features diverse animations and questions, aiming to develop board games on Transmission Medium using AR. This innovative approach sparks student interest, fostering new ways of learning. The goal is to simplify Transmission Medium concepts for students using modern technology, steering away from outdated methods. Recognizing the prevalence of smartphones, the project aims to engage students effectively, making learning enjoyable and accessible.
Keywords –(AR) Augmented Reality, Transmission Medium Using AR, quiz, board games.

INTRODUCTION

Transmission medium in AR board games benefits players by immersing them in a virtual world, fostering imagination and creativity applicable to studies. The games enhance interaction, teamwork, and concentration, aligning with the DEP30013 Communication System Fundamental course, Chapter 3. AR board games aid students in grasping transmission medium concepts, improving academic performance, and broadening knowledge. Studies on suggest cognitive enhancements for older adults in memory, attention, and executive function. It not only establishes the foundation for students to learn programming skills, but also fosters computational thinking concepts [1]

METHODOLOGY

This research utilizes marker-based augmented reality (AR), employing component symbol cut-outs as markers detected by the application. Markers are generated using Makar software, offering highcontrast node points for detection. Makar is also used to create objects and animations for each marker. Google is utilized for design and quiz questions in the board game.

RESULTS AND DISCUSSION

This project has deepened my understanding of AR, a valuable tool for today's internet-centric lifestyle. From ordering food to making reservations, most activities involve the internet, making AR knowledge crucial. Though not overly complex, AR isn't a breeze, yet learning its intricacies empowers me to complete this project. Focused on education and igniting student interest, my project centers on the Transmission Medium,a DEP30013 Communication System Fundamental topic. It merges learning and enjoyment allowing students to play and grasp the subject collaboratively. Through this approach, learning becomes interactive, fostering not only understanding but also an enjoyable learning process with friends. The board games that is design using canva for playing the AR board games are shown in Figure 1.

Figure 1: Trasmission medium AR board games

Figure 2: Quiz AR

Next is the example of result after scanning the image target for quiz to pop up shown in figure 2.

CONCLUSIONS

AR board games blend fun and learning, improving critical thinking and teamwork. To maximize their potential, efforts are needed to ensure affordability and utility. With the expanding tech landscape, AR board games, especially on Transmission Medium, offer immersive experiences for education and enjoyment.

ACKNOWLEDGEMENTS

The authors would like to thank Supervisor and parents for the financial support

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LINE FOLLOWING AND QR DECODING AUTOMATED DRONE WITH COEX AND DJI TELLO

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Abstract – The Line Following And Qr Decoding Automated Drone With Coex And Dji Tello project was developed to conduct research on automated drone driving to facilitate human work such as monitoring indoor areas. This project will program the drone to do two tasks such as the drone will follow the black line and decode the given QR code. This project is also done to study computer vision techniques to open drone cameras and perform image processing. As we know that drone technology is one of the new and popular technologies in Malaysia. With that, the problem that is trying to be solved is the study on the use of drones in the warehouse industry such as lifting stuff and the surveillance industry.

Keywords: QR, Drone, Tello, Automated, CoeX

INTRODUCTION

Recently, drone technology has advanced significantly. and is widely used due to its affordability, lightweight nature, and safety features [1]. Drones, or unmanned aerial vehicles (UAVs), are flying machines operated remotely by a pilot [2]. UAVs have the distinct characteristic of being able to access remote locations without direct human intervention on the aircraft. There is a growing demand for the use of UAVs indoors, such as for product transport, building inspections, and machinery inspections in factories. Today, there is a noticeable increase in the practical adaptation of quadcopters for industrial purposes .

METHODOLOGY

The process begins with the drone receiving images of the line and converting them to a readable format, enabling it to execute commands based on the image conditions. This section also explains the system blocks and flowchart regarding how theprogramming is constructed and utilized on both the Dji Tello and COEX Clover 4.2 drones.

RESULTS AND DISCUSSION

This project analyzes the decision-making of the data learned by YOLOv8. The analyzed data includes the results of training a YOLOv8 model designed to detect black lines.are shown in Figure 1.

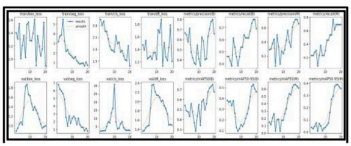

Figure 1: Data result.

This project analyzes the decision-making of the datalearned by YOLOv8. The analyzed data includes the results of training a YOLOv8 model designed to detect black lines. This project will utilize Google Colab for data collection. The data collected will involve employing the YOLOv8 technique, designed to learn how to identify black lines for a drone camera. YOLOv8 is a state-of-the-art computer vision model developed by Ultralytics, the creators of YOLOv5.

Figure 2: Training batch

Here are the results of the data collection for the confusion matrix. The confusion matrix is a matrix that illustrates the performance of machine learning ona test dataset.

CONCLUSIONS

In conclusion, this project can assist industries in employing drones automatically for indoor building area purposes. Additionally, the project can also be utilized to gather data for analysis.

ACKNOWLEDGEMENTS

The authors would like to thank my supervisor. For guide me to complete the final year project

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IOT BASED LAUNDRY SAFETY GAS LEAKAGE DETECTION SYSTEM

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Abstract – Iot based Laundry Safety Gas Leakage Detection System was developed by using micro controller namely esp32. The system aims at detecting gas leaks in laundry fasalities by alerting laundry users in the event of a gas leak using the MQ-2 sensor. The warning system to the user works with an led Flame as well as the sound of an alarm device that will ring when a gas leak is detected.In addition, the IOT element will send notifications to the laundry owner's smartphone through the telegram application so that fire prevention actions can be taken immediately.

Keywords –ESP32,IOT,MQ-2 SENSOR

INTRODUCTION

Iot Based Laundry Safety Gas Leakage Detection System" this will be created to use the gas leakage problem notification system for laundry premises. The basis of this project is to consider the safety of the public as well as laundry owners. This system is intended to notify laundry users as well as laundry owners if there is a gas leak in a certain place. With the existence of this system,it will be able to help and provide precautions and can increase safety to the laundry business sector.

METHODOLOGY

Using mq2 sensor as input, micro-controller ESP 32 an output i.e. LED, BUZZER.Create a reading simulation of proteus 8 professional software. The process operation of this project is shown in flow chart in Figure 1 below.

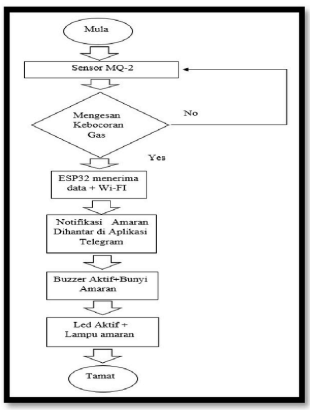

Figure 1: Flow Chart

RESULTS AND DISCUSSION

The display of gas leakage detection will be shown as in Figure 2.

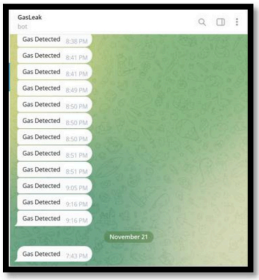

Figure 2: Gas leakage Detected

Table 1: Lpg gas hazard reading level

Lpg gas concentration level	Sensor reading Mq-2 (ppm)
Normal Reading	100-950
Readings to take security measure	1000-3000

The result shows the concentration of lpg gas and the degree of danger in the event of a gas leak.

CONCLUSIONS

When the researchers tried the project it was found that the MQ-2 sensor had successfully detected a gas leak,other ouput such as led buzzer and notification alerts were also successfully achieved.

ACKNOWLEDGEMENTS

The author would like to thank the supervisor and friends that always gives a continues support.

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IOT REAL TIME SMOKER DETECTION AND WARNING SYSTEM

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Abstract – The IoT Real-Time Smoker Detection and Warning System is a smoke detector capable of detecting and warning people who are smoking cigarettes inside a rental house. This device is able to detect cigarette smoke, and can measure the temperature and humidity in the house using a smoke sensor and a temperature sensor. This project also uses ESP32 as a microcontroller. Internet Of Thing (IoT) elements are also applied as a notification medium that is easier to monitor via smartphone. In addition, for the temperature sensor, the DHT11 will detect the temperature of the house to determine the temperature and humidity changes that will be displayed on the IoT MQTT panel on the host's smartphone.

Keywords –Ciggarate smoke detection

INTRODUCTION

The IoT Real Time Smoker Detection and Warning System was produced to detect cigarette smoke inside a rental house, as well as warn smokers. The use of the MQ-2 sensor works to detect the release of cigarette smoke to send a notification to the host via Telegram Bot and display a warning to smokers on the LCD at once the buzzer will sound. The second component used is DHT11. DHT11 is used to measure temperature and humidity, then send the reading to the MQTT application for the host to know about the temperature change in the house.

METHODOLOGY

IoT Real Time Smoker Detection and Warning System is used to detect cigarette smoke. The use of the MQ-2 sensor is able to detect the emission of cigarette smoke in the air and provide a programmed output which is LCD display, buzzer and Telegram Bot. In addition, DHT11 is used to measure the humidity temperature and with the use of IoT is able to deliver the reading data to the MQTT panel. Finally, the microcontroller used is an ESP32 that can work together with Wi-Fi.

RESULTS AND DISCUSSION

This project makes analysis through the use of IoT. The first application used is Telegram Bot which sends notifications to users when they detect cigarette smoke as shown in figure 1

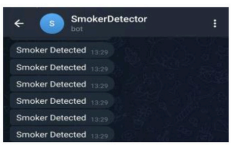

Figure 1: Notification received on Telegram Bot

The second application used is the MQTT panel which shows the humidity temperature data so that it can be monitored by the user as shown in figure 2.

Figure 2: Data publish humidity temperature on MQTT panel

Table 1: Analyze the reading value of each presence of smoke

Type of smoke	Voltage value (v)	Temperature with humidity
No presence of smoke	0 - 99	31.4°C, 83 %
Ciggarate smoke	100 - 150	34.7°C, 82 %

The reading of cigarette smoke is around 100 to 150 and the temperature rises to 34.7 degrees Celsius. As for the absence of smoke, it will also have a reading because the MQ-2 sensor is sensitive to the surrounding conditions.

CONCLUSIONS

This project worked and achieved the desired objective, although at the beginning it had some problems such as not having readings from both sensors. Therefore, such projects require a long period of time to meet the set criteria. In addition, this project emphasizes the use of the Internet of Things (IoT) by integrating the Telegram Bot application and the MQTT panel.

ACKNOWLEDGEMENTS

The authors would like to thank their parents and supervisor for financial and guidance support.

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PTSB KAMSIS ATTENDANCE SYSTEM USING RFID

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Abstract – This project involves creating an RFID system using an ESP32 microcontroller for student education. The RFID reader identifies students, sending data to a database for activity recording. The system tracks entry/exit times within the college area, displaying student details on an LCD. This hands-on approach helps students learn ESP32 programming and database management. Successfully achieving its goals, the system enhances practical learning. It also streamlines activity records for instructors. Future studies may explore the RFID system's impact on student academic performance and motivation.
Keywords –RFID,LCD,microcontroller,database

INTRODUCTION

Managing hostels can be tough, especially keeping track of student attendance. Traditionally, this is done manually, which is not very efficient. To solve this problem, we suggest using a smart RFID attendance system. This system uses Radio Frequency Identification (RFID) technology to automate attendance and give instant updates to hostel staff and parents. Our paper explains how we designed and implemented the system, evaluates its performance, and talks about its advantages, challenges, limitations, and potential future improvements.

METHODOLOGY

We designed an RFID attendance system to simplify student entry and exit from the dormitory. Students just need to scan their registered RFID card at the guard lodge. The LCD screen shows their name and room number, and the gate opens automatically. The system also records their attendance in Microsoft Excel for the dormitory warden to review during inspections. If a student arrives late, Excel signals it with a "late" status next to their name

RESULTS AND DISCUSSION

Result of student who agreed with this method compare to using old method which is using paper card to fill in Figure 1.

Figure 1: Data Sampling Methods

The results show that the students agree to use the RFID system to replace the old system where they have to fill in the name, room number and need a confirmation stamp from the security guard. The old system wastes a lot of students' time and is complicated. With this RFID system, students can make the process exit and entry more easily and quickly. This system also facilitates the work of wardens and security guards because they only need to monitor the names of students through Microsoft Excel.

Table 1: Data of students who scan using RFID cards

	DATE	NAME
2	27/11/2023 09:30:43	FAIZ
3	27/11/2023 09:51:29	FAIZ
4	27/11/2023 09:53:52	FADHIL-LATED
5	27/11/2023 11:56:38	FAIZ-LATED
6	27/11/2023 12:20:56	FAIZ
7	30/11/2023 06:06:52	ISS
8	30/11/2023 06:07:08	ISS
9	30/11/2023 06:10:52	FAIZ

The table shows the student's results in Microsoft Excel. If the student is late than the set time, it will send a late signal in Excel and also be displayed on the LCD display. This is intended for the monitoring of the dormitory warden to monitor students who are late to the dormitory so that the warden can take action

CONCLUSIONS

The process of completing this project has been carefully detailed and done with neat, even though there were various problems encountered at the beginning of its manufacture but it was successfully produced as stated in the objective.

ACKNOWLEDGEMENTS

The author would like to thank the supervisor, Madam Masburah Binti Mustaffa for all the help. Without her help the author could not been succeed in this project. Lastly, thanks to everyone for give the author the supports to succeed in this project

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SOIL MOISTURE STUDY FOR MUSTARD FARMING USING A MOISTURE SENSOR CONNECTED TO ESP32 AND EXCEL DATA COLLECTION IN MQTT AS WELL AS NODE-RED HELP

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Abstract – The study of soil moisture for mustard farming with the help of IOT is a study that works to simplify the way of planting mustard trees. This study is done automatically and does not require a lot of energy for the farmers in the mustard cultivation process. Among the problems, the lack of labor also results in negative effects for mustard trees due to inappropriate tree positions and pests. In addition, the main problem faced before the innovation was introduced was the problem of cost wastage due to the need to pay wages to the labor force to maintain the temperature and humidity of the mustard tree soil.

Keywords – mustard plant soil moisture with IoT system and esp32 connect to MQTT.

INTRODUCTION

The soil moisture system for mustard trees is a study to help farmers in the process of caring for mustard trees and is simple and effective. This system has its own advantage which is automatic watering and controlling the soil temperature at a distance and can be assisted by ESP 32. In this system, the soil moisture sensor works to detect whether the soil temperature is moist, medium and dry. In the dry season mustard trees can grow well but the price is cheap while in the rainy season mustard trees cannot grow well because the water content is too much but in this season the price of mustard is high, to overcome it, I studied and made a tool for soil moisture temperature for plants mustard automatically and manually.

METHODOLOGY

Soil moisture project using ESP32 using soil moisture sensor. This sensor works for soil moisture readings. Owners can view the status and temperature values in the Iot MQTT Panel dashboard on their smartphone.

RESULTS AND DISCUSSION

Soil moisture results, water quantity and control the water pump are shown in Figure 1.

Figure : 1Soil moisture results, water quantity and control the water pump

The results show that when the soil moisture is less than 2800 the water pump will be off and when the humidity is more than 2800 the water pump will be on then water and fertilizer will water the mustard trees. In addition, the reading of the quantity of water in the water storage tank which is more than 11cm from the bottom of the water tank status very little water. Water quantity 10 to 7 with low water status. Water quantity 6 to 2 full water.

Table 1: The results of soil moisture and water quantity.

Soil Moisture	Water Pump status	Water Level	Water Tank status
<2600	Off	2-6	Full water
<2700	Off	7-10	Low water
<2800	On	11-16	Very Low Water

The result of soil moisture and water quantity through a smart phone that can be read Mqtt. This project was done to see the soil moisture data and the quantity of mustard trees.

CONCLUSIONS

Through experiments and data analysis, the soil moisture project has an encouraging impact and effectively benefits farmers and the community. Overall, as it can help users with the tree care process, this project has met its goals and objectives. Because it is easy to use and maintain, the system used is well received.

ACKNOWLEDGEMENTS

The authors would like to thank Politeknik Tuanku Sultanah Bahiyah and En. Muhammad Jamaluddin for the financial support.

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CHICKEN EGG INCUBATOR TEMPERATURE STUDY FROM FIRST DAY TO HATCHING USING ESP32 AND DATA COLLECTION TO MICROSOFT EXCEL WITH THE HELP OF MQTT AND NODE-RED

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Abstract – This project is applied from observation based on the manual method that is used now, which is the method of hatching chicken eggs. The objective of this project is to produce a chicken egg incubator with the help of IoT that makes it easier for chicken farmers and the production of chicks in a shorter time than traditional.All of these are set to solve some of the problems that arise with the use of existing methods, among them, the unpredictable weather, the problem of lack of workers is also a factor in the chicks' eggs not being able to hatch properly and exposed chicks' eggs can be affected by disease outbreaks.

Keywords –Egg Incubator, Iot, ESP32 , the chick's egg factor cannot hatch .

INTRODUCTION

Now, the chicken egg hatcher, also known as the egg incubator, is a tool which helps you carry out the process of hatching chicken eggs efficiently and effective Among the problems experienced by chicken egg farmers is the unpredictable weather. In addition, the problem of lack of workers is also a factor of chicken eggs not can hatch well. Finally, exposed chick eggs can hit by an outbreak of disease[1].

METHODOLOGY

The smart eg incubator using ESP32 read temperature using sensor DS18B20. This sensor works like thermometer. Owner can see the status and temperature value in Iot MQTT Panel dashboard at their smartphone[2].

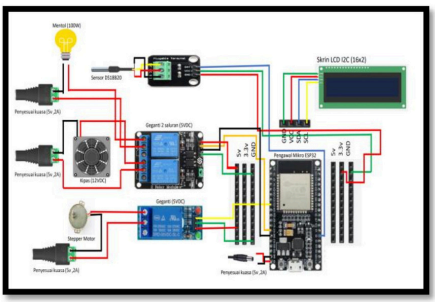

Figure 1 : Block diagram

RESULTS AND DISCUSSION

The result shows when tempearature below than 37.5 celcius lamp turn on and fan turn off . When tempearature more than 37.5 celcius lamp turn off and fan turn on .

Table 1: Incubator test result

Incubator Temperature Value	Light Condition	Fan Condition	Status
35°C	ON	OFF	Low Temperature
36°C	ON	OFF	Low Temperature
37°C	OFF	ON	High Temperature
38°C	OFF	ON	High Temperature

CONCLUSIONS

Through experiments and data analysis, we were able to establish the optimal temperature range which is required to maintain hatching success. The results show that temperature stability within a specified range plays an important role in the process incubation, giving a direct impact on the level of hatching and the health of the offspring newly hatched chickens.

ACKNOWLEDGEMENTS

The authors would like to thank En. Muhammad Jamaluddin for the support and my family for the financial support.

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PH VALUE STUDY OF POND WATER FOR HARUAN FISH FARMING USING PH SENSOR CONNECTED TO ESP32

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Abstract – This project is applied from observation based on the manual method that is used now, which is to measure the pH value of water in Haruan fishponds. The objective of this project is to produce a project to measure the pH of pond water automatically with the help of IoT which facilitates the fish farmers and increases the production rate of fish compared to manual. Furthermore, there are several researchscopes that have been set in this project which is the Target of this project built to facilitate the affairs ofthe haruan fish pond in ensuring that the pH value ofthe pond is always monitored by using the iot system.

Keywords – pH Value, IoT System, Measure the pH Automatically.

INTRODUCTION

Impaired water quality can result in death and make aquatic life vulnerable to infectious diseases. Survival and growth of aquatic animals in aquaculture systems suffer when water quality deteriorates. Water quality is also greatly affected by air temperature, pH, toxic algae, dissolved oxygen, ammonia nitrogen, nitrite, carbon dioxide and hydrogen sulfide (usually aquaculture inputs and management) (Boyd, 2017).

METHODOLOGY

When the water pH sensor reads a value outside the standard, the data will provide a notification on the smartphone and activate the pump automatically from the esp32.

RESULTS AND DISCUSSION

Data sampling for this project is intended to determine the value of the sensor reading to determine when the output should be turned on.

Table 1: Ph Sensor Data Sampling Table

pH Sensor	
pH value of water	**components**
2.5	Alkaline liquid pump (*on*)
3.5	Alkaline liquid pump (*on*)
5.5	Alkaline liquid pump (*on*)
6.5	Acid liquid pump (*off*)/alkaline liquid pump (*off*)
7.5	Acid liquid pump (*off*)/alkaline liquid pump (*off*)
8.5	Acid liquid pump (*off*)/alkaline liquid pump (*off*)
9.5	Acid liquid pump (*on*)
10.5	Acid liquid pump (*on*)

The data sampling method used for this project is tocarry out tests that are specialized for use in haruan fish ponds. In addition, pool pH stability testing was also carried out. This testing process is done several times to ensure that the recorded readings will not cause problems later on.

Table 2: Liquid Testing pH Drops against water.

pH	Larutan pH *Down*	Perubahan pH
8.2	300ml	7.4
7.9	250ml	7.5
7.6	100ml	7.5

Table 3: Liquid Testing pH Up against water.

pH	Larutan pH *Up*	Perubahan pH
5.9	200ml	6.5
6.2	150ml	6.6
6.4	50ml	6.5

When testing dosage, use pH Correction fluid in anydesired pH range. Prepare a tub containing 4 liters of water and then observe the pH change for each addition of 10 ml of pH Up liquid which has been dissolved in water at a scale of 1:100. Then the test was carried out 15 times. This test requires 200 ml of pH Up liquid which has been dissolved in water at a scale of 1:100. So that in 200 ml of pH Up liquid with a scale of 1/100 there are 2 ml of pure pH Up liquid.

CONCLUSIONS

The conclusion that can be made at the end of the production of this project is about the success of this project in achieving its goals. This project managed to work well as expected to automatically control thepump to stabilize the pH of the water in the haruan fish pond.

ACKNOWLEDGEMENTS

The authors would like to thank POLI and SUVfor the financial support.

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SOLAR PANEL WITH MONITORING SYSTEM IOT BASED SOLAR ENERGY WITH BLYNK HELP USING ESP32

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Abstract – The abstract discusses digital voltmeters (DVMs), covering their types, how they work, and design challenges. DVMs use methods like analog-to-digital converters to turn analog voltages into precise digital readings, crucial for electronic measurements. Switching from analog to digital brings benefits like better resolution, accuracy, and advanced features. Key DVM types are mentioned, considering factors like cost and speed. Design considerations for accurate measurements involve error correction, calibration, and addressing noise and temperature variations. This summary is useful for those seeking basic knowledge on digital voltmeters for various applications.

Keywords –DVM , ESP32 , Blynk.

INTRODUCTION

The introduction of digital voltmeters (DVMs) revolutionized electronic measurement, replacing analog counterparts with advanced technology and analog-to-digital converters (ADCs). DVMs offer precise voltage measurements, improved resolution, and features like digital displays. Various types cater to specific needs, such as dual-slope integrating and successive approximation. This evolution enhances precision, reliability, and adaptability in voltage measurements for diverse applications. The discussion ahead explores DVM types, concepts, and design considerations in contemporary electronic measuring systems.

METHODOLOGY

The digital voltmeter methodology employs ADCs for precise voltage measurements, aligning with study goals. It outlines the research design, sampling plan, and digital components, emphasizing relevant data collection techniques. In brief, it ensures a thorough understanding of the digital voltmeter's operation in the research context.

RESULTS AND DISCUSSION

The result of Digital Voltmeter (DVM) Blynk channel are shown in Figure 1.

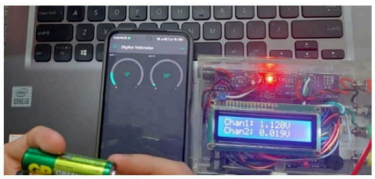

Figure 1 Blynk

My voltmeter testing using Blynk is succeeded but accuracy still needs to be improved. when I want to use Blynk, I need to change the coding to a new one so that the Blynk operation succeeds.

Table 1 Data Analysis

Battery	Result
Battery 1	Manual Channel 1: 1.16V
	Manual Channel 2: 1.16V
	Blynk Channel 1: 1.16V
	Blynk Channel 2: 1.16V
Battery 2	Manual Channel 1: 1.52V
	Manual Channel 2: 1.52V
	Blynk Channel 1: 1.52V
	Blynk Channel 2: 1.52V
Battery 3	Manual Channel 1: 1.46V
	Manual Channel 2: 1.46V
	Blynk Channel 1: 1.46V
	Blynk Channel 2: 1.46V

This digital voltmeter is functions properly, measures the voltage, and is reasonably accurate. Additionally, the findings obtained by sending the voltage via Blynk or the Internet of Things (IoT) match those shown on the display screen.

CONCLUSIONS

In summary, the successful Digital Voltmeter For Measurement System project offers portability and cost-effectiveness. Challenges include circuit and code instability, limited 0V to 6V voltage detection, and slower IoT/Blynk connectivity. To enhance performance, improvements like a larger battery, faster processing through code updates, and an expanded voltage range for laboratory use are needed. Despite challenges and providing convenience for users both in and outside the laboratory.

ACKNOWLEDGEMENTS

The authors would like to thank to supervisor Dr. Nor Aizam Binti Mohamed Yusof for guiding me throughout this project.

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AUTONOMOUS RACING CAR

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Abstract – Autonomous Car is a Self-Driving Car Platform for remote control cars. An autonomous car consists of several components. It's like a high-level self-driving library written in Python. It is a simulator that allows you to use Donkey without hardware to use a moderate size convolutional network to recognize objects in the input video feed from the Pi Camera. TensorFlow will be used to deploy the CNN model and OpenCV will be used for managing the video feed from thePiCamera.

Keywords: Python,Autonomous Car, TensorFlow

INTRODUCTION

Currently, the most common method of training cars for to do self-driving is to clone the behavior and follow the line. It is an Open Source Hardware design that makes it easy for you to build your own car.[1]At a high level, cloning behavior works by using convolutional neural network for learning mappings between car images (taken by Pi Camera) and steering wheel and throttle angle values through supervised learning.Another method, along the lines, works by using vision techniques computer to track the centerline and use the SSH controller to get the car in line.[2]

METHODOLOGY

Creating this project involves several steps in the software development process, each contributing to the overall functionality and performance of the autonomous vehicle. These steps cover a variety of tasks, from setting up hardware to implementing machine learning algorithms.

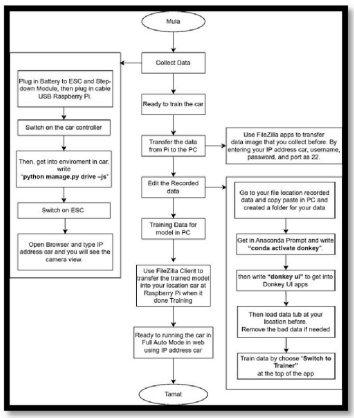

Figure 1: Flowchart Project

RESULTS AND DISCUSSION

The project that has been created works well and achieves the set objectives. The car could drive autonomously and able to drive using the recorded data. In addition, project analysis can also be presented through graphs from Donkey UI to prove that the project has been successfully completed. In a nutshell, the Donkey Car concept combines hardware, data and machine learning (using TensorFlow) to transform a regular remote control car into a self-driving or semiautonomous vehicle.

Figure 2: Final Prototype Project

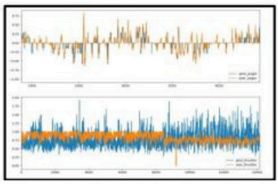

Figure 3: Car Driving Data Graph

CONCLUSIONS

In conclusion, the Autonomous Racing Car can be proved that this project has been successfully implemented by using several methods and data collection from the training phase of the project model.

ACKNOWLEDGEMENTS

The authors would like to thank to supervisor, Mr. Mahdzir Jamiaan for guide me and financial support.

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SOLAR PANEL CLEANER

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Abstract – A solar panel cleaning system equipped with an ESP32 microcontroller is designed to sense and clean dust and any debris on the solar panel surface. The system incorporates two mechanisms, namely a 12V DC water pump to draw water from a customized reservoir and create a spray on the solar panel surface during the cleaning process. Additionally, a 12V DC motor is employed to operate the cleaning device and rotate a brush mechanism that effectively removes dust and debris during the cleaning process. The system is enhanced with activation methods through both the Blynk application and a manual switch. This design aims to streamline and optimize the cleaning process for solar panels, minimizing time and labor required for maintenance.

Keywords – Solar Panel Cleaning,DC motor, Dc Water Pumm, ESP32.

INTRODUCTION

Solar panels that are dirty with dust can lead to a reduction in the efficiency of converting solar energy into electrical power. This occurs due to the lack of maintenance of the solar panels. Therefore, a solar panel cleaning project is developed to facilitate the cleaning process of solar panels and maintain the efficiency of solar panels in generating electrical power.

METHODOLOGY

The solar panel cleaner operates as a surface cleaner for solar panels. To ensure that the circuit of the solar panel cleaner operates correctly, the software Proteus is used to simulate the circuit of this system. Two DC gear motors, one with a speed of 530 RPM and the other with a speed of 66 RPM, are utilized, along with an R385 DC12V pneumatic water pump in this project. The solar panel cleaner will start when the push-button switch on the Blynk application is pressed, and it will stop when one cycle of the cleaning process is complete.

RESULTS AND DISCUSSION

The comparison of cleaning time between a manual cleaner and a solar panel cleaner is being conducted. By comparing the cleaning times, the most effective method for cleaning solar panels can be determined.

Cleaning Method	Cleaning Time
Manual Cleaning	5 minutes
Solar Panel Cleaner	20 Second

Table 1: Comparison Time

The results show that the time required for the manual cleaning process is longer than the time needed for using the solar panel cleaner.

The distance for the Blynk application's hotspot connection to activate the solar panel cleaner.

Distance	Action	Result
0m – 3m	Solar panel cleaner Activate.	YES
4m – 5m	Solar panel cleaner Activate.	YES
7m – 10m	Solar panel cleaner Activate.	YES
➢ 10m	The solar panel cleaner cannot activate.	YES

Table 2: Connection Distance

The result shows that the solar panel cleaner can be activated from a distance of 10 meters using the Blynk application.

CONCLUSIONS

The process of preparing this project has been carefully planned and executed efficiently. Despite facing various challenges, it was ultimately completed successfully. Although the results may not fully meet the original expectations, as envisioned, this experience emphasizes the importance of resilience and flexibility in handling issues during project development. It paves the way for improvements and future advancements in the field of solar panel technology.

ACKNOWLEDGEMENTS

The authors would like to thank the supervisor, Madam Norizan Bt Md Isa, the person who always helps the author to do this project. Without her help, maybe the author might have had some difficulties while completing this project. Also, to the PTSB, thank you for the allowing author to use the facilities to finish this project. Lastly, thank you everyone for the moral and physical support to the authors.

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AUTOMATIC PLANT WATERING SYSTEM

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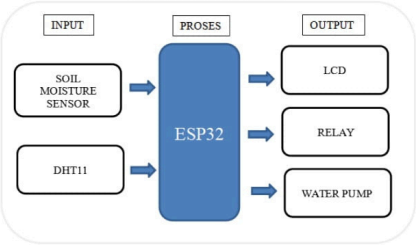
Abstract **–** Watering crops manually is considered less efficient as technology advances. With the automatic plant watering system, the temperature as well as the humidity and moisture level of the soil are all detected by sensors. The data is then sent to the ESP32 micro controller. In addition, the soil moisture sensor monitors the water level and sends information to the microcontroller unit. The micro controller chooses whether to start or stop the water pump depending on the set data. To allow the user to see the data value, the ESP32 micro controller will send the measured value to the Blynk application and the LCD display. This system provides convenience to users to take care of plants. However, this system can be improved by increasing the accuracy and sensitivity of the soil moisture sensor and humidity. This system can provide more accurate information about the plant's environment.

Keywords –ESP32, Blynk, Dht11,Soil Moisture Sensor, Water Pump

INTRODUCTION

The changes brought by current technological discoveries are quite real in human life. With this there are many man-made tools that are designed to make it easier for humans to do work. The objective of this study is to water plants automatically and using smart phones so that plants that are cared for can be avoided from withering or dying due to neglect. To help plant owners to water their plants even when they are not at home, an automatic plant watering system has been created using a smart phone namely Blynk and esp 32 which can solve the problem of watering plants adequately for plants.

METHODOLOGY



The LCD will display the soil moisture status. If the soil is dry then the ESP will activate the relay and water in the pump. At the appropriate humidity level the esp will send a signal to deactivate the pump.

RESULTS AND DISCUSSION

Analysis data taken on blynk application display and LCD display for 5 days. The data changes due to the weather factor in the Kulim area where it often rains hot.

DATE	TIME	TEMP	HUMIDITY	SOIL
SUNDAY 5.11.2023	8.00 AM	25	90	30
	6.00 PM	27	83	31
MONDAY 6.11.2023	8.00 AM	24	93	32
	6.00 PM	27	87	30
TUESDAY 7.11.2023	8.00 AM	24	91	30
	6.00 PM	26	85	31
WEDNESDAY 8.11.2023	8.00 AM	25	89	31
	6.00 PM	26	79	34
THURSDAY 9.11.2023	8.00 AM	24	90	30
	6.00 PM	25	85	35

CONCLUSIONS

Water use efficiency, convenience, and consistency of watering plants are the main factors. By using soil moisture sensors, the system can water plants only when needed, reducing water wastage and supporting efficient resource management practices. In addition, homeowners no longer need to spend valuable time watering plants manually, because this system can water plants based on soil moisture conditions.

ACKNOWLEDGEMENTS

The authors would like to extend his sincere gratitude to Pimpa A/P Soowan, the project supervisor, for her full guidance and insightful suggestions, which greatly facilitated the completion of this project.

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IOT SMART PLANT MONITORING SYSTEM USING ESP32

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Abstract – This research focuses on the development of an Internet of Things (IoT) based agricultural monitoring and irrigation automation system designed to optimize water usage and enhance crop health. The system utilizes a network of sensors, including the DHT22 for temperature and humidity monitoring, the DS18B20 for soil temperature measurement, and a soil moisture sensor for detecting soil moisture levels. These sensors are connected to an ESP32 microcontroller, which serves as the core component for data processing and communication.. The mobile application, powered by the Blynk App, enables users to remotely monitor and manage the system, offering real-time alerts and detailed analytics to support informed decision-making. The implementation of this system promises significant improvements in agricultural productivity and sustainability, leading to smarter and more resilient farming operations.

Keywords – IOT , ESP32 , Blynk.

INTRODUCTION

Agriculture, the backbone of the global economy, faces numerous challenges in the 21st century. Rapid population growth, climate change, and the depletion of natural resources have intensified the need for sustainable and efficient farming practices. Traditional agricultural methods often rely on manual labor and subjective decision-making, which can lead to inefficient water usage, inconsistent crop yields, and increased operational costs. Additionally, the unpredictability of weather patterns exacerbates these issues, making it difficult for farmers to maintain optimal growing conditions. One of the critical issues in contemporary agriculture is the inefficient management of water resources [1]. The lack of precise, real-time monitoring and control systems contributes significantly to these inefficiencies, creating a gap that modern technology can address.

METHODOLOGY

The primary components of the system include the ESP32 microcontroller, temperature and humidity sensors (DHT22), a solenoid valve for irrigation control, and a mobile application for user interaction and data monitoring. For the hardware components, the ESP32 will serve as the central processing unit for the system. When temperature or humidity readings reach certain limits, the microcontroller will activate the solenoid valve via the relay module to initiate irrigation. The ESP32 will use its Wi-Fi capability to transmit sensor data to a cloud server or directly to the mobile application. Finally, the app will provide alerts when irrigation is activated and allow users to set thresholds and control parameters remotely.

RESULTS AND DISCUSSION

The dashboard's Online Status indicator in Figure 1 shows that the system is currently online and operational, as indicated by the green status.

Figure 1 Blynk Display

Insights from the data, the high humidity level suggests a relatively moist environment, which could be beneficial for certain crops but may also indicate a need for careful monitoring to prevent mold or other moisture-related issues. The temperature is within a moderate range, suggesting that the conditions are suitable for many crops. Minor fluctuations indicate a stable environment. For the soil moisture level, it shows the data is above 50%, indicating that the soil has adequate moisture. This is crucial for plant health, as it ensures that crops are not experiencing water stress. The soil temperature is also stable and within a reasonable range, supporting healthy root development and overall plant growth.

CONCLUSIONS

In summary, this project demonstrates how IoT technology can be harnessed to create more sustainable and efficient agricultural practices. The implementation of such a system can led to improved crop health, higher yields, and more resilient farming operations. By adopting this technology, farmers can optimize resource usage, reduce environmental impact, and pave the way for a smarter and more sustainable future in agriculture.

ACKNOWLEDGEMENTS

The authors would like to thank supervisor Dr. Rahimah binti Abdul Rahman for guiding me throughout this project.

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WEATHER ADVANCED STATION

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Abstract – This project is applied from the observationsof Weather Advanced Station which aims to collect data related to environmental weather using sensors. This station is also a facility to measure temperature, pressure and humidity. it can measure temperature, humidity and pressure according to real-time location. The received data will be displayed and it can also be saved. Meanwhile, the data that has been stored allowsit to be analyzed. The monitoring system processes the data and stores it in a database that can be accessed through the application. In addition, it can also access data anywhere.

Keywords –Temperature, humidity, pressure, weather station, BME280

INTRODUCTION

The Advanced Weather Station was created with the aim of collecting environmental weather related data using sensors. This station is also a facility that can measure atmospheric conditions to provide information about the weather. It measures including temperature, pressure and humidity. Weather Advanced Station uses IOT (Internet of Things) and also uses a microcontroller which is ESP32 to help users access data about the weather anywhere at any time. Users can also collect data at any time. It can also be viewed through smartphones, tablets and laptops. This means that users who want to know the current temperature, users can access the information in a certain time.

METHODOLOGY

For this project, the input used is the BME280 sensor. It is to detect temperature, humidity and pressure. Once it has been detected, the received data will be processed. The processed data will be stored in the database Thingspeak that used Iot and the data will be displayed. Received data can also be recorded..

RESULTS AND DISCUSSION

The graph below shows the data value that has been received, field 1 temperature, field 2 humidity, field 3,pressure

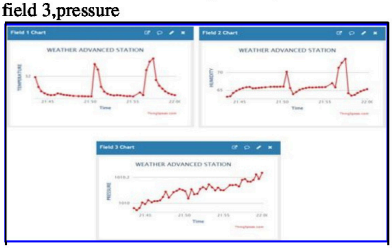

Figure 1: The temperature, humidity, pressure against time

In figure 1, shows the pattern of changes in the increase and decrease in temperature, humidity and pressure graph. It is recorded on the same day and date time. Data is recorded every 20 seconds. When there is an increase the data on the display increases and when there is a decrease the data on the display decreases.

Table 1: Temperature

time	entry_id	temperature
2023-11-19 13:43:34 UTC	1	31.92
2023-11-19 13:43:56 UTC	2	31.05
2023-11-19 13:44:17 UTC	3	30.66
2023-11-19 13:44:39 UTC	4	30.49
2023-11-19 13:45:01 UTC	5	30.37

Table 2: Humidity

time	entry_id	humidity
2023-11-19 13:43:34 UTC	1	63.18359
2023-11-19 13:43:56 UTC	2	63.32031
2023-11-19 13:44:17 UTC	3	64.23242
2023-11-19 13:44:39 UTC	4	64.83008
2023-11-19 13:45:01 UTC	5	65.25684

Table 3: Pressure

time	entry_id	pressure
2023-11-19 13:43:34 UTC	1	1009.961
2023-11-19 13:43:56 UTC	2	1009.946
2023-11-19 13:44:17 UTC	3	1009.962
2023-11-19 13:44:39 UTC	4	1010.005
2023-11-19 13:45:01 UTC	5	1009.992

The result shows that the value of the data that has been received and recorded in real time. It is recorded based on the same date and time of day. For the temperature data table, the data value received is not too high. As for the humidity table, based on the recorded data, the humidity change is not too significant. For the pressure table, based on the data values that have been recorded, the data changes on the pressure values do not show significant changes.

CONCLUSIONS

In this project, the conclusion is to make it easier for users to track temperature, humidity and pressure and provide a database. Users can also collect data at any time. It can also be viewed through smartphones, tablets and laptops. This means that users who want to know the current temperature, users can access the information in a certain time.

ACKNOWLEDGEMENTS

The authors would like to thank their supervisors and friends for their support and encouragement.

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SPEEDMETER CHECKER AND RECORDER

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Abstract – This project aims to reduce road accidents by introducing an alternative to control vehicle speed. The generated application records driving speed and activates a buzzer/alarm if it exceeds the set limit. The speed is displayed on an LCD for driver awareness. Safety is enhanced through an alarm system that alerts without disrupting the driver's view. Thus, this project helps drivers to drive more responsibly, reducing the risk of accidents.

Keywords – Speed tracker, speed detector, speed checker using ESP32, GPS module.

INTRODUCTION

This project involves developing an application to help drivers adhere to speed limits. Instead of using only a buzzer and LCD, the app will notify users via Telegram if they exceed speed limits, providing real-time alerts through a widely used messaging platform. This innovative approach ensures timely communication, leveraging a familiar platform for users and enhancing the overall experience. The Telegram notifications emphasize the project's commitment to promoting driver awareness and adherence to speed limits, contributing to safer roads and reduced accident risks.

METHODOLOGY

This project implements the use of a GPS module to create an application capable of tracking the speed and location of a vehicle in real-time, particularly when the driver exceeds the predetermined speed limit.

RESULTS AND DISCUSSION

The real-time speed detection notifications sent through Telegram are depicted in Figure 1 of the project's tracking results.

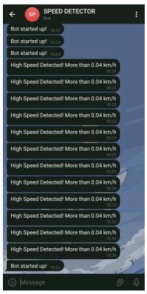

Figure 1: Tracking results.

The analysis of the project results indicates that, in the table, the status of the buzzer changes according to the vehicle's speed. At speeds of 0-4 km/h, the buzzer is in the "off" state, indicating that the audio alert is not activated. However, when the speed exceeds 5 km/h, the buzzer status changes to "on," indicating the activation of the audio alert due to exceeding the predetermined speed limit.

This project is a prototype tested in a controlled environment. It should be noted that the speed limit value requiring an audio alert may change in real-world road conditions, depending on local regulations. Therefore, adjustments are necessary to ensure effectiveness and compliance with the prevailing traffic rules.

Table 1: The buzzer will be activated if the speed exceeds the limit.

Speed (km/h)	Buzzer
0.01	off
0.02	off
0.03	off
0.04	on
0.05	on

The results reveal a seamless response mechanism: when the speed exceeds the set limit, the buzzer activates, providing immediate auditory feedback. Simultaneously, the user receives a digital notification via Telegram, enhancing real-time awareness and communication of speed limit breaches for improved driving safety.

CONCLUSIONS

In summary, the system promptly alerts drivers to speed limit breaches through both buzzer activation and Telegram notifications, fostering immediate awareness and improving overall driving safety.

ACKNOWLEDGEMENTS

The authors would like to thank supervisor for the outstanding guidance. Also, gratitude to Politeknik Tuanku Sultanah Bahiyah Kulim, Kedah, for facilitating my research.

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SMART LAWN MOWER

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Abstract – A smart lawn mower is an advanced, automated machine that can efficiently and autonomously mow a lawn without human intervention. It uses advanced technologies such as GPS, sensors, and artificial intelligence to map out and navigate the lawn, avoiding obstacles and adjusting its mowing patterns based on the terrain. Smart lawn mowers can also be controlled remotely through mobile apps, allowing homeowners to schedule mowing sessions and monitor their progress from anywhere.

Keywords – Lawnmower, remote control, mobile application.

INTRODUCTION

The controllable smart lawn mower represents a fusion of cutting-edge hardware and sophisticated software, aimed at revolutionizing lawn care. By integrating advanced sensors, precise navigation algorithms, and remote control capabilities, this innovation promises efficient remote management. Designed for optimal performance and safety, it employs obstacle avoidance, mapping, and a user-friendly interface for seamless control

METHODOLOGY

Creating a controllable smart lawn mower involves assembling the hardware components using AdruinoNano,Ultrasonic sensor and Motors for for precise control and navigation.It also a safety considerations encompass obstacle avoidance, weatherproofing, and secure remote access..

RESULTS AND DISCUSSION

The tracking time result of unfilled (UnF) XLPE and XLPE filled with various concentration of ZnO nanofillers are shown in Table 1.

No.	Test	Resullt
1	Bluetooth Connection	OK
2	Functionality	OK
3	Obstacle Detection	OK
4	Lawn Efficiency	OK

Table 1: Result and observation of smart lawn mower.

The result shows on the table, as for bluetooth conecction there's a light that will indicate in the bluetooth module which it shows the confirmation of connectivity of the bluetooth connection between phone and lawn mower. Then, for the functionality, for the remote control which in the application in the in phone are capable of controlling the smart lawn mower synchronously. Then the motors in lawn mower rotate without delay and move in the way of the user wants it to go. As for the ultrasonic sensor, it can detect the object or the obstacle infornt of in within radius of 20 centimeter.

Then, for the lawn efficiency, the smart lawn mower cannot cut the grass due to the prototype of the lawn mower because the blade is swapped with the cooling fan that will act as cutter for cutting blade.

This smart lawn mower obstacle detection of testing is have been measured which the lawn mower can stop during moving when there is a object or obstacle that stay infront of the smart lawn mower. By using ultrasonic sensor, the smart lawn mower can detect any object within 20 centimers to ensure the lawn mower not hitting any object.

CONCLUSIONS

In harnessing Arduino technology, ultrasonic sensors, motors, and Bluetooth connectivity, the controllable smart lawn mower delivers a compact yet powerful solution for efficient lawn maintenance. Through Arduino's versatile capabilities, the mower achieves precise motor control and sensor integration, enhancing its navigation and obstacle avoidance abilities. The ultrasonic sensors enable accurate distance measurement for obstacle detection, ensuring safe and seamless operation. Bluetooth connectivity empowers convenient remote control and monitoring via a mobile device, offering users flexibility and ease of use. This combination of technologies brings forth a sophisticated, adaptable lawn care solution, merging innovation with practicality for a smarter, more manageable outdoor maintenance experience.

ACKNOWLEDGEMENTS

The authors would like to take this opportunity to give a huge thanks and love towards for support and guidance me towards the making of this project to work perfectly.

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IOT BASED SOLAR POWER MONITORING SYSTEM

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Abstract – Renewable energy, especially solar photovoltaic technology, is recognized as a reliable and clean alternative to meet our growing energy needs. The proposal suggests an IoT-based solar energy monitoring system to collect and analyze solar parameters for stable power generation. The system aims to predict and optimize performance, providing a cost-effective solution for remote monitoring via computer or smartphone to enhance solar photovoltaic maintenance.

Keywords - photovoltaic technology, Solar, ESP32

INTRODUCTION

Solar energy is a leading renewable resource, offering a green alternative with lower ecological impact compared to conventional sources like oil, coal, and gas. These non-renewable options are depleting rapidly and contribute to global warming through the release of greenhouse gases. Solar power, notably through photovoltaic systems, ranks as the third-largest renewable energy source. Growing investments are driven by government policies and declining costs of PV components, making solar energy a compelling and sustainable choice for the future.

METHODOLOGY

This project was carrieed out with solar panel,Light Dependent Resistor (LDR),DHT 11 as temperature sensor and voltage sensor as inputs, ESP32 as processsesor and LCD, Bylnk, Thingspeak as channel to broadcast the result.

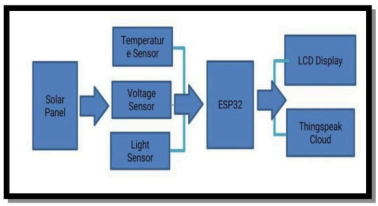


Figure 1:Show Block Diagram

RESULTS AND DISCUSSION

Iot Based Solar Power Monitoring System are shown in Figure 1.

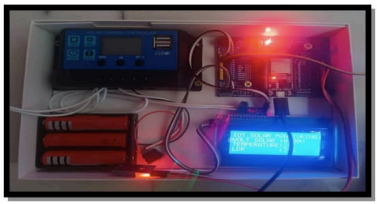
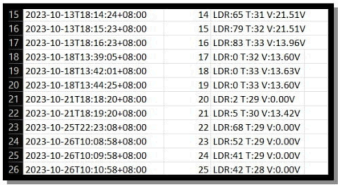


Figure 1:Iot Based Solar Power Monitoring System

The power supply used in this project is a power bank. When the supply is connected to the circuit, the LCD displays the results obtained from the three sensors. Then, it shows the obtained results which will then be sent to the blynk application and then the data will be stored in Thinkspeak.



15	2023-10-13T18:14:24+08:00	14 LDR:65 T:31 V:21.51V
16	2023-10-13T18:15:23+08:00	15 LDR:79 T:32 V:21.51V
17	2023-10-13T18:16:23+08:00	16 LDR:83 T:33 V:13.96V
18	2023-10-18T13:39:05+08:00	17 LDR:0 T:32 V:13.60V
19	2023-10-18T13:42:01+08:00	18 LDR:0 T:33 V:13.63V
20	2023-10-18T13:44:25+08:00	19 LDR:0 T:33 V:13.60V
21	2023-10-21T18:18:20+08:00	20 LDR:2 T:29 V:0.00V
22	2023-10-21T18:19:20+08:00	21 LDR:5 T:30 V:13.42V
23	2023-10-25T22:23:08+08:00	22 LDR:68 T:29 V:0.00V
24	2023-10-26T10:08:58+08:00	23 LDR:52 T:29 V:0.00V
25	2023-10-26T10:09:58+08:00	24 LDR:41 T:28 V:0.00V
26	2023-10-26T10:10:58+08:00	25 LDR:42 T:28 V:0.00V

Figure 2: shows the results stored in the thinkspeak application

Analysis of the results from the IoT solar monitoring optimizes efficiency, reduces costs, and enhances sustainability. Real-time monitoring and analytics benefit solar production, lowering costs for users. The system aligns with sustainability, reducing the carbon footprint through advanced technology integration for a more efficient and sustainable energy future.

CONCLUSIONS

The IoT solar monitoring system promotes sustainability, empowering individuals in energy conservation for global climate efforts. It catalyzes positive socio-economic change through job creation and education, aligning with global initiatives for a greener, more equitable future. Continuous innovation promises a resilient, sustainable energy landscape.

ACKNOWLEDGEMENTS

The authors would like to thank to supervisor,Ms. Roszaini Binti Yahaya for guide me.

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SMART MONITORING FOR AGRICULTURE USING IOT

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Abstract – The development of Smart Monitoring for Agriculture using IOT is designed to monitor the environmental temperature, soil moisture, and humidity of the crop soil. The system uses sensors, including the temperature and humidity sensor for temperature and humidity monitoring, and a soil moisture sensor to detect the level of soil moisture. These sensors connect to an ESP32 microcontroller, the central element for data processing and communication. These sensors transmit data to a smartphone application, which gives users immediate access to essential information about their plant. With the support of the Blynk App, users may remotely monitor and control the system using the mobile application, which provides real-time alerts The implementation of this system tends to eliminate water waste, save labor costs, and develop more sustainable as well as effective farming techniques. By using this technology, farming operations will become more intelligent, and agricultural output will increase significantly.

Keywords – Agriculture, monitoring, Blynk App

INTRODUCTION

Growth in the agricultural sector is necessary for the development of the economic condition of the country. The need for increased productivity in all industries, particularly agriculture, is a result of the growing world population.[1] However, there will be times when supply and demand are out of balance. To improve agricultural productivity, managing and maintaining capital and labor remains a difficult task. [2] The existing method and one of the oldest ways in agriculture is the manual method of checking the parameters. This project aims to develop an IoT-based smart agriculture monitoring system that addresses the above critical challenges. This Internet of Things (IoT)-based solution offers a contemporary way to address the urgent problems facing agriculture now, paving the path for a more robust and efficient farming industry in the future by giving farmers access to real-time data and automated control.

METHODOLOGY

The system comprises a soil moisture sensor and DHT11 as the input, and all are connected to the ESP32. The ESP32 processes the incoming data, comparing the current readings to predefined threshold values for soil moisture, humidity, and temperature. If the soil moisture level falls below a certain threshold, indicating that the soil is dry, the ESP32 activates the water pump by sending a signal to the relay. Once the soil moisture sensor detects that the desired moisture level has been reached, the ESP32 signals the water pump to stop, thus stopping the water flow.

RESULTS AND DISCUSSION

Figure 1 shows the irrigation system components of the systems where the main goal was to find out how well different sensors that were attached to an ESP32 microcontroller performed in terms of monitoring environmental conditions. Figure 2 shows the Blynk Dashboard in Mobile Phone. Data on soil moisture, temperature, and humidity sensor (DHT11) are collected and analyzed. The system is set up to turn it on automatically. If necessary, users can manually adjust irrigation via the dashboard

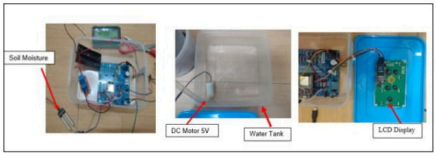

Figure 1: Irrigation system components

Figure 2: Blynk Dashboard in Mobile Phone

CONCLUSIONS

This project's implementation is an immense step forward for contemporary farming methods. This research significantly can reduce human expenses as well as improve decision-making when integrated with the ease of remote access and personalized notifications. Generally, this research shows how IoT technology could potentially be utilized to develop more effective and sustainable agriculture methods.

ACKNOWLEDGEMENTS

A thousand thanks and full appreciation to my parent and Puan Sharipah binti Daud for her trust in giving this project and for helping a lot throughout the process.

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SMART STREETLIGHT HYBRID

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Abstract – The smart streetlight hybrid project aims to enhance energy efficiency, cost savings, and environmental sustainability by utilizing renewable energy sources. Controlled by an Arduino IDE, the system employs an ESP32 board, LDR and IR sensors, LED, solar panel, voltage sensor, and solar charge controller. During daylight, the LDR sensor prevents unnecessary lighting. On dark days, the LED activates at 50% brightness, escalating to 100% when the IR sensor detects objects. Powered by solar energy, this innovative solution not only ensures safety but also allows real-time monitoring, contributing to reduced electricity consumption and environmental impact.
Keywords –Smart Streetlight Hybrid.

INTRODUCTION

Smart streetlights, blending cutting-edge technology with traditional systems, offer superior sustainability and energy efficiency over conventional counterparts. Urban areas adopting these lights can achieve substantial energy savings and lessen greenhouse gas emissions. In Malaysia, the preference for solar energy, supported by government initiatives like the National Renewable Energy and Net Energy Metering schemes, aligns with the smart streetlight's utilization of solar technologies. In Lebanon, the incorporation of energy-efficient LED lamps in smart streetlights presents an opportunity to shift from conventional HPS lamps, promoting energy savings and reduced carbon emissions. Overall, smart streetlights advance urban sustainability, curb emissions, and foster smart city development.

METHODOLOGY

The main component of Smart Streetlight Hybrid experiment is using ESP32, IR sensor, LDR sensor and Solar panel. The software used for this experiment is Arduino IDE, Proteus and Blynk.

RESULTS AND DISCUSSION

The Smart Streetlight Hybrid result of LDR react to presence or light and absence of light are shown in Figure 1 and Figure 2.

Figure 1: The situation when its bright.

The result shows when LDR detect the presence of light, the LED will turn off, and when the IR detect the presence of object, the LDR will prevent the LED from turn on.

Figure 2: The situation when its dark

In the figure 2, the result shows that, when the LDR detect the absent of light, the LED will turn ON at 50% of brightness and when the IR sensor detect the presence of object, the LED will change the brightness up to 100% for 3 second delay.

CONCLUSIONS

The study of the project concludes successfully in achieving its goals, effectively reducing energy consumption in the absence of an object and harnessing renewable energy. Through in-depth exploration of microcontrollers and the etching process, the project provided valuable insights. Circuit simulations using Proteus 8 improved proficiency in schematic design and PCB sketches. Beyond technical aspects, the project expanded understanding in the vast realm of the "Internet of Things.".

ACKNOWLEDGEMENTS

The authors would like to thank Mdm. Siti Maryam and Polytechnic Tuanku Sultanah Bahiyah for their support during my project activities.

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SMART COLOUR SORTER (COSORT)

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Abstract – This paper introduces a fruit color sorting system designed to assist orchard workers in their daily tasks. COSORT aims to address the issue of fruit dumping. The system achieves color separation by executing a program that utilizes three primary components the TCS3200, an Infrared sensor (IR), and a servo motor. The project employs an ESP32 microcontroller to transmit the isolation data to the Blynk application and display the count on an LCD. Consequently, this initiative has the potential to significantly save the workers' time, alleviating their primary burden.

Keywords –Colour sorting Sytem,ESP32,Blynk.

INTRODUCTION

Based on the type and color of the fruit, the system automatically separates it. Dealing with large quantities can pose a considerable challenge for those who struggle with color-based food categorization. This initiative targets industrialization for small farmers, businesses, and industries. The research holds the potential to impact labor, energy, and time expenses associated with segregating and classifying a single fruit variety into two colors.

METHODOLOGY

The ESP32 serves as the main controller in this project, designed using Proteus. TCS3200 sensors are employed to detect fruit color, utilizing an array of photodiodes for red and green detection. The Infrared sensors are programmed to identify input, sending data as a count on Blynk and issuing a notification when the quantity reaches the maximum level. A servo motor is utilized to move the item left and right, and the LCD displays the total number.

RESULTS AND DISCUSSION

Results for this application can display the exact type and amount of fruit by connecting Bluetooth to the device and can also examine it remotely are shown in Figure 1.

Figure 1: fruit type display on Blynk and prototype

Figure 1 shows the display on Blynk and the prototype of the Smart Colour Sorter (COSORT). When the switch is turned "ON," it initiates the fruit insertion process. Subsequently, the IR sensor detects and counts the fruit. The fruit then passes through the TCS3200 sensor to determine its color. During the separation process, the TCS3200 color sensor and the servo motor collaborate to move the object left and right, adjusting to rotation degrees of 0° and 180°.Next, the calculated data of the object is transmitted through the Blynk application, displaying the total count on the LCD. Once the set number of fruits is reached, the buzzer will sound.

Table 1: Data analysis

Jenis buah	Kiraan buah	Tindakan (*Infrared Sensor*)
Mangga Epal Merah	0-5	Sensor IR akan terus mengesan kemasukkan buah dan menghantar input dan memulakan pengiraan
Mangga Epal Hijau	0-5	Sensor IR akan terus mengesan kemasukkan buah dan menghantar input dan memulakan pengiraan

Based on the data analysis from Table 1, it is observed that one type of fruit is classified into two colors red and green. The fruit count is determined based on the capabilities of the implemented prototype.

CONCLUSIONS

Based on the research conducted for this project, the writer is confident that it will contribute to the community, particularly in the field of agriculture, ensuring the systematic and smooth separation of fruits.

ACKNOWLEDGEMENTS

The author would like to thank family and supervisors for their support and encouragement.

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MINI HYDRO POWER MODEL FOR EDUCATION

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Abstract – As everyone is aware, energy may be produced using water as a medium. But how many people know that water has the ability to generate electricity? Here, the authors have created a system that will be transformed into a hydroelectric model to aid in the education of the other students. In this system, water is circulated by the water pump to power the DC motor, which produces electricity. The other two sensors in this system are the voltage sensor and the water flow sensor. Also, the microcontroller ESP32 used to control this system.

Keywords – Hydropower model,DC motor, voltage sensor, water flow sensor, ESP32

INTRODUCTION

The name of this project is "Mini Hydro Power Model for Education". The main material used in this project is the water pump. ESP32 is used as a brain to control this model. The other components used in this project are 12V DC battery, DC motor, voltage sensor, water flow sensor, ultrasonic sensor, and LCD. The ESP32 will process information to display on LCD. The value of water flow, and voltage produced will be displayed on LCD. Battery is used to turn on the water pump. Water flows through a water flow sensor and then to the turbine. The turbine will drive DC motor to produce electricity.

METHODOLOGY

The model works when the water flow through the water flow sensor and then to the turbine to produce electricity. The voltage produced will be measured by voltage sensor. Esp32 will process all the information and send to LCD to display the result. .

RESULTS AND DISCUSSION

The result of Mini Hydro Power Model For Education are shown in Figure 1.

Figure 1: Result of the voltage produced and water flows per minutes.

From research, it is found that the water's ability to drive the turbine will affected the voltage produced. To proven the theory, an experiment was conducted by using this Mini Hydro Power Model for Education. The result shows that the voltage produced is 49.5mV and the water flows is 3.45L/min.

Table 1: The value of the water flow per minutes and voltage produced.

Water Flow (L/min)	Voltage (mV)
3.09	44.33
3.45	49.50
4.13	59.26

The result shows that the value of voltage produced is increasing when the water flow rate is increased. When water flow is 3.09L/min, the voltage produced is 44.33mV. Next, when water flow is 3.45L/min, the voltage produced is 49.50mV. Lastly, when the water flow is 4.13L/min, the voltage produced is 59.26mV.

CONCLUSIONS

This project can demonstrate how water velocity impacts energy output. This is since the DC motor can generate larger voltages when the water flows more quickly. Consequently, it is evident that a large, swiftly moving river is ideal for use as a dam site since the flowing water can generate more electricity.

ACKNOWLEDGEMENTS

The authors would like to thank the supervisor, Madam Syajaratul Dur Binti Ramli, the person who always helps the author to do this project. Without her help, maybe the author might have had some difficulties while completing this project. Also, to the PTSB, thank you for the allowing author to use the facilities to finish this project. Lastly, thank you everyone for the moral and physical support to the authors.

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SOCKET SAFETY SYSTEM

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Abstract – The project that will be carried out has a specific function to avoid the use of excessive loads on each electrical socket wiring circuit. The socket safety system contains main components such as an ESP-32, a current sensor, and an LCD. Socket Safety System has three modes namely "Normal Load", "Please Alert" and "Warning Overload". This tool can also be used in various industries to maintain the safety of the socket wiring circuit.

Keywords – Socket Safety System, Esp-32, Current Sensor

INTRODUCTION

The use of electricity plays an important role in daily life in order to live a more comfortable life. However, electricity is a dangerous energy and can cause harm to users, such as fire and short circuits. Therefore, this project, "Socket Safety System," can save users from being exposed to danger when using socket switches.

METHODOLOGY

In this project, there is a current sensor to detect the value of the current passing through the circuit. After that, the detected input will be sent to ESP 32 to process the input. Therefore, the processed input will produce an output, the LCD will display the detected current reading, the LED will light up, and the buzzer will produce a sound to alert the user to avoid using the load beyond the set value.

RESULTS AND DISCUSSION

The results of the analysis of the use of electric current by three different bulbs in twelve minutes are shown in Figure 1.

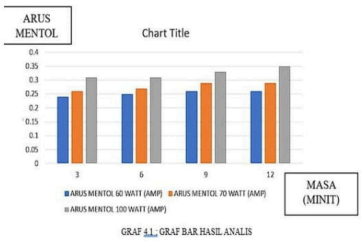

Figure 1: Bar graph Results of analysis of electric current consumption

The results show the consumption of electric current at different rates by three types of bulbs of different watts in twelve minutes. The electric current consumption of a 100-watt bulb is the highest.

Table 1: The results of the analysis of the use of electric current by three types of bulbs of different wattages

MASA	ARUS MENTOL 60 WATT	ARUS MENTOL 70 WATT	ARUS MENTOL 100 WATT
3 MINIT	0.24 A	0.26 A	0.31 A
6 MINIT	0.25 A	0.27 A	0.31 A
9 MINIT	0.26 A	0.29 A	0.33 A
12 MINIT	0.26 A	0.29 A	0.35A

The table above is an analysis that has been carried out to collect data on the use of loads on sockets that have different current readings. The Socket Safety System was created so that when the current is in the range of 0 to 0.5, this tool will read it as "normal load," then when the current is in the range of 0.5 and up and less than 0.85, this tool will read it as "PLEASE ALERT," and when the current exceeds 0.85, this tool will read it as "WARNING OVERLOAD".

CONCLUSIONS

In conclusion, this project has achieved every objective as a whole, according to the main purpose for which it was created. The main purpose of this project was to help users in certain premises avoid the problem of MCB always tripping and to avoid fires due to overload. This tool can educate users about safety when using electricity, This can provide many benefits to users to avoid any danger when using electricity.

ACKNOWLEDGEMENTS

The authors would like to thank their supervisor for guidance and support. The researchers would also like to thank friends and Polytechnic Lectures for helping in various ways to complete this project.

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WIRELESS GRASS CUTTER

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Abstract – The title of my study is wireless grass cutter. I can see there are some problems that some people often have is that some people can't stand to do work in the heat and it will take us a long time to mow the lawn because it uses human power. The objective I chose isto help people with problems to cut the grass at any time regardless of whether it is a manor a woman and can reduce the use of human energy and can save time.In this study, I have identified the importance of Wireless Grass Cutter in our daily life. We can see that this Wireless Grass Cutter is important to us because it can save time to cut grass in a wide area and can help people who have problems to do work under sunlight duetocertain problems.

Keywords – Help people with problems to cut the grass

INTRODUCTION

This project is designed to make it easier for users to mow the grass in hot weather conditions. This project is also designed with the use of solar panels placed on the top of this machine. The function of the solar panel used is to supply energy to the battery used. A used battery will work as a generator of electrical energy that will be sent to all other components for move the motorcycle. The L298N chip contains two standard capable H-bridges drives a pair of DC motors, making it ideal for building wheeled robotic platforms two. The L298N motor driver has a 5V to 35V supply range and is current capable continuous 2A per channel, so it works well with most DC motors.

METHODOLOGY

Proteus is a software used to literally build schematics and PCBs. Proteus is currently the best software for students to use. In addition, every student laptop that is used already has this Proteus. Because these Proteus apps are used in semester 4 in the embedded system subject. With the knowledge available through this embedded system subject, students can build a complete project circuit.

RESULTS AND DISCUSSION

In this analysis process, there are two analyzes that can be performed on this wireless grass cutter, which is to test the area that can be cut and the durability of the battery used on this wireless grass cutter.

TEST	TEST 1	TEST 2
Date	18/11/2023	19/11/2023
Time	9:00 a.m	10:00 a.m
Test Period	30 Minutes	30 Minutes
Distance 1	7 m+ 7 m=14 Meter	7 m+ 7 m=14 Meter
Distance 2	7 m+ 7 m=14 Meter	7 m+ 7 m=14 Meter
Total area	14 m x 14 m=196m²	14 m x 14 m=196m²

Table 1: Taking area table.

The table shows the calculation of the distance and area that can be cut by the wireless grass cutter in 30 minutes. In this table we can identify the distance limit ESP 32 can connect with the hotspot connected through the blynk app.

The time we recorded was 30 minutes for two tests. In the first test we get a distance reading of 17 cm and in the second reading we also get a distance of 17 cm the total area that can be calculated is 196m²

Table 2: The charging battery table

Charging time	Battery life (minutes/hour)
20 minutes	17 Minutes
40 minutes	38 Minutes
1 hour	56 Minutes
1 hour 20 minutes	1 Hour 17 Minutes
1 hour 40 minutes	1 Hour 38 Minutes
2 hour	1 Hour 56 Minutes

The result shows that the UnF XLPE composite in Figure 2, exhibit small total discharge quantity, which is 4.04 C, when compared with other concentration of nano-filler. The total discharge quantity of XLPE filled with 1 wt% to 4 wt% ZnO nanofiller is gradually increased from 6.73 to 10.42 C.

CONCLUSIONS

The conclusion that students get from implementing project 1 and project 2 is that they can put into practice the knowledge they have learned such as Embedded system during semester 4 and Digital electronics during semester 2. From the subject of Embedded system students can build program code to put on ESP32 in order to be successful this project. In addition, we can also hone each other's creativity in producing prototypes and project models that are safe and at the same time can attract someone's interest to see the completed project.

ACKNOWLEDGEMENTS

The authors want to say a big thank you to all of them. I am deeply indebted to my supervisor Mrs. Nurasyikin Binti Fazil for her continuous guidance and supervision as well as providing the necessary information regarding this project and also for her support in completing this project.

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SOLAR POWER MONITORING SYSTEM

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Abstract **–** This project is a monitoring system of solar panel input (Polycrystalline used in this project) which consist of reading temperature value (v) and temperature value (°C). Voltage sensor module and temperature value DS18B20 are used to measure voltage and temperature each. Solar charge controller are a device to show battery state and work as a power supply of this protoype at once connecting USB32 at it USB port as a load. Other than that, it is used to switch ON or OFF by using a switch connected to 3 lithium ion battery with capacity 3.7 volt and 6800mAh. Data will be broadcasted in 3 different channel which is LCD, Blynk and Thingspeak. Real-time data can be monitored by LCD and Blynk. Recorded data can be monitored by Thingspeak. LCD will display voltage value at the first row and temperature value at second row.

Keywords –Polycrystsalline, DS18B20, voltage sensor, ESP32, LCD, Blynk, Thingspeak.

INTRODUCTION

Solar power system or more referred as photovoltaic (PV) is a system where taking the advantage of sunlight to generate electricity through photovoltaic cells in solar panel. But, the whole advantage and potential could go to waste if it can not obtained in the most efficient way. To utilize the power system, some data must be obtain to be analyze

METHODOLOGY

This project was carrieed out with solar panel, DS18B20 temperature sensor and voltage sensor as inputs, ESP WROOM 32 as processsesor and LCD, Bylnk, Thingspeak as channel to broadcast the result.

RESULTS AND DISCUSSION

Result and analysis session were carried out at 19.9.2023 from 8.40 a.m. until 5.44 p.m. The prototype was left under the sun from morning until evening with cloudy and lightly rainy weather. Thus, for analysis only 9 a.m. until 3 p.m. duration of time that were taken.

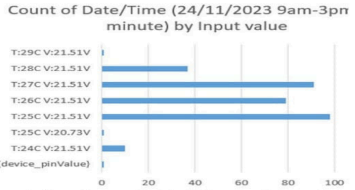

Figure 1: Result recorded in Thingspeak by microsoft excel in form of customized chart.

The data shown recorded by Thingspeak which consist of voltage transformed and temperature (°C) absorbed by PV in exact time and date with difference duration of 1 minute per recorded data. For data analysis, most of the voltage value are 21.51v with most of the temperature value are 24°C to 29°C. It appear that PV panel are not effected with the temperature because of the slightly difference. For the analysis, the data range are from 9 a.m. until 3 p.m. with total of time 7 hours or 420 minutes.

Table 1: Result recorded in Thingspeak by micorsoft excel with its raw table form started at 9.00 a.m.

created_at	entry_id	field1
2023-11-24T09:00:21+08:00	1	T:27C V:21.51V
2023-11-24T09:01:21+08:00	2	T:27C V:21.51V
2023-11-24T09:02:22+08:00	3	T:27C V:21.51V
2023-11-24T09:03:22+08:00	4	T:27C V:21.51V
2023-11-24T09:04:22+08:00	5	T:27C V:21.51V

CONCLUSIONS

In conclusion, we can conclude that solar power input is very important and useful in a place that consume large scale of solar panel such as solar farm to improve PV efficiency. It will help user to utilize solar power efficiency at the same time troubleshoot error or technical problems occur.

ACKNOWLEDGEMENTS

The authors would like to thank the electronic shop that help to provide the equipment and every component to build this project.

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BUS ALERT SYSTEM (WIRELESS)

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Abstract –The movement of intermediate public bus services in our country is random. There is no set schedule or time for an intermediate public bus to reach the bus stop. This system has a Liquid Crystal Display (LCD) to display the bus number approaching the bus stop. The system has a frequency reader to display the bus number on the LCD. In this system, there is an infrared sensor that detects to clear the bus number display on the LCD.

Keywords – 73. Bus alert system (wireless)

INTRODUCTION

One project that can assist all users of intermediate public transport at bus stops is the Bus Alert System (Wireless) project, which involves installing LCD displays at each bus stop to display the bus number that will arrive. If the bus is detectable by the Radio Frequency Identification (RFID) reader, which will be positioned ahead of the bus stop, the bus number will appear on the LCD display. If a bus is on its way to the bus stop, a buzzer will also be positioned close to the LCD display to alert users to the most recent bus number shown there.

METHODOLOGY

The ESP32 is intended to receive a signal from the RFID reader telling it to output the output it has received from the reader onto the LCD. All components are controlled in accordance with the instructions provided by the ESP32. The bus number display on the LCD is intended to be removed by the infrared sensor once it has departed from the bus stop. If the bus passes the RFID reader, the LCD is crucial because it will be used to show the bus number. A sound is produced by this buzzer whenever a new display appears on the LCD.

RESULTS AND DISCUSSION

The LCD result of Bus Alert System with display the bus destination are shown in Figure 1.

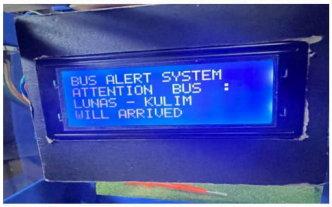

Figure 1 : LCD are display the bus destination.

The LCD's result indicates that, in the event that the RFID reader provides a frequency, the LCD will show the destination. The RFID reader won't be able to detect an invalid frequency, and the LCD won't produce any display if that happens. If you stop the stop as it moves out of the stop, the LCD display will also go out. An infrared sensor is scheduled to be installed immediately following the bus stop. Because another bus will pass through the designated bus stop and display its destination on the LCD display, it is extremely important.

Table 1: Surveys about this system were completed by respondents.

Name	Age	Does this system sound familiar to you?	Is the system user friendly?	Is this system logic applied outside?
Hafizzan	21 Years Old	No	Almost Agree	Almost Agree
Lim Yu Han	25 Years Old	No	Agree	Almost Agree
Nur Aina	28 Years Old	Yes	Almost Agree	Almost Agree

According to the responses provided by the respondents above, one person is familiar with this system, while the others are not. The system is user-friendly, according to the respondents, and they would strongly agree if it were used outside. Additionally, it makes sense for them to implement this system since it can raise user safety.

CONCLUSIONS

The entire system is capable of overcoming obstacles, recognising problems, and finding solutions in line with the advancements demanded by any given industry. Additionally, it can support and advance the development of security technology in our nation. As national security technology advances, the nation's economic activities can progress towards greater advancement and serve as a model for other nations to follow.

ACKNOWLEDGEMENTS

The authors would like to thank PTSB for the physical support and electronic shop are provide the equipment and component for this system to function.

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FISIO BIKE

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Abstract – Fisio Bike is a product designed to provide patients with physiotherapy. This device is designed to prevent patients from attending a physiotherapy center to undergo the treatment process, andinstead of simply using this product, they can do it at home and anywhere. The main objective of this product is that it can be used by physiotherapy patients as it has both lifting and weighting functions. This product is also carefully used by all ages, including children, teenagers and the elderly. This was created to dealwith some of the problems that arise when using existing methods, such as the difficulty of carrying instruments, storing them in a safe place, and the problem of transportation during treatmen.

Keywords:ARDUINO NANO, easily moved, smart physio bike

INTRODUCTION

Physiotherapy enhances the body's natural healing mechanisms to treat illness and injury. In most cases, it is painless. Physiotherapy treatment is a medical treatment that does not use drugs but uses techniques such as exercise, electrotherapy, posture, air waves and heat to help you recover Patients who receive physiotherapy gain knowledge about how they can help themselves to achieve better health. Physiotherapist may assist injured patients by using assistive devices physiotherapy, regardless of their age or condition.

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METHODOLOGY

The research techniques used in this study will be described in this chapter. This research will first explain how electrical and electronic goods made. Next, the research methodology is described, including samples, instruments developed, data collection methods, and data analysis used in this study.

RESULTS AND DISCUSSION

The questionnaires has been distributed to 20 people to record all data obtained from patients who have been seen at physiotherapy centers that have problems with their legs.

NO	PERKARA	SKALA	
		YA	TIDAK
1.	Adakah fisio bike mudah untuk digunakan ?		
2.	Adakah kelajuan fisio bike mudahdikawal ?		
3.	Adakah rintangan fisio bike mudah dilaraskan ?		
4.	Adakah kedudukan atau ketinggian fisio bikebersusaian ?		
5.	Adakah fisio bike menjimatkan masa rawatan ?		
6.	Bolehkah projek fisio bike menembusi pasarantempatan dan luar negara ?		
7.	Adakah projek ini selamat untuk digunakan olehsemua peringkat usia ?		

Figure 1: Questionaire

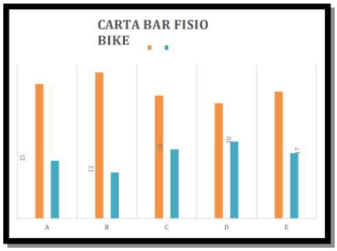

Figure 2: Fisio Bike bar chart

This analysis to take evidence from the patient or users who use my product which is Fisio Bike. They have filled the form that I have prepared so that I can know the result.

.

CONCLUSIONS

As a result, the products I produced have made the physiotherapy process easier and comfortable for users, allowing them to move and function normally without pain in the knees or feet. This product can also be sold because it is user-friendly and convenient for all ages. I hope this product will help everyone in physical health. In addition, we give physiotherapists ideas for creating devices which I created, which will make it easier for them to treat patients

ACKNOWLEDGEMENTS

The authors would like to extend his sincere gratitude to Wan Sabariah Binti Wan Ismail, the project supervisor, for her full guidance and insightful suggestions, which greatly facilitated the completion of this project.

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RFID MOTOR PARKING SYSTEM

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Abstract – This paper present the system that designed to provide users with secure motorcycle parking system and convenient access using RFID technology. This project combines RFID technology, linear actuators, infrared sensors, buzzers, LCDs, and the use of Arduino Nano. The security of this project is enhanced by using strong and secure security protocols.

Keywords –Motocycle, Parking System, RFID

INTRODUCTION

The system uses an RFID reader to read the RFID tag attached to the user. After the verification process is successful, the linear actuator will be used as a lock on the motorcycle tire or motorcycle rim and the control will be activated. The system is also equipped with infrared (IR) sensors to detect the presence of motorcycles and avoid accidents or collisions. The vibration sensor is an additional component that can detect movement or vibration such as theft or vandalism. Buzzer and LCD are used to provide notifications and safety information to users. The security of this project is enhanced by using strong and secure security protocols. This project makes it easy for users to park their motorcycles safely and easily. It also provides advantages in accessing the system and reduces the risk of motorcycle theft or violations.

METHODOLOGY

Methodology that has been implemented is divided into two parts: hardware design and software design. The hardware that is the core controller, the Arduino Nano board that connects to the sensors, is central to the hardware design. The software used is Arduino IDE to download the RFID Motocycle Parking system Coding. Figure 1 shows the Block Diagram of the system.

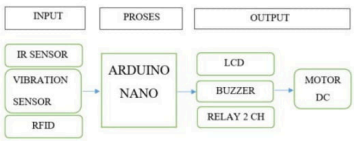

Figure 1: Block Diagram Of the System

RESULTS AND DISCUSSION

This project used PVC Box as a prototype. Also used an Infrared Sensor as a component to detect objects. This system is also equipped with a Vibration Sensor as a component to detect any attempted theft or damage to this system. The output data from RFID and IR sensor shown on LCD are as in Table 1 and Table 2.

Table 1: Data from RFID & IR Sensor

Aktiviti	Tindakbalas
Tag RFID berdaftar (6307 6E 20)	BuzzleTidak Berbunyi
Tag RFID tidak berdaftar (F1 C802 1B)	Buzzer berbunyi

Jarak (cm) tag RFID	Tindak balas Pembaca RFID
1	Membaca
2	Membaca
3	Tidak Membaca

Jarak (cm) IR sensor dengan objek	Tindak balas IR sensor
1	Mengesan
2	Mengesan
3	Mengesan
4	Tidak Kesan

Table 2: Output Display on LCD

KOMPONEN	SERIAL MONITOR	LCD
RFID Berdaftar	17:27:06.760 -> UID tag: 6307 6E 20 17:27:06.760 -> Message : Access Granted	Scan Your RFID Locked Scan Your RFID Un-Locked
RFID Tidak Berdaftar	17:27:19.296 -> UID tag: F1 C802 1B 17:27:19.296 -> Message : Access denied	Scan Your RFID Invalid RFID Tag
Penderia Inframerah (IR)	17:27:49.345 -> IR SENSOR DETEC	Scan Your RFID Detect Object
Penderia Getaran	17:27:04.959 -> Vibration Detected	Scan Your RFID Vibration Detect

CONCLUSIONS

The design of RFID Motocycle Parking system to overcome existing problems of motocycle thefty. This will contribute to the advancement of security technology for vehicle. Furthermore, advances in security feature such as IR Sensor & Vibration sensor. With the implementation of this project, it will be able to provide an effective and safe solution in the arrangement of motorcycle parking as well as improve the user experience.

ACKNOWLEDGEMENTS

The authors would like to thank Supervisor and JKE PTSB for the technical support.

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SMART PET FEEDER

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Abstract – Smart Pet Feeder is an automatic feeding machine for pets. Next, this machine is designed to make it easier for defenders to feed pets when they are not at home. In addition, this machine is designed using an existing concept but innovated with the addition of an internet connection on the device. Among the innovative components are electrical connections such as ESP32, ultrasonic sensors and servo motor. It works to distribute food automatically when the button is pushed. Furthermore, the notification will be sent when the food in the container is almost finished.

INTRODUCTION

Nowadays most of us have pets at home. However, some people fail to pay attention to their pets because they are too busy to feed them on time. This proposal addresses the above problem by introducing a Smart Pet Feeder to ensure pets are fed on time. This Smart Pet Feeder consists of a food container, a servo motor and an ultrasonic sensor. It also has an ESP32 to control the operation automatically. Pet food is filled in a container and food can be dispensed using the phone.

METHODOLOGY

To ensure that this Smart Pet Feeder can work well, it needs to take several factors such as the collection of data about the type of components used and the block diagram. In addition, there should also be a flow chart and the costs that need to be issued to make this project a success.

RESULTS AND DISCUSSION

The data that can be obtained from this prototype is the distance between the food and the ultrasonic sensor.

Distance/cm	Ultrasonic Sensor
1	Can detect food
2	Can detect food
3	Can detect food
4	Can detect food
5	Cannot detect food and notification will be send

Table 1: Distance between food and ultrasonic sensor

The Ultrasonic Sensor will reflect the ultrasound and when the ultrasound hits any object, it will reflect to the ultrasonic sensor. Ultrasonic will send data to ESP32 and will upload a notification on the Blynk application.

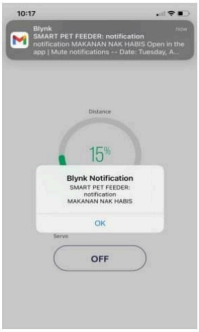

Figure 1: Notification sent

CONCLUSIONS

The project that has been created has been planned carefully to avoid any mistakes that may occur when used and to achieve the objectives that have been set. The hope of this project in the future is that it can be marketed and can become one of the needs of pet animal advocates even if there is a higher technology.

ACKNOWLEDGEMENTS

The authors would like to thank the supervisor and friends for the support given to make this project successful.

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SMART DUSTBIN ARDUINO NANO

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Abstract – This project is to design a smart trash that will help in keeping our environment clean and also the environment. Nowadays technology is getting more and more advanced day by day so that it can keep up with the times by cleaning the environment that has been polluted. Therefore, building a smart trash can by using Arduino Nano can overcome the problems that have been encountered. This smart trash can management system is built on a microcontroller-based system that has an ultrasonic sensor on the trash can. This project can reduce environmental problems and user health problems. This project can carried out if a person approaches the bin then the Sensor will be able to detect the movement and cause the lid of the bin to open automatically.

INTRODUCTION

The rate of population increase in our country is increasing rapidly and we also have an increasing amount of garbage every day and will cause environmental issues. A trash can is a container that collects garbage or stores items that can be recyclable, broken down and do not decompose. They are usually used in homes, offices and other places but if the trash can is full of trash no one will clean it. The environment of the trash can is also conducive to increasing the level of pollution. Water pollution due to the trash can produce bacteria and viruses that can cause life-threatening diseases for humans.

Therefore, I have designed a smart trash can using Arduino Nano, Ultrasonic sensors and so on to present this project. This project can also solve the problems faced by every user.

METHODOLOGY

Smart Dustbin uses Arduino nano. Here I use Arduino for the implementation of the code for my sensing and the ultrasonic sensor that will detect the object to be sent to the servo motor so that the lid of the dustbin is opened and closed [1-2]. It will bring a drastic change in the aspect of hygiene with the help of technology for the good of users. So, this facility in maintaining a clean and healthy environment. My goal is also to provide high-tech and affordable facilities for everyone. To complete this project, I need some electronic items and materials I need are Arduino Nano, Ultrasonic Sensor, Servo Motor, Battery, LCD, Garbage container and so on.

RESULTS AND DISCUSSION

This project will be running if we apply the supply and will appear on the LCD whether the dustbin is full or not and the distance object to give signal to servo motor to running. Other than that, the buzzer will be listening to if the trash can is full to give signal for users.

Figure1: The distance object and Garbage Not Full

Figure 2: The distance object and Garbage Full

Components	Distance	Output
Ultrasonic Sensor 1	>30 CM	Detect objects to open and close the bin
Ultrasonic Sensor 2	>5 CM	Detect trash level if full

Table 1: Summary of Ultrasonic Sensor detect on smart dustbin

CONCLUSIONS

This smart dustbin Arduino nano is an innovation that can help all users to always maintain cleanliness and health. Products designed for the needs of every time with built-in technology.

ACKNOWLEDGEMENTS

Special thanks to Politeknik Tuanku Sultanah Bahiyah for the opportuhelpingd especially to my supervisor for helping us to finish it the final year project.

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GREEN LAWN SOLAR-POWERED SMART CUTTER

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Abstract – This project presents an innovative solution, fully automated solar-powered lawn cutter featuring MQTT-enabled web control. The system integrates solar panels to harness renewable energy, powering a high-capacity battery for self-sufficient and autonomous operation. Utilizing MQTT for communication enables seamless real-time interaction between the lawn cutter and a user-friendly based web application. This integration allows for remote monitoring and control, enhancing user convenience. The synergy of solar energy, MQTT technology, and an intuitive web interface establishes an eco-friendly and efficient approach to lawn maintenance. By reducing environmental impact and offering remote management capabilities, this project represents a cutting-edge advancement in automated landscaping technology.

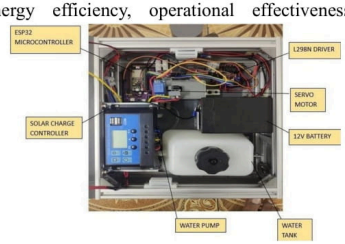
Keywords – Smart Cutter, Solar System, MQTT, IoT

INTRODUCTION

This project supports SDGs 7 (Affordable and Clean Energy) and 12 (Responsible Consumption and Production) by developing a solar-powered, MQTT-enabled automated lawn mower, which uses renewable energy to minimize environmental impact [1]. The system operates autonomously, utilizing solar panels to charge a high-capacity battery, and features real-time communication via a user-friendly web interface for remote control [2]. This innovation offers a sustainable, efficient, and modern approach to lawn care, advancing eco-friendly landscaping technology for both residential and commercial use [3].

METHODOLOGY

The methodology involves designing a solar-powered, fully automated lawn mower with MQTT communication for remote control via a web interface, using solar panels to power a high-capacity battery and embedded systems to navigate the lawn autonomously. It includes integrating sensors for obstacle detection, optimizing energy management, and performing field testing to ensure efficient operation, while evaluating performance in terms of energy efficiency, operational effectiveness, and environmental impact.



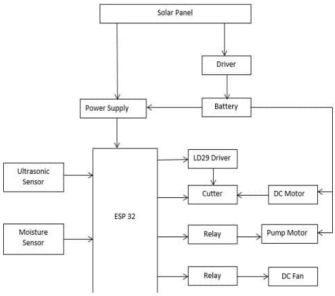


Figure 1: The internal part and block Diagram of project

RESULTS AND DISCUSSION

Figure 2 show the display of value of voltage of the reading of the battery that will charge to the solar controller. The system will automatically update the voltage capacity.

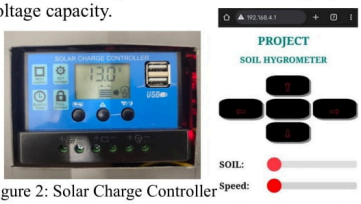


Figure 2: Solar Charge Controller Display and the controller of the cutter using app at phone.

CONCLUSIONS

The solar-powered fully automated lawn cutter provides a sustainable and efficient solution for modern lawn maintenance by reducing carbon emissions, minimizing manual labor, and utilizing a self-sustaining power source, though optimization is needed for performance in low-light conditions and cost-effectiveness.

ACKNOWLEDGEMENTS

The authors express their gratitude to JKE PTSB, lecturer, members, technical staff, and all individuals who contributed resources, guidance, and support toward the successful development of this project.

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ULTRASONIC WATER DISPENSER

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Abstract – The Ultrasonic Water Dispenser is a hands-free device designed to provide a convenient and hygienic way of dispensing drinking water. Unlike traditional gravity-fed water dispensers, which are inexpensive but prone to hygiene issues, this system uses ultrasonic sensors to automatically detect a glass and dispense water. The system stops dispensing when the glass is lifted slightly, preventing spills and contamination. The dispenser features a water reservoir, a DC water pump motor, ultrasonic sensors, an on/off switch, an LCD display, and LED indicators for water levels (low, medium, and full). The display and LED lights alert users to the water level, ensuring timely refills. This innovative design also includes a water level monitoring system powered by an Arduino Nano, relay modules, and ultrasonic sensors, all programmed using Arduino software. This project aims to enhance hygiene, simplify water dispensing, and assist individuals, including those with disabilities, by providing a user-friendly solution.

Keywords –Water Dispenser , Arduino Nano, ultrasonic.

INTRODUCTION

Every home typically has a manual water dispenser, such as a gravity-fed model, which is affordable but often lacks proper hygiene. To address this, the Ultrasonic Water Dispenser uses an ultrasonic sensor to automatically dispense water when a glass is detected, eliminating the need for manual operation. This system enhances hygiene by preventing contact with taps, reducing the spread of harmful bacteria. It features a water tank, a self-priming DC water pump, sensors, an on/off switch, and a water level indicator. The dispenser ensures clean and convenient access to drinking water, offering a hands-free and user-friendly solution.

METHODOLOGY

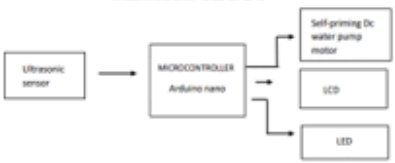

Figure 1:Block diagram

Input: The input of this project is a HC-SR04 ultrasonic sensor that is used to sense a presence of a cup. The sensor is placed at the ground of the water dispenser, so it can detect the glass if placed nearby it. Moreover, the ultrasonic sensor is used to measure the water level in the water tank with the calculating of the height of the water tank that is placed at the behind of the water dispenser. Output: The output components that are used in this project is self-priming DC water pump motor, LCD display and some LED lights. The self-priming DC water pump motor is used to pump down water into the cup when the sensor detects the cup. The LCD display is used to display the water level in the water tank. If the water level in the water tank is low the LCD display will show "LOW" and for medium level, it will display "MEDIUM" also for full level, will display "FULL". Lastly, the LED is used to notify the water level by its colours. Red is identified as low, yellow is identified as medium and green is identified as high.

RESULTS AND DISCUSSION

The result of Ultrasonic Water Dispenser are shown in Figure 2.

Figure 2: Front view of Ultrasonic water Dispenser

After the development of the prototype of an Ultrasonic water dispenser, it was tested by dispensing water in different types of mugs with different volume of water capacity. The test was included 5 different volumes of mugs to research the different between the time and the volume. The results show that the values of repeating and the time taken to fill the mug are not same for all the capacity of the mug. When the volume of the mug rises, the value of water to fill up the mug also rises. Due to the statement, it has proven that the analysis is stated correctly according to the theory.

CONCLUSIONS

The **Ultrasonic Water Dispenser** improves hygiene and accessibility by using ultrasonic sensors for hands-free water dispensing. Ideal for shared spaces, it reduces bacteria spread and simplifies clean water access. This reliable and user-friendly solution marks a significant step toward better water sanitation and health outcomes globally.

ACKNOWLEDGEMENTS

The authors would like to thank to supervisor Zarina Ismail for guiding me throughout this project.

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IOT WHEELCHAIR

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Abstract – The ***Smart Wheelchair*** is designed to assist individuals with lower-body disabilities, addressing challenges like dependence on others and the high cost of existing smart wheelchairs. This affordable solution uses an ESP-32 microcontroller for voice control and Bluetooth connectivity, an LED indicator, and a buzzer for emergencies. The system integrates cost-effective components and connects to a motor via a mobile app, with Android as the preferred platform for compatibility. By prioritizing affordability and accessibility, this prototype aims to provide an advanced mobility solution for individuals in developing countries.

Keywords –smart wheelchair, ESP32, bluetooth.

INTRODUCTION

The Smart Wheelchair is a cost-effective solution designed for individuals with disabilities, enabling them to control the wheelchair via a smartphone app using the ESP-32 microcontroller with Bluetooth connectivity. It features an LED indicator, a buzzer for emergencies, and a motor-driven system for effortless movement. Developed for accessibility and independence, this wheelchair reduces physical strain and reliance on others, benefiting users with permanent or temporary disabilities. Its versatile design makes it suitable for various situations, appealing even to younger users for its innovative remote-control-like functionality.

METHODOLOGY

This chapter outlines the methodology for developing the intelligent wheelchair system, focusing on both software and hardware. A Gantt chart ensures efficient project tracking, while a block diagram illustrates the integration of components like ESP-32, Bluetooth commands, motor, LED, and buzzer. The design process includes cost analysis, circuit simulation using Proteus 8.9, and step-by-step PCB creation through autoplacing, autorouting, and etching. Precise soldering ensures circuit functionality. Visual aids enhance clarity, making this chapter a practical guide for implementing and evaluating the system.

RESULTS AND DISCUSSION

The result of Ultrasonic Water Dispenser are shown in Figure 1. The results of testing the wheelchair with different weights show variations in the time taken and the number of repetitions needed to move the weights over a distance of 1 meter. For lighter weights, such as 500 grams, the wheelchair exhibited quick responses with consistent performance across multiple repetitions. As the weight increased to 800 grams and 1400 grams, the time taken for the wheelchair to move the weights slightly increased,

indicating steady and smooth movement without significant delays.

Figure 1: Prototype of IOT wheelchair

The analysis reveals that the wheelchair's performance is influenced by the weight it carries, with heavier loads requiring slightly more time to move. However, the overall performance remains consistent and within acceptable parameters for assisting users with mobility needs. These findings align with the expected behavior based on the theory and design of the wheelchair, validating the effectiveness of the project's implementation.

CONCLUSIONS

The intelligent wheelchair project successfully integrates cost-effective technology to enhance mobility for individuals with disabilities. Using the ESP-32 microcontroller and Bluetooth, it provides a reliable, accessible solution for independent movement. The project's affordable design ensures it benefits users, particularly in developing countries, and promotes greater independence. This work lays the foundation for future innovations in assistive technology.

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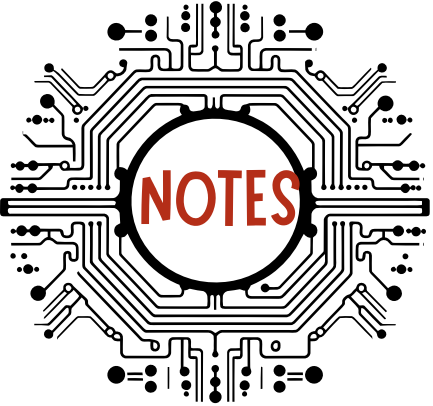
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