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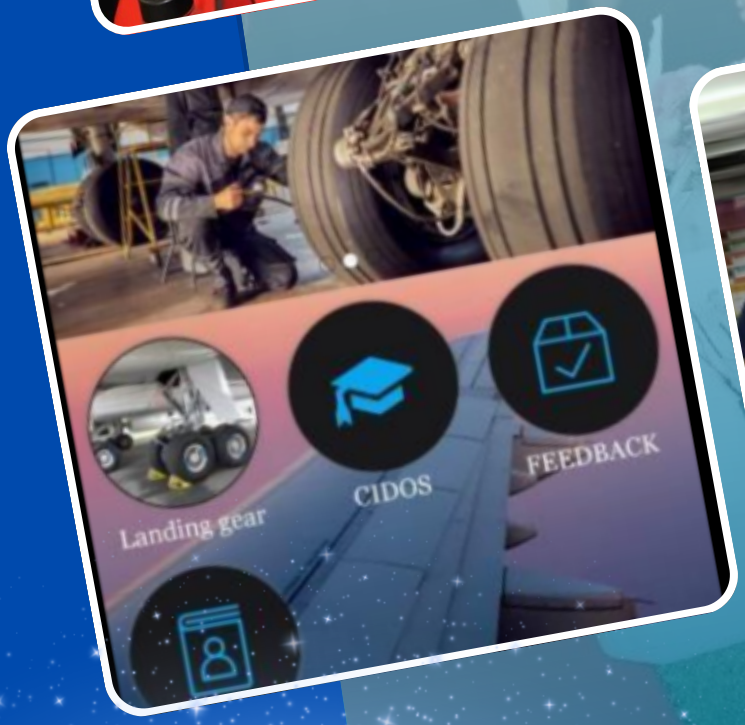
AEROMECH
POLITEKNIK BANTING

COMPILATION of AEROMECH INNOVATION

Session I & II 2023/2024



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BANTING

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PREFACE

The AEROMECH Innovation Compilation session I & II 2023/2024 celebrates the creativity, technical skill, and problem-solving capabilities of our final-year students in the Diploma in Aircraft Maintenance, Diploma in Mechanical Engineering, and Diploma in Manufacturing Engineering programs at Politeknik Banting Selangor. As we witness rapid advancements in engineering and technology, the importance of hands-on, innovative projects in aeromechanical engineering has never been more relevant. These projects are essential in preparing students not only as competent graduates but as visionary thinkers who can address real-world challenges in their fields.

This compilation serves several important purposes. Primarily, it is a platform to document and recognize the exceptional work of our students, highlighting their ability to translate theoretical knowledge into practical, impactful solutions. Each project featured in this collection represents a significant step toward enhancing safety, efficiency, and sustainability within aeromechanical and manufacturing fields.

Through AEROMECH Innovation Compilation I & II 2023/2024, we aim to share these achievements with a wider audience including educators, industry professionals, and prospective students showcasing the high standard of education and skill development at Politeknik Banting Selangor. By celebrating these projects, we also encourage future cohorts to pursue innovation with dedication and ingenuity, strengthening the bridge between academic learning and industry needs. This book is not only a testament to our students' hard work but also a foundation for ongoing inspiration and advancement in engineering education.

Lim Yee Kai
Chief Editor
Politeknik Banting Selangor

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DECLARATION

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This book is a work of student projects compiled by Politeknik Banting Selangor. Any reference to real persons, organizations, or other actual entities, past or present, is for informational purposes only and does not constitute an endorsement.

Compilation of AEROMECH Innovation Session I & II 2023/2024

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ACKNOWLEDGMENT

We extend our heartfelt gratitude to all individuals and teams who contributed to the realization of the Compilation of AEROMECH Innovation Session I & II 2023/2024. This book would not have been possible without collective efforts and dedication.

Firstly, we wish to acknowledge the unwavering support of our institution's leadership and the Director of Politeknik Banting Selangor, who championed this project and provided the resources and encouragement needed to bring it to fruition.

We sincerely thank the Publication Committee members, whose commitment to quality and attention to detail have shaped this compilation. Special appreciation goes to the reviewers, editors, and technical advisors who meticulously evaluated each project for inclusion, ensuring the highest standards were maintained.

To the students whose innovative projects are showcased here, we celebrate your hard work, creativity, and dedication to excellence. Your achievements reflect the spirit of Politeknik Banting Selangor and inspire future cohorts to strive for innovation.

Lastly, we are grateful to our families, friends, and colleagues for their patience and encouragement throughout this process. This book is a testament to the power of collaboration and shared vision.

Thank you all.

DIRECTOR'S REVIEW

Ts. Ibrahim bin Burhan
Director
Politeknik Banting Selangor

It is with great pride that I present the AEROMECH Innovation Compilation session I & II 2023/2024, a testament to the ingenuity, technical skill, and dedication of our students at Politeknik Banting Selangor. This compilation reflects not only the academic achievements of our students but also their potential to contribute meaningfully to their chosen fields. At Politeknik Banting Selangor, we believe that student projects serve as a critical platform for bridging academic knowledge with real-world application, empowering students to address complex challenges and innovate solutions that resonate beyond the classroom.

Student final year projects, such as those featured in this collection, are essential in cultivating skills that align with industry standards and societal needs. These projects exemplify the depth of our students' learning experiences, advancing both academic and professional knowledge. Each project showcases a unique approach to problem-solving and highlights the importance of hands-on learning in developing both technical expertise and a commitment to lifelong learning.

Politeknik Banting Selangor is deeply committed to fostering a learning environment that encourages creativity, technical mastery, and forward-thinking innovation. Our goal is to prepare students who are not only academically equipped but also resilient and adaptable, ready to meet the demands of today's dynamic industry landscape.

I extend my heartfelt congratulations to all students and faculty members involved in this compilation. May this book inspire future cohorts to pursue excellence and innovation, embodying the values of Politeknik Banting Selangor as they forge new paths in their careers.

EDITORIAL BOARD

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Project Abstract
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CapCut


GRASS CUTTER CONTROL
POLITEKNIK
A10
ABSTRACT
OBJECTIVE
PRODUCTS DESCRIPTION
ANUGERAH NOVASI

AIRCRAFT PARTS EXPLORER (APEX) GAME USING ROBLOX

Supervisor : Norlia Binti Ghazali

Email : norlia@polibanting.edu.my

Students : Muhammad Izzan Syahmi bin Mohd Salihin, Hamizah Maisarah binti Ahmad Syahril, Muhammad Danish bin Julian Zulkhairi

BACKGROUND

A rising integration of digital technologies and gaming to improve learning experiences is evident in current trends in education. This includes using educational games to help students become more proficient in a variety of areas, including chemistry, foreign languages, and mathematics. Gamification is increasingly being used in teaching methods to improve student and teacher digital abilities while streamlining the learning process.

OBJECTIVE

This project is aimed to design and develop a game progression system that encourages players to proceed through the game by fulfilling objectives, obtaining awards, and getting access to new content. Furthermore, it is aimed to create an aviation game that educates aircraft engineering students on aircraft, hangar and aircraft components in a fun and interactive way.

METHODS

A quantitative study was conducted to gauge the effectiveness of the APEX Game, involving a sample group of students, evaluating the game's usability, its effectiveness in improving knowledge of aircraft parts, and overall user satisfaction.

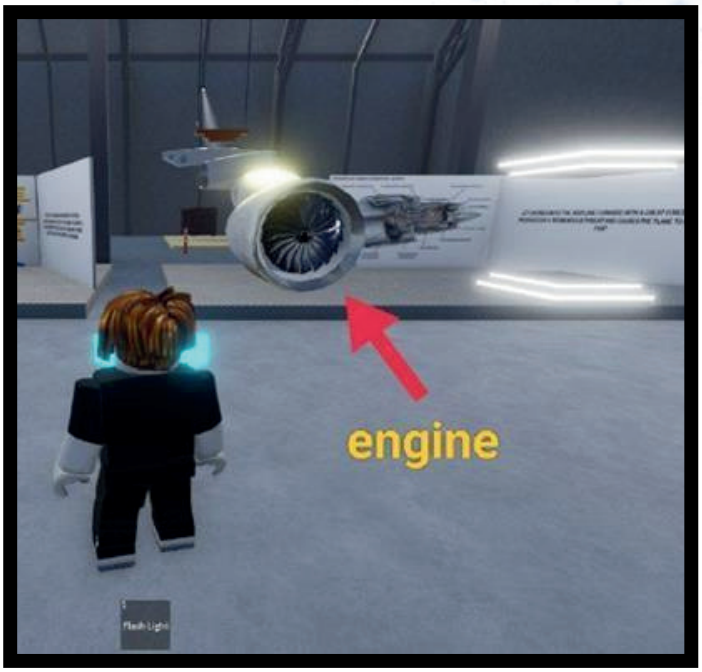
RESULTS

A simple data was collected using Google Forms revealed a substantial 96.4% of total respondents expressing satisfaction. Conclusively, the APEX Game has the potential to significantly improve students' knowledge of aircraft parts, addressing gaps in understanding and offering a practical and engaging tool for self-directed learning in aviation mechanics.

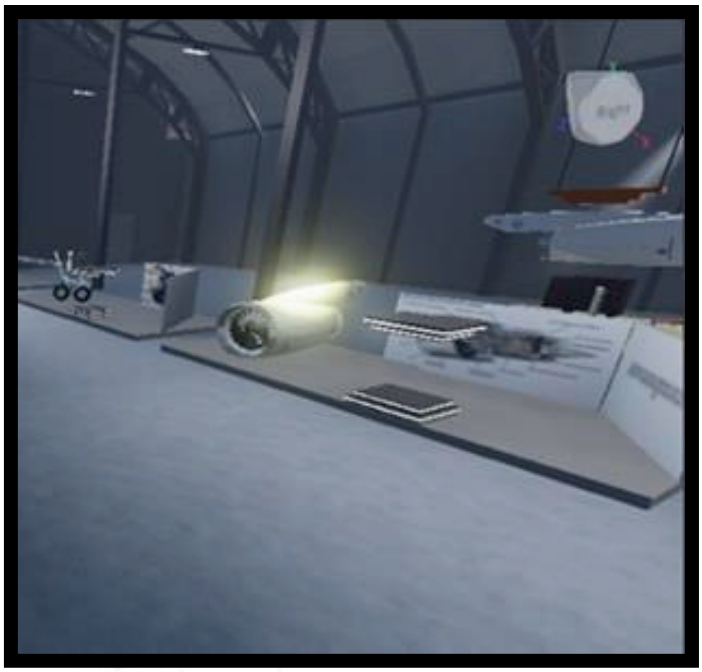
CONCLUSION AND IMPLICATIONS

The use of technology in education is crucial in our technologically advanced society, as learning is increasingly seen to be most successful when it is relevant and interesting. The Roblox game APEX (Aircraft Parts Explorer) is a prime example of this since it skilfully combines teaching with entertainment to offer an immersive aircraft mechanical experience.

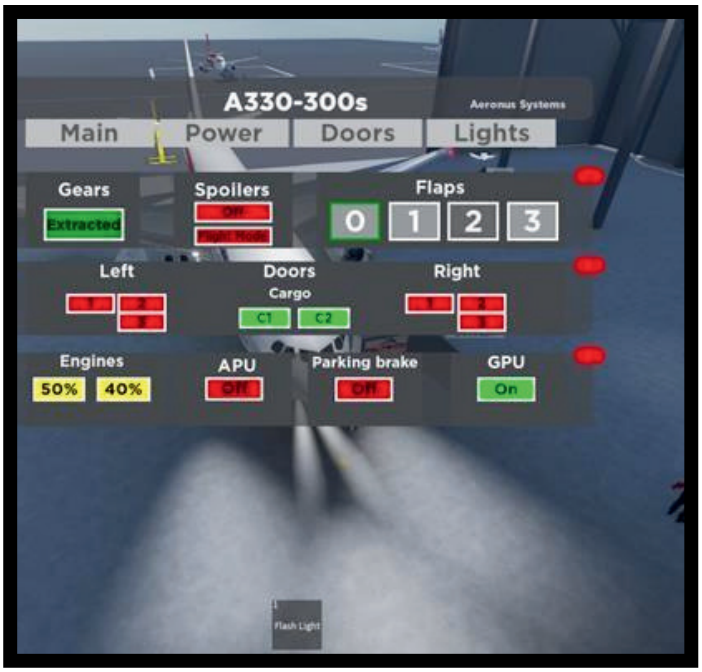
Uniform Customization



Detailed Aircraft Compenents



Education Cubicle: Each Part of Aircraft



Cockpit Controls

HIGH UPLIFT

Supervisor : Norlia Binti Ghazali

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Students : Rubanesh A/L Balamurugan, Dilip A/L Nandakumar, Avinaash A/L Gogula Krishnan

BACKGROUND

Professionals in the field of aircraft maintenance have expressed grave worry about the limitations of current lifting methods. While current hydraulic scissor lifts are useful in specific instances, they have been criticized for their inability to adapt to small places and small aircraft maintenance work. Feedback from maintenance professionals' highlights occasions when conventional lifts were challenging and impracticable, impeding operating efficiency.

OBJECTIVE

The project is aimed to design and develop a compact and flexible High Uplift structure suitable for use in small aircraft maintenance using a hydraulic system that allows precise control over the lifting mechanism.

METHODS

High uplift is a hydraulic scissor lift innovation. In general, this piece of machinery is divided into two compartments or sections, with the lower half housing the hydraulic scissor lift and the upper section serving as a platform for standing while carrying out maintenance tasks. The HIGH UPLIFT product incorporates electronic parts such as an ARDUINO R3, an ultrasonic sensor and a button system which connected to a 12W DC Motor located next to the hydraulic system.

RESULTS

In terms of speed limit, High Uplift is capable to move at a top speed of 4.5km/h during unloaded. However, it is not advisable to move during loaded. The time taken to pedal the hydraulic jack to reach the max height is 60s and time taken to retract it is 15s by using a linear motor. This indicates the overall efficiency has been successfully improved.

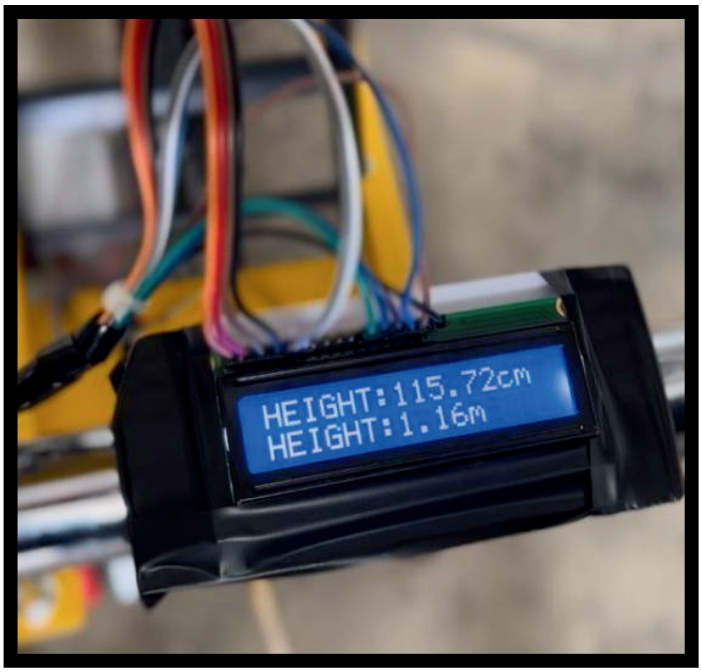
CONCLUSION AND IMPLICATIONS

The hydraulic scissor lift of the High Uplift project is revolutionizing aviation servicing. It maximizes productivity and versatility with its user-friendly controls, improved safety measures, and compact design for confined situations. In addition to providing increased safety and comfort, the lift's innovative technology and other features like warning lights and a small toolkit also help to save time and resources.

Product View Before Extraction

Product View After Extraction

Extraction of Hydraulic Scissor Lift



Reading of Height

AVIATION FRIENDLY DUSTBIN (AFD)

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Students : Muhammad Musyrif Aqil Bin Razlisham, Muhammad Syafi Bin Shahrifzan, Muhammad Danial Iskandar Bin Nooraini, Aizanatasha Qistina Binti Rosli

BACKGROUND

Foreign Object Debris (FOD) refers to any object located in and around an airport (especially on the runway and the taxiway) that can damage the aircraft or harm air-carrier personnel safety. FOD presents considerable risks to both equipment and personnel safety which poses a direct threat to aircraft safety and is a major safety hazard in air transportation, thus highlighting the need for automation in FOD waste management in the vicinity of airport or airfield areas.

OBJECTIVE

The project is aimed to design and develop an Aviation Friendly Dustbin (AFD) specifically tailored for use in base maintenance lines and aircraft hangars; which operates efficiently without hindering maintenance activities.

METHODS

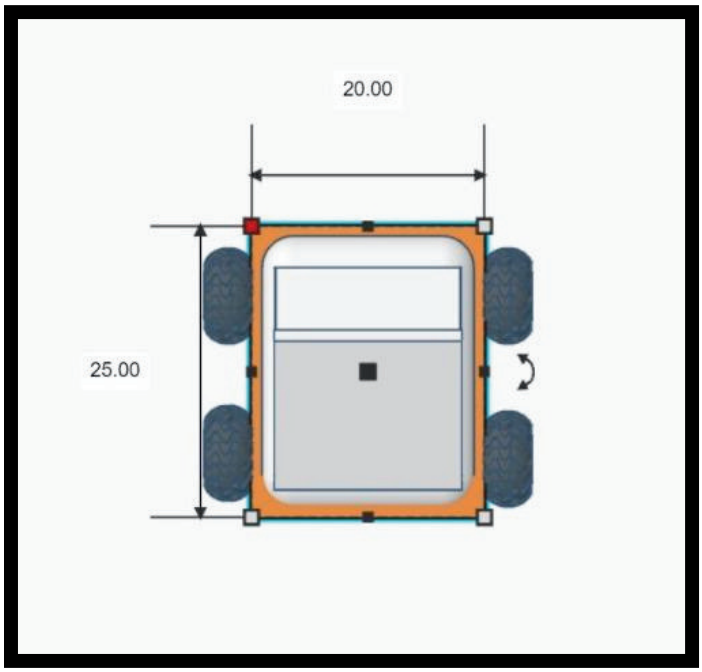
The acrylic board was cut and assembled using sealant while the aluminum sheet was cut, bent to a 90-degree angle, and drilled to attach it to the dustbin using rivets. The Arduino IDE was used to program 4 DC motors and a servo motor. The performance test was conducted to measure overall efficiency including speed limit, load capacity and turning radius.

RESULTS

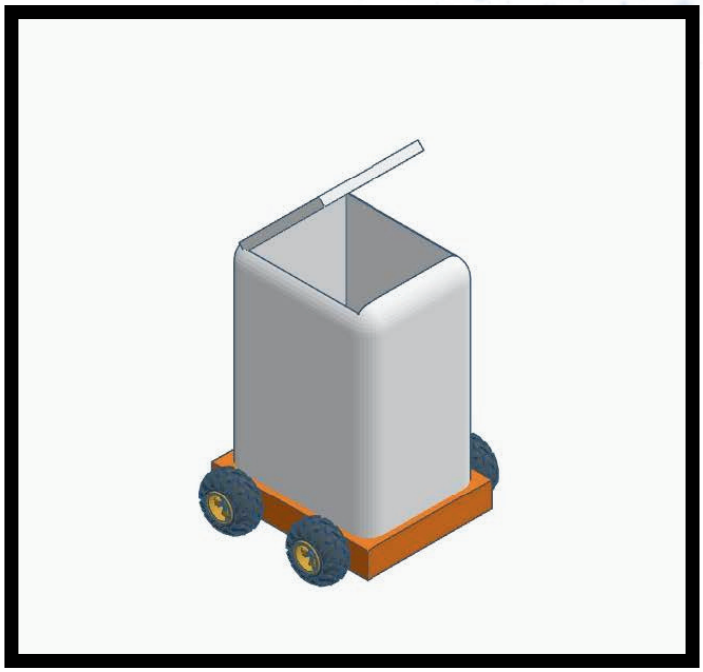
The AFD can operate for a maximum of 1 hour and 30 minutes on a single charge, indicating its reliance on rechargeable power sources for extended use. With a weight of 3.5 kg, the AFD is lightweight, facilitating easy maneuverability and transportability in various operational environments. It boasts a maximum turning radius of 180 degrees, allowing for agile navigation and flexibility in confined spaces.

CONCLUSION AND IMPLICATIONS

AFD significantly reduces Foreign Object Debris (FOD) incidents, thereby enhancing safety and operational efficiency in aviation. AFDs play a critical role in mitigating risks by preventing hazardous debris from damaging aircraft engines and other vital components, which in turn minimizes costly repairs and operational disruptions.



AFD DIMENSIONS



AFD IN OPERATION MODE (OPENING LID)

ACTUAL PRODUCT (AFD)

SERVO MECHANISMS

THE MAINTENANCE PROVISION CRIB (MPC)

Supervisor : Mohd Aizuddin bin Elias

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Students : Arig Jeremiah Along Anak Michael, Shivataarani D/O Mohan, Muhammad Haikal bin Shah Kamaruzzaman, Lew Kim Weng

BACKGROUND

The Maintenance Provision Crib (MPC) revolutionizes tool storage with smart technology, enabling automated mobility, real-time tool tracking, and smartphone integration via the Blynk app. It improves efficiency, safety, and durability with features like Wi-Fi-based tool location, robust materials, rechargeable batteries, and bright safety paint, redefining productivity and accessibility in tool management.

OBJECTIVE

- To design a user-friendly and ergonomic smart toolbox system that maximizes tool accessibility, storage, organisation, and controlled movement of the toolbox.
- To develop a smart toolbox that combines advanced technologies and IoT to enhance the greatest level of tool reliability and accountability.
- To demonstrate a cost-effective smart toolbox solution that optimises tool usage minimises tool loss or theft, and reduces the need for manual inventory tracking, thereby lowering overall tool management expenses.

METHODS

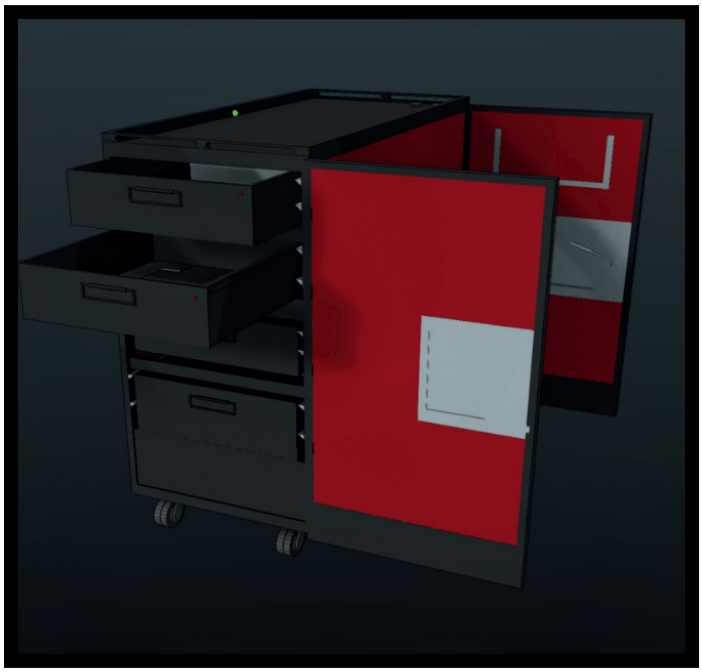
MPC employs an advanced motorized system for semi-autonomous mobility, a Wi-Fi-enabled ESP32 board, and the Blynk app for tool tracking via a smartphone interface. It integrates electromechanical assemblies for real-time tool detection, rechargeable batteries for extended use, and robust materials to ensure safety, durability, and user efficiency.

RESULTS

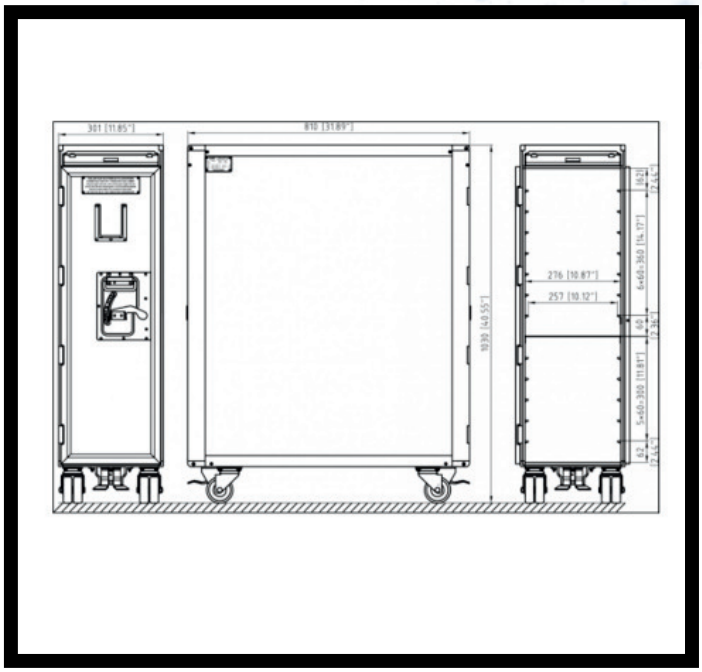
The MPC demonstrated efficient tool tracking, real-time inventory management, and seamless smartphone integration via the Blynk app. Its motorized mobility enhanced accessibility and productivity, while the durable design and safety features reduced workplace hazards. Overall, the system improved efficiency, user satisfaction, and organization in tool storage and management.

CONCLUSION AND IMPLICATIONS

The MPC successfully revolutionizes traditional tool storage with advanced smart technology, combining mobility, real-time tool tracking, and user-friendly smartphone integration. Its durable construction, safety features, and efficiency enhancements improve workplace productivity and safety. This innovative solution sets a new standard for tool storage, bridging technology, user convenience, and practicality.



Maintenance Provision Crib (MPC)



Schematic Diagram of MPC

U-shape Slider and Butt Hinges

Finishing of MPC

LANDING GEAR LEARNING APP

Supervisor : Muhd Hafizuddin bin Othman

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BACKGROUND

The digital revolution has transformed education, making mobile apps essential tools for enhancing learning of landing gear. This study focuses on developing aircraft landing gear educational apps tailored to students' needs, improving engagement and flexibility. By examining design, development, and outcomes, the research aims to integrate these apps into teaching, particularly for aircraft engineering students, enhancing the learning experiences.

OBJECTIVE

- To develop an aircraft landing gear mobile app for aircraft engineering students.
- To measure the acceptance of aircraft landing gear mobile learning applications.
- To incorporate the mobile application into the teaching and learning process of the landing gear topic.

METHODS

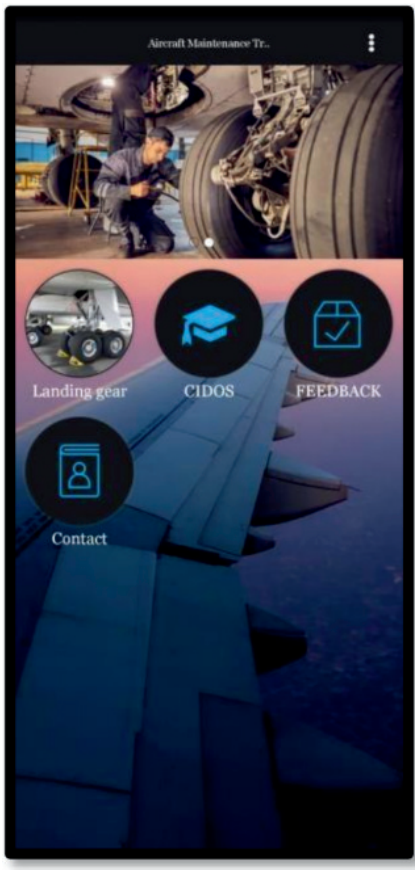
This research outlines the steps involved in creating the mobile app, including design, development, editing, and testing. The app's interface was designed using the AppyPie platform, which allowed for customization of features to enhance its appeal and functionality. AppyPie was chosen for its accessibility and ease of use.

RESULTS

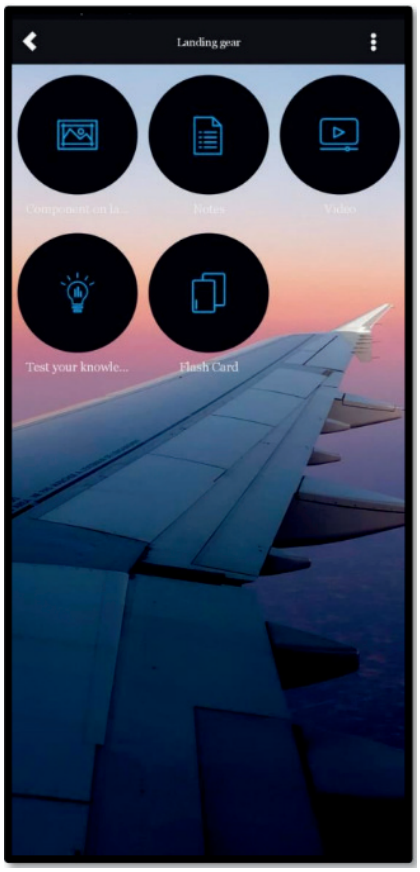
The mobile app for aircraft landing gear provides interactive educational content, including maintenance checklists, animated videos, notes, and quizzes. It helps students understand landing gear components and operations, with easy access to Polycc Cidos resources. Users can provide feedback, ensuring continuous improvement and enhancing the learning experience.

CONCLUSION AND IMPLICATIONS

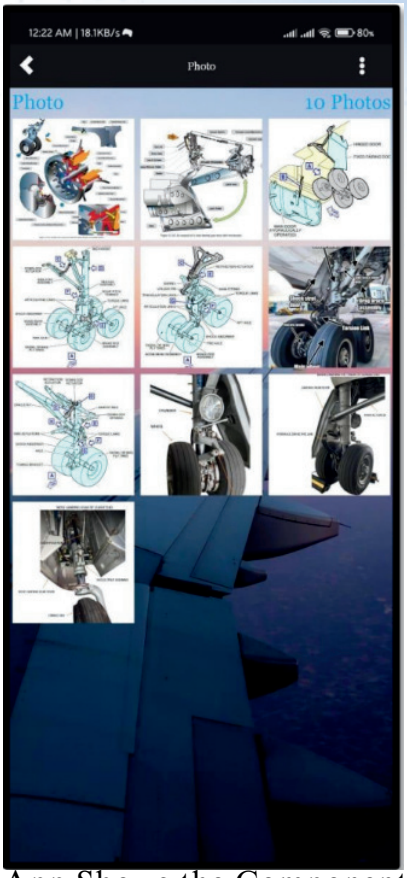
The app successfully meets its objectives, providing a user-friendly interface for easy navigation. Designed for aircraft engineering students, it offers accessible learning on landing gear. The app is compatible across devices, ensuring students can easily access and learn from the provided notes and features.



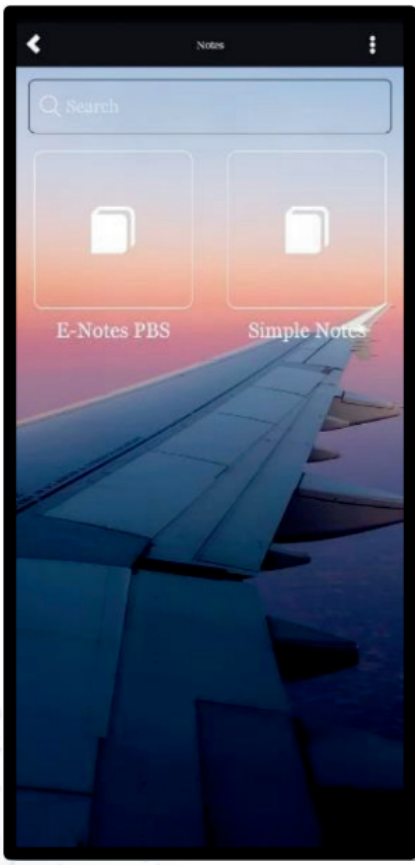
App Home Screen



App Features



App Shows the Component of Landing Gear



App Notes

RECORDED EQUIPMENT AND TOOLS SYSTEM

Supervisor : Ts. Muhamad Farouk bin Abdul Rashid

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Students : Aiman Nurhakim bin Norzain, Muhammad Najwan Irfan bin Mohd Nahar, Harith Iskandar bin Jaafar, Muhammad Aiman bin Jefridin

BACKGROUND

The Recorded Equipment and Tools System (RETS) was developed to enhance the efficiency of tracking tools and equipment in industrial settings. It replaces traditional logbooks with a digital system, ensuring accurate data recording, reducing tool loss, and minimizing borrowing time. The system integrates barcode scanning for improved inventory management.

OBJECTIVE

- To digitalize the tool tracking process – Replace traditional logbooks with a secure digital system to reduce paper usage and improve efficiency.
- To enhance inventory management – Implement a barcode-based tracking system to minimize tool loss and improve accountability.
- To reduce borrowing time – Develop a user-friendly system that streamlines the tool loaning process, saving time for staff and technicians.

METHODS

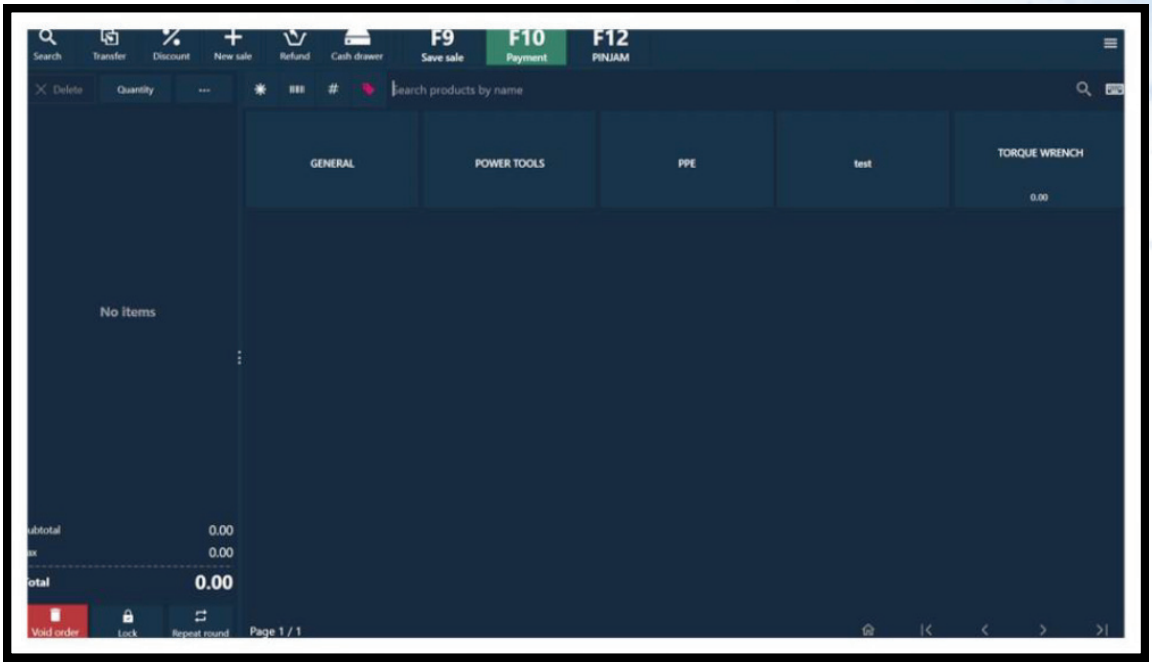
The project followed a structured approach, including problem identification, software development using C++, interface design, and data management implementation. User surveys and testing were conducted to assess efficiency. The system consists of a user-friendly interface, database management, and barcode scanning for tracking tools.

RESULTS

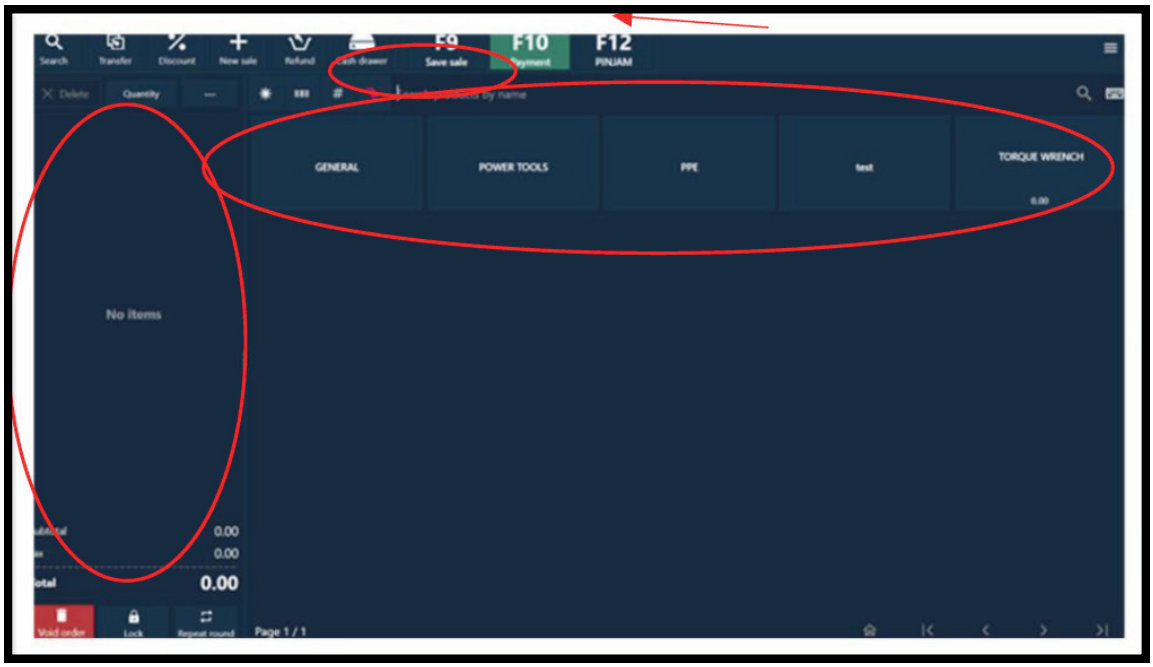
RETS successfully streamlined the borrowing process, reducing time delays and tool misplacement. User feedback indicated increased efficiency and ease of use. The system provided real-time inventory tracking and improved data security. Compared to traditional methods, RETS enhanced accountability and optimized resource allocation.

CONCLUSION AND IMPLICATIONS

The implementation of RETS improved inventory management, reduced paperwork, and increased tool security. The project demonstrated the potential for digital transformation in industrial settings. Future improvements include cloud integration for centralized data storage and expanded usability across industries beyond aviation maintenance.



Main Menu of R.E.T.S



Selection of tools

REMOTE CONTROL AIRCRAFT TUG (RCAT)

Supervisor : Mohamad Faizal bin Daud

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Students : Ahmad Shofi Kumaeni bin Abdul Munif, Ahmad Hafiz Daniel bin Ahmad Hafizul, Muhammad Haziq Hazirul bin Mohsin, Thivenesh Kumar a/l Siva Kumar

BACKGROUND

Aircraft towing is essential for safe and efficient aircraft maneuvering, especially in confined spaces like hangars. Conventional methods often involve towbar or towbarless systems, which can lead to accidents, as highlighted by incidents in Bangkok and Mumbai airports. These events underscore the need for innovative towing solutions that enhance safety, reduce accidents, and improve operational efficiency.

OBJECTIVE

- To develop a reliable method to secure nose landing gears during towing.
- To create an intuitive control system for tight maneuvering.
- To design an environmentally friendly, compact device tailored for lightweight aircraft.
- To minimize risks to ground crew through remote operation and enhance efficiency by reducing aircraft turnaround time.

METHODS

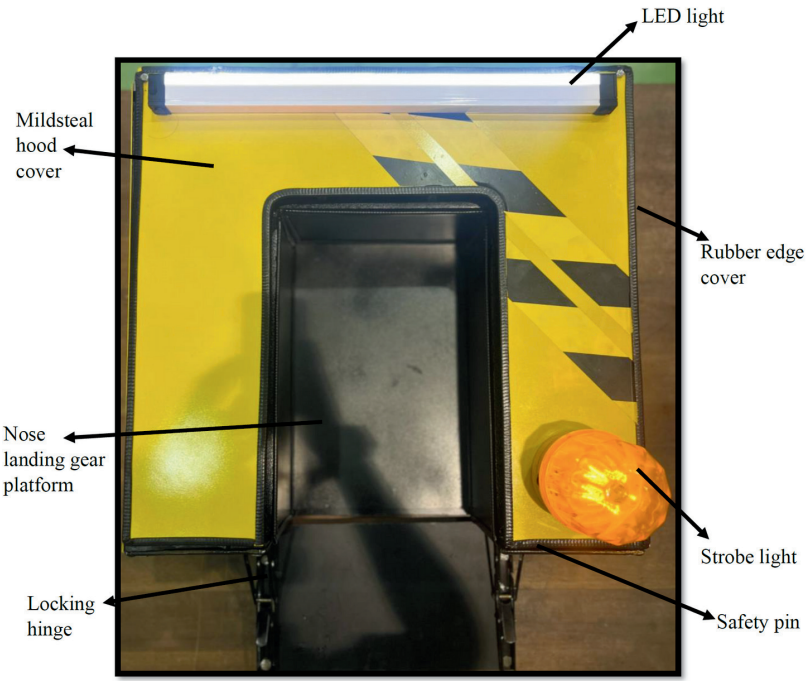
The RCAT employs Arduino programming with BTS7960 motor drivers for precise motor control. Its mechanical design incorporates a locking mechanism using mild steel and pins for secure aircraft connection. The FlySky FS-i6X remote system ensures reliable long-range control. A compact structure, built with durable materials, houses the electronics and mechanical components. Testing involved validating stability, performance, and user-friendly operation.

RESULTS

The RCAT demonstrated effective towing capabilities for lightweight aircraft like the Cessna 172. The system's locking mechanism ensured secure handling, and its compact design facilitated storage and mobility. Operators appreciated its safety features, including anti-collision sensors and manual overrides, which minimized risks. Performance evaluations indicated smooth, reliable operation across various terrains.

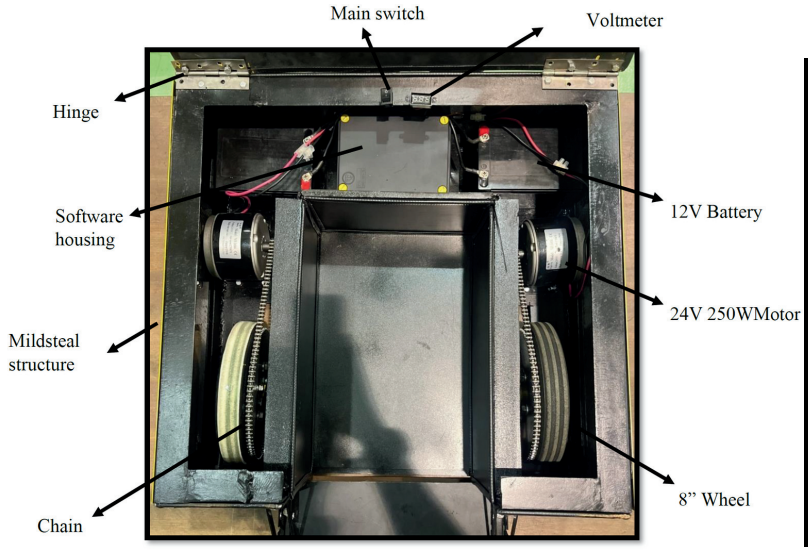
CONCLUSION AND IMPLICATIONS

The RCAT project successfully combines wireless technology, durable design, and user-centric programming to enhance aircraft towing. It offers a safer, more efficient alternative to conventional methods. Future improvements could include expanded remote control features and enhanced power capacity, paving the way for widespread adoption in training organizations and flying academies



Outside look of RCAT

RCAT full assembly



Components arrangement inside RCAT

RCAT towing the Cessna 172

WING AEROFOIL STALL TRAINER (WAST)

Supervisor : Ts. Muhamad Farouk bin Abdul Rashid

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Students : Aiman Nurhakim bin Norzain, Muhammad Najwan Irfan bin Mohd Nahar, Harith Iskandar bin Jaafar, Muhammad Aiman bin Jefridin

BACKGROUND

The Wing Aeroflow Stall Trainer (WAST) project was developed to enhance aviation education by providing a realistic, interactive training kit. It simulates aerofoil configurations and stall behavior, offering real-time feedback to help students understand aerodynamic principles. The durable design ensures long-term use, improving students' practical knowledge of aerodynamics.

OBJECTIVE

- To create and construct a wind tunnel trainer kit that effectively replicates real-world aerofoil configurations.
- To integrate a stall indicator into the trainer kit, ensuring its reliability and accuracy in providing real-time feedback on the stall behavior.
- To provide students a practical and immersive opportunity to do experiments with aerofoils within a controlled environment, enabling them to develop a profound comprehension of the fundamental principles of aerodynamics.

METHODS

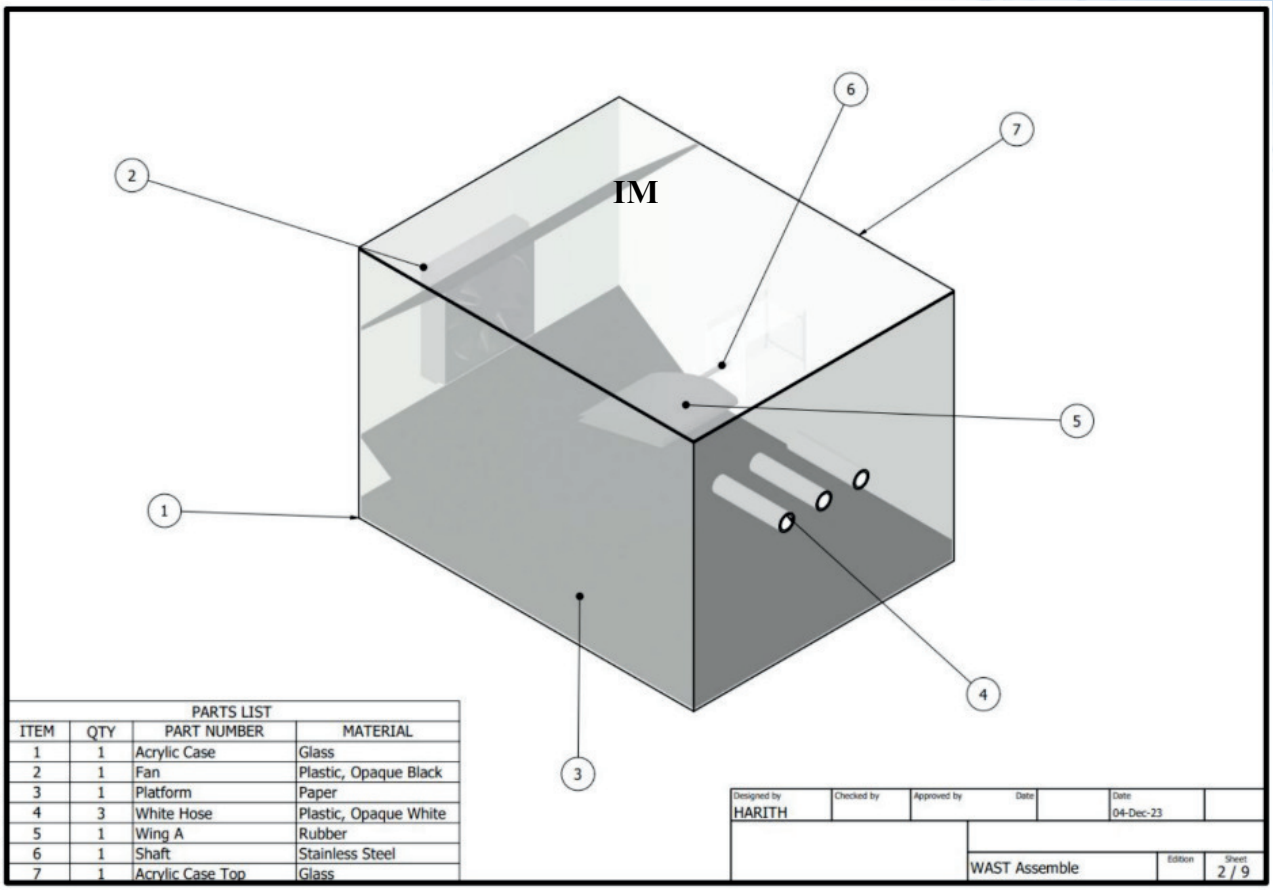
The WAST involved designing a training kit with realistic aerofoil configurations and a stall indicator for accurate aerodynamic simulations. It was developed using durable materials like acrylic to ensure longevity. The kit provides real-time feedback, allowing students to experiment hands-on, improving their understanding of stall behavior.

RESULTS

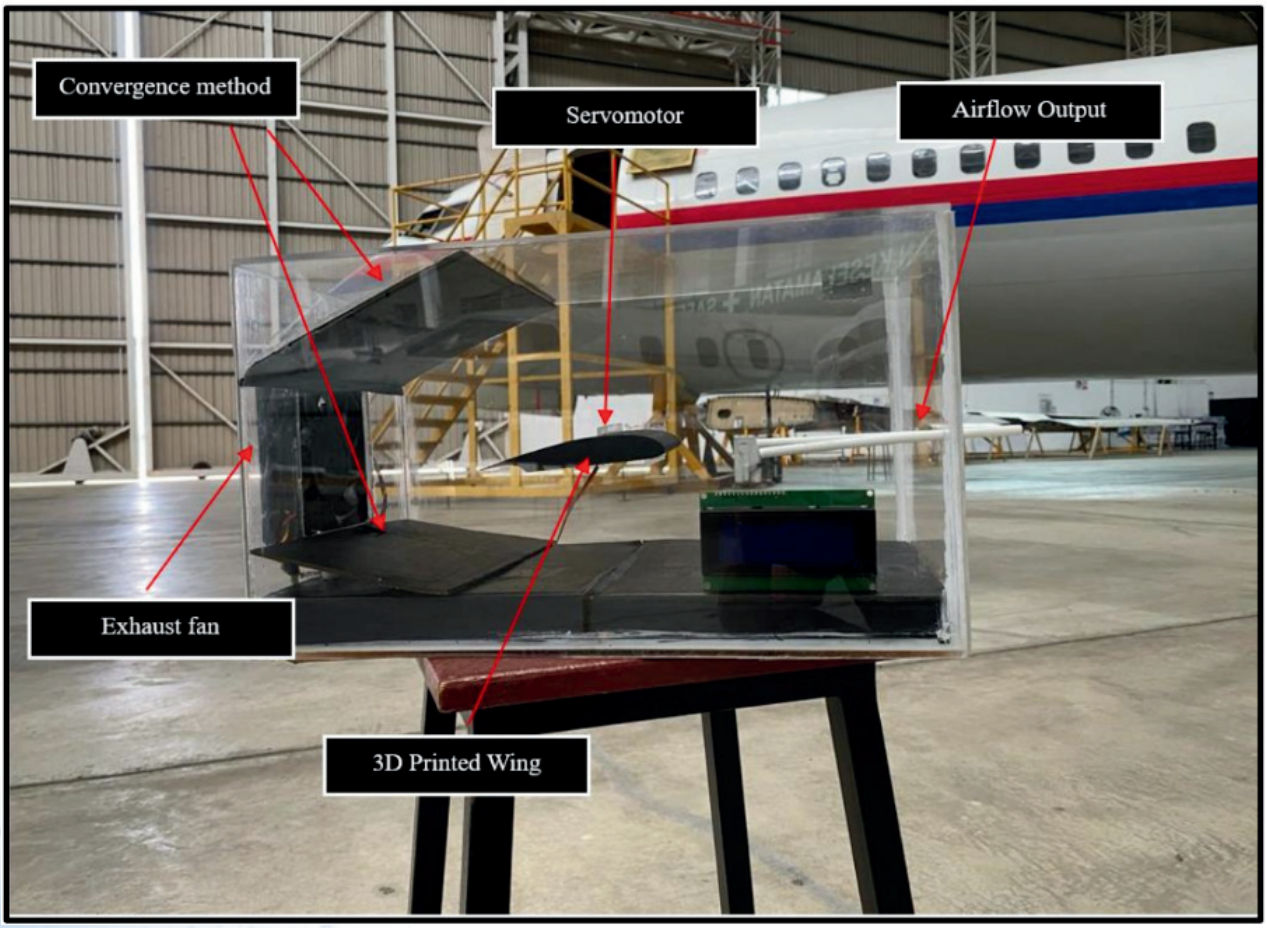
The WAST project successfully met its objectives, providing students with a hands-on, interactive tool to learn about aerodynamics and stall behavior. The kit's real-time feedback and durable design enhanced learning. Post-survey results showed that most students found the trainer effective in improving their understanding of aerodynamic concepts and stall behavior.

CONCLUSION AND IMPLICATIONS

The WAST project significantly impacts aviation education by enhancing students' understanding of aerodynamics and stall behavior. The interactive, durable training kit effectively simulates real-world conditions, providing valuable hands-on experience. Survey results confirm its effectiveness, making WAST a valuable tool for teaching aerodynamic principles in aviation education.



Isometric View of WAST



Full View of Finished Product with Labels

DESCRIPTION OF INNOVATION
SESSION I 2023/2024

DIPLOMA IN MECHANICAL ENGINEERING (DKM)

SMART RECYCLE BIN

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Students : Mohammad Nazwinn Faddamy Suzuki, Mohamad Fakhrul Bin Hanapi, Muhannad Adlan Bin Ahmad Latif

BACKGROUND

Recycle bins that can separate different recyclable materials according to their categories using solar power and hybrid control.

OBJECTIVE

To produce recycle bins that automatically separate recyclable materials according to their categories using a hybrid control system.

METHODS

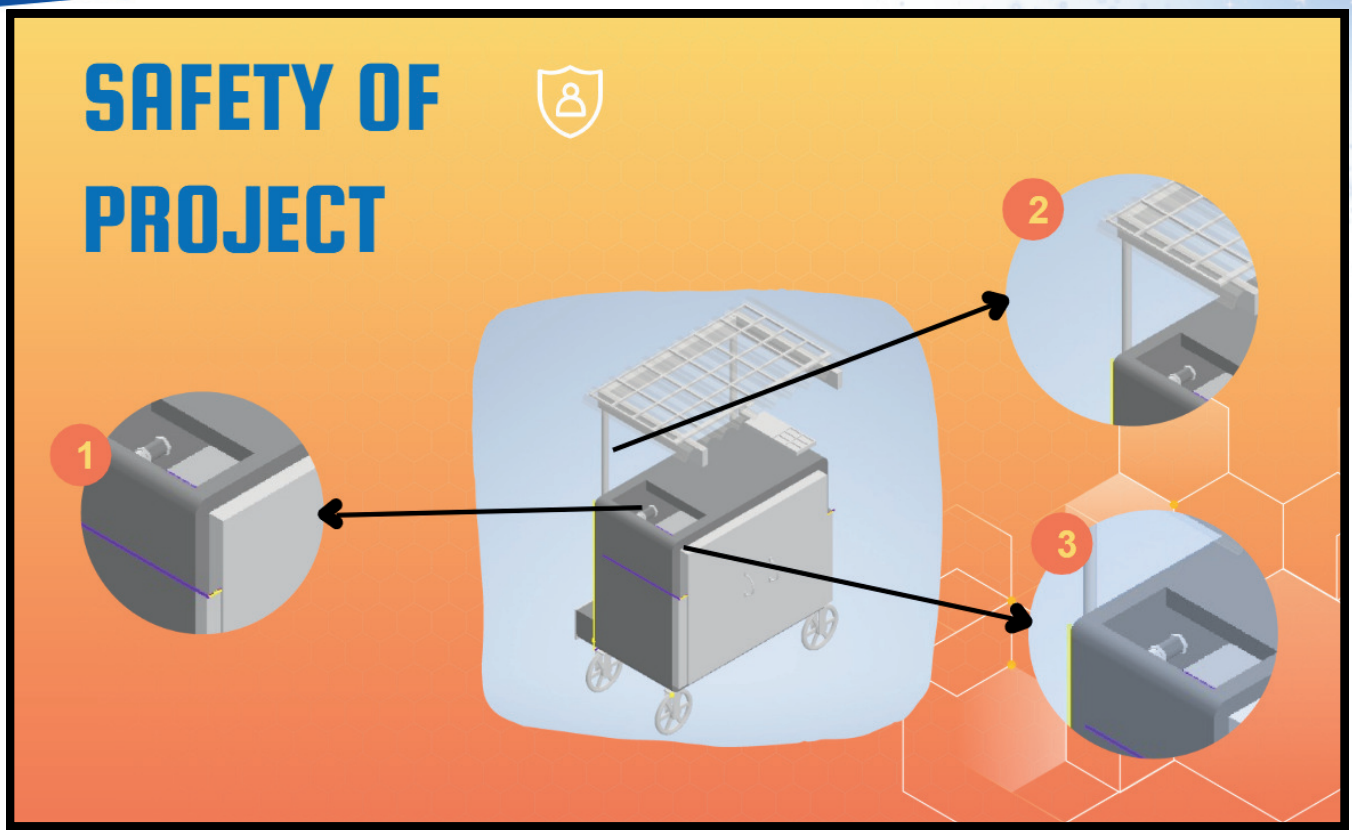
Inventor software has been used as an essential CAD tool for designing body parts and assembly purposes. The frame and body parts are fabricated using TIG welding, riveting, and fasteners such as bolts and nuts. The control system is a hybrid concept that uses solar and electrical.

RESULTS

One of the key aspects of sustainability in recycling bins powered by solar energy is the reduction of dependence on fossil fuels. Solar power provides a clean and renewable energy source, reducing the need for non-renewable resources. Sustainable placement of recycling bins in public areas, workplaces, and homes encourages recycling. It should be easily accessible, visible, and convenient for users to promote recycling. A sustainable recycle bin should be designed to withstand weather conditions, such as rain, snow, and sun, without deteriorating. This durability extends the bin's life and reduces the need for replacements.

CONCLUSION AND IMPLICATIONS

Accomplished in produced recycle bin that automatically separates recyclable materials according to their categories by using a hybrid control system



Close up CAD view for safety feature

Prototype of Smart Recyle Bin

ERGONOMIC CASAVA HARVESTER

Supervisor : Suhana Binti Ab Majid

Email : suhanaabmajid@polibanting.edu.my

Students : Aiman Bin Kamari, Nasrulhaq Afiq Bin Nozely, Luven Raj a/l Manivannan

BACKGROUND

The traditional method of harvesting cassava is challenging, time-consuming, and requires enough energy. Producing this innovation will help the community harvest cassava tuber. Besides, considering the ergonomic concept in this design will avoid injury and discomfort, making it appropriate to muse for the long term.

OBJECTIVE

To produce ergonomic casava harvester by using hydraulic concept and apps for android

METHODS

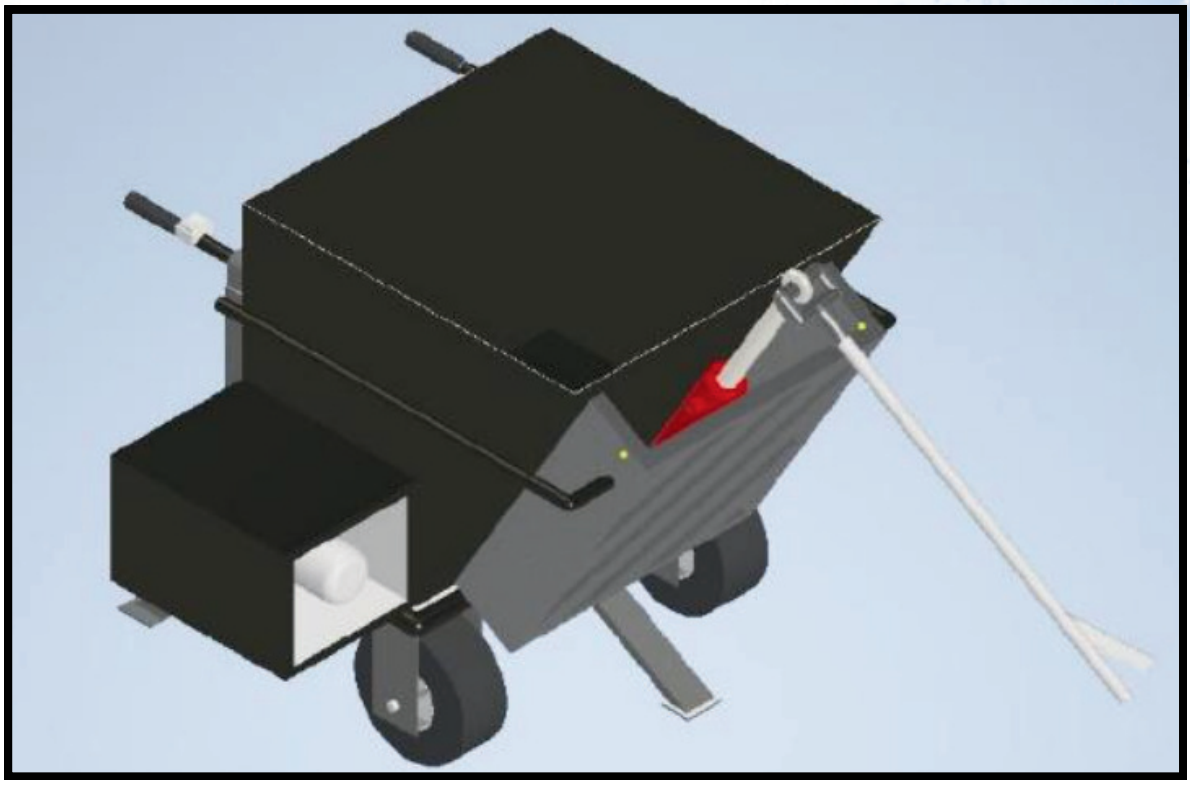
The machine integrates hydraulic technology to pick and separate from soil, ensuring uniformity in size and shape. The machine utilizes a single-phase, 2HP hydraulic motor connected to a needle valve and a double-acting hydraulic cylinder with a maximum stroke of 380mm and a lifting capacity of 11.22 tons. A big compartment for after-harvest is use as storage. The design includes a user-friendly control panel, a detachable frame for easy cleaning, and food-grade materials for safety. Performance tests were conducted to measure production speed, quality consistency, and operational efficiency.

RESULTS

The machine demonstrated significant improvements, can harvest casava and collected up to 20kg, with each cycle taking 5 minutes to harvest. It significantly outperformed traditional methods in terms of speed and output, proving its ability to reduce time and manpower requirements.

CONCLUSION AND IMPLICATIONS

The semi-automatic hydraulic casava revolutionizes traditional snack production by combining efficiency, sustainability, and user safety. Its implementation has the potential to reduce costs, meet growing market demands, and contribute to environmentally friendly practices, making it a valuable asset for commercial food producers.



CAD design for full aseembly

App for Android

Front view of end product

3 IN 1 PORTABLE CAR WASHER

Supervisor : Suhana Binti Ab Majid
Email : suhanaabmajid@polibanting.edu.my
Students : Putera Farez Daniel Bin Jeffere, Mervin a/l Vasu, Raja Faiq Firdaus Bin Raja Shaiful Azmir

BACKGROUND

The traditional method of water jet car washing uses a high-pressure water system to clean vehicles, especially cars, by directing a powerful stream of water to remove dirt and grime efficiently. An automatic car wash is a mechanical facility that cleans vehicles using automated systems, such as brushes and jets of water, without the need for manual labour.

OBJECTIVE

To produce a portable car washer that have multipurpose function than the standard existing car washer on the market.

METHODS

The 3 in 1 Portable Car Washer is fabricated using mild steel and is highly weldable, allowing for a strong, toughness joint for the structures and overall components. Applied MIG welding can maintain the material's durability for safety features that are composed of rounded edges with smooth surfaces. When handling the 3 1 Portable Car Washer, especially during shipping and emptying, the danger of injury from sharp edges is reduced as a result. Besides, stopper usage at the wheel is implemented in order to keep it stationary while using it.

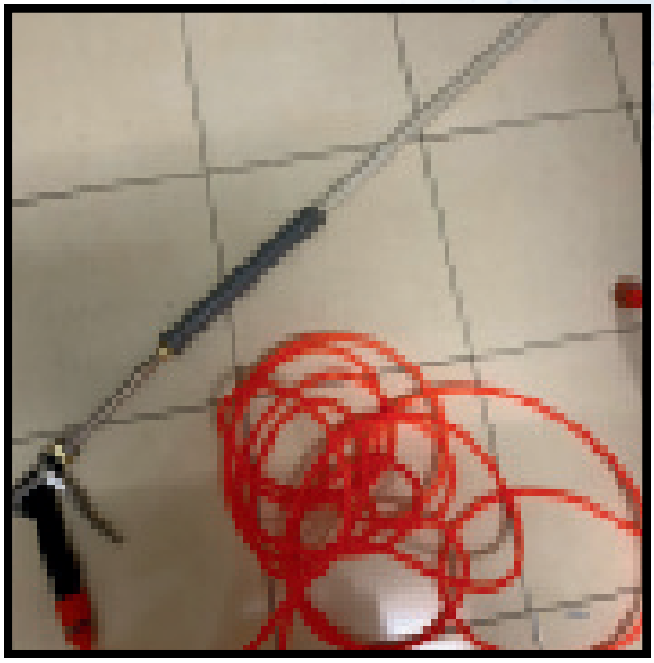
RESULTS

In conclusion, the innovation of 3 in 1 Portable Car Washer is accomplished to fulfil the user-friendly need in car cleaning through its portability. It offers various usage of cleaning accessories in one kit. Its significantly less water consumption than traditional car washes, contributing to water conservation efforts and reducing the environmental impact. By allowing car owners to wash their vehicles at home or in their community, these portable systems lessen the need for long-distance travel to commercial car washes, which can save fuel and reduce emissions.

CONCLUSION AND IMPLICATIONS

In conclusion, the innovation of 3 in 1 Portable Car Washer accomplished to fulfill the user friendly need in car cleaning by its portability and offers various usage of cleaning accessories at one kit. It significantly less water consumption than traditional car washes, contributing to water conservation efforts and reducing the environmental impact. By allowing car owners to wash their vehicles at home or in their community, these portable systems reduce the need for long-distance travel to commercial car washes, which can save fuel and reduce emissions.

Front view of actual product



Accessories in 3 in 1 Portable Car Washer

Side view of actual product

A SUSTAINABLE SAND PURIFYING SYSTEM FOR SMALL CONSTRUCTORS AND D.I.Y BUILDERS : DESIGN AND FABRICATION

Supervisor : Mohd Azizee Bin Sukor

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Students : Ahmad Zahirul Razi Bin Zolkeflee, Muhammad Haziq Bin Mat Isra, Muhammad Asna Ruzaini Bin Md Nor

BACKGROUND

The construction industry faces growing challenges in accessing clean and purified sand, particularly for small contractors and do-it-yourself (DIY) builders. The high cost of large-scale sand purification systems limits their ability to adopt sustainable and efficient practices, creating a need for innovative and accessible solutions.

OBJECTIVE

This study aims to design, develop, and fabricate a cost-effective and sustainable sand purification system tailored for small-scale construction projects, prioritizing environmental conservation and operational feasibility.

METHODS

The research involved selecting eco-friendly materials, optimizing design features, and developing operational methodologies to ensure effective sand purification while minimizing environmental impact. Renewable energy sources and waste minimization strategies were integrated into the system's design to align with sustainability principles.

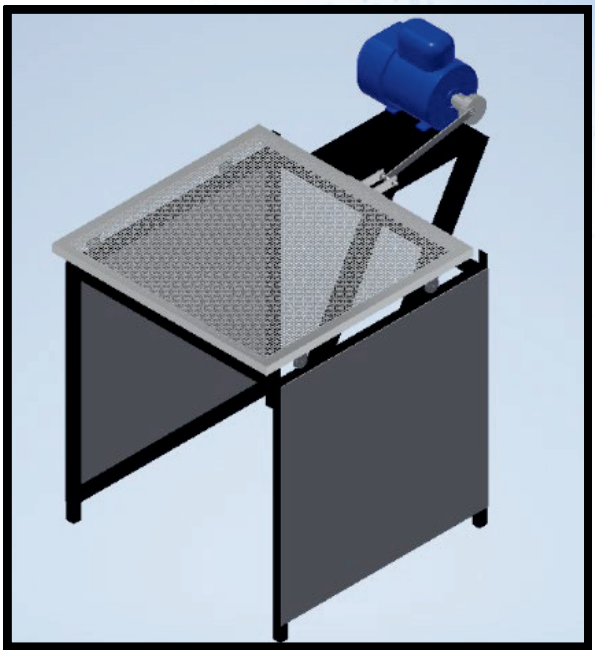
RESULTS

The developed system demonstrated efficient sand purification capabilities, reduced waste generation, and operated effectively using renewable energy sources. Its modular and scalable design ensures accessibility and cost-efficiency, making it viable for small contractors and DIY builders.

CONCLUSION AND IMPLICATIONS

The proposed sand purification system bridges a critical gap in sustainable construction practices, enabling smaller entities to meet their operational needs while contributing to environmental conservation. This work provides a practical, scalable solution that promotes the democratization of sustainable building practices and supports the construction industry's transition toward more eco-friendly operations.

Full assembly of the Machine



3D CAD drawing

AEROMECH Session I: 2023/2024 Participation

AIR BLADE 3

Supervisor : Ismail Bin Lias

Email : ismail@polibanting.edu.my

Students : Muhammad Faidhi Bin Muhammad, Amier Shaffiq Bin Abdullah Munshi, Danial Asyraf Bin Mohd Fadzli & Ikhwanul Aiman Bin Jainar

BACKGROUND

The Air Blades 3 stands as a crucial innovation within the aquaculture industry, revolutionizing the paddlewheel process across oxygen suppliers worldwide. Serving as a technological marvel, these projects significantly enhance aquaculture productivity by automating the complex and labour-intensive task of fish farming. Furthermore, Air Blades 3 enables the fish farmer to manage the aquaculture areas effectively by taking care of every marine life in the lake, fulfilling market demands and ensuring consistent oxygen supply. Other than that, by being equipped with durable and long-lasting materials, these projects offer precision in oxygen suppliers. Ultimately, their contribution streamlines operations, saves time and plays an important role in sustaining a productive and sustainable aquaculture industry.

OBJECTIVE

- To create a product that uses a natural source of energy. (Green technology)
- To reduce the cost of electricity usage in the paddlewheel aerator.
- To create a new design for the paddlewheel.

METHODS

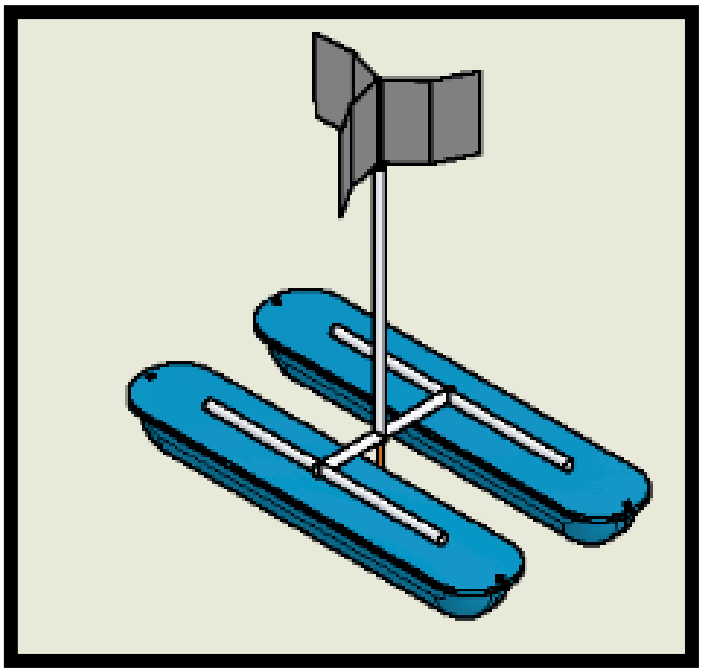
Our initiatives revolved around addressing the challenges faced by small fish farmers through the creation of a dedicated small-scale oxygen supply project. Recognizing the distinct requirements of these fish farmers, our approach aims to design and develop a specialized oxygen supply specifically for their diverse and smaller aquaculture setup.

RESULTS

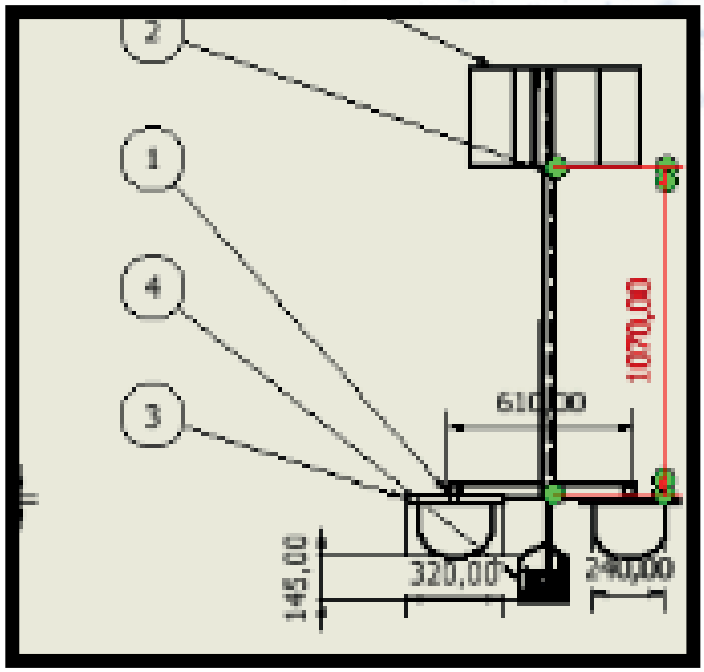
Project findings are to show analytical results in a systematically reported organised based on the objective of our project. This project is tested at the nearby lake and using a device, an anemometer, to take detailing wind speed. Analysing wind speed is one of the main factors that need to be detailed based on the project AIRBLADE 3

CONCLUSION AND IMPLICATIONS

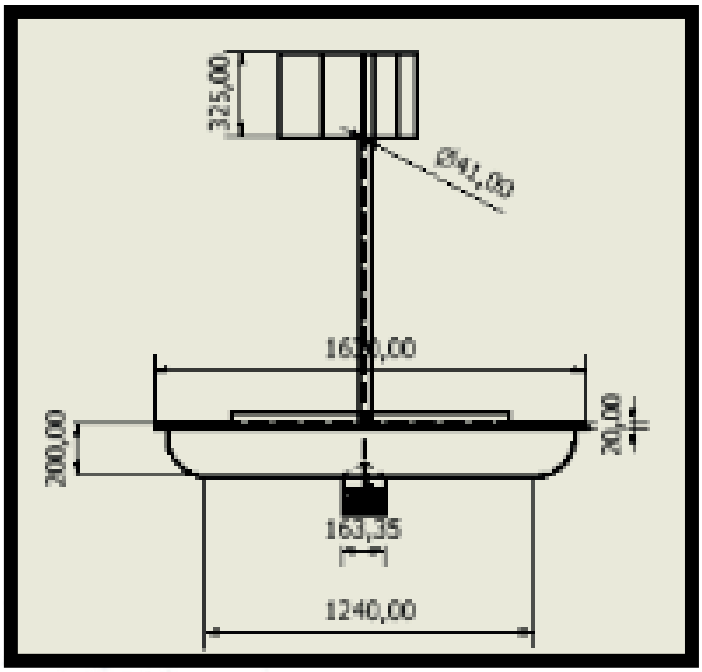
The Air Blade 3 machine serves as a tool for fish farmers and aids in preserving air circulation in bodies of water, such as lakes or ponds, in the absence of current.



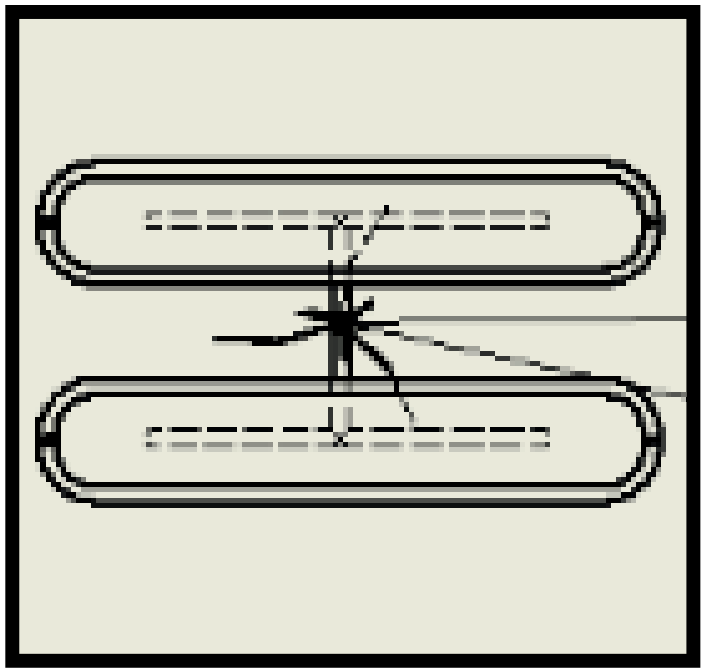
Isometric View



Right Side View



Front View



Top View

AIR BLADE 4

Supervisor : Ismail Bin Lias

Email : ismail@p0libanting.edu.my

Students : Mohamad Hafis Bin Wagiman, Nasrullah Bin Amran, Muhammad Aiman Naim Bin Zainizam & Nik Ammar Idris Bin Nik Muhammad Affendi

BACKGROUND

Paddlewheel aerators are a popular aeration technology used in aquaculture to improve dissolved oxygen levels and water quality. They are often used in large-scale aquaculture operations, such as fish farms and lakes. Based on the analysis and research we have studied, the paddlewheel has several shortcomings. One is that it uses expensive materials and electricity.

OBJECTIVE

- To make a machine that is affordable and low cost.
- To reduce the usage of non-natural energy and replace it with green technology.
- To make a machine that could be used to replace the paddlewheel aerator.

METHODS

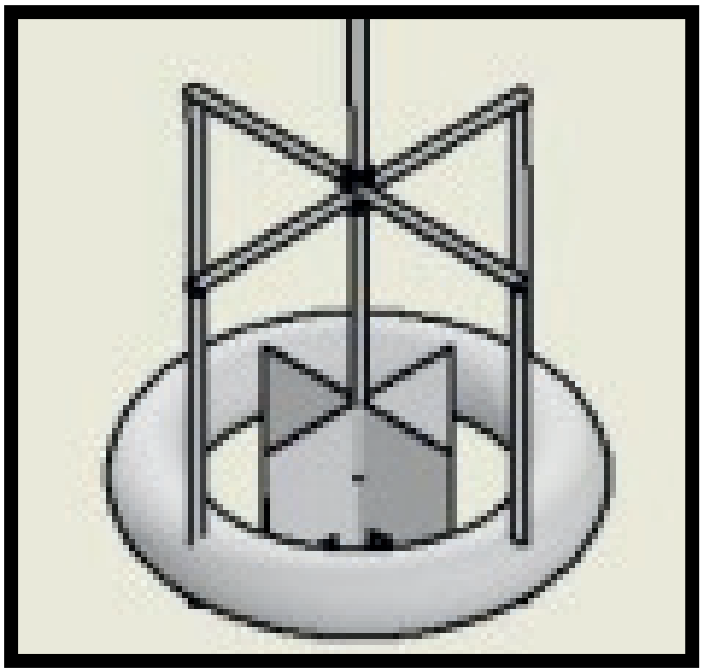
We also found that the material used on the paddlewheel can be replaced more cheaply and effectively, then we can also replace the use of electricity sources that can be replaced by using green technology such as wind energy to reduce costs and waste of energy. Air blade 4 is a product that has been improvised from a paddlewheel product. It uses natural resources such as wind and cheap and effective materials.

RESULTS

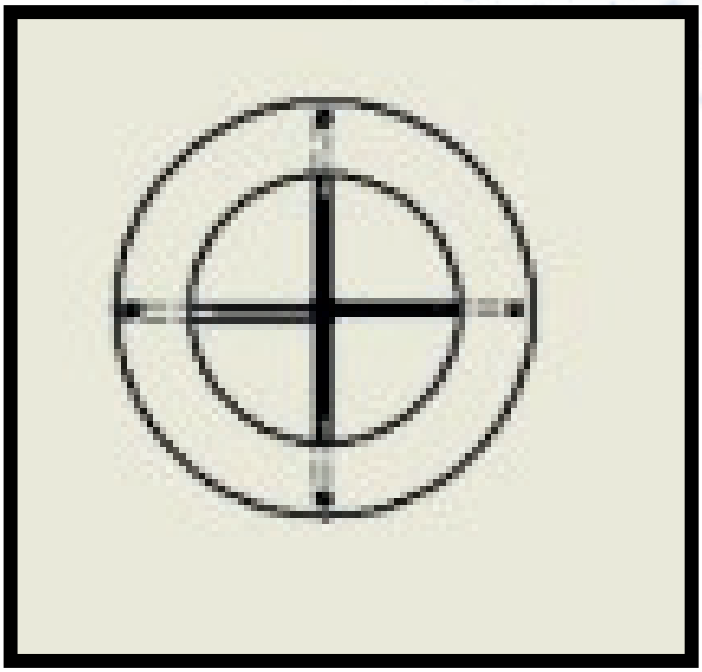
The aim of this product is to produce oxygen by circulating water. Despite that, it uses 100% natural energy and is easy to access, portable, affordable, and uses green technology. Hence, it is also an alternative to paddlewheel aerators.

CONCLUSION AND IMPLICATIONS

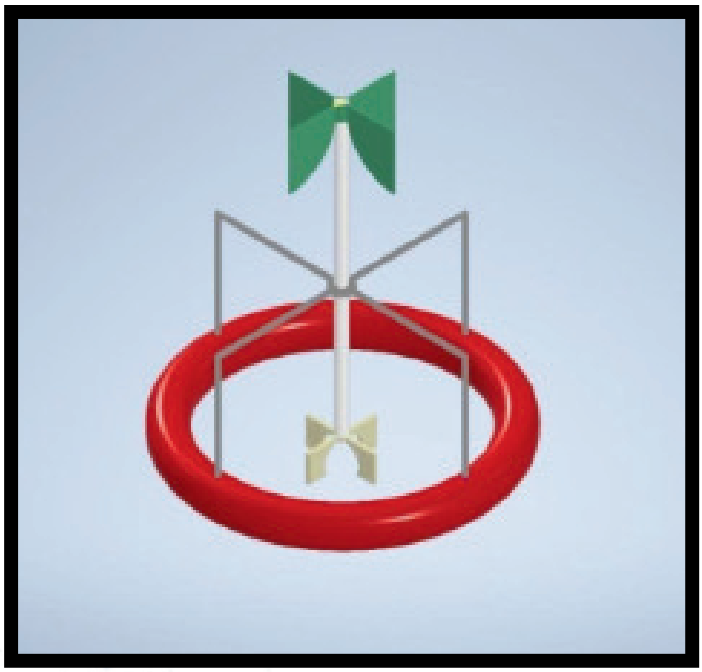
This product has been tested for effectiveness and succeeded in achieving our objective of making affordable and low-cost products. Air Blade 4 can also reduce the use of electricity and can replace the main source of electricity with the wind source. It can also replace paddlewheel products with more efficient and affordable products.



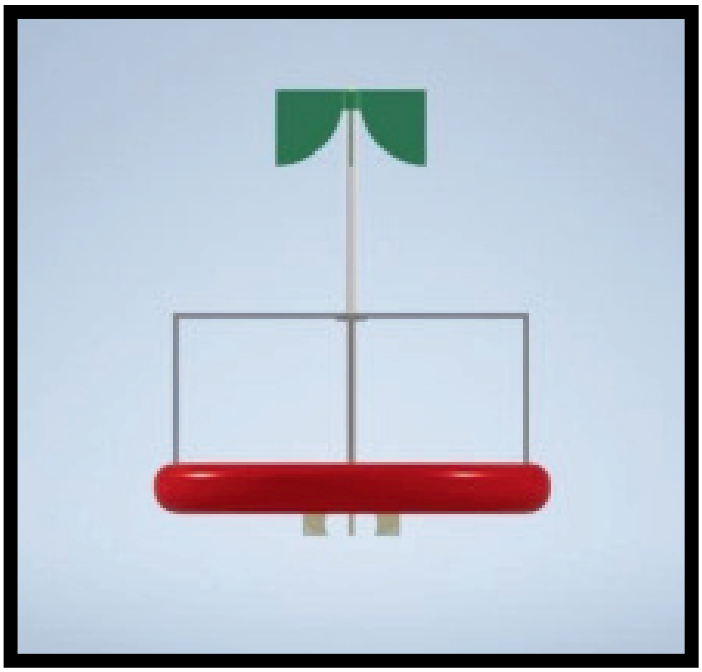
Blade Structure



Top View



Isometric View



Right Side View

AIR DUSTER TUNNEL WITH MOTION SENSOR

Supervisor : Dr Hartiny Binti Abd. Kahar

Email : hartiny@polibanting.edu.my

Students : Afiq Muqrish Bin Amiruddin, Nur Avadah Yasmeen Azha, Muhammad Rohaizad Mohamad, Muhammad Izham Syamir Mohd Khalid

BACKGROUND

Malaysia's Department of Occupational Safety and Health (DOSH) released the data of the Occupational Accident Statistics By Sector 2023. Six thousand nine hundred fifty-one workplace accidents were recorded in 2023, an increase from 6023 in 2022. The manufacturing and machinery sector contributed to the highest number of workplace accidents. Despite wearing PPE, metal chips and debris become stuck in safety jackets or clothing worn in a mechanical workshop. It can pose several risks to the wearer, such as eye injuries, cuts and lacerations, puncture wounds, skin irritation and respiratory problems.

OBJECTIVE

This innovation aims to eliminate potential hazards associated with metal chips and debris in the workshop environment and reduce the likelihood of injuries. It also aims to ensure the health and safety of technical students working in mechanical workshops involving metal cutting and fabrication, machining, foundry processes, etc.

METHODS

The design methodology of this innovation includes components for mechanical parts, electronic and sensor parts, and testing devices. The fabrication and installation process provides metal cutting and joining (welding) for the fabrication of the frame structure, inlet and outlet pipe installation, motion sensor installation and outlet pressure testing. The completed installation consists of main parts such as six outlet nozzles, an air gun, a motion sensor, and automatic valves.

RESULTS

The test shows that the air pressure range achieved at different air outlets ranging from 31 to 59 psi is sufficient to remove loose metal chips and debris from clothing when the person passes through the tunnel without damaging the fabric or causing injury. A safe distance of around 6 to 12 inches should be maintained between the air nozzle and the clothing surface.

CONCLUSION AND IMPLICATIONS

Therefore, this innovation can create a safer environment in mechanical workshops in educational institutions. Reducing the likelihood of injuries and ensuring the health and safety of students working with metal chips and debris.

AIR DUSTER TUNNEL WITH MOTION SENSOR

Air Duster Tunnel With Motion Sensor

Full assembly of the
Air Duster Tunnel With Motion Sensor

Result : Before and after

Final year project AEROMECH competition

ANCHOVISE ISOLATOR MACHINE

Supervisor : Mohd Azizee Bin Sukor

Email : mohdazizee@polibanting.edu.my

Students : Muhammad Aqil Ilmi Bin Abdul Aziz, Mohammad Arif Bin Sainuddin, Ahmad Ramadhan Bin Nordin

BACKGROUND

The fishing industry faces challenges in effectively isolating anchovies from a mixed catch, a process that is traditionally time-consuming, labor-intensive, and prone to errors. These inefficiencies lead to an increased risk of injuries and require numerous tools, ultimately hindering productivity and quality control.

OBJECTIVE

The objective of this study is to design and develop an Anchovy Grading Machine that simplifies the anchovy sorting process, reduces injury risks, improves operational efficiency, and ensures high-quality anchovy separation for canning and further processing.

METHODS

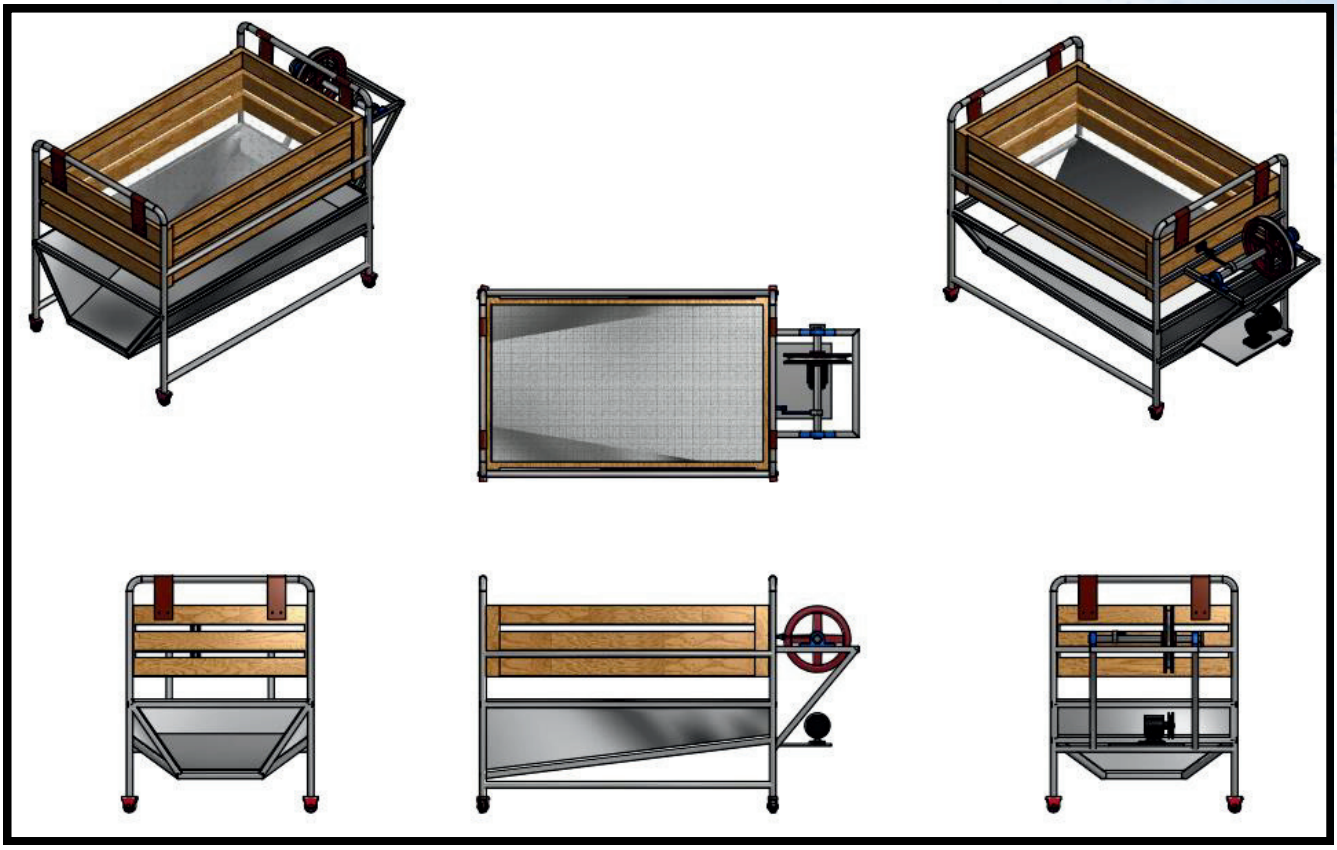
The Anchovy Grading Machine utilizes a vibration system instead of rollers to separate anchovies from other fish species. Key features include automation to reduce manual labor, efficient processing for higher output, and ease of maintenance for hygiene standards in food processing.

RESULTS

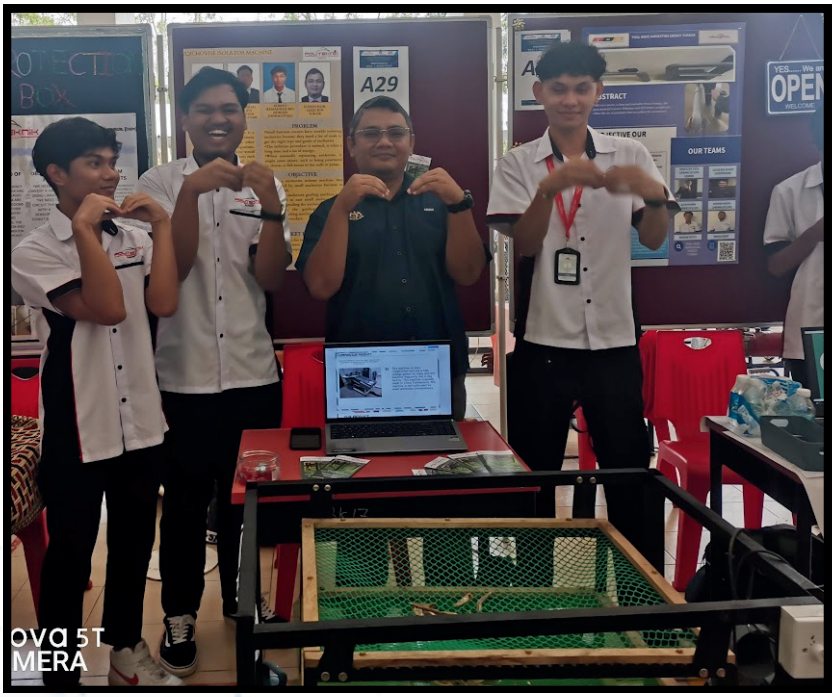
The developed machine, designated as Machine A, demonstrates a processing capacity of 2.0 kg of anchovies per minute, surpassing existing machines (Machine X and Machine Y), which can process 1.5 kg and 1.0 kg, respectively, in the same time. Over a three-minute interval, Machine A separates up to 4.0 kg, compared to 3.5 kg by Machine X and 3.0 kg by Machine Y. This demonstrates the superior efficiency and time-saving capabilities of Machine A.

CONCLUSION AND IMPLICATIONS

The Anchovy Grading Machine significantly improves the speed, efficiency, and safety of the anchovy sorting process. By automating the separation and reducing labor reliance, it helps small businesses reduce operational costs and errors while ensuring high-quality products. This innovation has strong potential to enhance productivity in the fishing industry and improve the competitiveness of small-scale processing operations.



3D CAD drawing



AEROMECH Session I: 2023/2024 Participation

Full assembly of the Machine

AUTO DRAIN CLEANING MACHINE

Supervisor : Zulkarnain Bin Jamak

Email : zulkarnainjamak@polibanting.edu.my

Students : Muhammad Nur Aiman Bin Hardi, Ahmad Iqbal Bin Zulkefly, Muhammad Syakir Ar Razzi Bin Mohd Sabri, Azri Bin Idris

BACKGROUND

A cleaning machine is a device used to clear up clogged drains. This solution facilitates drain cleaning and lessens drain blockages. It keeps the drain from becoming clogged by separating the trash from it.

OBJECTIVE

- To evaluate the effectiveness of garbage traps in preventing drain blockages.
- To analyze the role of garbage traps in maintaining free water flow within drainage systems.
- To assess the efficiency of personnel in operating garbage traps for optimal performance

METHODS

The methodology for this project was specifically inspired by the challenge of addressing blocked residential drains. The design focuses on simplifying the process and reducing labour requirements. Furthermore, the system is versatile and can be utilized by municipalities for various purposes, such as maintaining recreational parks, managing events, and addressing temporary drainage needs.

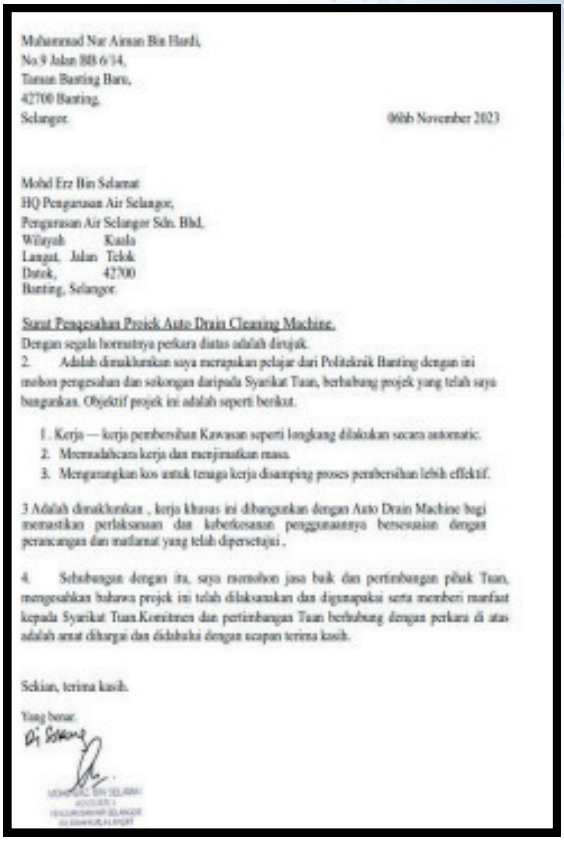
RESULTS

Auto drain cleaning refers to a system that automatically cleans and clears out the drain pipes in a plumbing system. This type of system typically utilizes sensors, timers, or other types of automation technology to initiate a cleaning process when it detects a buildup of debris, sludge, or other blockages in the drain lines.

CONCLUSION AND IMPLICATIONS

In addition, the aim of the project implementation is to support cleaning works in a way that makes them easier and more advanced in the modern era.

Full assembly



Muhammad Nur Aiman Bin Hardi,
No.9 Jalan BB 6/14,
Taman Bunting Baru,
42700 Banting,
Selangor.

06hb November 2023

Mohd Erz Bin Selamat
HQ Pengurusan Air Selangor,
Pengurusan Air Selangor Sdn. Bhd,
Wilayah Kuala
Langat, Jalan Telok
Datok, 42700
Bunting, Selangor.

Surat Pengesahan Projek Auto Drain Cleaning Machine.

Dengan segala hormatnya perkara diatas adalah dirujuk.

2. Adalah dimaklumkan saya merupakan pelajar dari Politeknik Banting dengan ini mohon pengesahan dan sokongan daripada Syarikat Tuan, berhubung projek yang telah saya bangunkan. Objektif projek ini adalah seperti berikut.

1. Kerja — kerja pembersihan Kawasan seperti longkang dilakukan secara automatic.
2. Memudahkan kerja dan menjimatkan masa.
3. Mengurangkan kos untuk tenaga kerja disamping proses pembersihan lebih effektif.

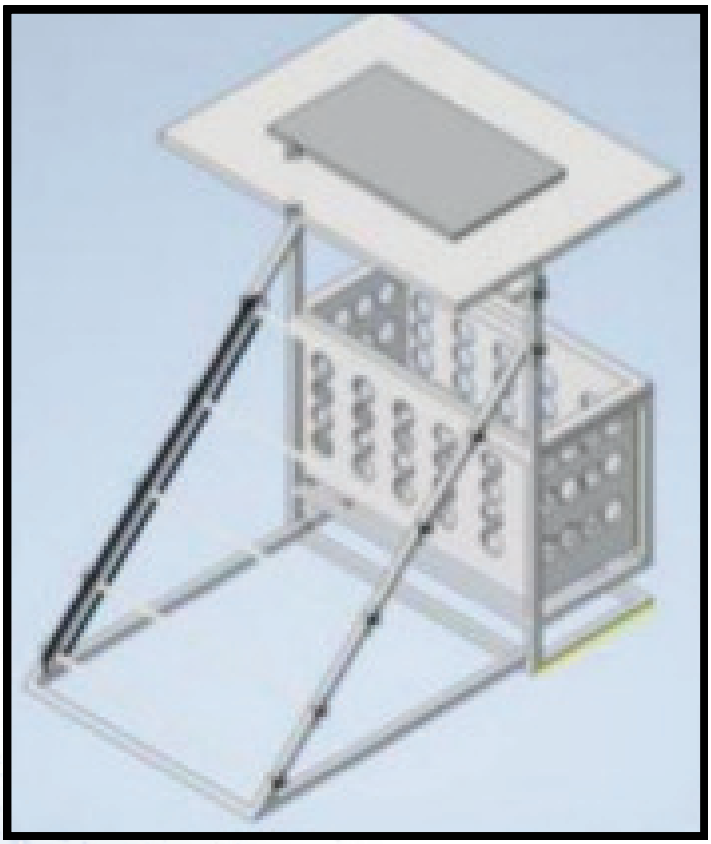
3 Adalah dimaklumkan , kerja khusus ini dibangunkan dengan Auto Drain Machine bagi memastikan perlaksanaan dan keberkesanan penggunaannya bersesuaian dengan perancangan dan matlamat yang telah dipersetujui ,

4. Sehubungan dengan itu, saya memohon jasa baik dan pertimbangan pihak Tuan, mengesahkan bahawa projek ini telah dilaksanakan dan digunapakai serta memberi manfaat kepada Syarikat Tuan.Komitmen dan pertimbangan Tuan berhubung dengan perkara di atas adalah amat dihargai dan didahului dengan ucapan terima kasih.

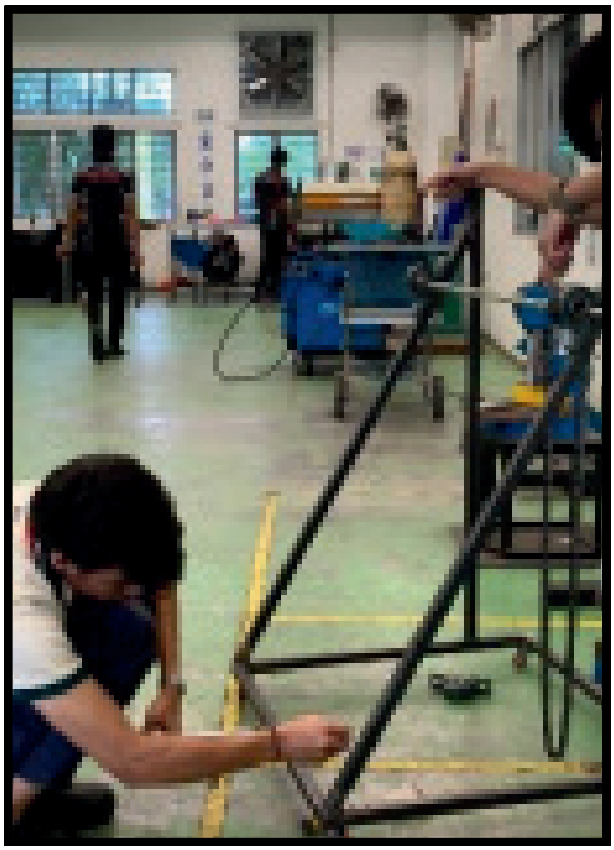
Sekian, terima kasih.

Yang benar.

Approved by company



Stainless steel rotating



Test the functionality

AUTOMATED DRAINAGE CLEANER

Supervisor : Nurul Hayati Binti Jamil
Email : nurulhayati@polibanting.edu.my
Students : Kisheaan A/L Prathaban, Kugan Raj A/L Kandhavel,
Mohammad Nazim Mohammed Sukarno, Uvan Saravean A/L Madhavan

BACKGROUND

Manual drain cleaning methods are time-consuming, labour-intensive, and often require specialized skills. As an innovative solution, Automatic drain cleaners (ADCs) with smart technology improve the efficiency and effectiveness of drain maintenance. The developed system uses an automatic drain cleaning device that is capable of capturing and collecting large solid waste materials such as bottles and plastics while allowing liquids to pass through. Since drains contain a large amount of waste and chemicals, workers cleaning them are at high risk of illness and poisoning. Therefore, this developed product is able to reduce the risks involved. Eco-friendly operations eliminate the use of hazardous chemicals and contribute to sustainable practices. In short, automatic drain cleaning machines are the latest solution for efficient and effective drain cleaning. Autonomous features, advanced technology, and smart algorithms provide a reliable and environmentally friendly approach to solving drainage problems, improving system performance, and promoting the sustainability of the overall infrastructure.

OBJECTIVE

The objective of the project is to create an automatic drain cleaner to collect garbage passing through the drain and prevent clogging. With the use of an alternating current power source and a hydroelectric generator, this machine also uses a garbage bin lifting system that will be raised by a hydraulic jack when the garbage bin is full. The machine is also equipped with an IOT system with the use of Arduino to make the drain cleaner only work when a sensor detects garbage in the drain and another sensor to make the hydraulic jack raise the garbage bin when the garbage bin is full.

METHODS

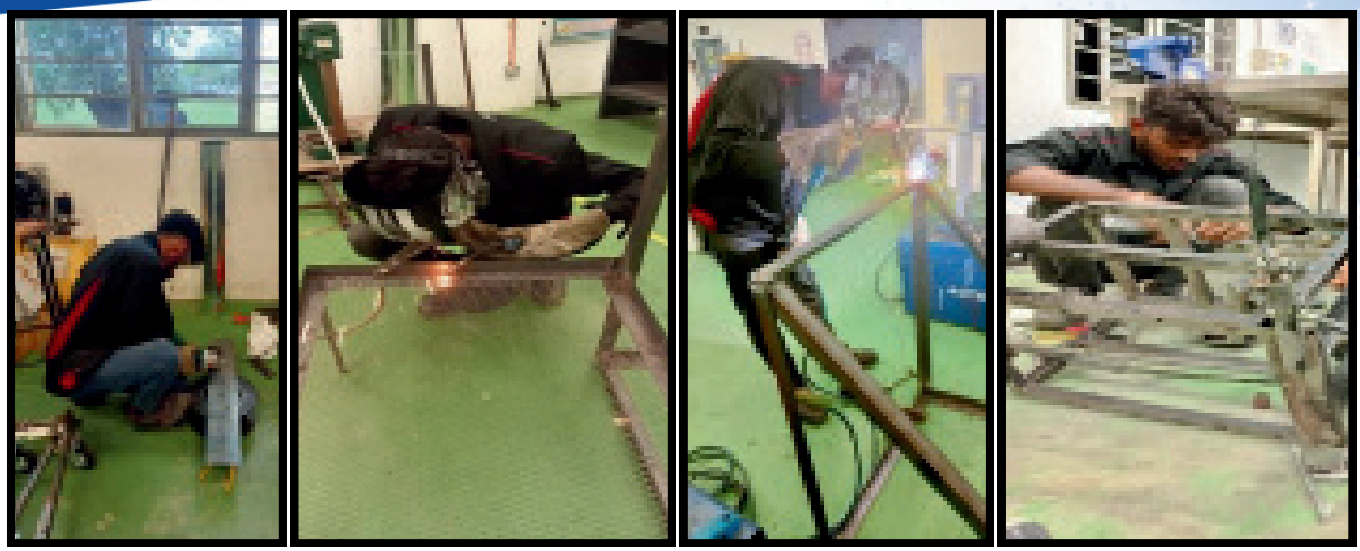
This research covers various aspects related to automatic drain cleaners, including design, function, performance and practical applications. In order to develop a product that meets the identified problem solution, the study was also conducted through article reviews and market surveys to collect information related to the automatic drain cleaner market and the advantages and disadvantages of existing products. Then, information such as design specifications and several factors need to be considered to design an effective and user-friendly automatic drain cleaner. By implementing morphological charts and conceptual designs, the developed product can meet the targeted objectives.

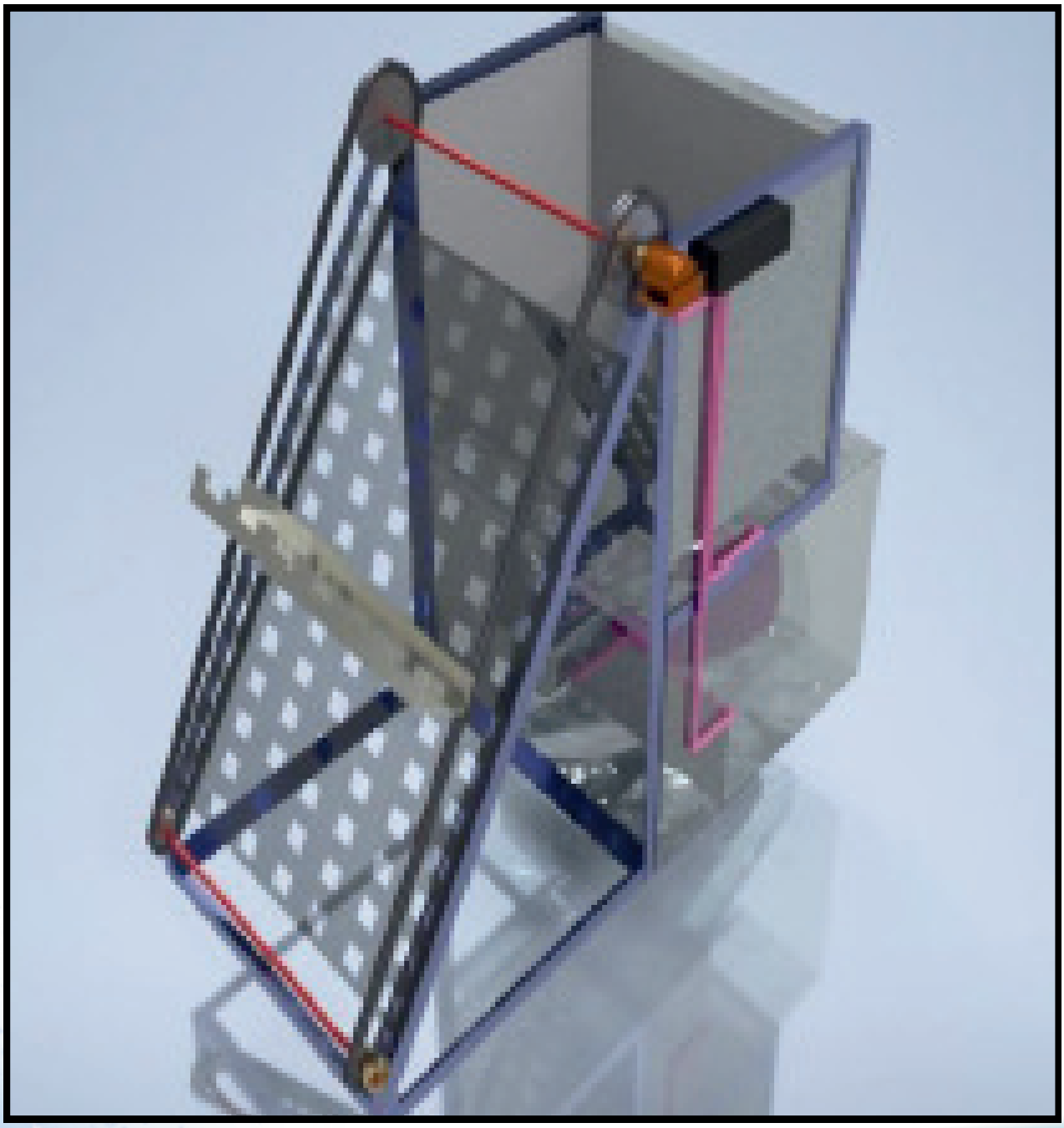
RESULTS

Automated drain cleaners have produced significant results and advancements such as energy-saving operations, ergonomics and safety, and intelligent waste management. The system's ability to overcome long-standing difficulties associated with manual cleaning methods is very encouraging.

CONCLUSION

The project aims to provide reliable and environmentally friendly solutions focused on achieving optimal energy efficiency, mobility in an urban context, and environmental responsibility. The automated drain cleaner is a monument to ingenuity, teamwork, and a forward-looking approach to the sustainability of urban infrastructure.





ROTATING MOLD FOR MURUKKU HYDRAULIC MACHINE

Supervisor : Lim Yee Kai

Email : limyeekai@gmail.com

Students : Norman Ashmawie Bin Napi, Muhammad Aqmal Irfan Bin Mohamad Azhar, Farid Azri Bin Md Puad, Muhammad Hamizan Bin Mohamad Rafi

BACKGROUND

Traditional methods of preparing Murukku snacks involve challenges such as inconsistent shapes, labour-intensive processes, safety hazards from handling hot oil, and inefficiencies in production. These issues affect the quality, hygiene, and productivity of Murukku production in commercial settings.

OBJECTIVE

This project aimed to design and fabricate a deep fryer with a rotating stainless-steel mould to improve the efficiency, safety, and consistency of Murukku production.

METHODS

The fryer was equipped with a rotating mould mechanism, capable of extruding dough into uniform spiral shapes at 30–60 rpm adjustable speeds. The design incorporated features for hygienic cleaning, a safe frying process, and reduced manual labour. The system was tested for its performance in shaping and frying Murukku.

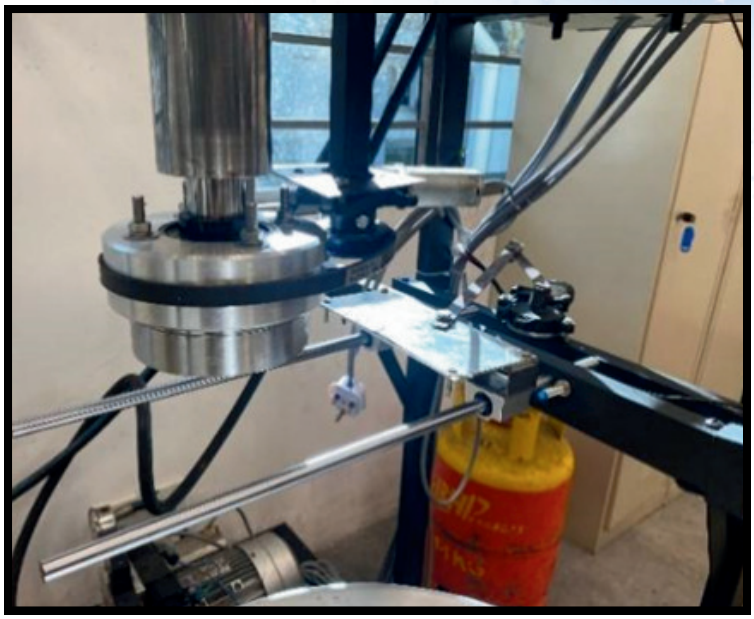
RESULTS

The rotating mould produced uniformly shaped Murukku, eliminating manual pressing and cutting and reducing the risk of burns from hot oil. The device demonstrated efficient frying times of 3–5 minutes per batch, achieving visually appealing results and improving productivity while reducing labour requirements.

CONCLUSION AND IMPLICATIONS

The deep fryer with a rotating mould addresses critical inefficiencies in Murukku production. Its innovative design improves safety, consistency, and production efficiency, making it a valuable tool for commercial snack preparation while enhancing customer satisfaction with aesthetically pleasing results.

Complete assembly of the deep fryer with rotating mold



Rotating mold with cutter

Stainless steel rotating mold

Group photo during Aeromech competition

AUTOMATIC HYDRAULIC MURUKKU MACHINE

Supervisor : Lim Yee Kai

Email : limyeekai@gmail.com

Students : Vishnu Raj A/L Chelvam, Muhammad Daniel Bin Rozman Hafizi, Muhammad Haiqal Bin Mohd Asman, Muhammad Zahrul Aiman Bin Mohd Yunus

BACKGROUND

The traditional method of producing Murukku is labour-intensive and time-consuming, leading to low productivity and significant workforce reliance. Manual techniques also struggle to meet high production demands efficiently, highlighting the need for automation in Murukku production.

OBJECTIVE

This project aimed to design and fabricate an automatic hydraulic Murukku machine to enhance efficiency, reduce labour reliance, and promote sustainability in Murukku production.

METHODS

The machine integrates hydraulic technology to automate dough pressing and shaping, ensuring uniformity in size and shape. The machine utilizes a single-phase, 2HP hydraulic motor connected to a needle valve and a double-acting hydraulic cylinder with a maximum stroke of 380mm and a lifting capacity of 11.22 tons. The design includes a user-friendly control panel, a detachable frame for easy cleaning, and food-grade materials for safety. Performance tests were conducted to measure production speed, quality consistency, and operational efficiency.

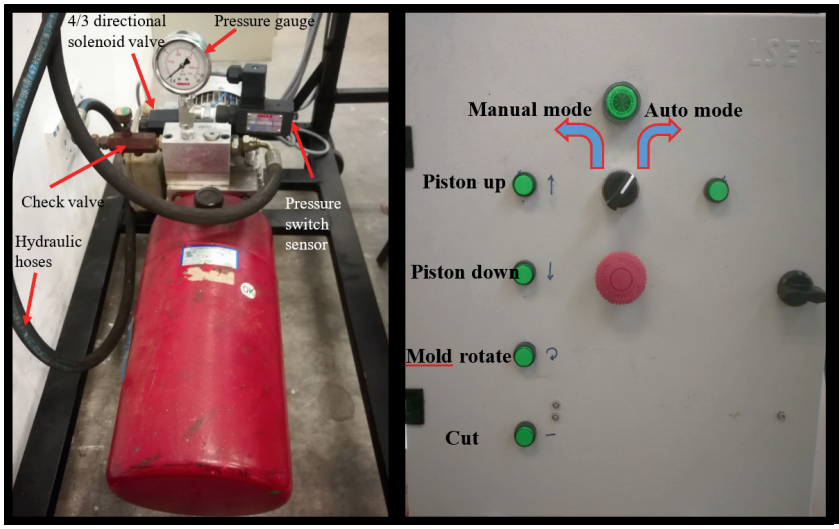
RESULTS

The machine demonstrated significant improvements, producing up to 1050 pieces/hour, each cycle taking 4 minutes to produce 70 pieces. It significantly outperformed traditional methods in speed and output, proving its ability to reduce time and workforce requirements.

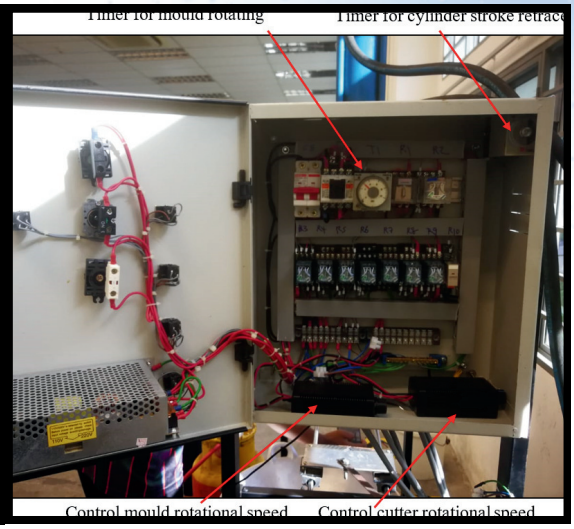
CONCLUSION AND IMPLICATIONS

The automatic hydraulic Murukku machine revolutionizes traditional snack production by combining efficiency, sustainability, and user safety. Its implementation has the potential to reduce costs, meet growing market demands, and contribute to environmentally friendly practices, making it a valuable asset for commercial food producers.

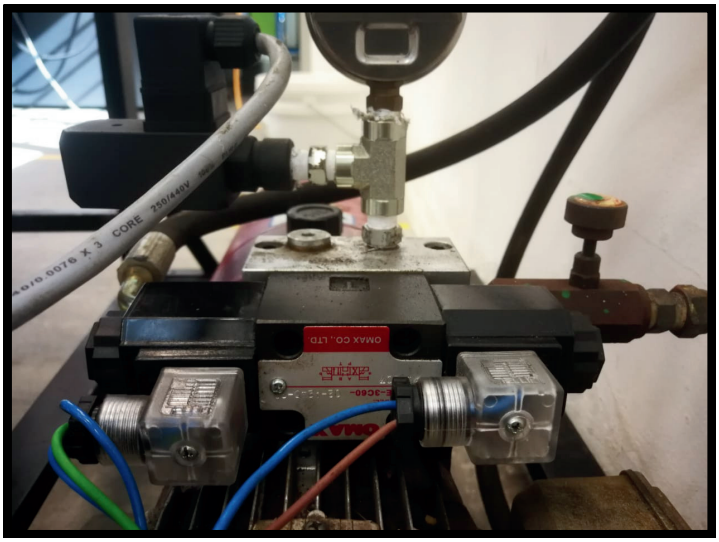
AUTOMATIC HYDRAULIC MURUKKU MACHINE



Hydraulic power pack

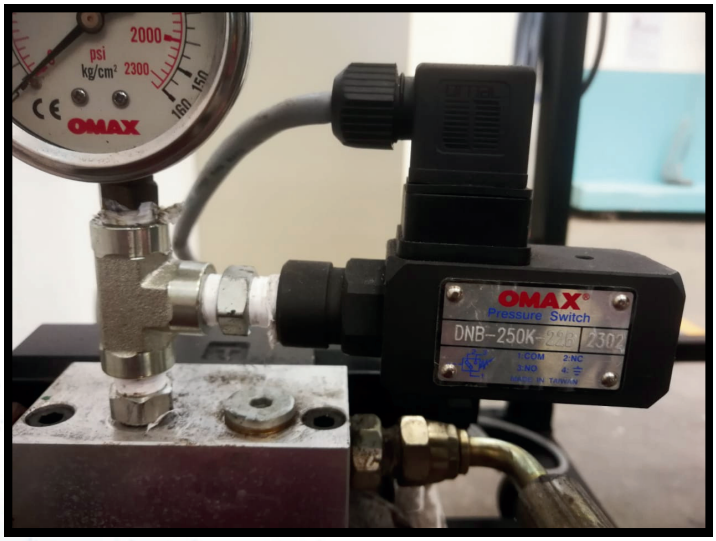


Control system



4/3 directional solenoid valve

Automatic Hydraulic Murukku Machine



Pressure switch sensor

AUTOMATIC CANOPY

Supervisor : Safiah binti Abdul Razak

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Students : Muhammad Alzam Syahni bin Mohd Alhad, Danial Woo Ikhwan, Mohamad Azrisyam bin Mohd Hairi, Ikhwan Hadi bin Mohd Zaini

BACKGROUND

The Automatic Canopy was designed to open the automatic canopy easily. It is built with eight linear actuators that are placed in the four pillars of the canopy. Remote control is used to move the cylinders to open/close the canopy. The wheels were attached at the very bottom of the leg assembly to make the canopy easy to move. The automatic canopy's power source is electrical energy, which can be charged or directly connected to the power supply

OBJECTIVE

- To design and fabricate a prototype canopy
- To compare the time of the opening of the old canopy and the automatic canopy

METHODS

The linear actuator was installed at each pillar, where one of them is used as a leg of the canopy to adjust the height of the canopy while another one is connected to the sliders to control the movement of the canopy to expand. Materials used to make the structure of the canopy are hollow steel, a 12V linear motor, a Wheel, a mild steel plate, and canvas. The automatic canopy uses a 12V battery as it supplies energy to move the linear motor. The electronic control box for an automatic canopy system is a critical component that manages the operation of the canopy. It integrates various electronic and electrical components to ensure proper functioning.

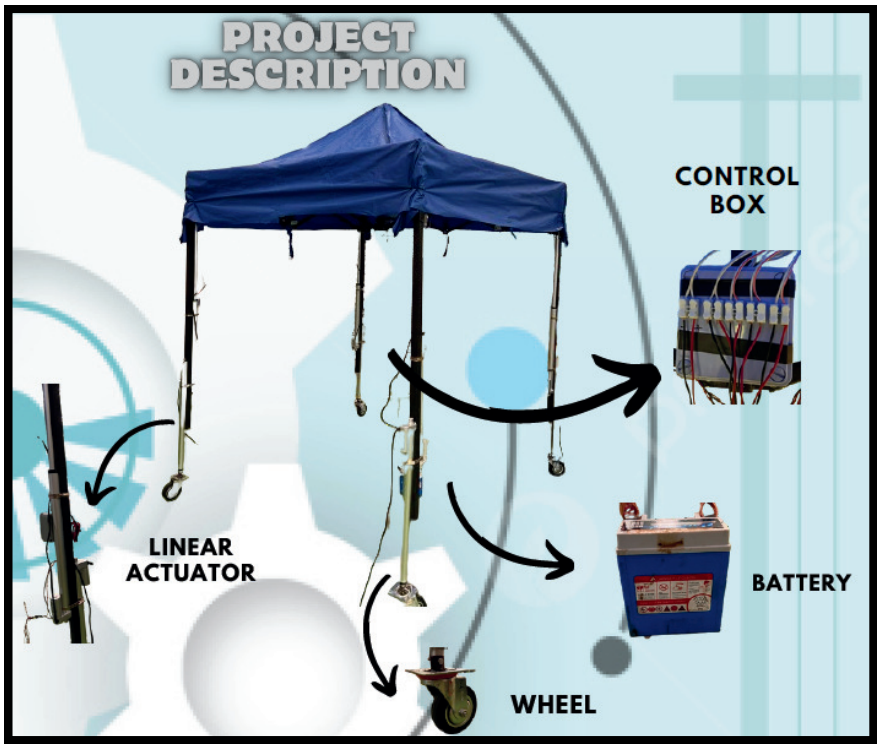
RESULTS

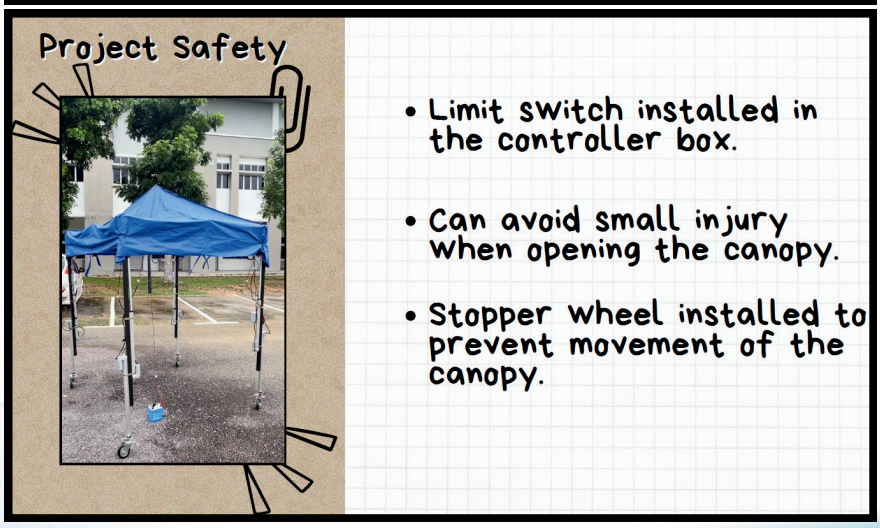
The project was tested and showed a good result, which it can reduce the time to open the canopy from 3 minutes 47 seconds for the old canopy to 48 seconds for the automatic canopy. Automatic Canopy are advantageous because they ensure that opening times are shortened, the device is simple to use, and anyone who wants to use it can do so without difficulty. A DC 12V linear motor is a good choice for this undertaking.

CONCLUSION AND IMPLICATIONS

Developing an automatic canopy involves several design challenges and considerations, such as selecting lightweight yet durable materials and ensuring components can withstand the stresses of repetitive motion. Automation and control aspects, including power supply choices and the implementation of reliable control systems with sensors for automation, demand careful planning. This project is suitable for Vendor Streett or any outside activities. In addition, this project is user-friendly, time-saving, and easy to operate.

Time comparison to open canopy for conventional canopy and automatic canopy





AUTOMATIC MOTORCYCLE SKYLIFT

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Muhammad Adib Hakeeem bin Abdul, Sujeet Nair A/L Jeetendran

BACKGROUND

Motorcycle maintenance and repair often require specialized equipment and tools to ensure safe and effective service. One of the critical aspects of the motorcycle maintenance work process is lifting and suspending the vehicle to allow technicians to easily access parts of the motorcycle from different directions or angles. Motorcycle repairs often require lifting for a variety of purposes, such as maintenance, repair, cleaning and storage. Current manual lifting methods are labour-intensive and pose several challenges, including physical strain, non-ergonomic, time-consuming and safety risks.

OBJECTIVES

The objective of the automatic motorcycle skylift is to design an innovative and efficient system. Next, develop a prototype that works automatically. The sky lift combines sensors and motors to enable a smooth operation.

METHODS

The project begins with information gathering and research design according to the project flow chart or work order established at the initial stage. The Gantt Chart, which encompasses and displays the stages of project development, guides elements such as idea generation, design process, design details, design specifications, and material selection and manufacturing processes. Each team member contributes to completing the assigned tasks within this structured framework, allowing team members to understand how to navigate the various processes smoothly.

RESULTS

The strength and structural integrity of the material used in the automatic motorcycle skylift were evaluated through a comprehensive testing methodology. This included controlled load testing to simulate lifting conditions, assessment of weight distribution, analysis of material properties using techniques like tensile testing and hardness testing, Finite Element Analysis (FEA) for stress distribution, dynamic testing to mimic rapid load changes, intentional overloading for failure mode analysis, and non-destructive testing (NDT) to detect hidden defects. The results of these tests provided insights into potential weaknesses and informed measures to ensure the skylift's structural integrity and reliability in lifting motorcycles safely and efficiently.

CONCLUSION

In conclusion, while the automatic motorcycle skylift project holds great promise, careful attention to the potential failure modes of the lifting mechanism is crucial for ensuring the system's long-term reliability and user safety. By addressing these challenges head-on and implementing robust design and maintenance practices, the project can achieve its goals of providing a safe, efficient, and innovative solution for motorcycle maintenance and storage.

Top view of the clamp base

Side view of the clamp base

Automatic Motorcycle Sky lift

BEACH CLEANING MACHINE

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Students : Arif Danial Bin Zulkifli, Ahmad Shah Fitri Bin Mohd Zamani, Afiq Danial Bin Mohd Almi, Akmal Haris Bin Suhizlizani Ihsan

BACKGROUND

The Beach Cleaning Machine Project offers several benefits and potential impacts. Firstly, it can enhance beach cleanliness by efficiently removing debris and pollutants. The project helps restore and maintain the natural beauty of beaches, making them more appealing to visitors. Cleaner beaches also contribute to the preservation of coastal ecosystems, safeguarding habitats for marine life, birds, and plants. The project raises awareness about the importance of beach cleanliness and encourages responsible waste disposal practices among beachgoers and local communities.

OBJECTIVE

- To design a more ergonomic beach cleaning machine, it should be lightweight and well-balanced to minimize strain on the operator's body.
- To develop a beach cleaning machine that can suck up certain types of garbage on the beach. Our project has limitations for trash that we can suck. Our machine beach cleaner can only collect small and simple garbage such as plastic, bottles, and water cans and has a limit of 10kg of waste.

METHODS

This product will aim to design a garbage collector for beach cleaning machines for ergonomic uses. The BCM is to operate a beach cleaning machine using mechanical tools to help clean up garbage on the beach. This product is to develop a beach cleaning machine that can suck up certain types of waste on the beach. Most importantly, to analyse the performance of the beach cleaning cleaner to clean garbage on the beach.

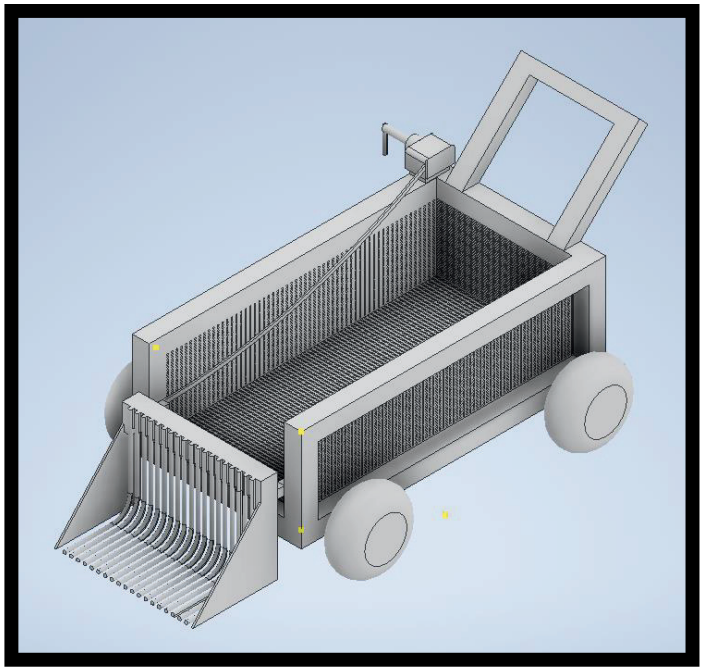
RESULTS

This product is expected to be used not only for beach cleaners but also the citizens who have

awareness of beach care also can use it. Furthermore, this machine's features, such as the automatic garbage collector using a motor, can save energy. It can be used by women also because it is not a heavy machine to pull and push it.

CONCLUSION AND IMPLICATIONS

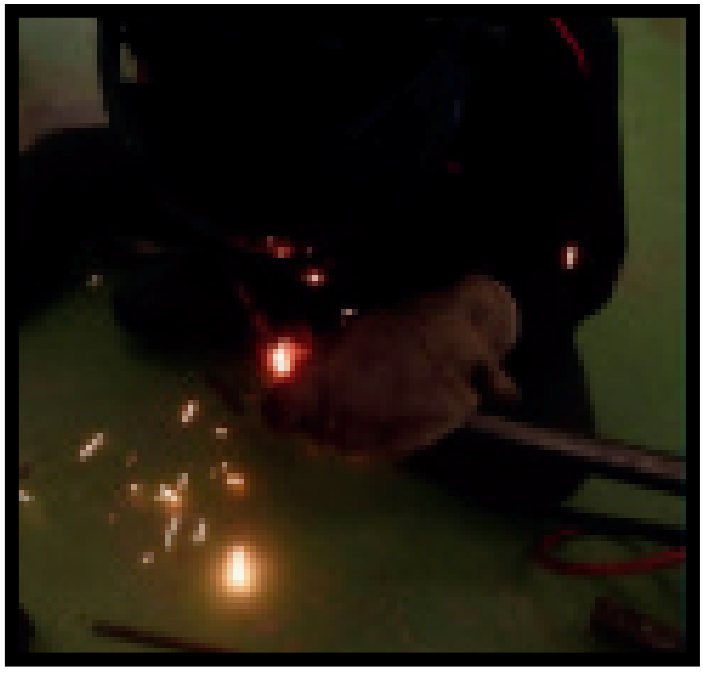
Beach cleaning machines have a profound impact on environmental preservation, community engagement, tourism, safety, education, and technological advancement. Their use plays a crucial role in maintaining cleaner and healthier coastal ecosystems while promoting sustainability and raising awareness about the importance of preserving our natural environments.



Prototype of Beach Cleaning Machine

Material used for develop project

The complete Beach Cleaning Machine



Prototype fabrication process by student

SMART DOOR CONTROLLER

Supervisor : Norasyidah binti Mohd Noh

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Students : Syedah Banu binti Syed Mohamed, Asmita A/P Rajamohan, Hariharan A/L S. Kalidass

BACKGROUND

The smart door controller intercepts the slamming doors, guides them slowly into the lock, and keeps them safely closed. This way, it prevents a lot of hassle for all residents. If the door closer is not functioning correctly, it can create loud noises when closed. A door will open and close repeatedly so that the damper will be damaged. The soundless door damper should keep the door's functionality and durability while maintaining smooth and silent operation.

OBJECTIVE

This project's objectives are to develop and produce a silent door damper and to free the damper from leakage.

METHODS

A wooden stick, plywood, and hinges are used to make a door frame and door leaf. A sensor, microcontrollers, electrical linear actuator and communication modules are used to program the controlling system. The relay should programmed to the button; when the start button is ON, the power supply is given to the relay and programmed to the relay, and the door will open. When the button is OFF, the door will close.

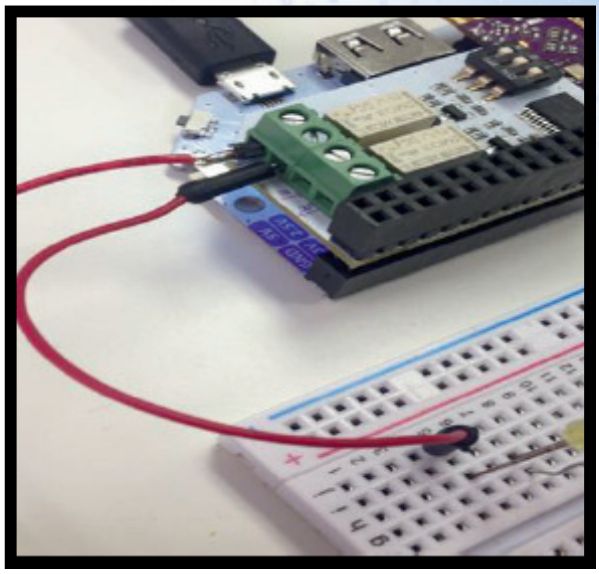
RESULTS

The door opens and closes silently, smoothly, and consistently for the same duration. The damper will be used for more than two years.

CONCLUSION AND IMPLICATIONS

The linear actuator reduces sound when the door slams, making people feel relaxed and free from disturbance. It also prevents the door from slamming shut, eliminating the risk of accidents and injuries caused by sudden door closures. The smart door damper controller represents a significant step forward in modern home automation and security.

Cutting a board as a frame



Programming relay to the button

Damper attached to the leaf door

Operational testing Smart Door Controller

Smart Door Controller

FISH FEEDER BOAT

Supervisor : Mmaniyarasi a/p Munusamy

Email : m.maniyarasi@polibanting.edu.my

Students : Muhammad Adwa Hazim bin Abd Halim, Vannessa Ruth Sigar, Amenur Adib bin Maarus, Arumugam a/l Sagaran

BACKGROUND

A fish feeder boat is a specialized watercraft designed for the purpose of feeding fish in aquaculture farms, fish hatcheries, or recreational fishing areas. Its primary function is to dispense fish feed into the water. Accurate distribution, ensuring that it is evenly spread across the water surface.

OBJECTIVE

To design and develop a product that simplifies the work of feeding fish with less workforce that has reliable and precise feeding mechanism capability to distribute feed over the target area evenly

METHODS

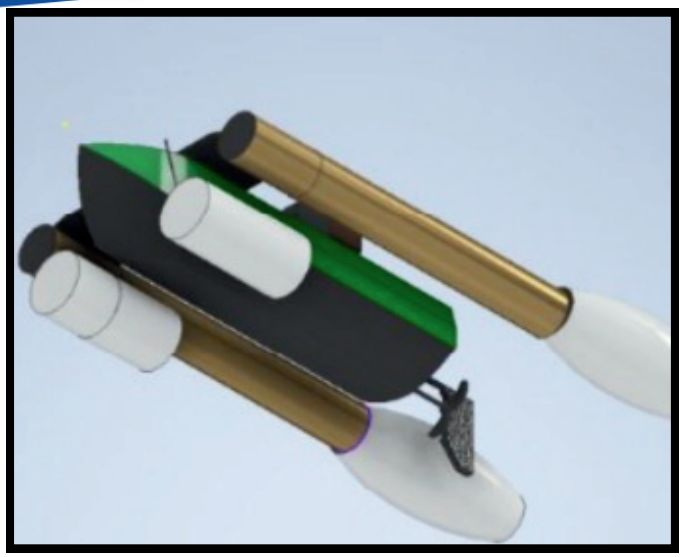
The fabrication technique is a crucial aspect of building a boat fish feeder. It involves the selection of appropriate materials and the utilization of specific manufacturing processes. The chosen fabrication technique should consider factors such as durability, corrosion resistance, and suitability for the marine environment. Techniques such as 3D printing, CNC machining, or traditional fabrication methods may be employed depending on the complexity and requirements of the feeder.

RESULTS

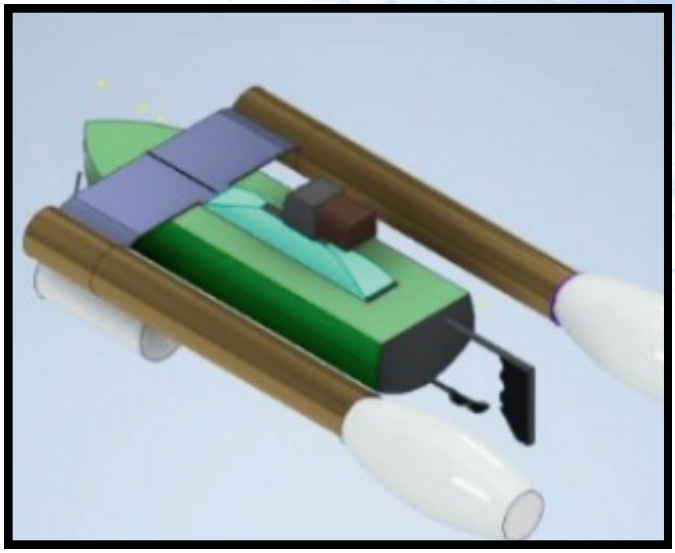
The boat battery lasts around 30 minutes if it continuously operates. It can hold approximately 100 grams of fish food, and the feed rate is about 2g/s.

CONCLUSION AND IMPLICATIONS

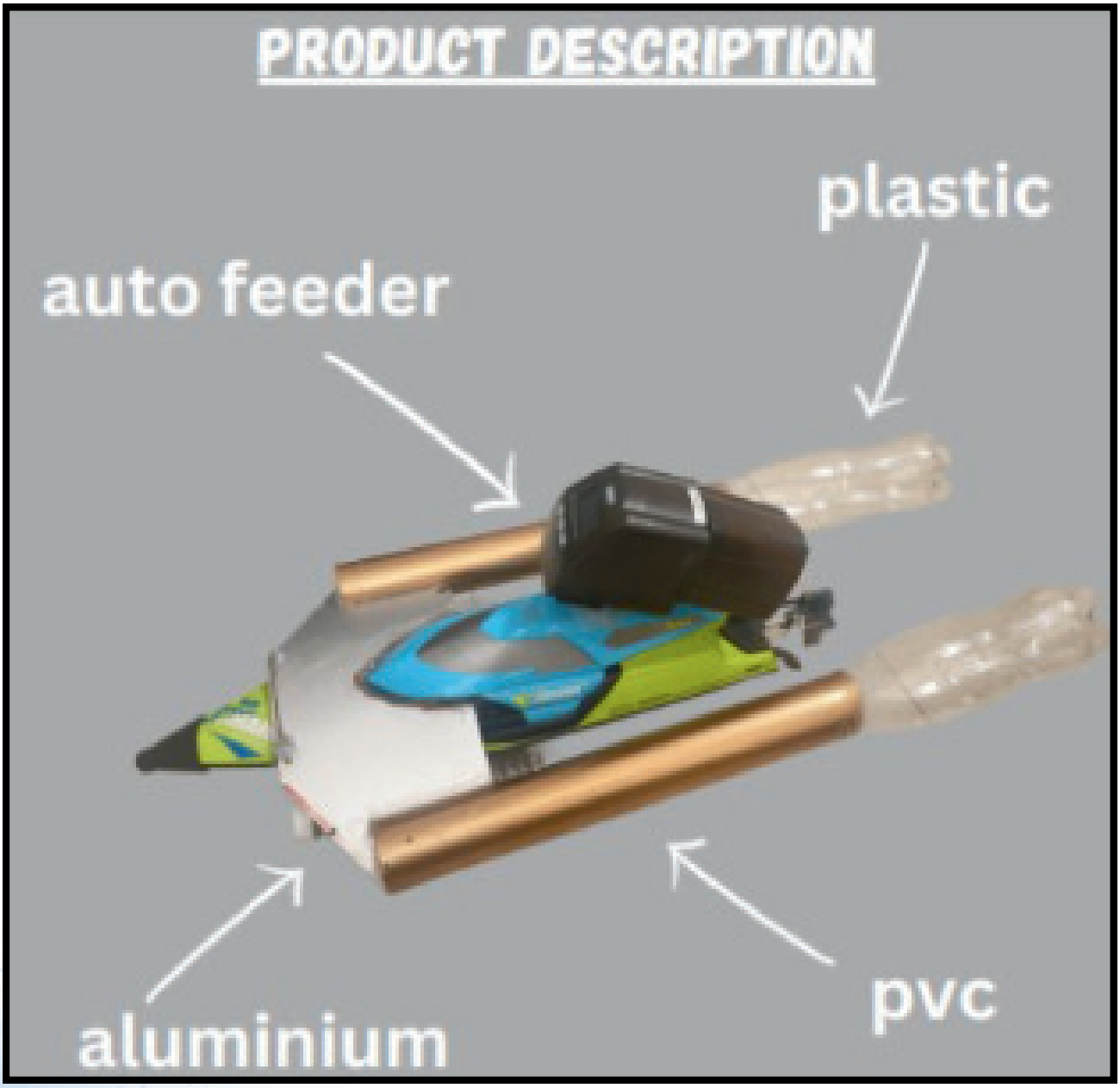
Customized boats called fish feeder boats are made to feed fish in aquaculture environments automatically. These boats are equipped with sensors and precision distribution systems. The automation is intended to maximize feed utilization, lower labor costs, and improve efficiency. The information gathered helps to enhance both feeding plans and farm management in general. Reduced feed waste and nutrient discharge make fish feeder boats more environmentally friendly. Integration with IoT and other smart technologies makes remote control and real-time monitoring possible. All things considered, fish feeder boats provide aquaculture companies with a cutting-edge and effective technological solution.



Back view of CAD



Top view of CAD



End product with material used for part labelling

AN INVENTION OF A SMART BLIND STICK USING IOT

Supervisor : Mmaniyarasi a/p Munusamy

Email : m.maniyarasi@polibanting.edu.my

Students : Muhammad Luqman bin Mohd Fadzil, Muhammad Fazly bin Basri, Hafiz Rifdi bin Ismail, Najatul Insyirah binti Zaini

BACKGROUND

Designed for visually impaired people who want more mobility and independence. The blind stick with IoT (infrared or ultrasonic sensors) is a highly recommended tool by giving users instant feedback on their surroundings, the obstacle and moisture detection functions encourage safer and more self-assured exploration of their surroundings.

OBJECTIVE

To design and fabricate an effective device for visually disable people. By providing this system, enable to impair individuals with a comprehensive and reliable tool through navigating their environment with greater safety, independence and confidence

METHODS

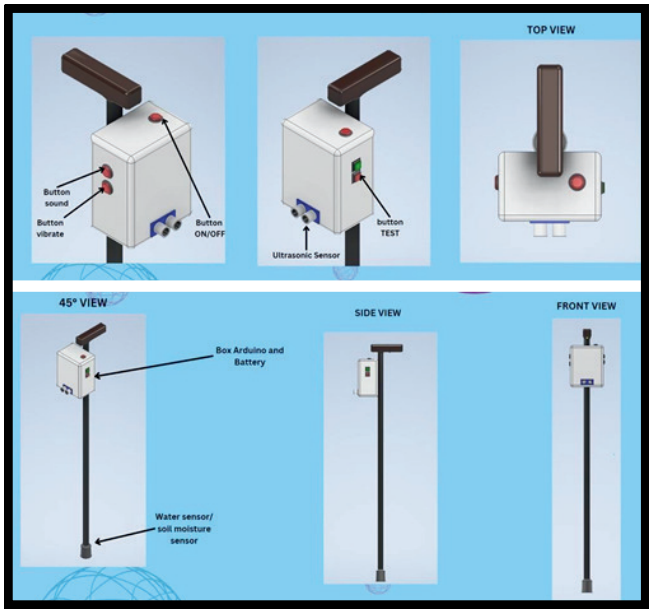
The main aim is to improve security and help for people who have vision impairments. By utilizing cutting-edge technologies like Arduino, ultrasonic sensors, moisture sensors, buzzers, and rechargeable batteries, this invention tackles the problems faced by the visualized community. A proactive and dynamic navigating approach is provided by the inventive design, which combines electrical and sensor components.

RESULTS

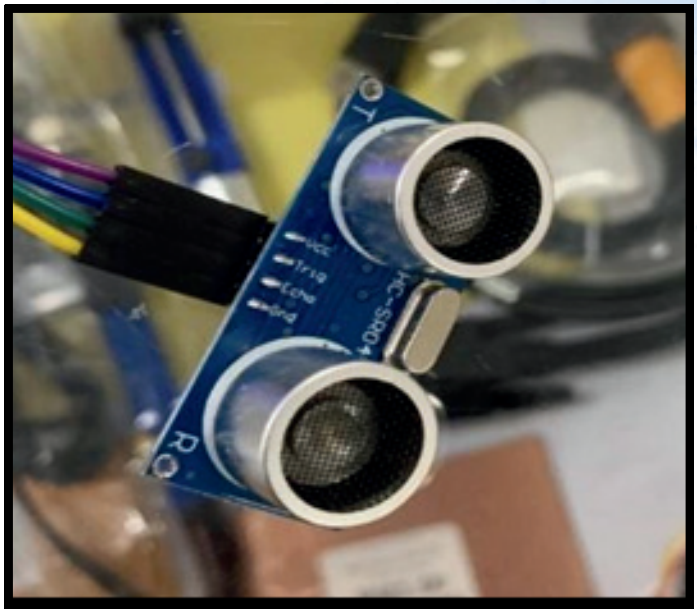
Extensive testing has been undertaken to enhance the performance and dependability of our intelligent blind stick, yielding a substantial amount of critical data that is essential for further improvement. This segment is devoted to the data analysis that was obtained through extensive testing, which included the detection of ultrasonic obstacles and the sensing of moisture. In addition to water sensors, we used ultrasonic sensors. A buzzer that sounds an alarm is connected to these sensors.

CONCLUSION AND IMPLICATIONS

The development of the smart blind stick was necessitated by the lack of existing initiatives to provide independent blind folks with a feeling of safety during outside excursions. A significant proportion of individuals depend on canes to assist them in their everyday activities. This project utilizes a vibrator motor for the vibration warning and ultrasonic sensors for measuring distance. Overall, this equipment is a worthwhile purchase for anyone who are visually impaired. The blind stick using IoT is a highly recommended tool for individuals with visual impairments who desire increased mobility and freedom.

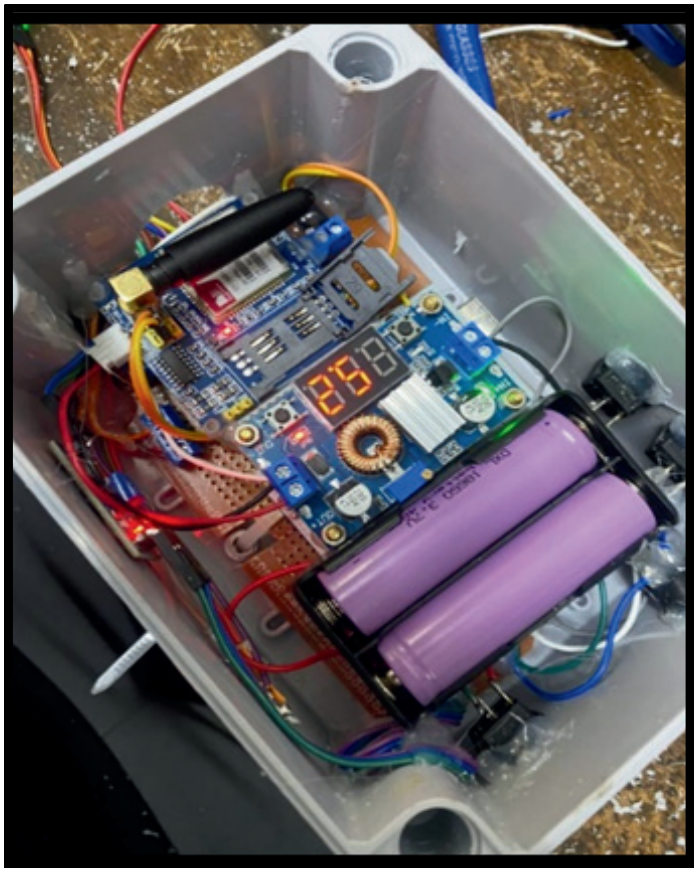


3D drawing of a smart blind stick



Ultrasonic Sensor

Ultrasonic Detection



The circuit of smart blind stick connected with Arduino Uno and ultrasonic sensor

GO TO GET DROID

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Students : Mior Muhammad Aqil Bin Mior Zawari, Muhammad Faris Bin Omar, Muhammad Heiry Harif, Muhammad Nur Ierfan Bin Mohamd Yatim

BACKGROUND

An accessible and user-friendly solution. The essence of the Go to Get Droid lies in its integration of programming, electrical, and mechanical components, harmoniously combined to yield a flexible and highly effective robotic solution applicable across diverse sectors. This prototype aims to bridge the gap between simplicity and efficiency, offering a seamless entry point for those venturing into the world of robotics.

OBJECTIVE

Venturing into the world of robotics. At its core, the pick-and-place robot prototype seeks to address the need for increased accuracy and productivity in routine operations involving the handling of goods. By automating these tasks, the robot reduces the reliance on manual labor and enhances the overall efficiency of the processes involved.

METHODS

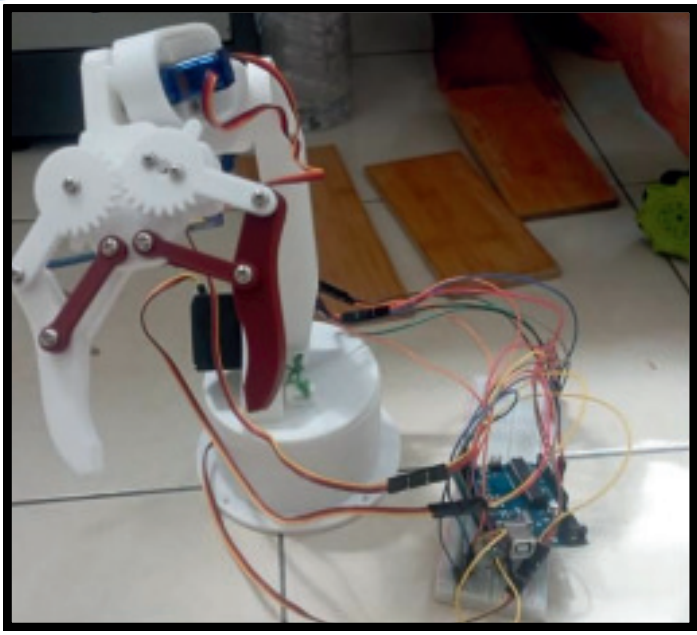
The versatility of the Go to Get Droid is manifested through its specialized grippers or suction cups strategically designed to accommodate a wide array of objects in terms of weights, sizes, and forms. These robotic appendages facilitate the robot's ability to safely and securely grasp objects, ensuring a delicate touch that is crucial for the successful handling of items with varying characteristics. In essence, the Go to Get Droid represents a significant stride.

RESULTS

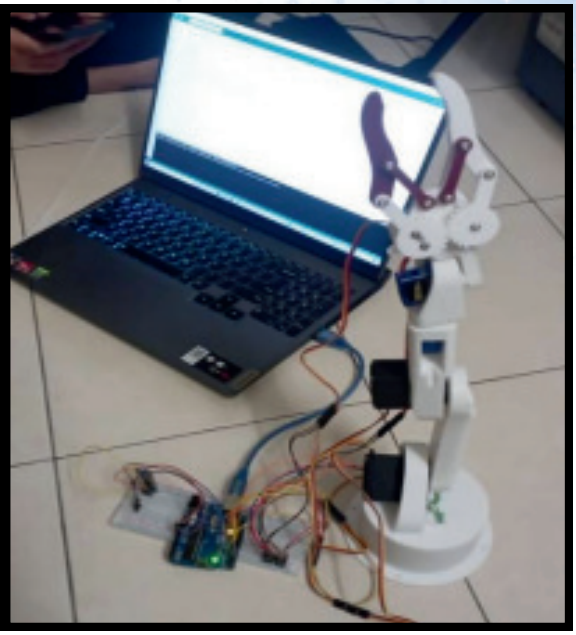
In essence, the Go to Get Droid represents a significant stride in the evolution of robotics, combining accessibility with advanced functionality. This prototype showcases the potential for automation to simplify and streamline routine tasks, providing a glimpse into a future where robots seamlessly collaborate with humans to optimize productivity across various industries.

CONCLUSION AND IMPLICATIONS

The robotic arm is a futuristic solution for our factory production and can increase productivity. Therefore, this robotic arm is not suit for study because it needs a large budget to create one robot; some robots can reach around a thousand ringgit, and people can afford to buy it.



Full assembly of the GO TO GET DROID



Rotating GO TO GET DROID

6 November 2023
Dr. Amar Alif Abdullah (DM45),
Pensyarah (DM46) Universiti Teknologi MARA (UiTM),
FAKULTI SAINS PENTADBIRAN & PENGAJIAN POLISI
Universiti Teknologi MARA (UiTM)
Kampus Shah Alam
Universiti Teknologi MARA,
40450 Shah Alam, Selangor,
MALAYSIA
Tuan/Puan,

SURAT PENGESAHAN MENGGUNAKAN PRODUK "GO TO GET DROID"

Dengan ini syarikat di atas telah menggunakan produk kami iaitu GO TO GET DROID untuk membantu kerja harian mereka seperti;

1. Menggunakan GO TO GET DROID untuk mengangkat skru yang berada tinggi di rak.
2. Menggunakan GO TO GET DROID untuk mengangkat sisa-sisa buangan yang ringan.
3. Menggunakan GO TO GET DROID untuk mengalihkan fail.

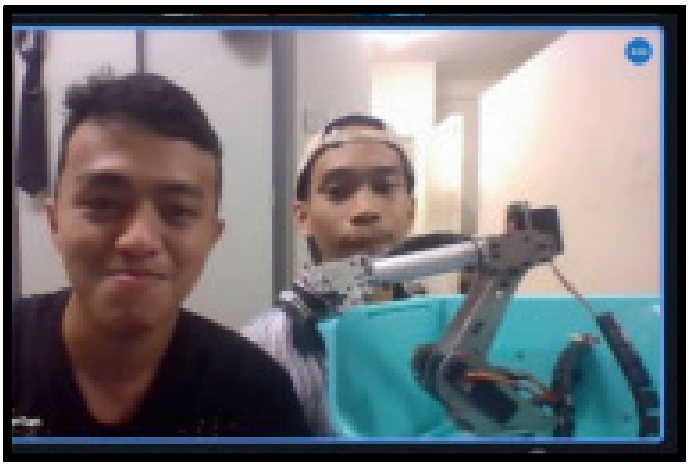
Pihak kami telah BERSETUJU untuk mengesahkan produk ini iaitu GO TO GET DROID sebagai sebuah alat yang dapat membantu kerja harian kami seperti yang dinyatakan di atas.

Sekian, terima kasih .

Yang Benar

.....
(Dr. Amar Alif Abdullah)

Approved by third party



Group photo during online

GRASS CUTTER CONTROL

Supervisor : Zulkarnain Bin Jamak

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Students : Fakhrul Ihtisyam Putra Bin Badrul Hisyam, Muhammad Nausyad Bin Amir Najib, Muhammad Hafiz Bin Ahmad Nizam, Muhammad Syahmi Zawawi Bin Azahari

BACKGROUND

This "Grass Cutter Control" study aims to design a mobile lawn mower by using only remote control as a key factor in moving the grass machine. Where this machine plays an important role in replacing human energy.

OBJECTIVE

- To innovate the lawn machine by integrating a remote control system for mobility.
- To ensure user safety during the operation of the grass cutter.
- To develop a remote-controlled grass cutter.
- To test and analyze the control range and battery efficiency.

METHODS

The project is designed to be suitable for various types of grass, ensuring wide applicability. The design incorporates two primary functions: grass cutting and remote controlling, enhancing usability. The system simplifies operations and reduces labor requirements, making it a practical solution. The design is tailored to be easy to control and adapt seamlessly to user needs and preferences.

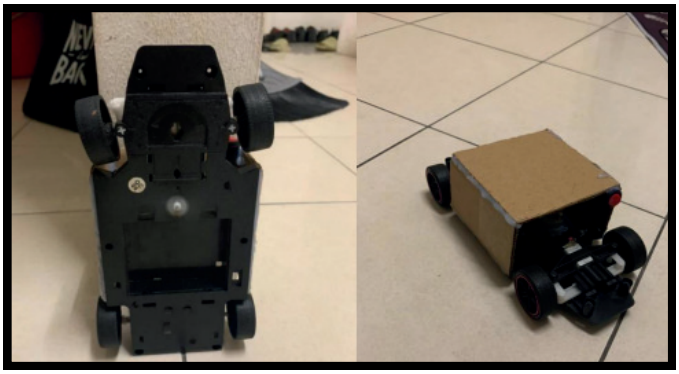
RESULTS

At the end of this study, we hope to be able to produce the potential to help all kinds of aspects involving the lawn by building a Grass Cutter Control that makes it easier for everyone to use it.

CONCLUSION AND IMPLICATIONS

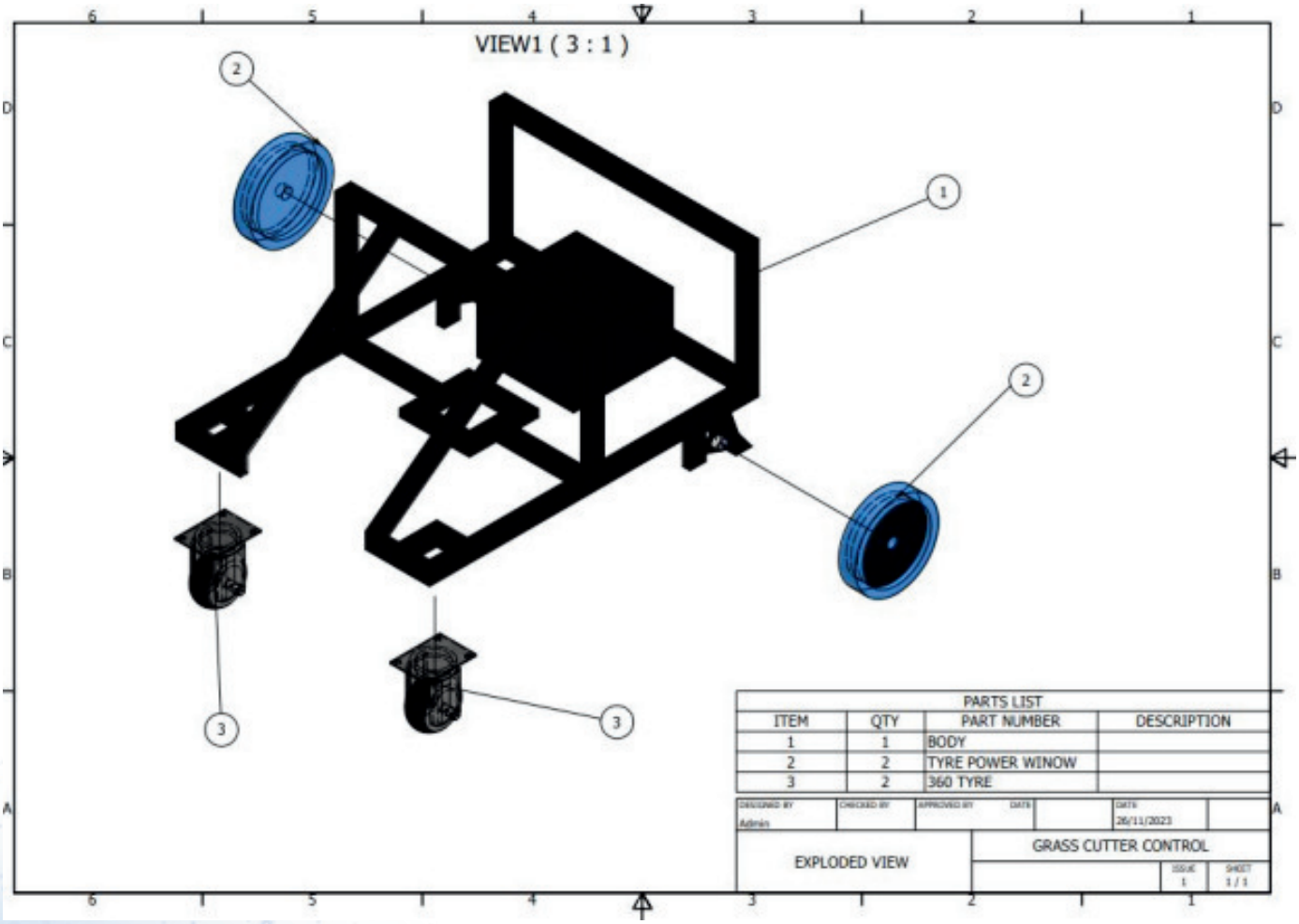
A Grass Cutter Control is a lawn mower that has a remote control. A system that uses a remote control that makes it easier for a person to use it and reduces labor. The purpose of this Grass Cutter Control machine was created especially for beginners who are just learning to use it.

Full assembly



Prototype

Certificate



Exploded views

GRASS CUTTER MACHINE

Supervisor : Muhamad Sani Bin Buang

Email : sani@polibanting.edu.my

Students : Muhammad Hafzhan Bin Jazmi, Mohamad Amirul Aiman Bin Kamaruzaman, Sharul Azri Bin Shukor, Adam Faiz Bin Md Zaironi

BACKGROUND

The farmers need grass feeder machines, which is extremely great these days, as they have become a necessity in our daily lives. They will never run out of generated they may run out of fossil fuels that are generated for home and industrial usage. Furthermore, power outages occur frequently, causing everyday necessities to be disturbed. Unevenly, trimmed grass has an impact not only on humans but also on animals. That's why, with the help of a grass feeder machine, came up with a solution. The power source is engine-powered.

OBJECTIVE

- To design grass feeder machines for cows and goats for small farming or moderate farming.
- To fabricate machine 2 in 1 for grass feeder machine and distribute for food distribution to farm animals.
- To develop the system Internet of Things (IoT) for the distribution of grass to animals by remote control for the grass feeder machine.
- To analyze the convenience of using a grass feeder machine to feed animals.

METHODS

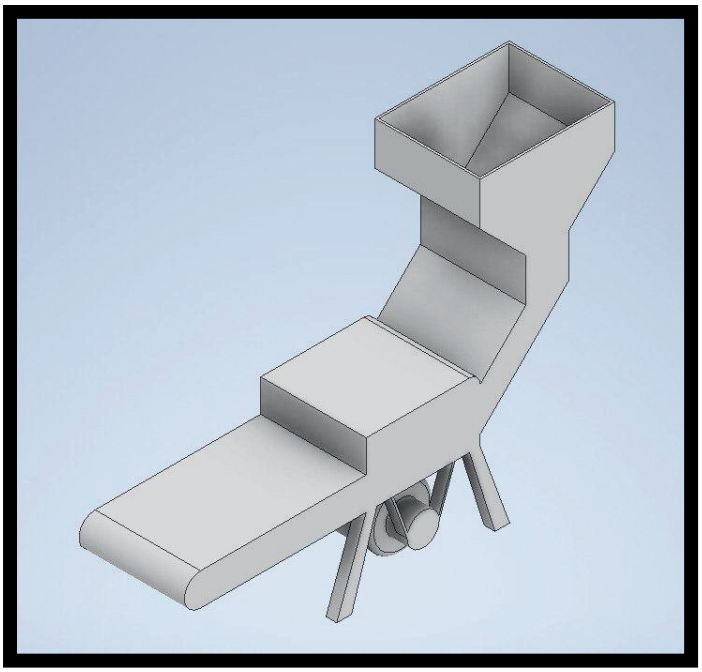
Grass feeder machine has a number of features and capabilities that improve the efficiency of cutting and separating grass. The motor in this product moves the cutting blade. It has a sizable tank that can hold uncut grass next. For balance, it also has four legs. It also contains a conveyor and a weight sensor. We employ a single phase motor in this product. In addition, this machine requires very little maintenance and is simple to operate. The motor can endure a very long period. Farmers may divide the grass to their livestock more easily by using this weight sensor and conveyor. The weight sensor will detect when they cut grasslands on the conveyor, move the conveyor, and divide it up for the farm animals.

RESULTS

The goal of this project is to create an ergonomic grass feeder for cows and goats. The device can also lessen waste by giving the animals a controlled amount of grass, lowering the likelihood of overfeeding or trampling.

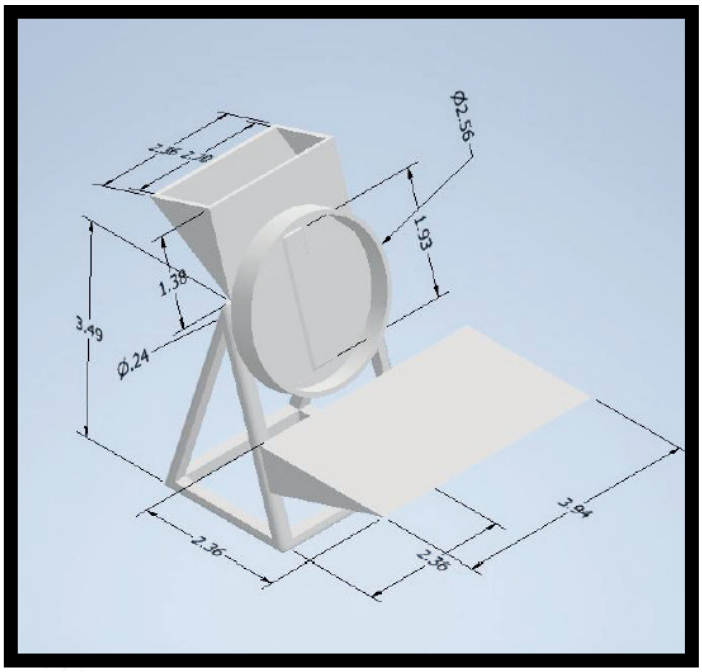
CONCLUSION AND IMPLICATIONS

In conclusion, the grass feeder machine offers numerous benefits and advantages for farmers and livestock owners. It provides an efficient and convenient solution for feeding grass to livestock, eliminating the need for manual labor and saving time and effort. The machine is designed to cut and distribute grass evenly, ensuring a balanced and controlled diet for the animals.



The Product Modelling

Prototype fabrication process by student for welding



Assembly view of CAD

Full assembly project of grass cutting machine

HERBICIDE CONTROL MACHINE

Supervisor : Tamil Moli A/P Loganathan
Email : tamilmoli@polibating.edu.my
Students : Ahmat Alwi Bin Ali Akbar, Mohamad Fariez Ezairie Bin Mohd Nor Azmi, Muhamad Fareez Izzuddin Bin Jafri Din, Mohamad Faris Aiman Bin Saharudin

BACKGROUND

Herbicides are essential in modern agriculture for weed control and crop yield optimization. However, their application poses significant challenges, including environmental contamination, health risks, and inefficiencies in current methods.

OBJECTIVE

This project aims to design a herbicide control machine with dual functionality for aerial and ground operation, create a time-saving and efficient solution for farmers, and advance the integration of modern technology in agricultural machinery.

METHODS

The research was conducted to identify the challenges faced by farmers through surveys and field observations, as well as to study existing technologies like drones and ATV sprayers. The design and fabrication process focused on developing a prototype with dual functionalities, incorporating durable materials such as polyethene tanks and rubber tyres. Testing and evaluation were conducted on 1-hectare experimental plots to assess spray coverage, efficiency, and ease of use, with performance metrics including spray speed (6 m/s) and herbicide distribution accuracy. Safety protocols were also followed during testing to ensure environmental and operator protection.

RESULTS

The study showed that the herbicide control machine effectively reduced farmers' workload and time while providing consistent herbicide coverage across various terrains, including narrow and hard-to-reach areas. Farmers reported reduced physical strain and improved ease of operation compared to traditional methods. The machine demonstrated an optimal balance between spray accuracy and speed, enhancing overall productivity.

CONCLUSION AND IMPLICATIONS

In conclusion, the developed herbicide control machine successfully addresses key challenges in agricultural herbicide application by combining aerial and ground mobility. Its efficient design saves time, reduces physical strain on farmers, and minimizes environmental impact.

Herbicide Control Machine with remote

Fan Blade

Herbicide Control Machine

Nozzle

PORTABLE LAUNDRY MACHINE

Supervisor : Tamil Moli A/P Loganathan

Email : tamilmoli@polibating.edu.my

Students : Amir Alif Faisal Bin Jasnin, Muhammad Asyraaf Bin Roslan, Alman Faluthi Bin Mohd Faruk

BACKGROUND

In today's fast-paced world, modern lifestyles demand convenience and flexibility in household tasks, including laundry care. Traditional laundry machines are often large, immobile, and reliant on constant access to electrical outlets. This presents a challenge for users who need a portable solution for laundry tasks.

OBJECTIVE

The primary objective of this study is to design and develop a portable laundry machine that integrates advanced technologies to enhance the user experience. Specifically, the device aims to provide portability through Lipho battery technology, flexibility with an extended timer, and connectivity through Wi-Fi integration.

METHODS

The design and development of the portable laundry machine involved incorporating Lipho battery technology, which ensures that the device remains lightweight and portable while providing a long-lasting power source. The extended timer function was integrated to allow users to customize the duration of the laundry cycle, offering greater control over the washing process.

RESULTS

The developed portable laundry machine demonstrated successful performance with key features functioning as intended. The Lipho battery provided a lightweight yet durable power source, allowing for extended usage between charges.

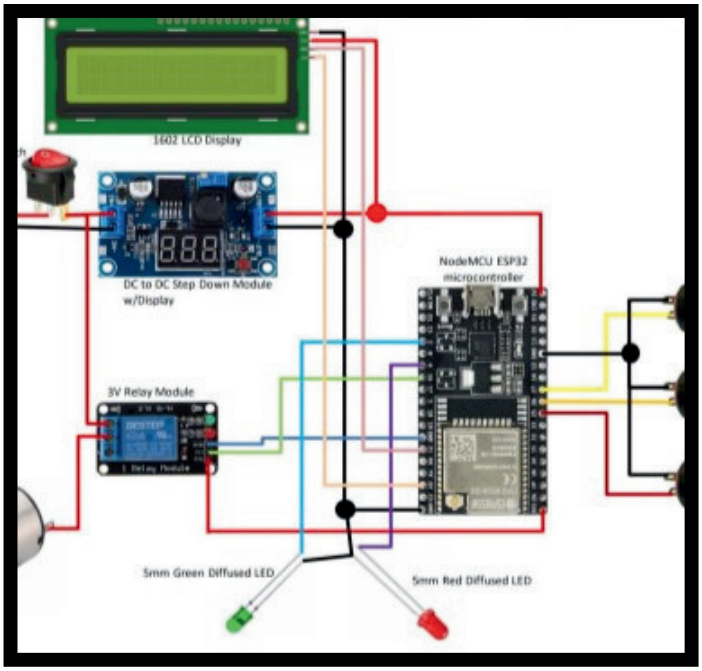
CONCLUSION AND IMPLICATIONS

In conclusion, the portable laundry machine effectively addresses the limitations of traditional laundry systems by combining portability, flexibility, and connectivity. The integration of Lipho battery technology, an extended timer, and Wi-Fi connectivity offers users an innovative and convenient solution for laundry care.

Portable laundry machine front view

Portable laundry machine top view

The component



The circuit

SEGREGATE CLEANING TROLLEY

Supervisor : Tamil Moli A/P Loganathan

Email : tamilmoli@polibating.edu.my

Students : Nur Adriani Rafizah Binti Roslan, Sharvineish Jegathesan , Muhammad Syafiq Aiman Bin Mohd Shukri

BACKGROUND

The restaurant industry is a significant contributor to food waste, with improper waste management practices often leading to environmental and operational challenges. Food waste, typically a mix of wet and dry components, is frequently disposed of in the same container, causing unpleasant odors, pest infestations, and health hazards such as food contamination.

OBJECTIVE

The objective of this project is to design a segregate cleaning trolley tailored for food waste management in restaurants.

METHODS

This study employed a mixed-methods approach combining qualitative and quantitative techniques. Interviews and surveys were conducted with restaurant employees to identify current challenges in waste management and gather user requirements for the segregate cleaning trolley. Additionally, a market analysis was undertaken to evaluate existing waste management tools and identify gaps in functionality. The design and fabrication of the trolley involved iterative prototyping, incorporating features such as waste compression and separation mechanisms.

RESULTS

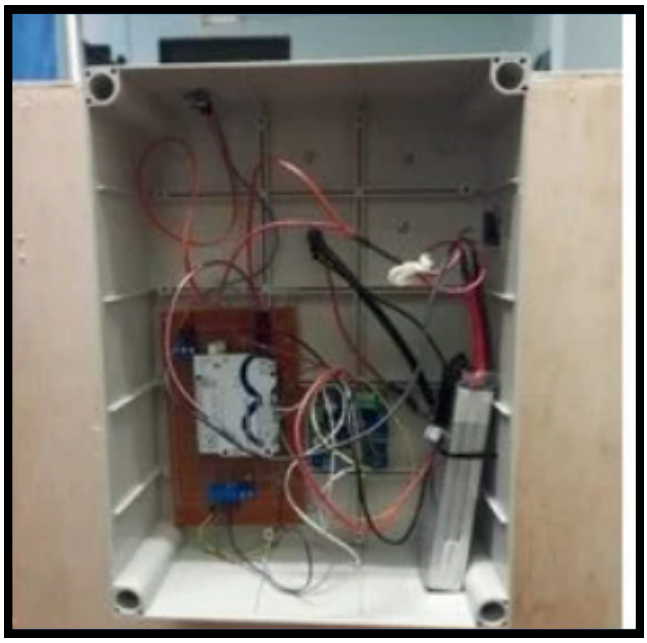
The prototype segregate cleaning trolley successfully met the design objectives, demonstrating efficient separation of wet and dry waste. Testing revealed that the device reduced odors by over 60% compared to conventional waste handling methods, minimizing the attraction of pests. Employees reported a 40% reduction in the time required for table cleaning and waste disposal tasks. The compression feature ensured minimal spillage, contributing to a cleaner and more hygienic environment.

CONCLUSION AND IMPLICATIONS

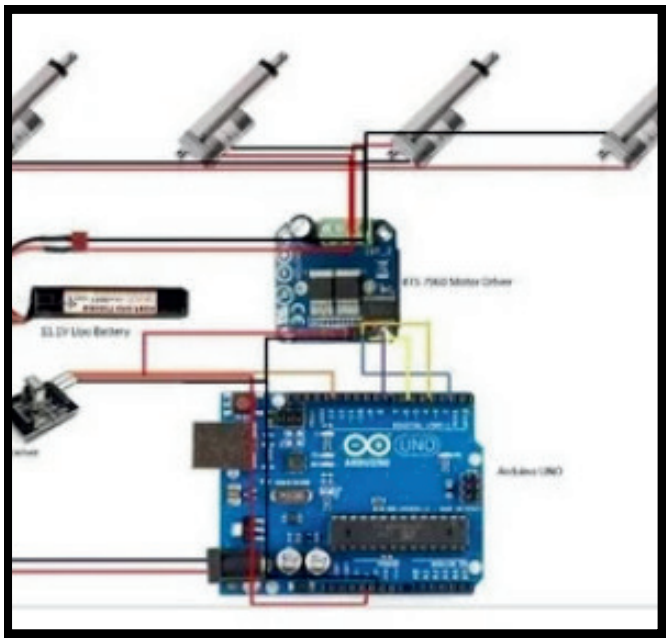
The prototype segregate cleaning trolley successfully met the design objectives, demonstrating efficient separation of wet and dry waste. Testing revealed that the device reduced odors by over 60% compared to conventional waste handling methods, minimizing the attraction of pests. Employees reported a 40% reduction in the time required for table cleaning and waste disposal tasks. The compression feature ensured minimal spillage, contributing to a cleaner and more hygienic environment.

Segregate Cleaning Trolley

Segregate Cleaning Trolley development



Wiring fix in trolley



Wiring

HYDRAULICS FLOOD PROTECTION STORAGE SYSTEM

Supervisor : Mohd Aly Rajie Bin Halim

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Students : Eashwar A/L Ravi Shanker , Shivanantini A/P Ravee , Dhiveneshvar A/L Remesh , Girevaasan A/L Muthu

BACKGROUND

Floods increasingly threaten homes, requiring proactive solutions to protect valuable items. The project addresses this need by designing a system capable of detecting rising water levels and safeguarding possessions through automated lifting mechanisms. This approach is especially crucial in flood-prone regions like Selangor, Pahang, and Melaka.

OBJECTIVE

- To design and fabricate a handmade jack with linear actuators.
- Develop a storage box integrated with ultrasonic sensors, Arduino Uno, and a lifting mechanism.
- To ensure the system protects essential belongings from flood damage effectively and affordably.

METHODS

Hardware: Used Arduino Uno, ultrasonic sensors, linear actuators, and a robust metal and plywood storage box.
Software: Programmed Arduino for real-time sensor data processing and actuator control.
Testing: Evaluated lifting efficiency, battery performance, and sensor accuracy under simulated flood conditions.

RESULTS

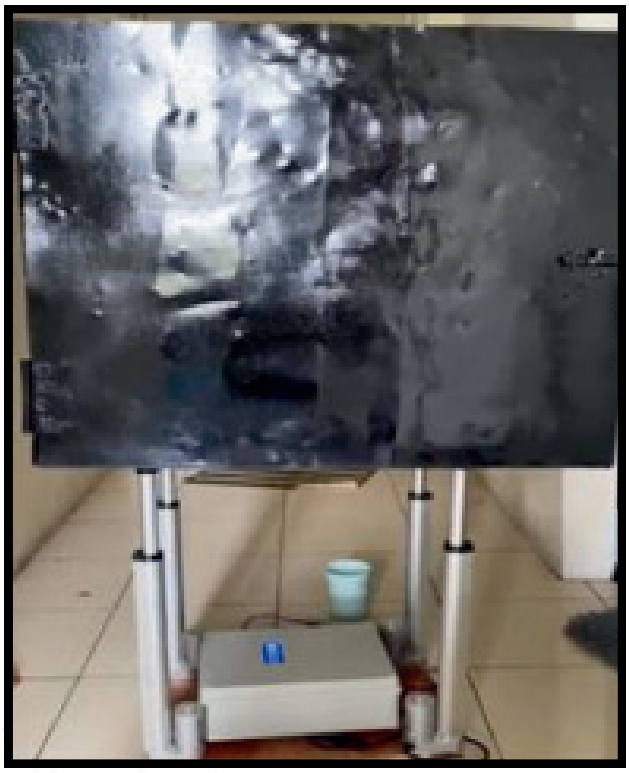
The system successfully activates upon detecting floodwater, lifting the storage box to a safe height. It demonstrated reliable performance, with sensors detecting water accurately, actuators lifting up to 40 kg, and battery-sustaining operations for up to three months without recharging.

CONCLUSION AND IMPLICATIONS

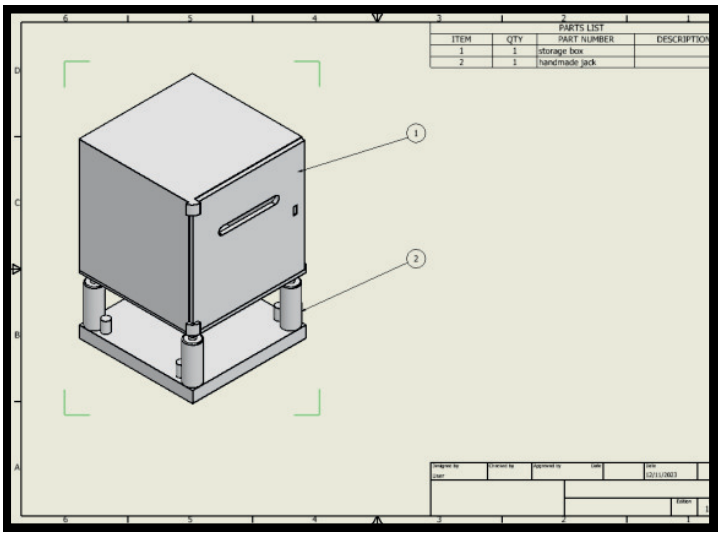
The Flood Protection Storage Box System is a practical and user-friendly solution for flood-prone areas. It minimizes physical effort and protects belongings effectively. Future improvements include enhancing material durability, optimizing energy efficiency, and integrating advanced automation for broader applications.

Prototype fabrication process by student

Prototype fabrication process by student for cutting



Full assembly picture



Assembly view of CAD

COCONUT PEELING MACHINE

Supervisor : Muhammad bin Abdullah

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Students : Muhammad Asyraff Idil Bin Ariffin, Muhammad Zaim Bin Sihar, Aqmal Hakim Bin Badrol Hisham, Muhammad Adam Bin Muhammad Azhar

BACKGROUND

The coconut is widely known as the most versatile tree because all of its parts can be utilized in economically viable products. Most of the major uses come from the fruits, the water in it, as a healthy refreshing drink, the shell for charcoal, and the husk for fiber or coil. These raw materials can be further processed to formhigh-valuee coconut-basedproductst that can be traded and marketed. The initial processing of the coconut fruit involves peeling the coconut. Peeling is usually done manually using hand-cutting blades such as knives, machetes, and axes. Even with the use of these tools, husking is still difficult because the peel is thick and hard. It also poses threats and dangers to the users since, in the process of peeling, they may injure themselves as the tools tend to bounce back upon hitting the peel. Also, this manual process of coconut peeling is time consuming and has a low production result because it is dependent on human strength.

OBJECTIVE

To design, fabricate, and analyze a user-friendly lightweight coconut peeling machine that can save time. It can safely peel a coconut in less than 10 seconds and then grind it to become cocopeat.

METHODS

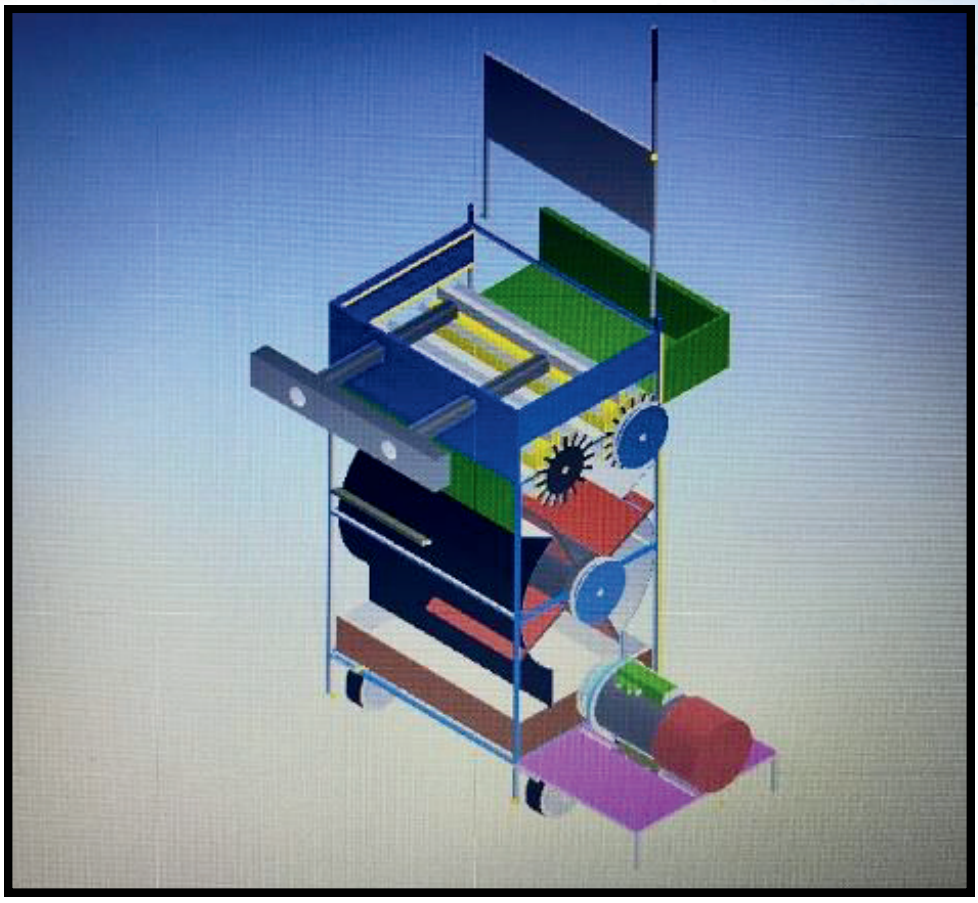
The machine uses a peeler blade to depericarp the coconut from its embryo. It drives using an electrical motor, which then connects to two shafts that rotate in parallel but in different directions. It makes the coconut pull down bit by bit until it completely depericarps. The pericarp is then ground in the blender section using a multistage blade. It will turn to cocopeat, located in the barrel under the blender section.

RESULTS

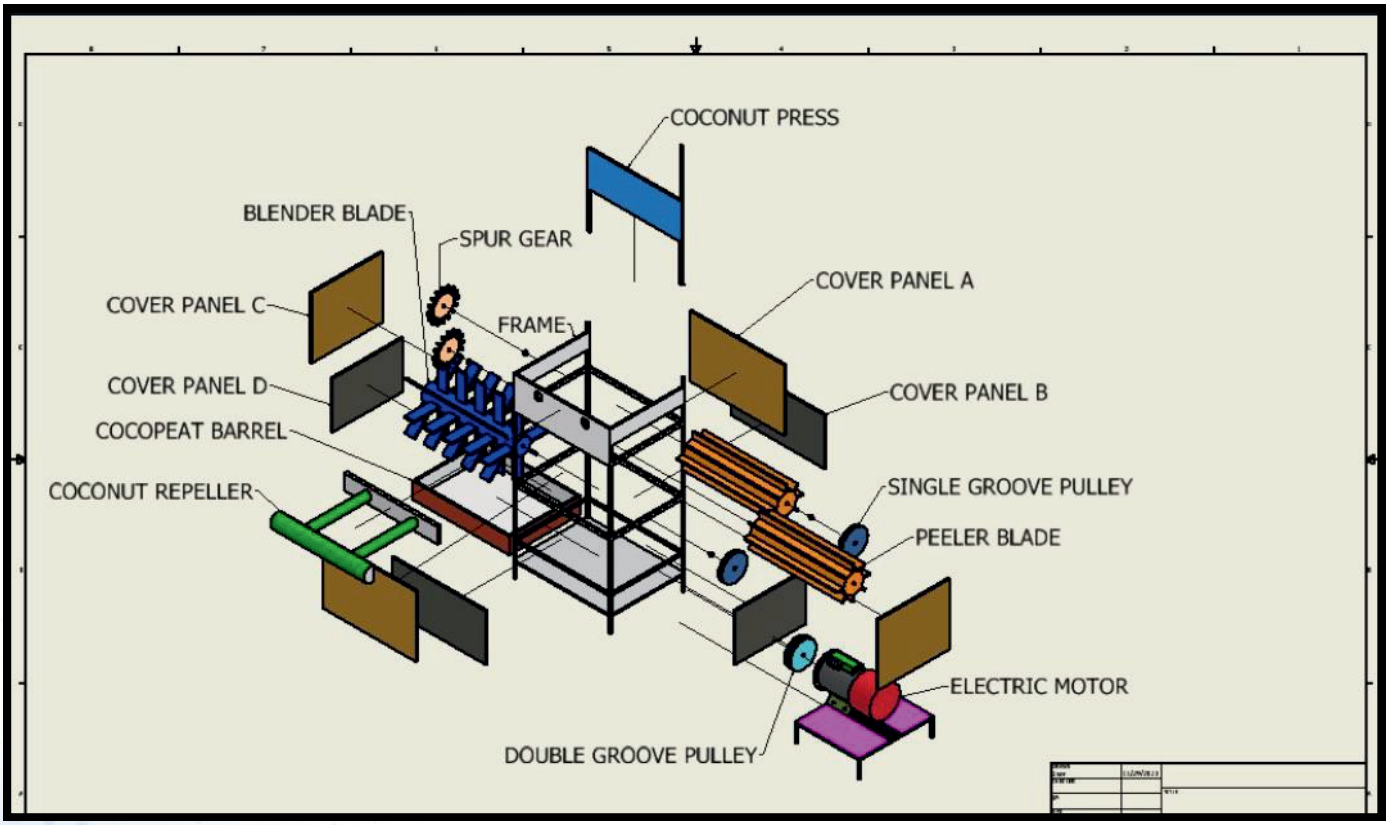
The results show that the number of coconuts being peeled in a certain period is obtained using a coconut peeling machine, which is 10 pieces of coconut in 20 sec compared to a maximum of 8 pieces of coconut peeled in 20 sec using manual technique.

CONCLUSION AND IMPLICATIONS

The coconut peeling machine is a practical and user-friendly solution for SME coconut processors. It minimizes physical effort and protects workers' hands safely. Future improvements include enhancing material durability, optimizing energy efficiency, and integrating advanced automation for more downstream applications.



ISO view of CAD



Assembly view of CAD

MULTI PURPOSE CUTTER

Supervisor : Safiah binti Abdul Razak

Email : safiah@polibanting.edu.my

Students : Syafiq bin Zulkefle, Muhammad Haikal bin Razali, Badrul Amin bin Samad, Syahir Amzar bin Mohd Fairuz

BACKGROUND

A multipurpose cutter is a versatile tool designed to perform a variety of cutting tasks on a variety of materials. It is equipped with interchangeable blades and cuttinheadsad to meet different cuttineedseed. This project has 2 types of cuts, which are vertical and diagonal, to cut food such as vegetables, chicken,n and yong tau foo. It can save time, cut with a large amount of material, and can reduce the risk of injury. Other than that, the cutting is more regular and uniform. This product is a semi-automatic machine that saves labor to cut food, packaging food, and the part of dropping food into the hopper is fully automatic.

OBJECTIVE

- To design and fabricate a multi-purpose cutter
- To measure the cutting time of design and existing product

METHODS

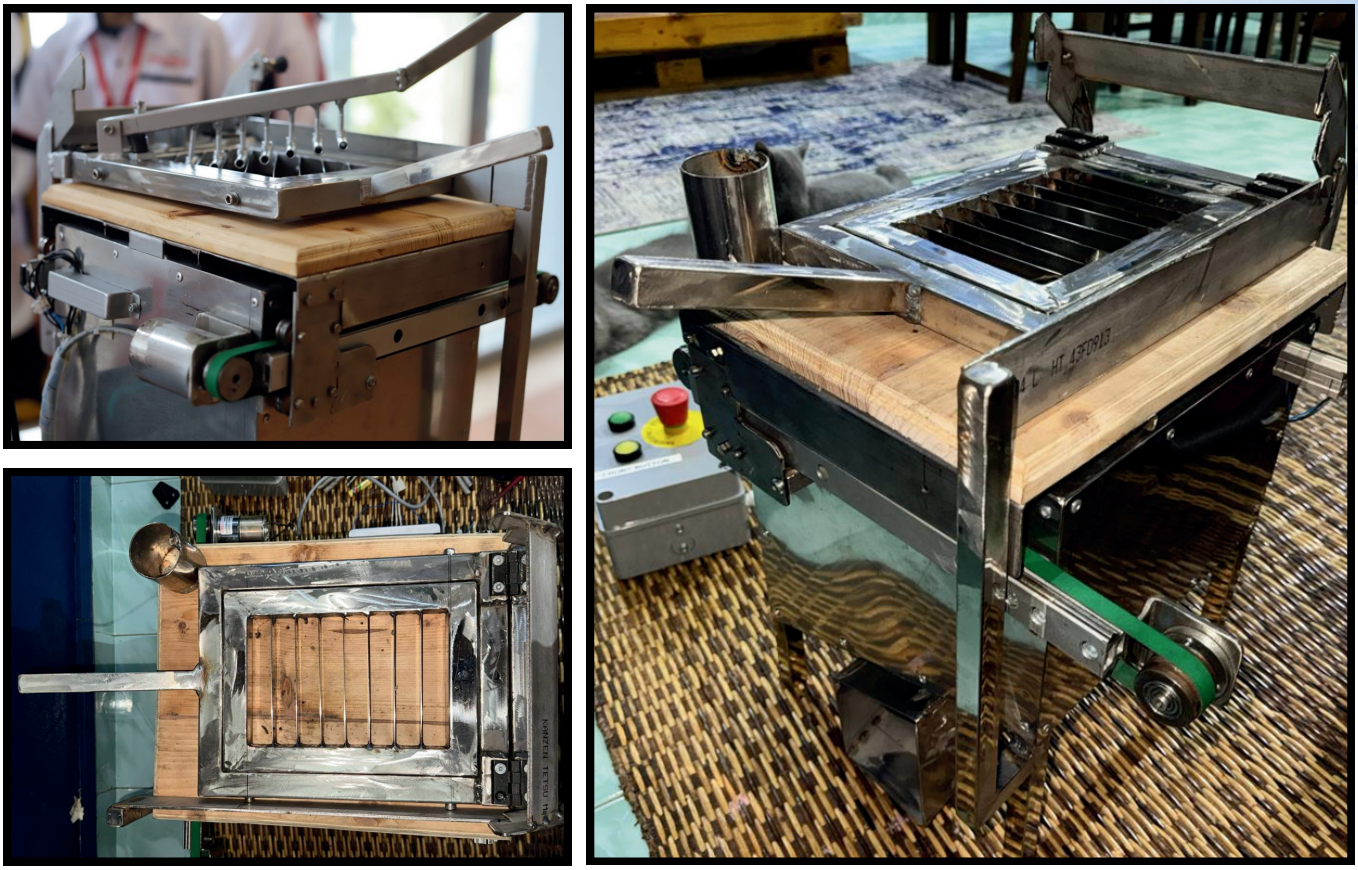
Materials used to make the frame of this project are stainless steel sheet plate, blade, square hollow stainless steel 1.0 mm & 0.5 mm, DC Gear Motor Worm 12V/24V, wooden plate, bearing, stopper, belt, and aluminum rail. Stainless steel is highly recommended for use in various machines that produce food products. A motor speed controller was chosen for this project, which is 3.7V (4800mAH). This AC motor can move the wooden plate to drop the food into the packaging hopper. The crucial part of the design is a cutter. It was designed in 2 shapes, made from stainless material to fulfill various types of food.

RESULTS

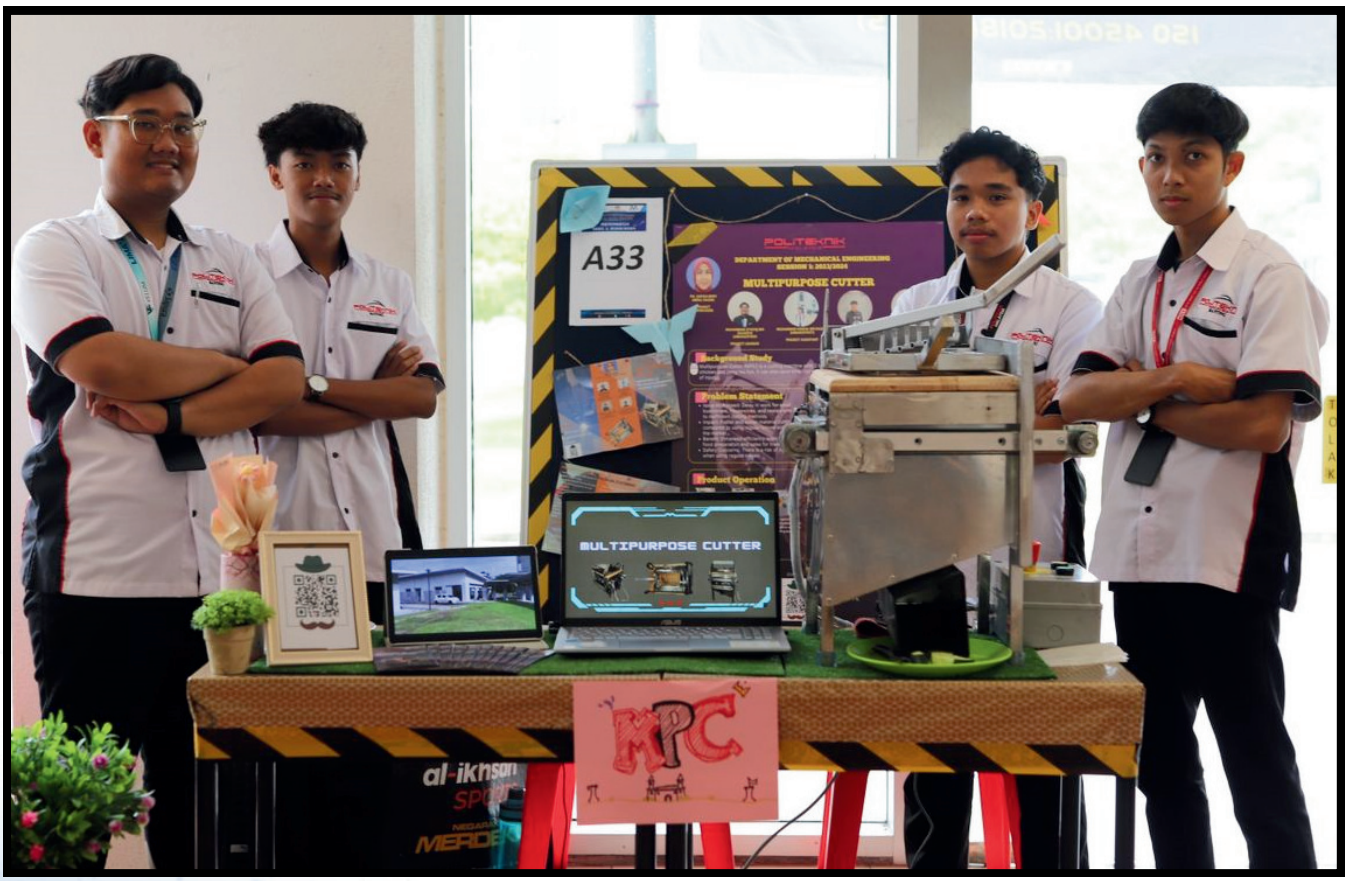
Based on project testing, the results show that the time it takes to cut a chicken (1-2 pieces) is 8-10s compared to traditional methods like using a knife or scissors, which takes 20-40s to finish. For this project, it can be cut with one wrap, taking 3 to 5 minutes for the whole process from cutting to packaging.

CONCLUSION AND IMPLICATIONS

The Multipurpose Cutter for cutting and wrapping has been developed for small traders, restaurants, and housewives in all settlements. The operation of this machine is easy, and the maintenance of the machine is low to repair. In addition, this project is user-friendly y, a time-saving, meaning this machine is 2 1, which is done simultaneously and is easy to operate.



Multipurpose Cutter



SMART EARMUFF

Supervisor : Mohd Nasiruddin Bin Hushim

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Students : Muhammad Fared Bin Muhammad, Nor Zidane Bin Mohamed Hapidz, Hafiz Akmal Bin Khairuddin, Akmal Bin Nadzri

BACKGROUND

Noise-induced hearing loss (NIHL) remains a prevalent occupational hazard in industries with high noise levels, such as aviation and construction. Conventional earmuffs provide hearing protection but limit effective communication and awareness, complicating work in noisy environments.

OBJECTIVE

This project aims to design and develop "Smart Earmuffs" equipped with innovative features such as automatic noise cancellation, emergency alert systems, and wireless connectivity to enhance usability while ensuring superior hearing protection.

METHODS

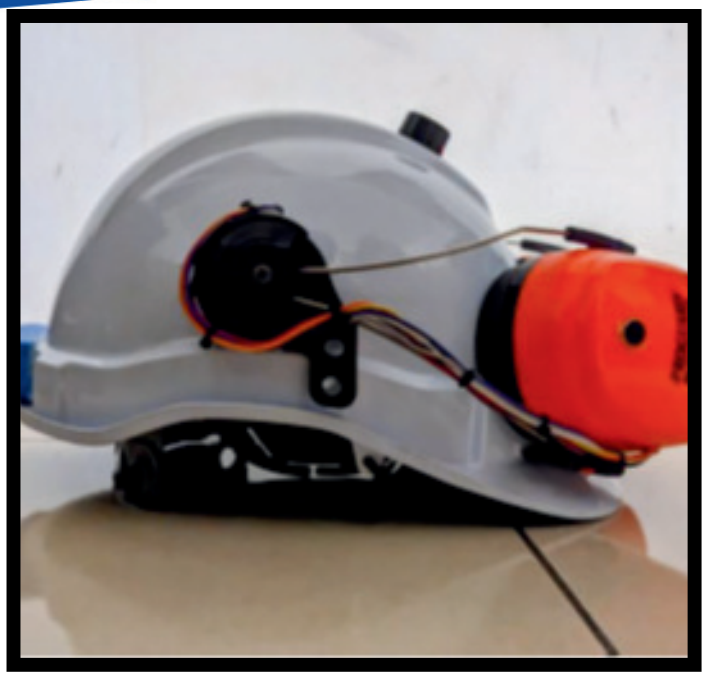
The Smart Earmuffs were engineered to include an integrated noise cancellation system, a call-up feature activated through a smartphone application, and WiFi-enabled notification alerts. The design combines advanced electronic components and durable materials to ensure functionality and reliability. Testing was conducted in controlled environments to evaluate the product's effectiveness.

RESULTS

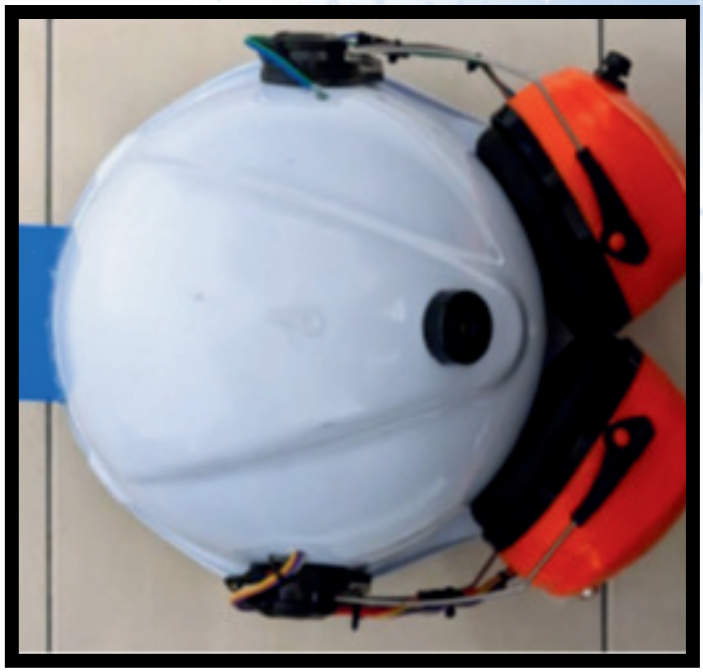
The Smart Earmuffs effectively reduced hazardous noise levels while allowing ambient sounds for communication under normal conditions. The emergency alert system successfully activated alarms for individual earmuff users, and WiFi connectivity facilitated real-time notifications. Limitations include reliance on battery life and restricted emergency alert activation per interface.

CONCLUSION AND IMPLICATIONS

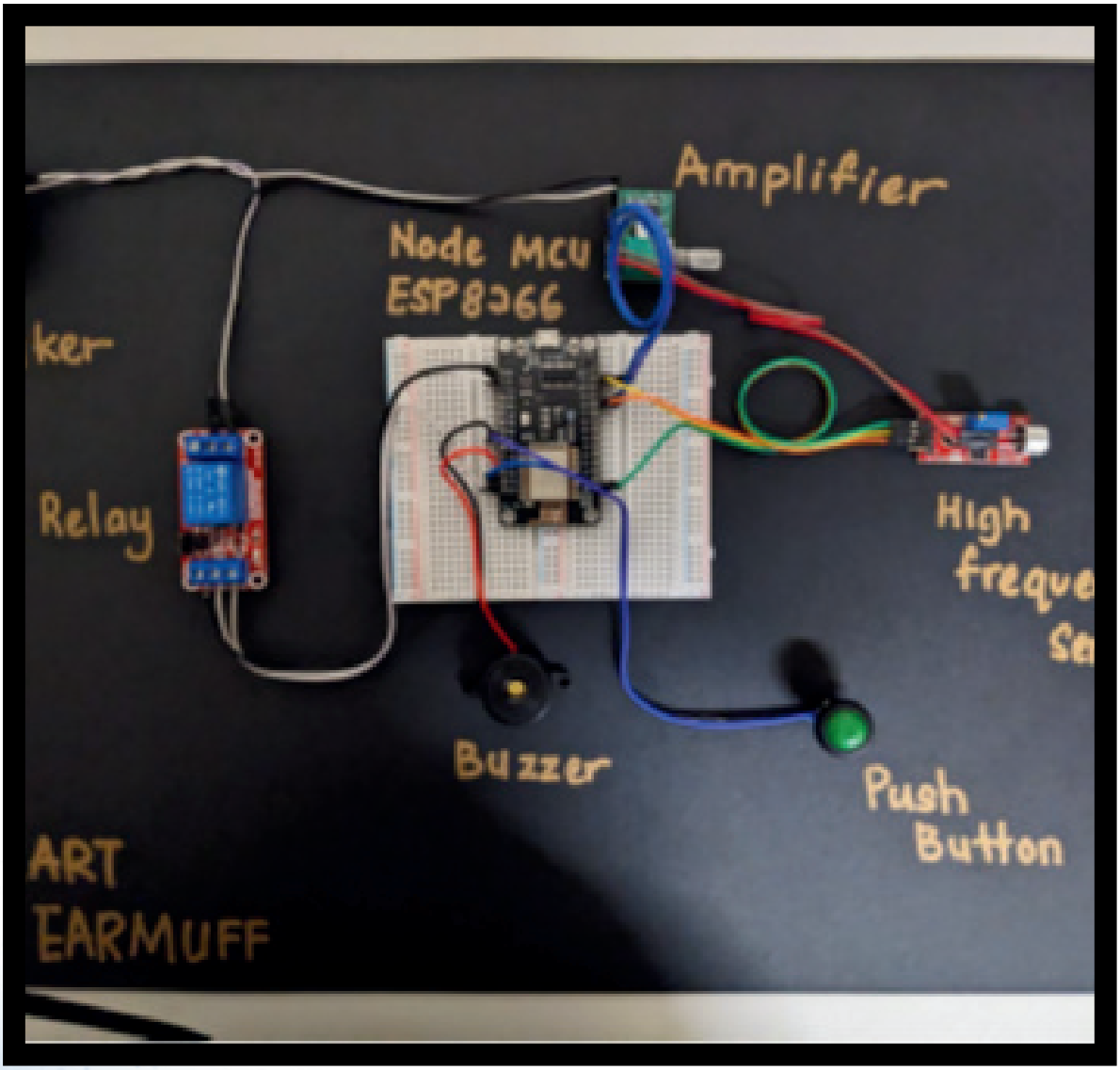
The Smart Earmuffs demonstrate significant potential for protecting workers from NIHL while enabling efficient communication and safety in industrial settings. Future improvements in component quality and design optimization could enhance durability and broader usability, providing a scalable solution for occupational safety.



Side view of project



Plan view project



Prototype Circuit

OYSTER MUSHROOM HOUSE

Supervisor : Mohd Nasiruddin Bin Hushim

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Students : Mohammad Norlokman Bin Samah, Muhammad Nazhan Bin Nazli, Ahmad Aiman Haziq Bin Azman, Muhammad Danny Iskandar Bin Zapidi

BACKGROUND

Oyster mushrooms are valued for their nutritional benefits and economic potential. However, cultivating these mushrooms requires precise control of environmental factors such as temperature, humidity, and ventilation. Traditional methods often fail to ensure optimal conditions, leading to inconsistent yields and quality issues.

OBJECTIVE

This project aims to design and develop a "Smart Oyster Mushroom House" that integrates automated systems to provide controlled environmental conditions, ensuring consistent quality and efficient cultivation while minimizing labor requirements.

METHODS

The Smart Mushroom House incorporates sensors (DHT22 for temperature and humidity), Arduino Uno microcontrollers, exhaust fans, water sprinklers, and WiFi connectivity. These components are programmed to monitor and regulate temperature, humidity, and air circulation autonomously. The system also utilizes the Blynk IoT application for real-time monitoring and control via smartphones.

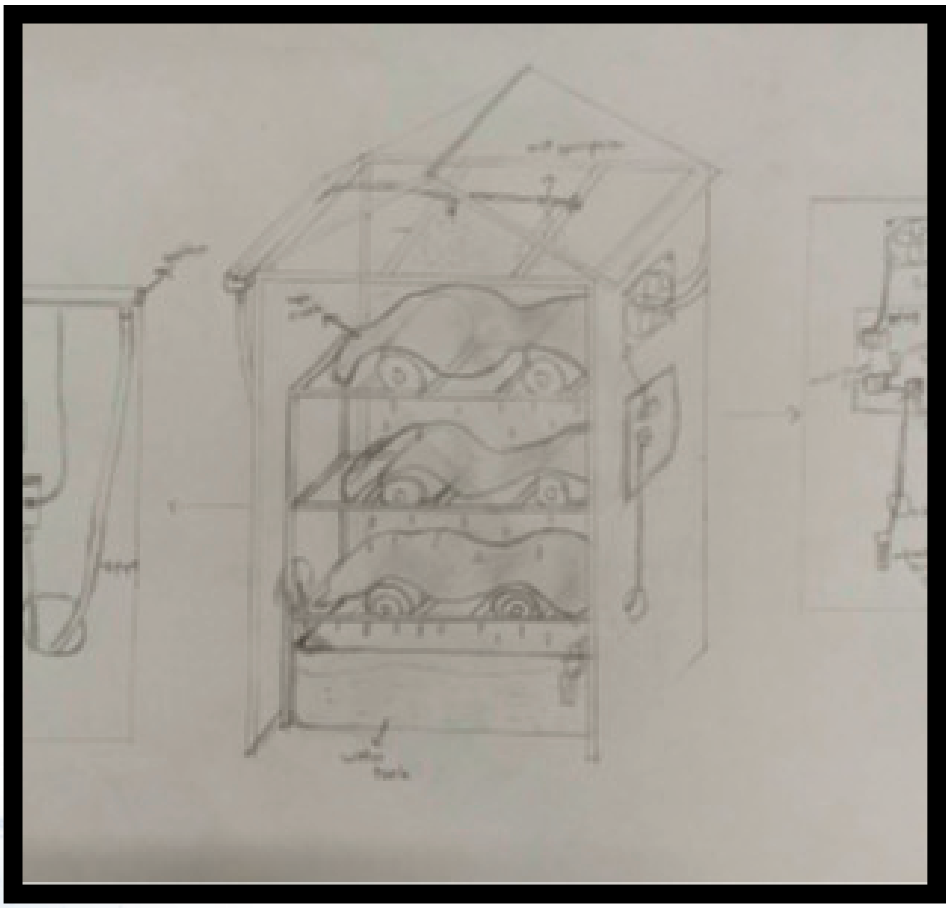
RESULTS

The prototype achieved a regulated microclimate suitable for oyster mushroom growth. Automated systems successfully maintained optimal temperature and humidity levels, leading to consistent mushroom quality and improved yields. The compact design also addressed space constraints, making it accessible for small-scale farmers.

CONCLUSION AND IMPLICATIONS

The Smart Oyster Mushroom House offers a practical and efficient solution for mushroom cultivation, enhancing productivity and quality while reducing manual effort. Future advancements, such as IoT integration and enhanced automation, can further improve its usability and scalability, promoting sustainable agriculture practices.

Side view of project



Design of project

PORTABLE MINI WET SCRUBBER

Supervisor : Mohd Aly Rajaie Bin Halim

Email : m_aly@polibanting.edu.my

Students : Muhammad Nurhafiz Bin Mat Wali , Muhammad Umarwaiz Bin Muhammad , Firdaus Fitri Bin Zainal Abidin , Muhammad Syahril Fitri Bin Mohammad Zen

BACKGROUND

The project focuses on designing a portable mini wet scrubber to address air pollution issues caused by industrial emissions. By introducing a compact and mobile solution, the system aims to remove pollutants from gas streams through gas-liquid contact, ensuring improved air quality across various applications.

OBJECTIVE

To develop a compact, lightweight, and portable wet scrubber system that optimizes energy efficiency and water conservation. This innovation will ensure high efficiency in pollutant removal for different industrial applications. Besides, it incorporates user-friendly controls and compliance with environmental standards.

METHODS

Design: Used Autodesk Inventor and AutoCAD to create precise 2D and 3D models.
Fabrication: Implemented measurement, cutting, and welding processes to construct the system frame and components.
Testing: Evaluated pollutant removal efficiency and airflow resistance using gas analyzers and pressure drop measurements.

RESULTS

The system successfully converted polluted gas into cleaner gas. Filtration performance was visually confirmed through discoloration of the filter cotton. The scrubber efficiently handled pollutants with minimal dirt accumulation at the outlet.

CONCLUSION AND IMPLICATIONS

The portable mini wet scrubber effectively controls air pollution in industrial applications. Its compact design, efficiency, and user-friendly features make it suitable for diverse settings. Future enhancements could focus on material durability, energy optimization, and broader application potential.

Fabrication process by students

Metal cutting process by student

Prototype

Testing process for actual product

PORTABLE TRASH COMPACTOR

Supervisor : Asiah binti Yunos
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Students : Mhammad Emir Reeza, Muhamad Zafran, Muhammad Rohaizan, Muhammad Shazrul

BACKGROUND

This project is Efficient waste management is a critical aspect of maintaining clean and sustainable environments. The development of a portable trash compactor presents an innovative solution to enhance waste management efficiency. Its compact and user-friendly design, coupled with effective waste volume reduction, demonstrates its potential to revolutionize waste management systems. The design and development of a manual trash compactor aiming to improve waste management in residential and commercial settings.

OBJECTIVE

This project aims to design a portable trash compacter prototype that can reduce environmental pollution. It will also integrate an efficient compacting mechanism to reduce the volume of trash effectively. Finally, it will create a product that fully automates the working domain to reduce human efforts.

METHODS

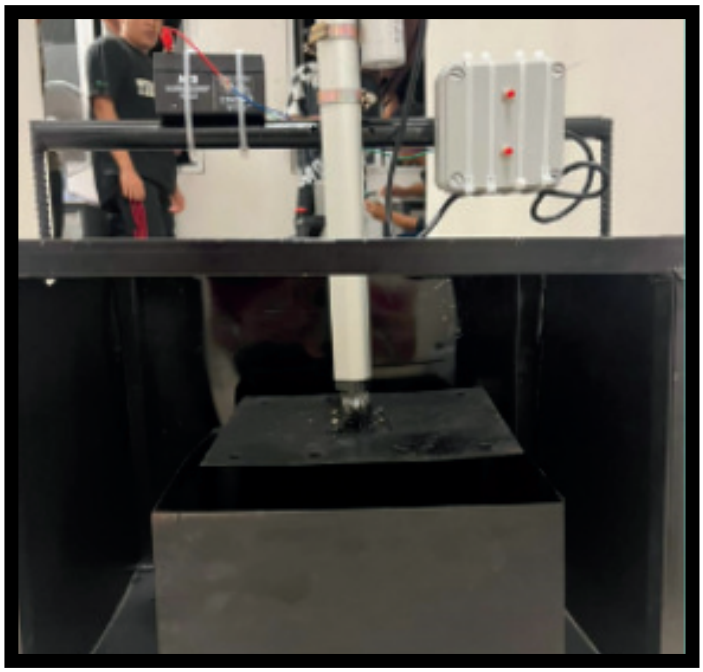
There are two steps to this project, which are Idea Generation and Design and Development. Google Forms are used to collect responses from respondents. The method used is quantitative. After that, the answers from the respondents are summarized and discussed. The project manufacturing process flow chart and project design are discussed. The cost of materials in the manufacturing of this project is reviewed. For the fabrication process, The Portable Trash compactor machine was made at the Project Workshop, Mechanical Engineering Department, Polytechnic Banting Selangor. To guarantee the smoothness of the process, each group member is given the scope of their respective tasks.

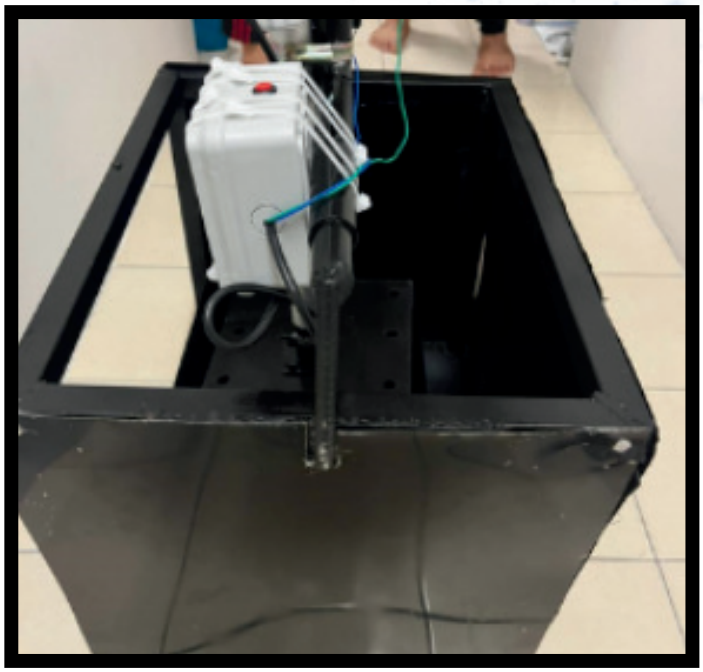
RESULTS

The project's objective is to optimize waste management practices so the environment becomes cleaner and carbon emissions are reduced. This project also helps students, especially in educational institutions. It contributes to creating a conducive and responsible living and learning environment for the student population. With this product, we will supply an automated trash compactor using a push button. The efforts to create this portable trash compactor will increase productivity for people who want this product.

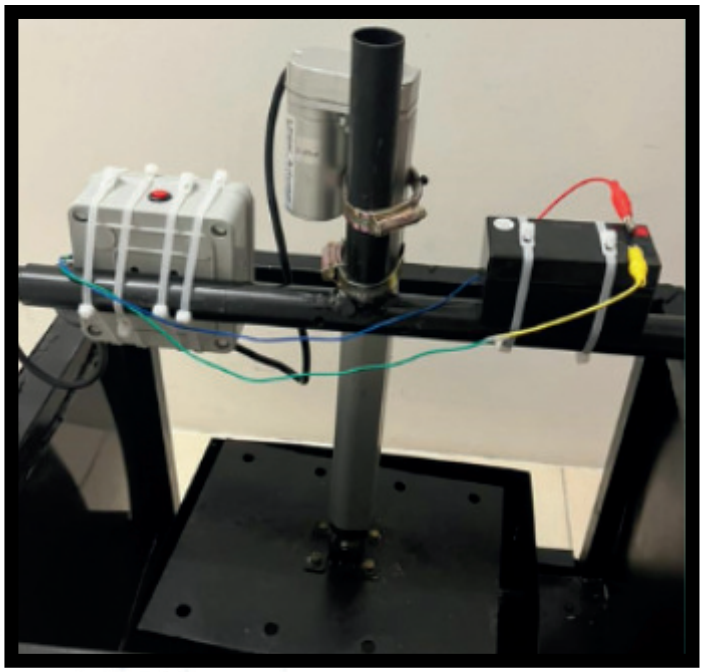
CONCLUSION AND IMPLICATIONS

Portable trash compactors offer a practical and efficient solution to managing waste in various settings. These compact devices are designed to minimize the volume of the trash, making them particularly useful in environments where space is limited or waste disposal is a frequent concern. The convenience and portability of these compactors make them well-suited for both residential and commercial use.

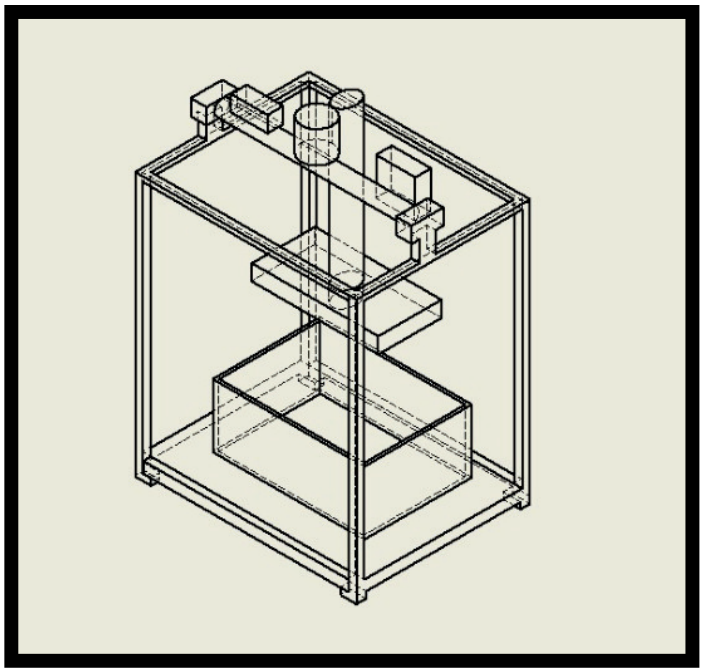




Completed projects



Control systems for projects containing motors, switches, etc.



3D drawing using CAD software

ROAD AND FLOOR DUST CLEANING BICYCLE

Supervisor : Zulkarnain Bin Jamak

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Students : Surajh Anjum Bin Sarfaraz Anjum, Arjun Rajh A/L Vengadesen & Muhammad Aiman Bin Norffendy.

BACKGROUND

The concept not only addresses hygiene concerns but also promotes a healthier environment and encourages physical activity through the integration of cycling into the routine cleaning process.

OBJECTIVE

- To ensure the safety of roadside garbage sweepers in a safe condition
- To save operating costs when doing cleaning work

METHODS

These modified bicycles equipped with a sweeping or vacuuming mechanism offer an environmentally friendly and cost-effective way to maintain cleaner public spaces. This solution not only addresses environmental concerns and hazards by reducing dust and accidents but also encourages physical activity through cycling, contributing to a healthier and cleaner community.

RESULTS

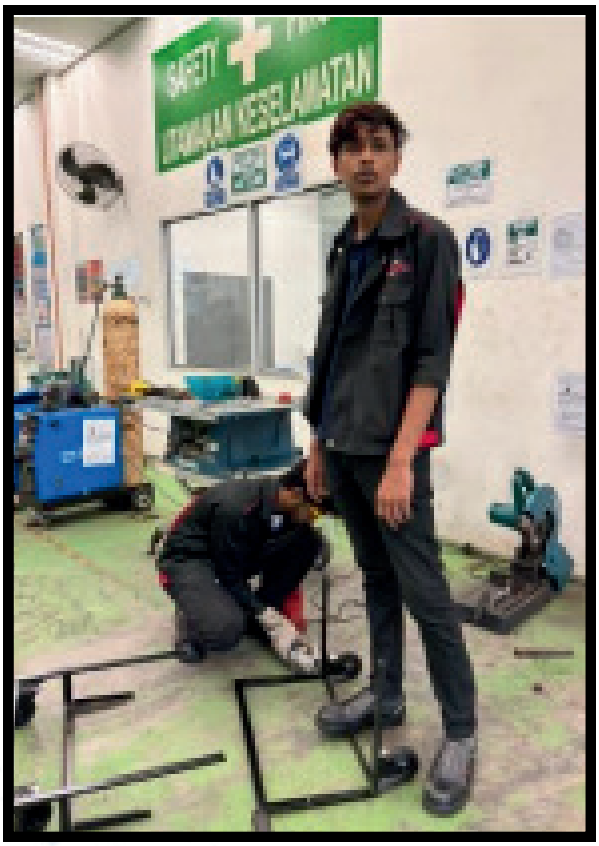
This innovative approach amalgamates mobility with functionality, introducing a sustainable and efficient method to tackle the persistent problem of dust and debris accumulation on roads and floors.

CONCLUSION AND IMPLICATIONS

The inclusion of a high-powered suction system at the front adeptly addresses the challenge of collecting fine particles and debris from various surfaces, ensuring a thorough and precise cleaning process.

Full assembly of the Road and floor dust cleaning

Road and floor dust cleaning bicycle already done



Tried to do the test

Welding on each mildsteel used as a frame

SHREDDED COMPOSE MACHINE

Supervisor : Rosedhila binti Ramli

Email : rosechisai@gmail.com

Students : Muhammad Sufi Emir bin Edy Izham, Deva Kumaran A/L Poornesveran, Amirul Aqeem bin Zakaria, Azrul Azmi bin Junaidi

BACKGROUND

Composting is an eco-friendly solution for managing organic waste, which otherwise contributes to pollution and the degradation of ecosystems through greenhouse gas emissions and land infertility. The increasing volume of waste necessitates efficient methods to process organic materials and reduce reliance on chemical fertilizers.

OBJECTIVE

This project aims to design and fabricate a Shredded Compost Machine to streamline the processing of organic waste, reduce shredding time, and produce organic fertilizer cost-effectively and sustainably.

METHODS

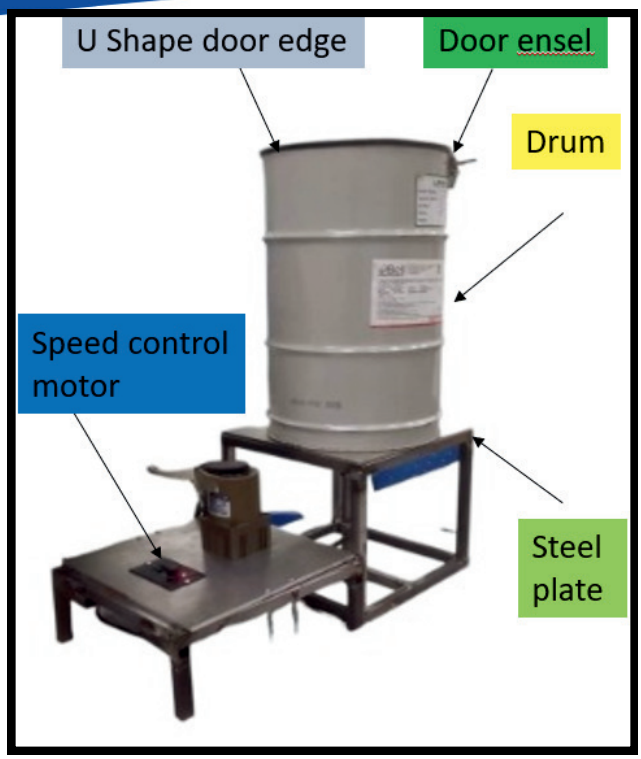
The compact machine, measuring 30cm x 30cm x 50cm, was constructed using durable materials such as mild steel and equipped with a 220V single-phase electric motor for efficient shredding. The design process incorporated cutting, assembly, and wiring to integrate features like speed control and vibration reduction. Market analysis and feedback were utilized to refine the machine's functionality and usability.

RESULTS

The Shredded Compost Machine efficiently shreds organic waste, reducing time and effort compared to manual methods. The fertilizer produced is entirely organic, free of chemicals, and cost-effective. The compact design ensures suitability for householders, florists, and farmers.

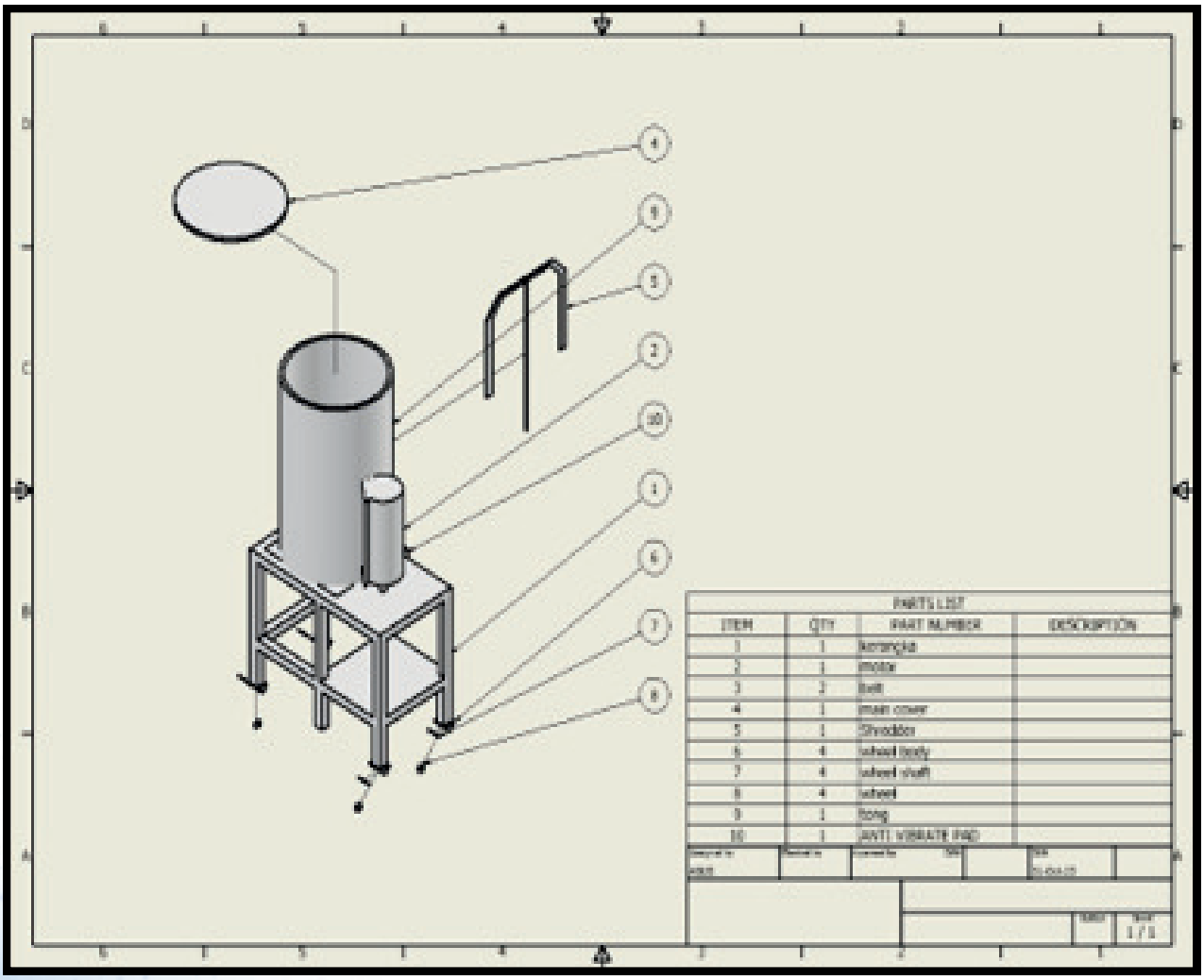
CONCLUSION AND IMPLICATIONS

The machine offers a practical solution for sustainable waste management by reducing environmental pollution and supporting organic farming. Its affordability and user-friendly design make it accessible to various community segments, promoting the widespread adoption of eco-friendly practices.



Group photo during Aeromech competition

Shredded Compose Machine



Assembly Drawing

SOLAR POWERED ENZYME SPRAY MACHINE

Supervisor : Ts. Mohd Hazwan bin Mohamed Norli

Email : sirhazwan@gmail.com

Students : Or Yang Jia Ler, Tiviya Swarna Sehar & Puteri Qasdina Bt Abdul Latif

BACKGROUND

The agricultural sector is transitioning towards modern, eco-friendly technologies that align with the Fourth Industrial Revolution and green energy goals. Manual spraying methods are labor-intensive, time-consuming, and inefficient while existing automated solutions often lack affordability and environmental focus. TTheSolar Powered Enzyme Sprayer (SPES) integrates green technology with IoT capabilities. to address these challenges

OBJECTIVE

This project aims to design, fabricate, and test a solar-powered, smartphone-controlled enzyme sprayer that reduces manpower requirements, minimizes environmental impact, and supports sustainable agricultural practices.

METHODS

The SPES prototype was developed using solar panels to power its movements and spray operations. The machine's design incorporated a tank, smart nozzles, and a smartphone application for control. Key fabrication steps included component selection, programming, assembly, and testing for operational efficiency, including movement range and weight capacity.

RESULTS

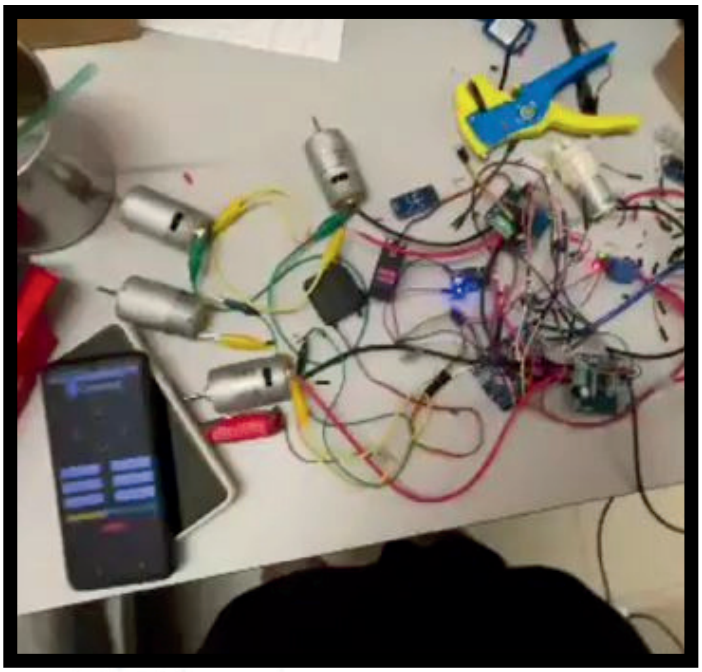
The SPES achieved an average operational range of 28.7 meters via Bluetooth connectivity and supported a maximum weight of 25 kilograms before efficiency declined. The solar-powered system successfully reduced dependency on non-renewable energy while offering precise enzyme application, ensuring sustainable resource utilization and reduced labor costs.

CONCLUSION AND IMPLICATIONS

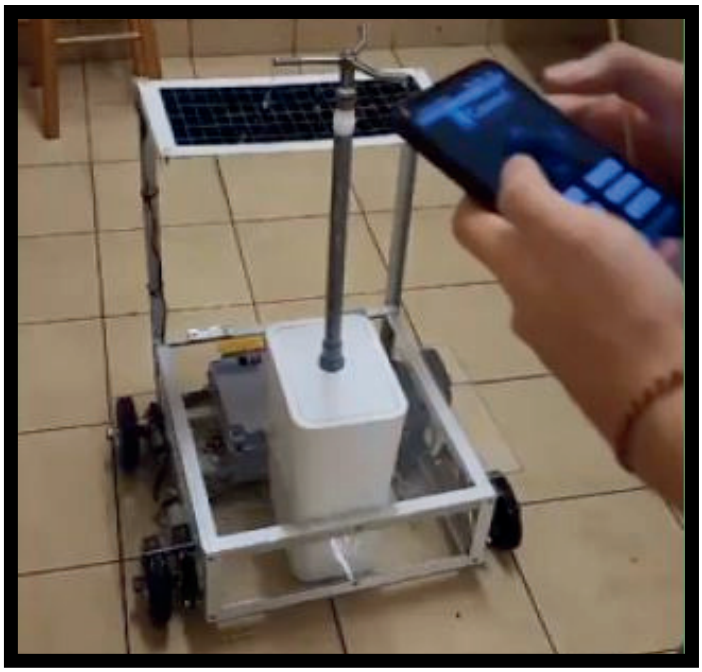
The SPES demonstrates the potential to modernize agricultural spraying with affordable, eco-friendly automation. It aligns with Sustainable Development Goals (SDGs) 7, 12, and 13 by promoting renewable energy, efficient resource usage, and reduced greenhouse emissions. Future enhancements may include AI integration and expanded functionalities for broader agricultural applications.

Team members and Supervisor

Fabrication process



Wiring modification



Final product

SHUTTLECOCK COLLECTOR

Supervisor : Asiah binti Yunos
Email : asiahyunos@polibanting.edu.my
Students : Muhammad Nurazlee, Muhammad Ashmaan, Ahmad Aiman, Khir Irsyadudddin

BACKGROUND

This project, badminton, is a famous sport that is played around the world. Like every other sport, some problems need to be faced. For example, when a player is in training, many shuttlecocks are used to keep the training going, but sometimes, training stops due to the lack of a shuttlecock. The player needs to collect it, which will take a lot of time and energy to collect it because there is no specific device to use to collect it. This device will help not only the player but also the court's manager, who was rented to the local community to play badminton. This tool will help them to save their time and their energy in collecting shuttlecocks.

OBJECTIVE

This project aims to make a specific tool or device for collecting shuttlecocks that will ease the collecting process of the shuttlecock. Using this innovation, will so reduce the time and energy consumed.

METHODS

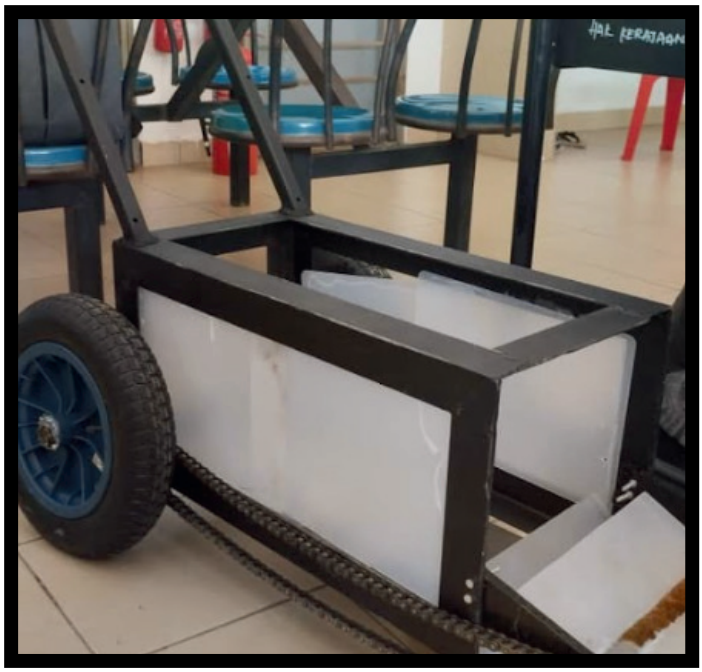
There are two steps to this project which are, Idea Generation and Design and Development. The data of the survey was gathered, analyzed, summarized, and discussed. The project manufacturing process flow chart and project design are discussed. The cost of materials in the manufacturing of this project is reviewed. The design process is conceptual design, which gives an idea a visual form. Making a variety of solutions is part of the project development process so that the design's course can be gradually narrowed down. For the fabrication process The project was made at the Project Workshop, Mechanical Engineering Department, Polytechnic Banting Selangor. To guarantee the smoothness of the process, each group member is given the scope of their respective tasks.

RESULTS

The project's objective was achieved: the Shuttlecock collector is a device that makes it easier for badminton players, coaches, and court managers to collect a large number of shuttlecocks. The project was finished despite our miscalculation of time.

CONCLUSION AND IMPLICATIONS

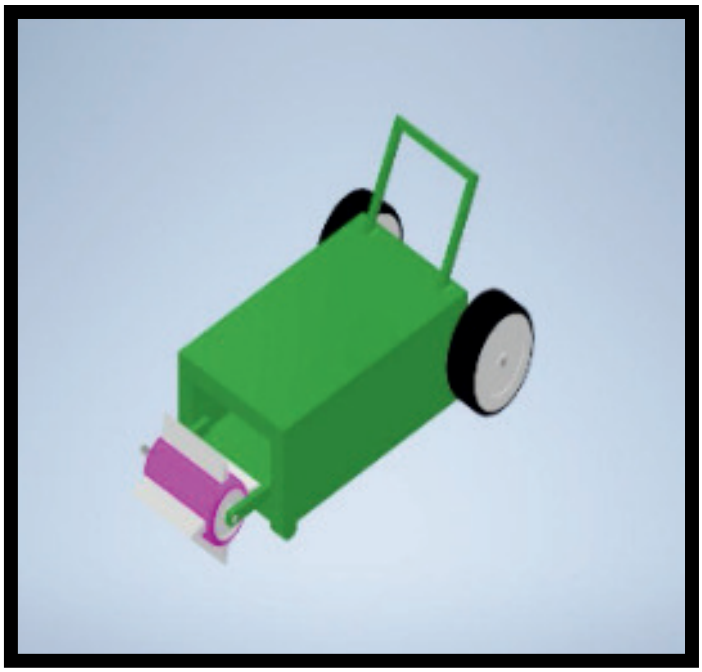
The project is to have a convenient design of the project, to fabricate, and to provide an easier way to collect shuttlecocks. The problem statement for the project also gets to counter, which is avoiding the player wasting their time and energy collecting the shuttlecock also prevents them from getting back pain when bowing down to collect the shuttlecock



Side view of prototype

Front view of prototype

Fabrication process by student



3D Drawing using CAD Inventor software

ELECTROMAGNETIC SUPPORT

Supervisor : Norasyidah binti Mohd Noh

Email : norasyidah@polibanting.edu.my

Students : Muhammad Akmal bin Buzani, Maisarah binti Jasmaidham, Siti Khadijah binti Ahmad Reza

BACKGROUND

Electromagnetic is hailed as the second source of electrical energy. It can be used for electrical appliances with up to 240 V outlets without fuel. Electromagnetic is one of the ways to supply the much-needed energy to power the appliances. It can also support a lack of electricity or electricity being cut off.

OBJECTIVE

- To become the second source of energy
- To be used in the absence of electrical power.

METHODS

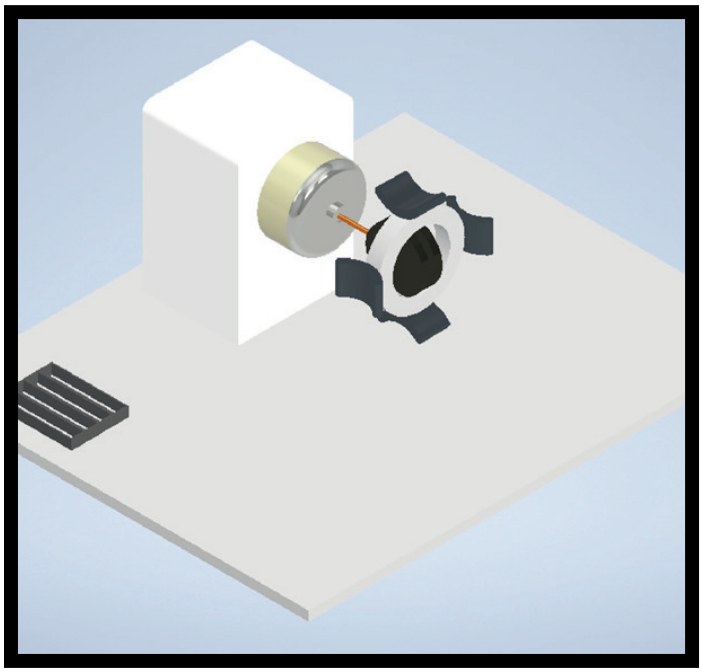
This project uses electrical components such as a motor, magnet, copper wire, alternator and dynamo. When the switch starts the motor, it causes persistent dizziness, so the magnet creates a flux and generates electricity simultaneously. Smooth turning bearings also make a flux that continuously generates electricity.

RESULTS

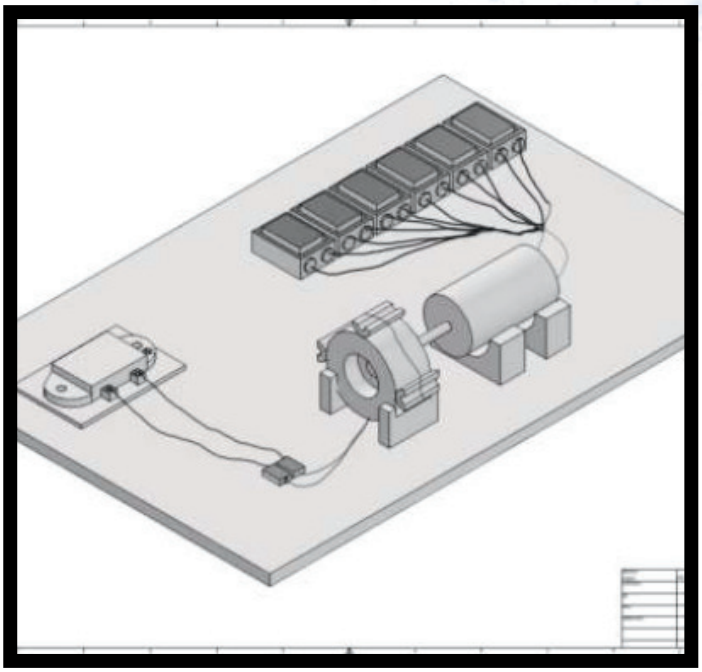
Small voltage from a battery or hand crank can produce small electricity. A copper wire needs to be rounded at the main magnet to make ample electricity. A higher and more consistent voltage occurred.

CONCLUSION AND IMPLICATIONS

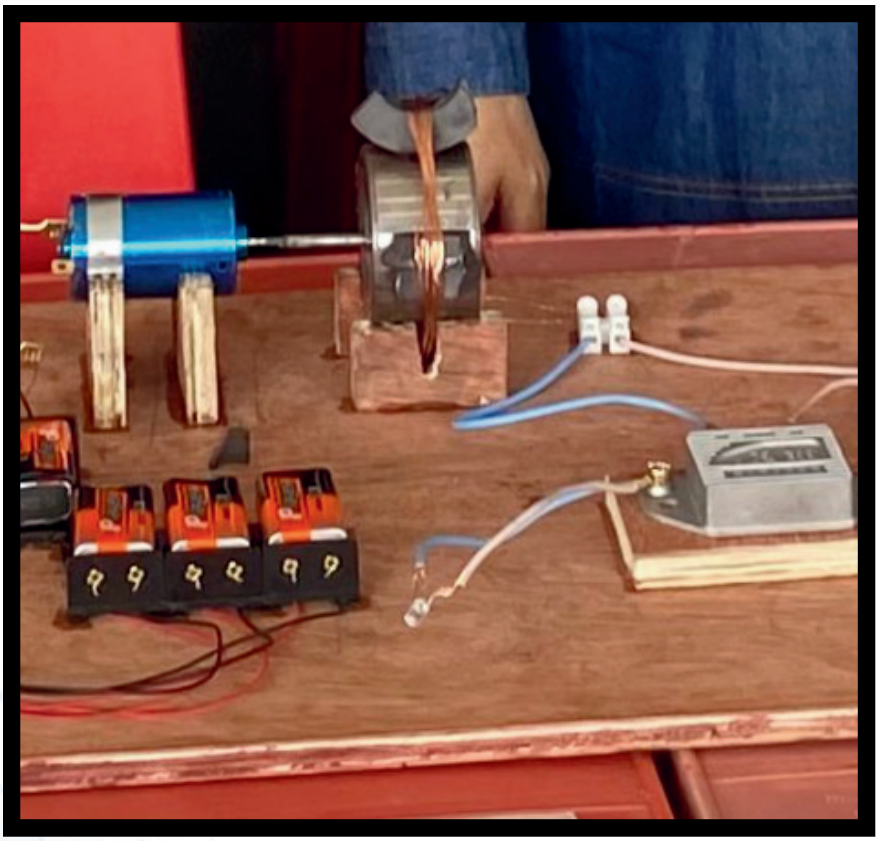
A higher voltage produces electricity without using fuel. This project will be used anywhere easily when electricity breaks out but in a small capacity. By the way, the cost is a bit expensive.



Main components (motor, bearing, copper wire and magnet)



Orthographic drawing



Electromagnetic Support

TIDAL WAVE HARVESTING ENERGY TURBINE

Supervisor : Mohd Azizee Bin Sukor

Email : mohdazizee@polibanting.edu.my

Students : Frentzen Cruz, Syahmi Fadhli Bin Shamsul Farikh, Azim Hakimi Bin Amran

BACKGROUND

The global demand for sustainable energy solutions is growing, driving research into renewable energy sources. Tidal wave energy is an up-and-coming yet underutilized resource for generating clean electricity. It offers a predictable and reliable energy supply, making it an ideal candidate for addressing environmental concerns associated with conventional energy production methods. However, designing efficient and cost-effective turbines for harnessing tidal wave energy remains a key challenge.

OBJECTIVE

This project aims to:

- Develop a novel turbine design that maximizes the efficiency of tidal wave energy conversion.
- Contribute to the body of knowledge in renewable energy technologies by advancing the understanding of tidal wave energy harvesting and turbine optimization.

METHODS

The project will begin with a comprehensive review of current research on tidal wave energy, turbine design, and materials suitable for marine environments. Based on the findings, Computer-Aided Design (CAD) and computational fluid dynamics (CFD) simulations will optimize the turbine's geometric configuration for improved energy conversion efficiency. Performance evaluation of the optimized design will follow through simulation-based analysis.

RESULTS

The project's expected outcomes include the creation of a prototype of an optimized tidal wave energy harvesting turbine. Simulations will yield insights into the performance improvements in energy conversion efficiency and provide detailed analyses of the turbine's functionality under various tidal conditions.

CONCLUSION AND IMPLICATIONS

This research will contribute to developing more efficient tidal wave energy harvesting systems, providing a sustainable energy solution for coastal regions. By advancing the turbine design and performance evaluation process, the project supports the global transition to renewable energy. The results will inform future developments in tidal wave energy technologies and offer valuable insights into their scalability and applicability in addressing global energy needs.

Full assembly of the Machine

Test the functionality

AEROMECH Session I: 2023/2024 Participation

WATERHEAD ALERT SYSTEM

Supervisor : Noor Liza Wati binti Othman

Email : geniusaqilah@gmail.com

Students : Nurjasneeta Binti Hamzah, Nurjanah Izzati Binti Indro Waseso, Muhammad Afiq Afandi Bin Azhar, Muhammad Afiq Afandi Bin Azhar, Akmal Bin Aida Asmadi

BACKGROUND

The waterfall is a natural wonder that attracts many visitors yearly, but it poses an inherent danger due to rapid water head and changes in water levels. Moreover, it creates hazards for the public and the environment.

OBJECTIVE

This project aimed to design, fabricate, and detect a Waterhead alert system to monitor incoming water heads in the waterfall environment and a warning system.

METHODS

This is a prototype machine of the Waterhead alert system that will be tested in waterfall environments using ultrasonic to monitor the Waterhead levels. Based on the levels, the signal will be sent to the siren for a warning alarm if it exceeds a particular threshold. A strong prototype is designed that can endure rough conditions and incorporate hardware and software components for detection and alerts in real-time.

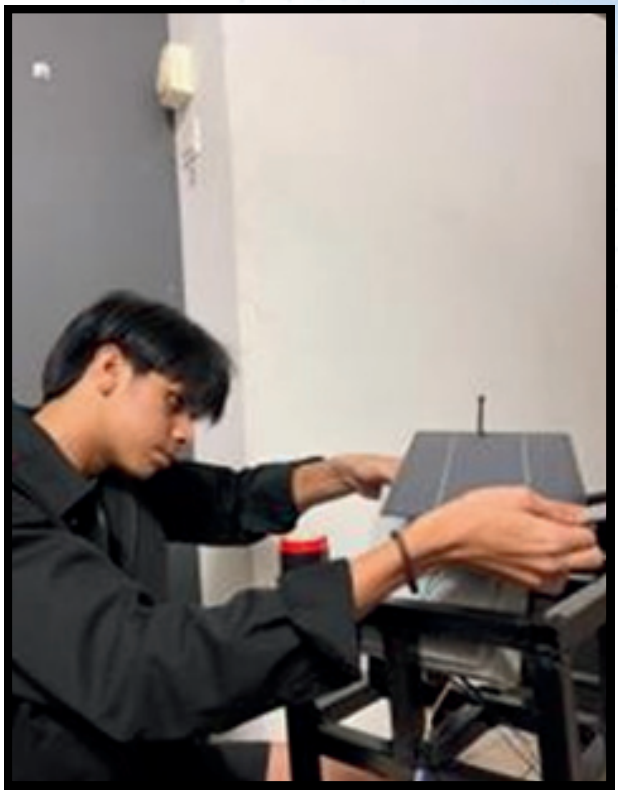
RESULTS

Testing yielded promising results from the prototype waterhead alert system. However, in lab conditions, the ultrasonic sensor had been verified with a 95% accuracy. Even though there were things such as mist and debris, the sensors showed a 92% accuracy in field conditions. When the Waterhead exceeded the threshold,ld the system consistently triggered the siren within 2s. A two-week test showed how well the prototype's robust design handled the challenging waterfall environment, which included heavy rain and water splashes. It ran smoothly, surviving on a battery charge and solar power for 48 hours.

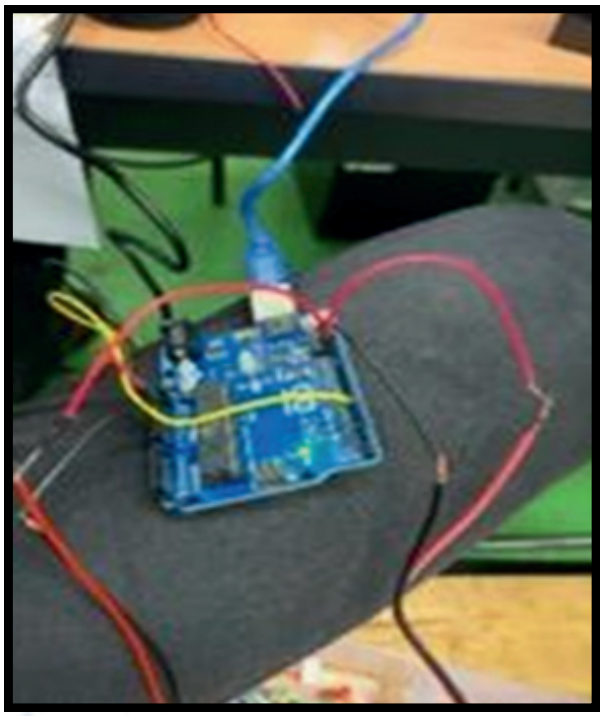
CONCLUSION AND IMPLICATIONS

This prototype waterhead system provides effective performance alerts in controlled environments. Despite mist and debris conditions, the ultrasonic sensor had a high degree of precision. Consistent earlier warning with effective alerts using the siren after crossing a threshold in less than 2 seconds of response. Built Durability for Waterfall Conditions The system worked well, operating continuously for 48 hours on batteries and solar energy, and its implications for real-world applications are significant.

Full assembly of waterhead alert system



Solar panel that attach to the system



Electronic sensor for waterhead alert system

The process of fabrication for the frame

DESCRIPTION OF INNOVATION
SESSION I 2023/2024

DIPLOMA IN MECHANICAL ENGINEERING (MANUFACTURING) (DTP)

A33
POLITEKNIK
DEPARTMENT OF MECHANICAL ENGINEERING
SESSION 1: 2023/2024
MULTIPURPOSE CUTTER
Background Study
Problem Statement
Product Operation
MULTIPURPOSE CUTTER
MPC

A15

GAS DETECTOR

Supervisor : Masfizaizan Binti Manaf

Email : masfizamanaf@gmail.com

Students : Mohamad Ainuddin Bin Rosli, Mohamad Fariz Al-Hafiz Bin Ab Rahman, Muhammad Fazli Aiman Bin Mohamad Zalina, Razin Khan Bin Mohamad Rashiddin Farid Khan

BACKGROUND

Gas Detectors have been introduced in the market as a new era life saver. Basically, Gas Detectors have the ability to detect and notify users of presence dangerous gases such as carbon monoxide and other flammable gases. It is because of several dangerous gases such as CO (silent killer) are odorless and tasteless. Matters related to accidents due to gas monoxide began to be emphasized in Malaysia when there were casesof death in 2020. therefore, we realized this idea to reduce the risk of accidents from happening.

OBJECTIVE

The objectives of this project are to design and fabricate gas detector in car and lorry

METHODS

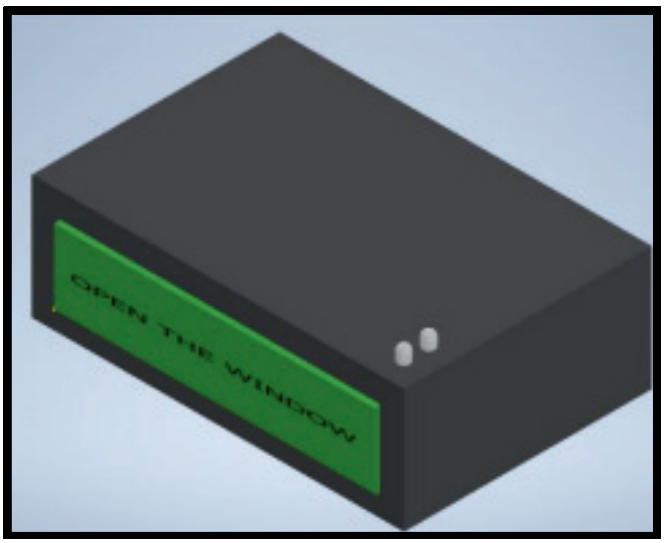
The system of gas detector will be designed using electronic components as well as utilizing MQ9 gas sensors and alarms. In addition, it will feature a user- friendly interface, allowing the driver to identify gas leaks by looking at the LCD.

RESULTS

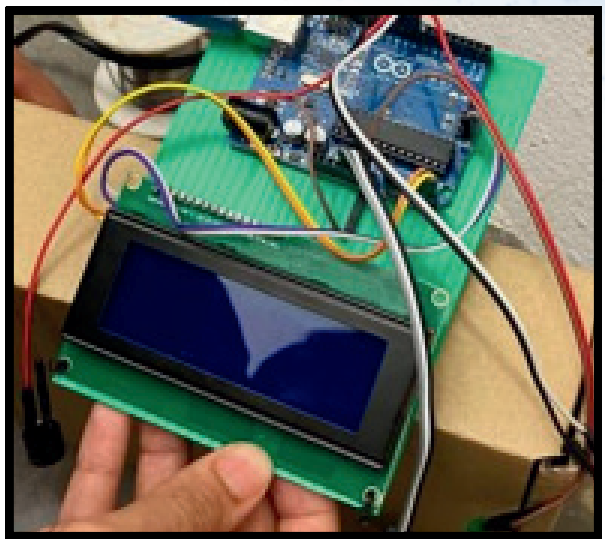
The gas detector have successfully designed and fabricated in car and lorry. It has has alarm buzzer to notify people in the cars and using USB adaptor as input power. Based on the research, the rate of time for leaking gas monoxide to harm passengers is less than one hour. Therefore, this project can detect the gas within 20 to 30 minutes. This project also can detect leaking gas from a maximum distance of 1 meter. Therefore, passengers will get information earlier before the gas can harm them.

CONCLUSION AND IMPLICATIONS

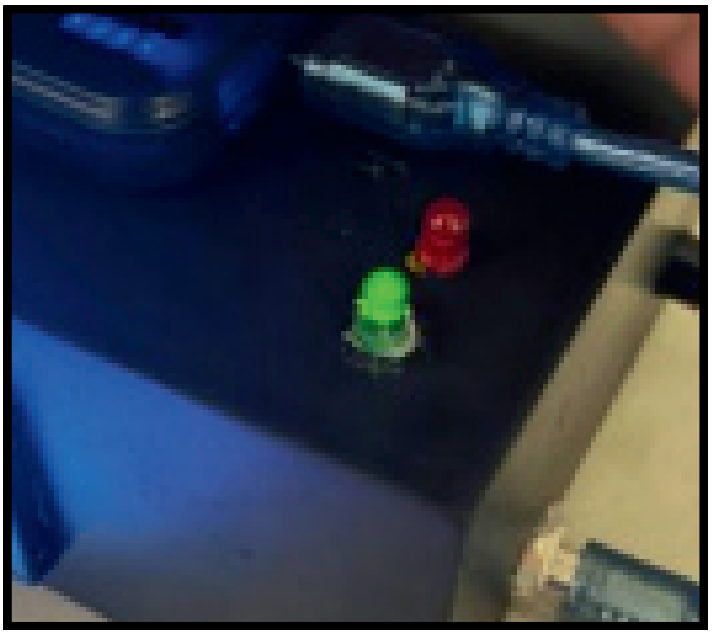
The gas detector project in this vehicle has been successfully carried out. By using technology like this, every car should implement this safety in order to prevent any incident happen to the driver and other people in car. This system could be the one that can help people inside the car to take an action to save their life from the hazardous gas that produce from the leakage of exhaust pipe.



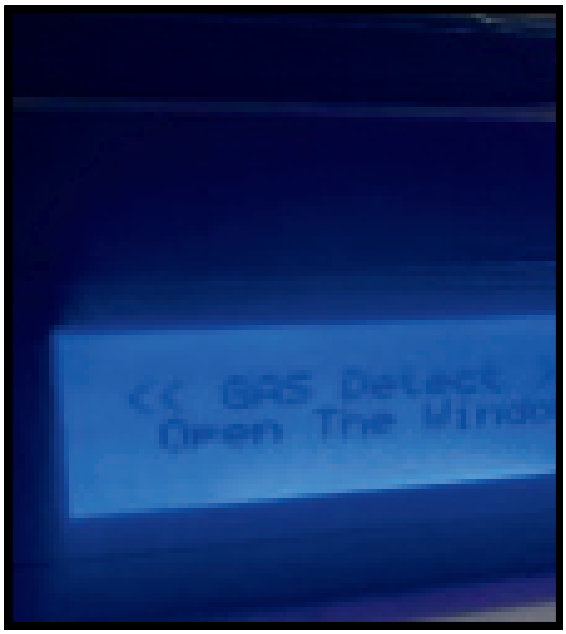
Isometric View of Gas Detector



Circuit Diagram of Gas Dtetector



Connect Cable to Power Supply



Screen Panel

LIFT UP WHEELCHAIR

Supervisor : Nor Fairuz Hayati binti Amir

Email : nor_fairuz@polibanting.edu.my

Students : Muhammad Rahin bin Md Rozi, Mohammad Daniel bin Rokman, Muhammad Alif Iqbal bin Taufek, Khairul Haziq Haiqal bin Khairul Azuan

BACKGROUND

Mobility limitations significantly impact the quality of life for individuals with disabilities. Traditional wheelchairs, while widely used, often lack functionalities such as stair-climbing and assistance with standing, which are crucial for promoting independence and accessibility. The demand for innovative, modernized wheelchair designs that address these limitations has grown over the years.

OBJECTIVE

This project aims to design and develop a multifunctional wheelchair that can climb stairs using a tri-wheel mechanism and assist users in transitioning to a standing position through a lever-controlled lifting system. The goal is to enhance safety, simplicity, energy efficiency, and affordability compared to existing solutions.

METHODS

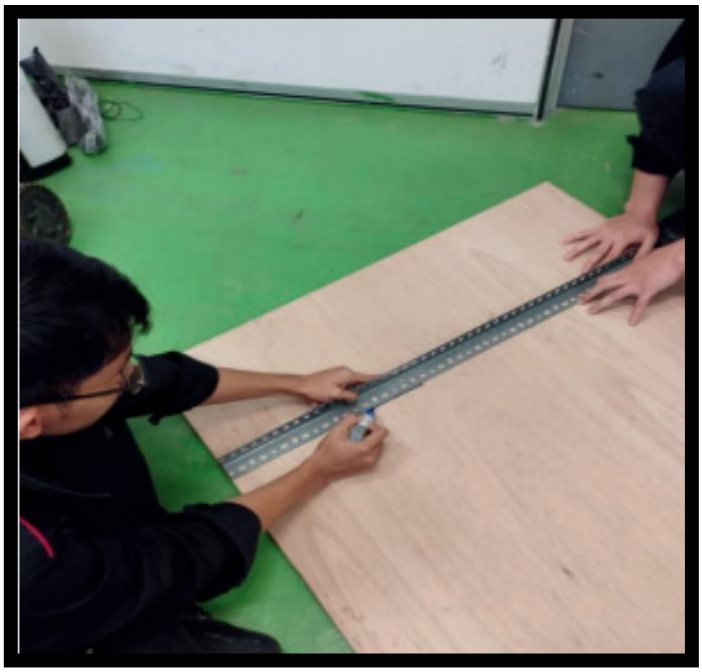
The design process began with extensive research on the challenges faced by wheelchair users, focusing on stair navigation and body positioning. A tri-wheel mechanism was selected for stair climbing due to its efficiency and stability, while a lever control system was integrated to facilitate body lifting. Prototypes were tested for structural integrity, user safety, and functionality under various conditions.

RESULTS

Initial testing demonstrated that the tri-wheel system provided stable and reliable stair-climbing capabilities, while the lever control mechanism successfully transitioned the user to a standing position without excessive power consumption. The prototype showed promise in terms of safety, comfort, and ease of use.

CONCLUSION AND IMPLICATIONS

The proposed wheelchair design addresses critical mobility challenges for individuals with disabilities, offering enhanced functionality and user independence. By combining stair-climbing ability and standing assistance into a single system, this project has the potential to improve daily living for users and contribute to the development of more advanced assistive technologies. Further refinement and user feedback will guide future iterations.



Measuring and marking process

Cutting process

Welding process

Full assembly of Lift Up Wheelchair

DISH DRYER STERILIZER

Supervisor : Mohd Azam bin Mohd Daud

Email : azam@polibanting.edu.my

Students : Muhammad Fitri Aiman bin Mohd Yusof, Muhammad Aizat Akmal Bin Mohd Hasli, Nur' Aleiya Afieqah binti Zairizan Shamsul, Nur Hana Khalilah binti Rosman

BACKGROUND

After the covid 19 epidemic spread, Malaysians are very concerned about cleanliness and personal health. This made us think of creating a project/product to ensure the health and hygiene of Malaysians is guaranteed, Nowadays, many products use sterilizers. so we here will improve the use of sterilizers so that we can disinfect all items. Not only disinfecting the plate, but also other items such as towels, fruits, milk bottles and more. To lead Malaysia towards a healthier community, we will make a project based on the use of sterilizers. To ensure that our sterilizer can disinfect as much as up to 85%, we have made a study based on products i that use sterilizers, based on the study we have made, many products use UV rays. and has been proven to kill germs.

OBJECTIVE

To design and fabricate dish dryer with sterilizer and reduce time and energy to dry many plate

METHODS

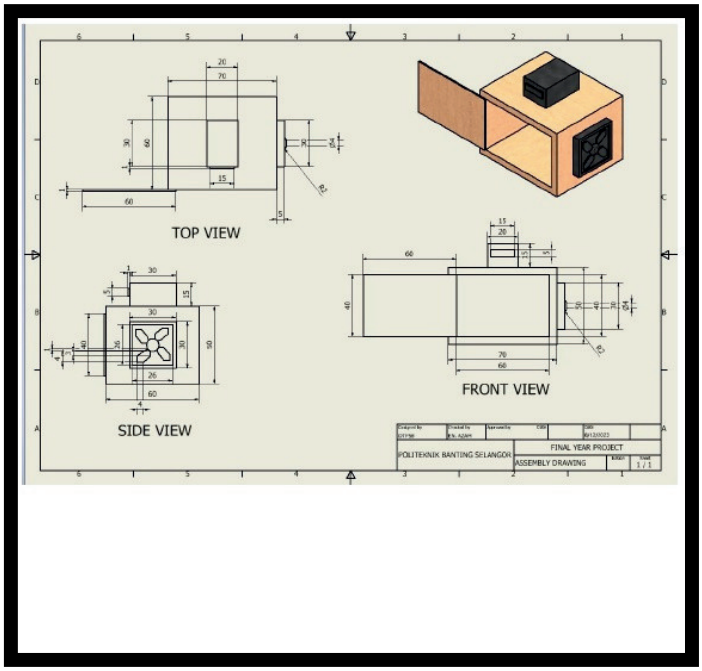
Identify the project design and produce the drawing according the dimension needed. Fabrication process from the every part making process to the assembly process and wiring process following the Gantt Chart and lastly some analysis conducted to completed project

RESULTS

Tests were performed to compare the operating time and drying rate between dish dryer and method manually drying. Result show dish dryer sterilizer saving up to 50% time operating and 100% germ and bacteria was eliminated.

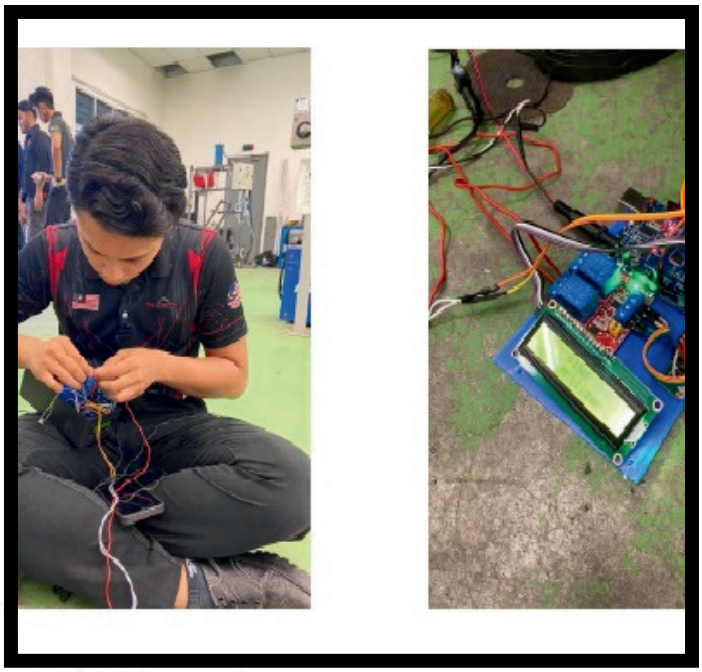
CONCLUSION AND IMPLICATIONS

Dish Dryer Sterilizer is a new innovation for the purpose of improving and speeding up the process of drying clean plates among users such as housewives or restaurant traders. So we fixed it by putting this sterilizer uvc sterilizer into our project which is can disinfect while the dryer process doing. Also , on this project they have safety precaution which is when the process was running while the door suddenly open the process will stop.



Dish Dryer Sterilizer Drawing

Part manufacturing process



Electrical (wiring process)

Assembly process

MAGNETIC WIND TURBINE

Supervisor : Mohd Azam bin Mohd Daud

Email : azam@polibanting.edu.my

Students : Adib Fidzral bin Mohd Nazran, Daniel Irfan bin Mohd Hazly, Muhammad Syafiq bin Mohd Nizam

BACKGROUND

Conventional energy sources such as oil, natural gas, coal, biomass, and electricity are diminishing rapidly. As a result, there is an urgent necessity for a more environmentally friendly option derived from renewable energy sources like water, sunlight, and wind. The Magnetic Wind Turbine generator is designed to harness wind energy for electricity generation, ensuring a constant power supply

OBJECTIVE

To design and fabricate wind turbine using magnetic force as a power supply and analyze the function of magnetic that used in the wing turbine as magnetic repulsion

METHODS

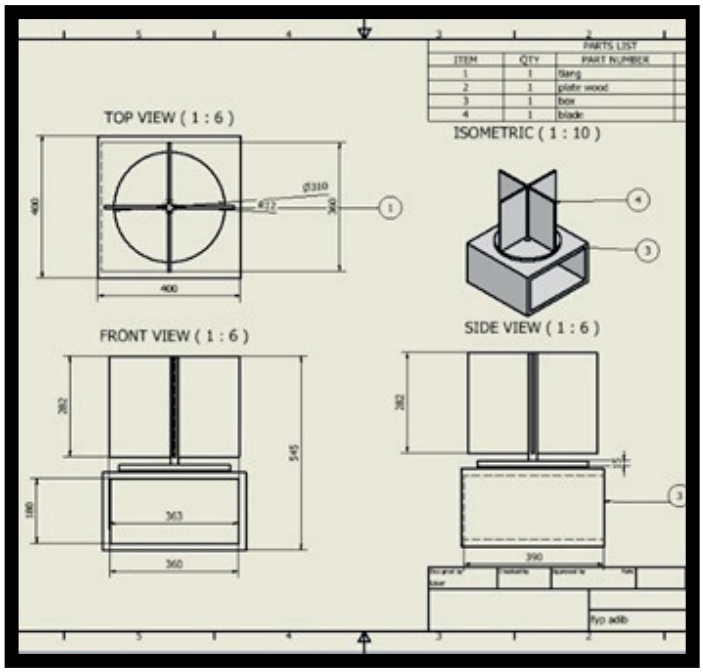
The Magnetic Wind Turbine will be powered by wind and magnetic force. The source of electricity will originate from the rotating blades connected to a DC motor. The wind turbine generator system requires a power conditioning circuit called a power converter capable of adjusting the generator frequency and voltage to the grid . Subsequently, the DC motor will produce electrical power transmitted to the power bank via wires. Once the power bank is charged, it will be linked to an output socket. Finally, users can connect and activate the power adapter to utilize our product

RESULTS

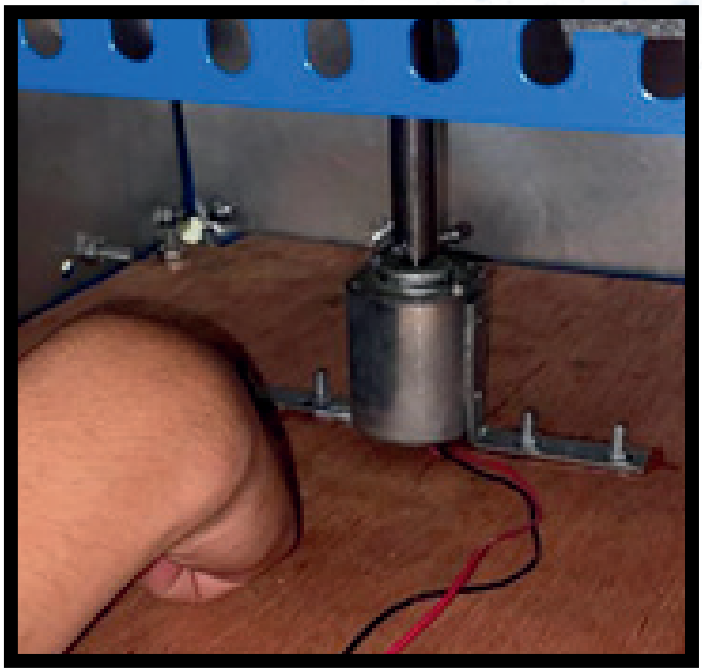
The effectiveness of magnetic wind turbines in magnetic repulsion and reducing pollution such as noise and air pollution. The Magnetic Wind Turbine represents a leap forward in wind power technology, with potential applications in rural and urban areas with low-speed wind regions

CONCLUSION AND IMPLICATIONS

The magnetic wind turbine stands as a pioneering advancement in generator technology aimed at improving existing systems, Magnetic wind turbines excel in their complete absence of pollution, encompassing air and noise pollution. Finally, Findings indicate a clear correlation between magnet quantity and blade rotation speed, with higher magnet counts resulting in swifter blade spins

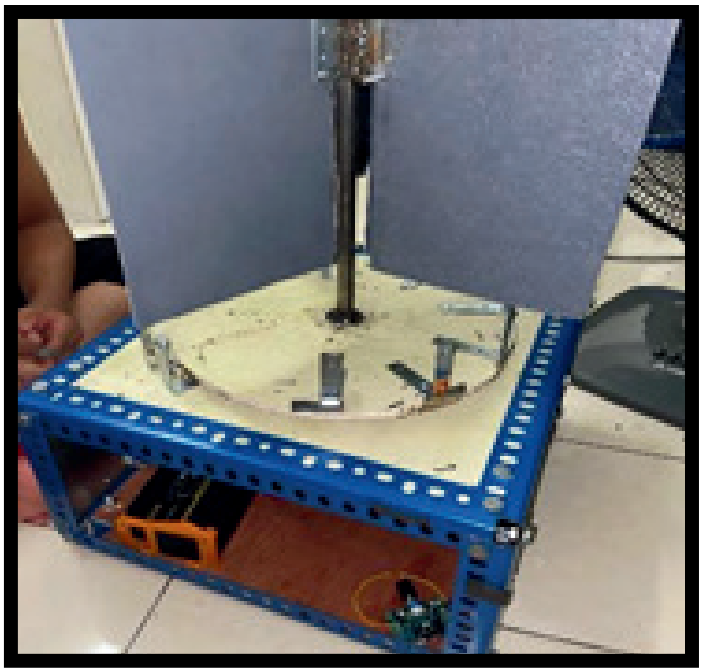


Magnetic wind turbine drawing



Wiring process

Fabrication process



Assembly process

MONO AXIS SOLAR TRACKER

Supervisor : Ts. Intan Liyana binti Ramli

Email : intanliyanaramli@gmail.com

Students : Nurul Hazirah Binti Mohd Zamri, Zaianatul Marisya Binti Abdul Aziz,Muhammad Akif Bin Muhammad Azam,Ahmad Idham Bin Jamal Abdul Naser

BACKGROUND

This approach is very different to fixed solar panels, as it allows for dynamic adjustments based on the position of the sun, ensuring the panels are consistently aligned for optimal light absorption.

OBJECTIVE

Main objective when we created in this project are to design a mono axis solar tracker sensor for urban farming use. Secondly, to fabricate an automated mono axis solar tracker sensor to increase power generation. Lastly, to increase the energy yield of solar panels by maintaining the optimal angle facing the sun, minimizing the effect of shading and increasing exposure to direct sunlight.

METHODS

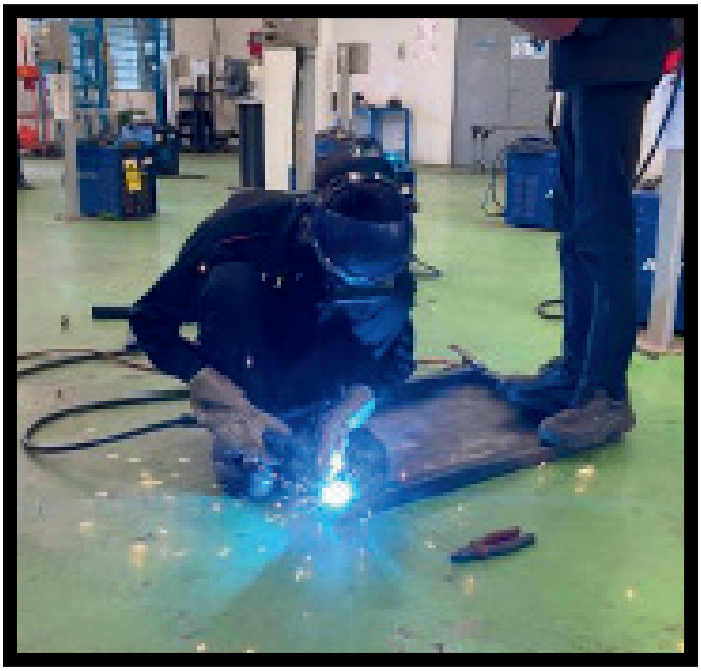
The use of motors and Arduino, adjusting the tilt and azimuth of the solar panels, allows them to maintain the ideal angle. This dynamic adjustment ensures that sunlight hits the panels perpendicularly, optimizing energy capture and significantly increasing overall efficiency.

RESULTS

The benefits of using a mono-axis solar tracker go beyond mere efficiency gains. The economic viability of solar energy systems improves, as increased energy production translates into a faster return on investment. Furthermore, the environmental impact is reduced, as increased efficiency means fewer resources are needed for the same energy production

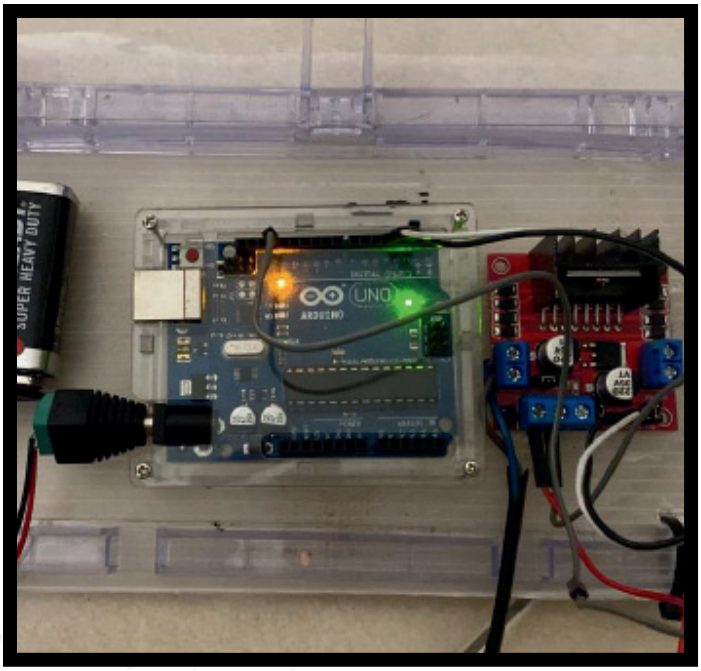
CONCLUSION AND IMPLICATIONS

In conclusion, this report describes the advantages of various aspects of single-axis solar trackers, explains their technical intricacies and wider implications for sustainable energy production. As the world increasingly embraces solar power, understanding and implementing such technologies becomes essential to harness the full potential of renewable energy sources.



Fabrication phase

Fabrication phase



Arduino part

Final Product

WATER LEVEL DETECTOR

Supervisor : Ts. Intan Liyana binti Ramli

Email : intanliyanaramli@gmail.com

Students : Muhammad Nazrin Faiz Bin Shabudin,Rosalinda Natasha Binti Mohammed Salim Reja, Muhammad Haziq Muqriz Bin Ab Azis, Nurul Irdina Binti Mohd Akram

BACKGROUND

This project is based on observations of the current manual method used to transfer rainwater from the harvesting tank to the fertilizer tank for mixing in the Urban Farming area at Polytechnic Banting Selangor. By implementing an automatic system, the handling time can be significantly reduced, ensuring a more efficient and consistent process while minimizing human intervention.

OBJECTIVE

The objective of this project is to design an automatic pipe system, develop a pipeline connecting the rainwater harvesting tank to the fertilizer tank, and fabricate a water level detector capable of measuring both maximum and minimum water levels. This system aims to benefit farmers, urban farming practitioners, and hydroponic plant growers.

METHODS

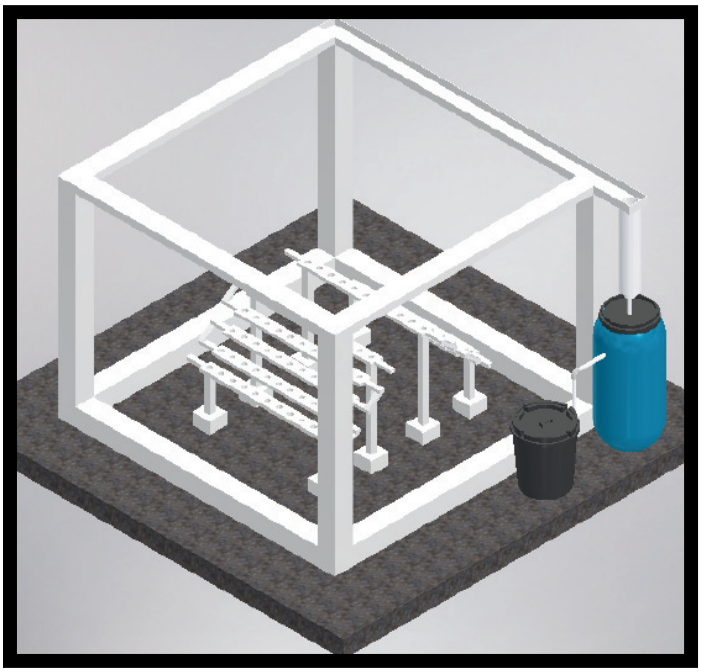
This project using a 10 litter water tank as a container to save the water for the hidroponic. The system has a sensor which can sense the water level adn the motor pump will automatically stop when the water reaches at the maximum level. The estimation time to fill the tank completely is 30 seconds

RESULTS

The water level detector successfully measured both the maximum and minimum water levels with high accuracy, ensuring effective monitoring. The automatic pipe system and the developed pipeline efficiently facilitated the transfer of water from the rainwater harvesting tank to the fertilizer tank, optimizing resource usage.

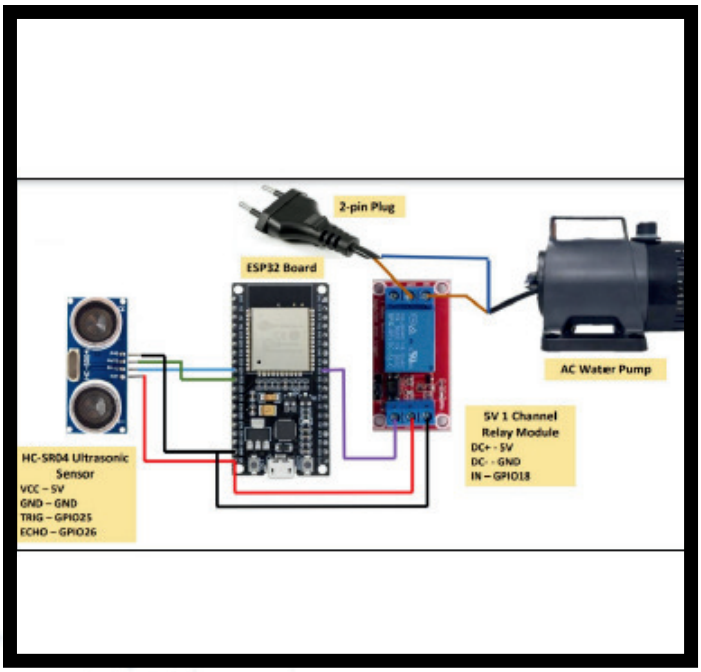
CONCLUSION AND IMPLICATIONS

This project can provide great benefits to farmers or gardeners because this project can reduce their burden from the use of manpower, excessive water used and save time. In addition to being able to help the growth of plants, the quality of plants can also be improved in terms of cleanliness and freshness.



Project illustration

Fabrication process



Circuit

Aeromech

MULTIPURPOSE CUTTER

Supervisor : Masfizaizan Binti Manaf

Email : masfizamanaf@gmail.com

Students : Muhammad Azrie Farhan Bin Nor Azman, Muhammad Hazan Shawti, Muhammad Amin Bin Rosli

BACKGROUND

According to a Malaysian public health study, the average height of men is 164.7cm while women are 153.3cm. Therefore, the user can reach tree to kinit the fruit with height below 7 meters. So that multipurpose cutter designed to overcome the limitations of cutting fruit with stems and cutting high branches or twigs.

OBJECTIVE

This project aimed to design and fabricate multipurpose cutter stalk fruit hook

METHODS

The multipurpose cutter was designed that can hook off stalks fruit maximum for 7 meters tree and have a adjustable rod that can be adjusted depends on the height of the tree.

RESULTS

The designed can reduce the rate of people falling from climbing trees and the difficulty of removing fruit stalks from tall trees. The designed can make it easier for users or farmers to tie fruit with stalks and cut branches. In addition, the easily adjustable stem can make it easier for users to store it.

CONCLUSION AND IMPLICATIONS

A multi-purpose cutter is a versatile cutting tool designed to handle a variety of cutting tasks. These cutters are customizable and equipped with features such as an adjustable stem, cutting stemmed fruit, and can cut branches and twigs. When choosing a multi-purpose cutter, consider the material to be cut, safety features, requirements, accuracy and portability Overall, multi-purpose cutters simplify cutting tasks, increase efficiency and promote accuracy in a variety of settings.

Finish product of multipurpose fruit hook cutter

SMART KEY BOX

Supervisor : Rama Rao Lachanna
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Students : Muhammad Kholiq Bin Abd.Latif, Umi Humairah Binti Omar, Nurul Adila Binti Mohammad Ikram

BACKGROUND

The Smart Key Box introduces an innovative solution to address the disorganization and security risks associated with traditional key storage systems in Malaysia. Focusing on enhancing efficiency and security in key management, the system incorporates advanced technologies such as biometric fingerprint sensors and RFID. The results demonstrate significant improvements in reducing key loss risks, enhancing security, and streamlining key management

OBJECTIVE

- Enhanced Security: Integration of fingerprint and RFID technology ensures that only authorized individuals can access the keys.
- Real-Time Monitoring: Tracks key usage with alerts and logs, improving accountability.
- User-Friendly Design: Provides organized storage and intuitive controls for ease of use.
- Versatile Application: Suitable for residential and commercial environments across various scale

METHODS

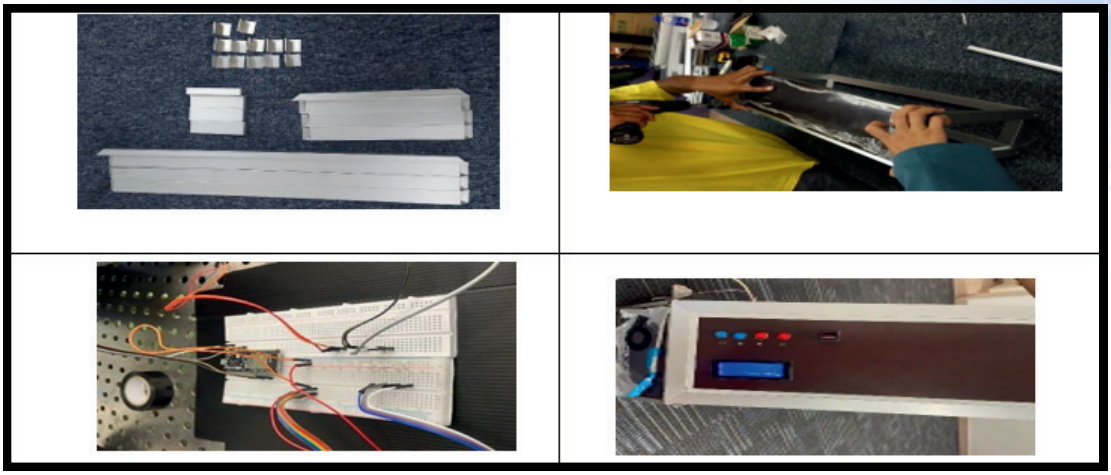
The Smart Key Box is built with a durable aluminum and ACP frame, integrated with electronic components such as sensors and a touch screen display. The meticulous design and programming process ensure optimal functionality and reliability.

RESULTS

The system addresses the growing demand for advanced security solutions. It minimizes costs associated with key loss and lock replacements and is ideal for industries like property management, hospitality, and retail. The Smart Key Box is economically sustainable, offering long-term cost savings and operational benefits.

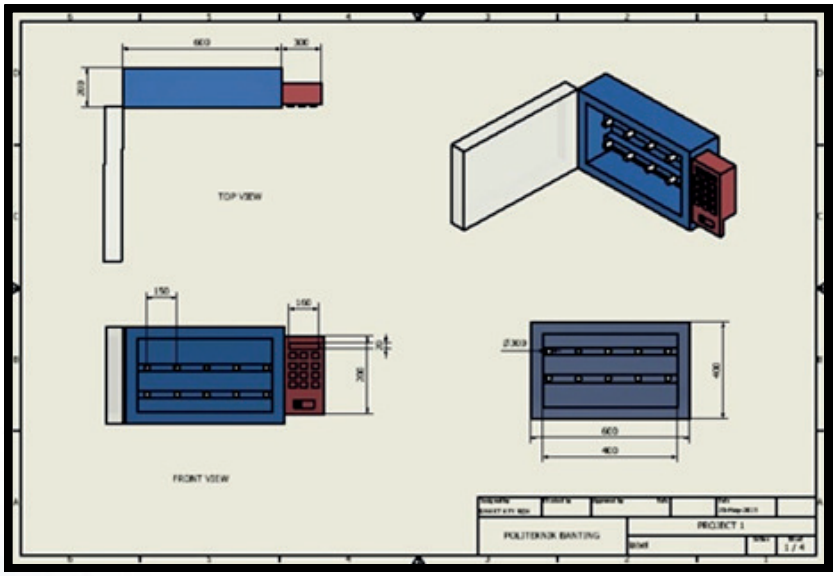
CONCLUSION AND IMPLICATIONS

The Smart Key Box not only provides a modern solution to traditional key storage challenges but also represents a significant advancement in key management and security. The recognition it has garnered highlights its potential as a commercially valuable product for residential and commercial users alike.



Fabrication Process of Smart Key Box

Smart Key Box



Design of Smart Key Box

SMART MOUSE TRAP

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Email : nurulhuda_khalid@polibanting.edu.my

Students : Syed Muhammad Danish Aiman bin Abdul Razak, Muhammad Mirza Zharfan bin Azmar Hisham, Mohd Hadif bin Mohd Rozlan, Farid Hazim bin Amaran

BACKGROUND

Rodent infestations, particularly by Norway rats (Rattus norvegicus), pose significant health and economic risks, including the spread of diseases such as Hantavirus and Lassa fever, and damage to infrastructure and food supplies. Traditional mousetraps often lack efficiency, real-time monitoring, and user-friendly features.

OBJECTIVE

This project aims to design and fabricate a Smart Mouse Trap equipped with sensor-based notifications and automated locking mechanisms to improve efficiency, user convenience, and safety in rodent control.

METHODS

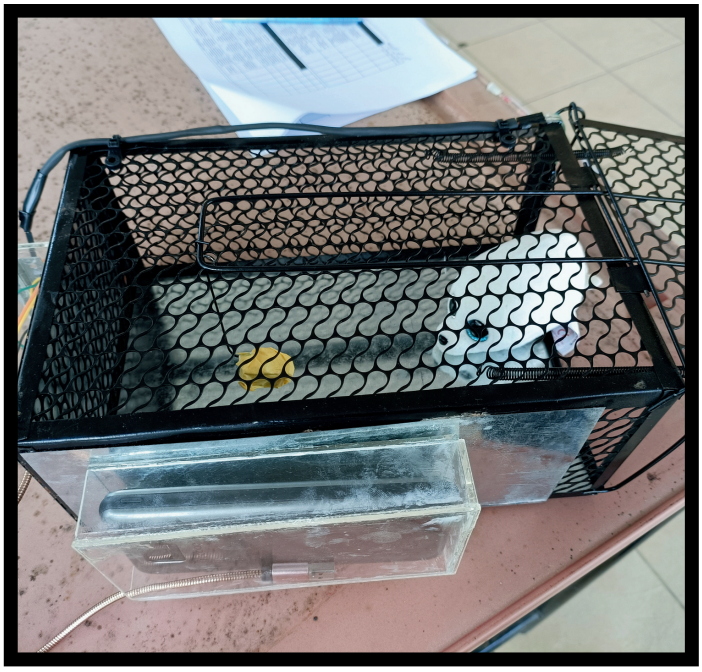
The trap integrates key components such as an FSR sensor, NodeMCU ESP8266, and an automated door-locking system. A notification system was implemented to alert users upon trap activation. The prototype was tested for efficiency, response time, and battery life using a structured experimental setup.

RESULTS

The Smart Mouse Trap successfully demonstrated quick response times, with door activation occurring within 0.024 seconds and notification alerts sent in 0.49 seconds. The average time for a mouse to interact with the bait was approximately 3 minutes, and the system maintained a stable battery life of 6 days under continuous operation.

CONCLUSION AND IMPLICATIONS

The Smart Mouse Trap proved to be an efficient, user-friendly, and sustainable solution for rodent control. Its integration with sensor technology and remote monitoring enhances user convenience while minimizing direct human intervention. Future enhancements could include multi-catch capabilities and advanced analytics for better monitoring and management of rodent activity.



Smart Mouse Trap

Group Members

Aeromech Competition

Jury Evaluation

SMART PARCEL COLLECTOR

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Students : Harindrra a/l Mohan, Mohammad Azairul Darwis bin Azhar, Nur Muhammad bin Saifulyazan, Thanaruban a/l Kanapathy

BACKGROUND

The rise of online shopping has revolutionized consumer behavior, yet it brings challenges such as parcel theft, damage, and delivery delays when recipients are not at home. Traditional delivery systems often fail to address these issues effectively, necessitating an innovative solution to ensure parcel security and integrity.

OBJECTIVE

This project aims to design and fabricate a Smart Parcel Collector that enhances parcel security, protects packages from environmental damage, and provides user notifications upon parcel delivery.

METHODS

The SPC incorporates an IR sensor, Arduino UNO, and DC motor, enabling automated parcel collection and secure storage. The system operates via a notification system that alerts users upon successful parcel delivery. Testing focused on system response time, movement efficiency, and battery performance.

RESULTS

The Smart Parcel Collector successfully achieved an average system response time of 0.2–0.3 seconds and demonstrated stable movement capabilities with an average speed of 0.5 m/s. Battery life extended up to 2–3 days under continuous operation, and the system performed reliably in delivering parcel security and user notifications.

CONCLUSION AND IMPLICATIONS

The Smart Parcel Collector effectively addresses the challenges of parcel theft, damage, and delivery inefficiencies. It offers a practical solution for residential and office use, ensuring convenience and security. Future enhancements may include extended battery life, advanced sensors, and integration with smart home ecosystems for broader applications.

Smart Parcel Collector

Front View

Door to Put Parcel

Group Members

SMART PARKING BARRIER

Supervisor : Muhammad Zuraidi Bin Rohani

Email : Zuraidi@polibanting.edu.my

Students : Muhamad Luqman Hakim Bin Anuar , Mohammad Mirza Asyraaf Bin Hilmy, Muhammad Adib Farhan Bin Ruslan, Muhammad Ahnaf Bin Abd Halim

BACKGROUND

The rapid increase in urbanization and vehicle usage has created challenges in managing parking spaces efficiently. Traditional parking systems often lead to congestion, unauthorized usage, and inefficiencies. Smart parking barriers offer a modern solution by automating access control and ensuring efficient parking management through technology integration.

OBJECTIVE

The primary objective of this project is to design and develop a Smart Parking Barrier system that automates vehicle entry and exit, prevents unauthorized parking, and enhances the security and management of parking spaces.

METHODS

The project involves designing a barrier system integrated with sensors, RFID readers, and microcontrollers. The system uses an RFID card for authorized access, with the barrier automatically lifting upon successful verification. Additional features include manual override controls and safety mechanisms to prevent damage to vehicles or the barrier.

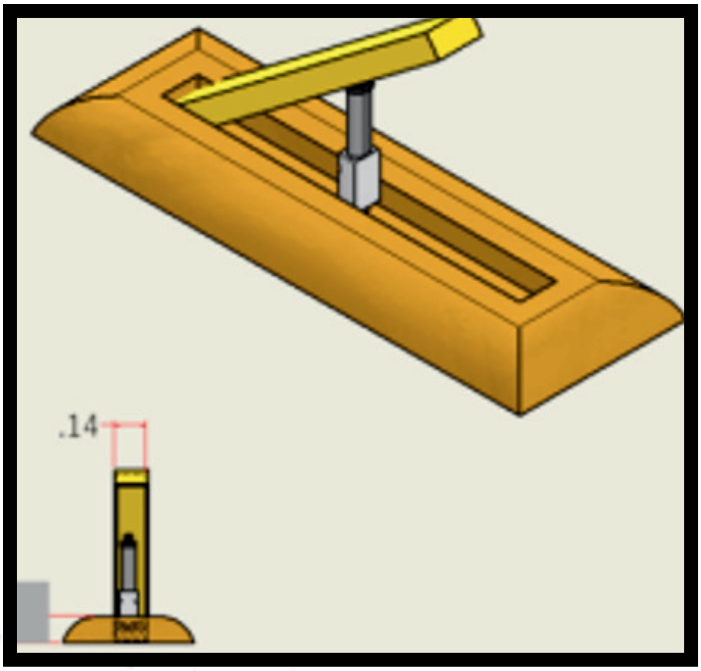
RESULTS

The prototype of the Smart Parking Barrier system demonstrated improved efficiency in managing parking access. The automated system reduced the need for human intervention, ensuring only authorized vehicles could enter. Testing showed consistent performance in various conditions, confirming the reliability and practicality of the design.

CONCLUSION AND IMPLICATIONS

The Smart Parking Barrier system offers a secure and efficient solution to parking management issues in various settings, such as commercial buildings, residential complexes, and public parking areas. The automation significantly reduces human error and unauthorized access. Implementing smart parking solutions can improve traffic flow, optimize parking space usage, and reduce operational costs. Future improvements could include integrating real-time monitoring, mobile app control, and additional security features to further enhance system functionality.


SAFETY
MAKE COMPLETE
FALL PREVENTION
AEROMECH
RM120
NO PARKING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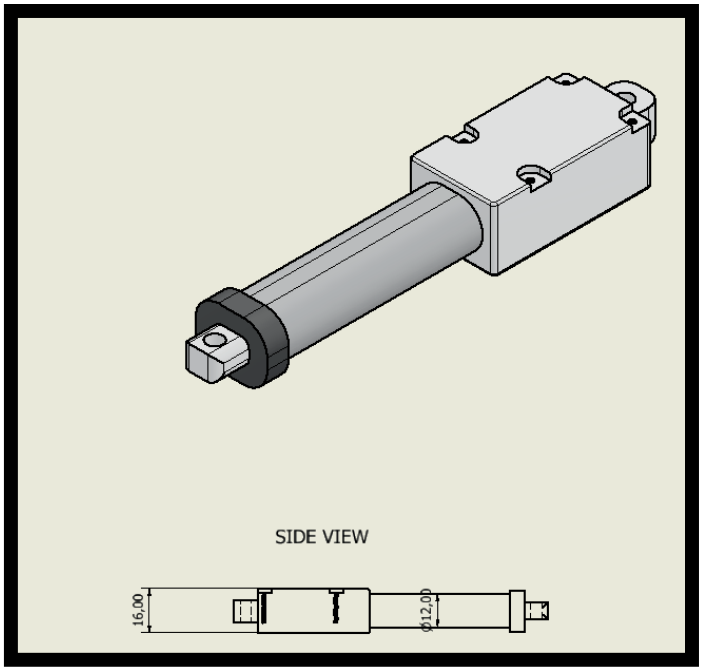

SIDE VIEW
16,00
Ø12,00

WELDING MACHINE LIFTING TROLLEY

Supervisor : Muhammad Zuraidi Bin Rohani

Email : Zuraidi@polibanting.edu.my

Students : Mohamad Alif Imran Bin Mohd Ruzi, Wan Muhammad Aidil Sharif Bin Wan Mohd Has Panizam, Muhammad Danish Bin Zainal Abidin, Wan Ahmad Daniel Bin Wan Hussin

BACKGROUND

Manual lifting of heavy welding equipment, such as MIG machines, during roofing and awning installation is a common challenge in construction and metalworking industries. The absence of efficient lifting mechanisms often leads to increased physical strain, time consumption, and safety risks for workers.

OBJECTIVE

The primary goal of this project is to design and fabricate a Welding Machine Lifting Trolley to facilitate the safe and efficient transport and elevation of MIG welding machines up to a height of 2.5 meters with a load capacity of 30 kg.

METHODS

The project involved designing a scissor-lift mechanism combined with a mobile trolley structure. The materials used include mild steel for the frame and platform, gas springs for height adjustment, and wheels for mobility. The lifting mechanism is powered by a drill-operated system. The fabrication process included cutting, drilling, welding, painting, and assembling the components.

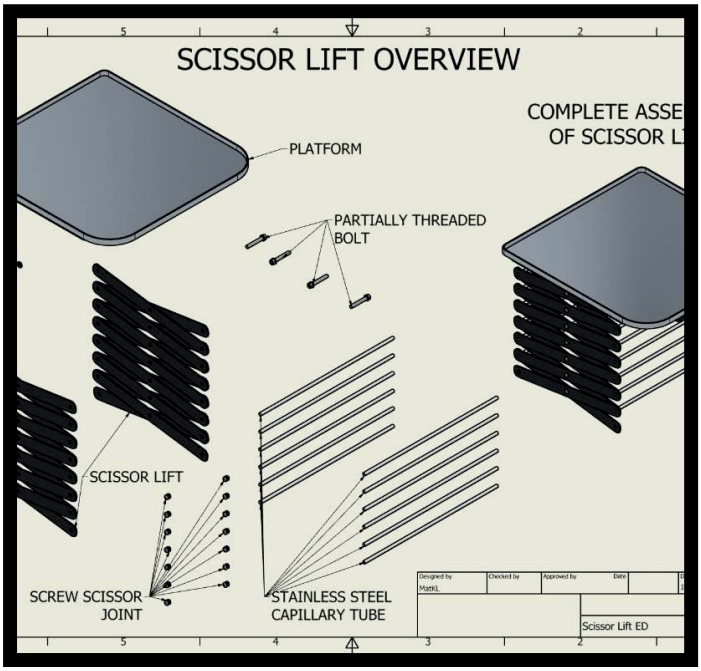
RESULTS

The final prototype demonstrated effective lifting capabilities, achieving a height of 2.5 meters and supporting a load of 30 kg. The trolley improved the ease of positioning MIG machines during awning installations and reduced the physical burden on workers. Data analysis confirmed the mechanical advantage and shear force limits within safe operating parameters.

CONCLUSION AND IMPLICATIONS

The Welding Machine Lifting Trolley provides a practical solution for material handling in welding tasks at elevated heights. It enhances worker safety, reduces time spent on manual adjustments, and increases overall productivity. The adoption of this lifting trolley can improve work efficiency in various industrial sectors, especially in construction and fabrication. Further enhancements, such as adding programmable controls and advanced safety features, can make the trolley more versatile and suitable for broader applications.


70


SCISSOR LIFT OVERVIEW
PLATFORM
PARTIALLY THREADED BOLT
SCISSOR LIFT
SCREW SCISSOR JOINT
STAINLESS STEEL CAPILLARY TUBE
Scissor Lift ED

DESCRIPTION OF INNOVATION

SESSION II 2023/2024

DIPLOMA ENGINEERING IN AIRCRAFT MAINTENANCE (DAM)

AUTOMATIC BUFFET TRAY
B5
AUTOMATI
BUFFET TR

AEROLAND KIT

Supervisor : Shalhayuni binti Saripuden

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Students : Muhammad Aleef Irffan bin Roslan, Muhammad Nabil bin Tajul Ariffly, Muhammad Syafiq Iman bin Sufian

BACKGROUND

Aircraft landing gear systems are critical for safe and efficient aviation operations. However, the absence of practical, accessible training tools in aviation maintenance education creates a significant gap in understanding their mechanics. The AeroLand Kit was developed to address this gap by providing a compact, portable, and hands-on learning tool. It enables aviation maintenance students to bridge theoretical knowledge with practical skills, enhancing safety and operational efficiency in aircraft maintenance.

OBJECTIVE

- To create a compact and portable landing gear training kit for aviation maintenance education.
- To emulate real-world aircraft landing gear operations, including extension and retraction mechanisms.
- To provide an affordable and accessible teaching aid for institutions.

METHODS

The AeroLand Kit was developed as a portable, 1:10 scale landing gear training tool using durable materials like mild steel and acrylic panels. It features hydraulic actuators for realistic movement, simple button controls, and an Arduino microcontroller for automation. The development involved building the structure, assembling components, and programming the system, with thorough testing to ensure safety and functionality for aviation training.

RESULTS

The AeroLand Kit successfully demonstrated its ability to simulate landing gear operations. Students found it intuitive to use, gaining valuable insights into gear mechanisms. Testing validated its safety, portability, and cost-effectiveness. The kit bridged the gap between theoretical concepts and real-world applications, offering a practical solution for aviation maintenance training.

CONCLUSION AND IMPLICATIONS

The AeroLand Kit enhances aviation maintenance education by providing a comprehensive, hands-on training experience. Its portability and affordability make it accessible to a wider range of institutions, empowering students with practical skills in landing gear operations. Future improvements could include advanced diagnostic features and integration with augmented reality for an even more immersive learning experience.

Full view of finished product

VOICE' EM MANUAL

Supervisor : Shalhayuni Binti Saripudin

Email : shalhayuni@polibanting.edu.my

Students : Muhammad Afif Danial Bin Ramlee, Mirza Muhammad Al-Amin Bin Mustapa Kamal, Alfattah Bin Fauzi, Muhammad Azrin Nizam Bin Arba'in

BACKGROUND

Aircraft Maintenance Manuals (AMMs) are essential for aviation safety but are often cumbersome, prone to damage, and challenging to update. Traditional navigation through these manuals can delay maintenance processes, especially under high-pressure scenarios. There is a need for a portable, hands-free solution to improve accessibility and usability for aviation professionals and students.

OBJECTIVE

The Voice'Em Manual aims to revolutionize how AMMs are accessed by integrating voice recognition technology. The primary goals are to enable hands-free navigation, improve workflow efficiency, reduce human error, and ensure real-time access to updated documentation for technicians, engineers, and students.

METHODS

The app uses Flutter and Dart for its cross-platform capabilities, integrating advanced speech-to-text plugins for voice navigation. Firebase supports real-time database functionality, while a user-friendly interface ensures seamless interaction. Features include offline access, account verification for security, and text search options. Iterative testing and user feedback refined the app's performance and usability.

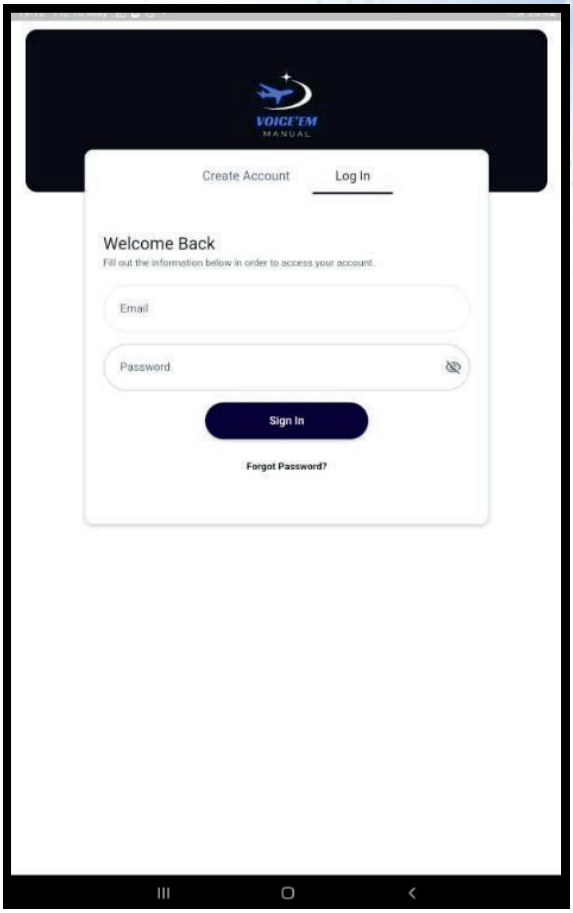
RESULTS

Testing demonstrated that Voice'Em Manual significantly improved efficiency, with voice navigation reducing search times by up to 60%. Users praised its accessibility and intuitive design, especially the offline functionality. Challenges like speech recognition accuracy and UI navigation were resolved during development, ensuring reliability across varied operating conditions.

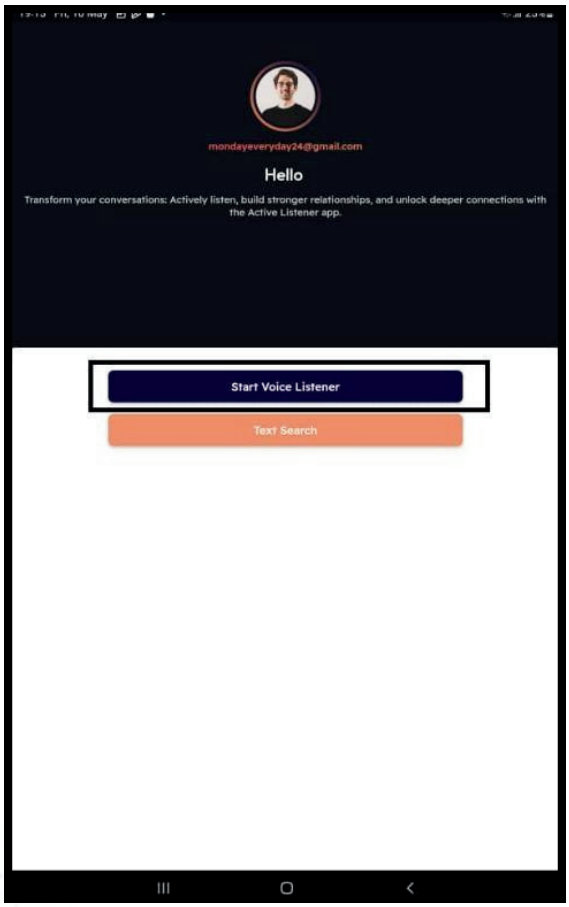
CONCLUSION AND IMPLICATIONS

Voice'Em Manual bridges the gap between traditional AMMs and modern digital solutions, enhancing efficiency and safety in aviation maintenance. Its portability and hands-free functionality make it ideal for real-world applications. Future developments may include expanded compatibility, multilingual support, and integration with augmented reality for even greater functionality.

Main menu of Voice'Em Manual



Start voice listener button



User App Log-in

AR COCKPIT

Supervisor : Amaluddin Salihin bin Muhamad

Email : amaluddin@polibanting.edu.my

Students : Nur Batrisyia Binti Shaiful Azhar, Vandy Bran Gerron, Muhammad Ikhwan Zafri bin Ah Sabri

BACKGROUND

Mobile technologies have transformed education, enabling digital learning tools to supplement traditional methods. In aviation, students often struggle with the complexities of cockpit systems, as theoretical knowledge alone cannot replace hands-on practice. Missing or unclear cockpit components further complicate learning, limiting understanding and operational readiness.

OBJECTIVE

ARCOCKPIT aims to enhance aviation education by integrating Augmented Reality (AR) to create an immersive and interactive learning experience. The app provides students with realistic cockpit simulations, detailed component explanations, and practical engagement with virtual controls to bridge the gap between theory and practice.

METHODS

The app uses Unity for AR development and 3D modeling of a Boeing 737 cockpit, supported by Canva for interface design. AR overlays cockpit components onto real-world environments, allowing students to explore and interact with instruments through their mobile devices. Features include note-taking, interactive guides, and virtual cockpit navigation. Iterative testing with user feedback refined usability and functionality.

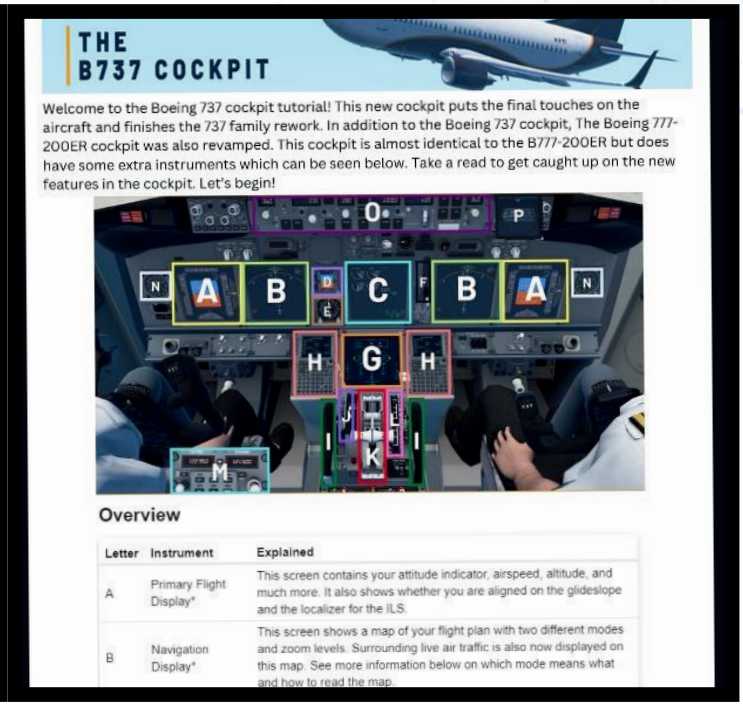
RESULTS

ARCOCKPIT effectively delivered immersive and realistic simulations, with over 80% of users reporting improved understanding of cockpit systems. The app addressed challenges such as rendering inaccuracies and bugs through updates. Features like interactive guides and notes enhanced engagement and clarity, providing an effective alternative to traditional learning methods.

CONCLUSION AND IMPLICATIONS

ARCOCKPIT bridges the gap between theoretical and practical aviation education, offering an accessible, immersive learning tool. Its portability democratizes aviation training, enabling flexible learning for students. Future upgrades may include VR integration, multiplayer features, and expanded aircraft models, further transforming aviation education and preparing students for industry demands.

General Product Interface Layout



Notes

Aircraft Cockpit Layout

About Us

GAS TURBINE ENGINE APPLICATION

Supervisor : Amaluddin Salihin bin Muhamad

Email : amaluddin@polibanting.edu.my

Students : Ruvanesh A/L Murugan @ Suresh, Uma Mageswaran A/L Mohanadas, Mateshwaran A/L Ragu, Aqmal Dinie

BACKGROUND

Gas turbine engines are critical to the aviation industry but are complex systems requiring a strong theoretical and practical understanding. Traditional educational methods, like books and lectures, often fail to provide the hands-on experience necessary for effective learning. The demand for innovative tools that bridge the gap between theory and practice in gas turbine education is increasing.

OBJECTIVE

The Gas Turbine Engine (GTE) application was developed to enhance learning through interactive, multimedia-based resources. The app aims to provide students and professionals with detailed knowledge of gas turbine engines using 3D models, notes, infographics, and quizzes. The focus is to make learning immersive, engaging, and accessible across platforms.

METHODS

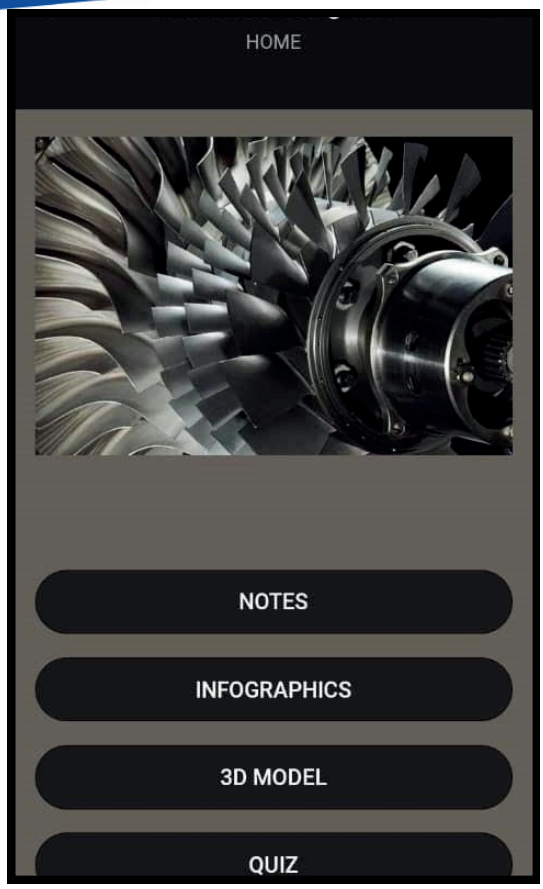
The app was developed using tools like JotForm for interface design, Canva for infographics, and Sketchfab for 3D modeling. A robust content management system (CMS) organizes educational materials for seamless access. Features include interactive quizzes with instant feedback, infographics for visual learners, and 3D models offering dynamic exploration of engine parts. Testing and user feedback ensured usability and effectiveness.

RESULTS

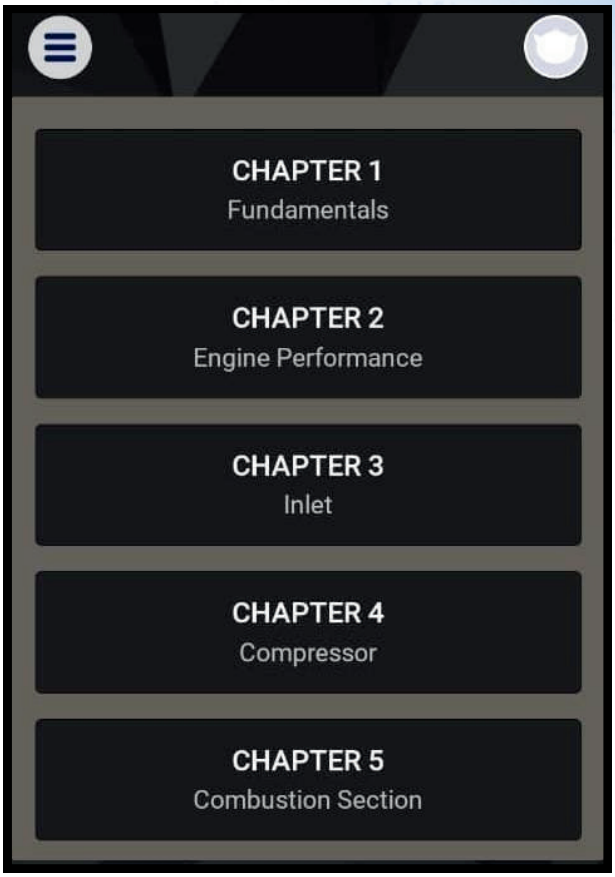
User testing indicated that over 85% of students found the app enhanced their understanding of gas turbine principles. The 3D models and quizzes were particularly well-received, with users appreciating their accessibility and ease of use. Challenges, such as content rendering and navigation issues, were resolved through iterative updates.

CONCLUSION AND IMPLICATIONS

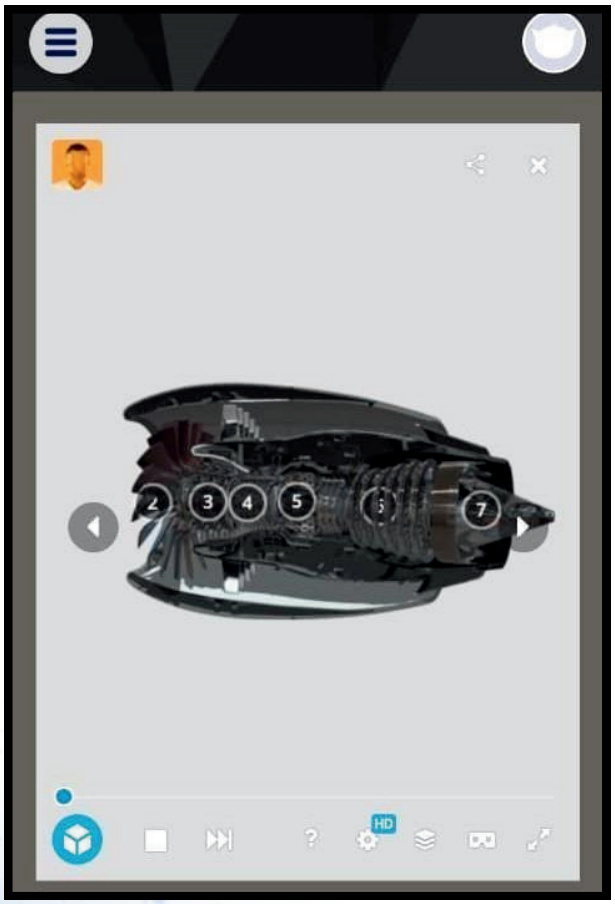
The GTE app bridges the gap between theoretical and practical learning, offering an engaging and portable solution for gas turbine education. It empowers students and professionals to enhance their knowledge effectively. Future enhancements may include VR integration and advanced simulation features to broaden its educational scope.



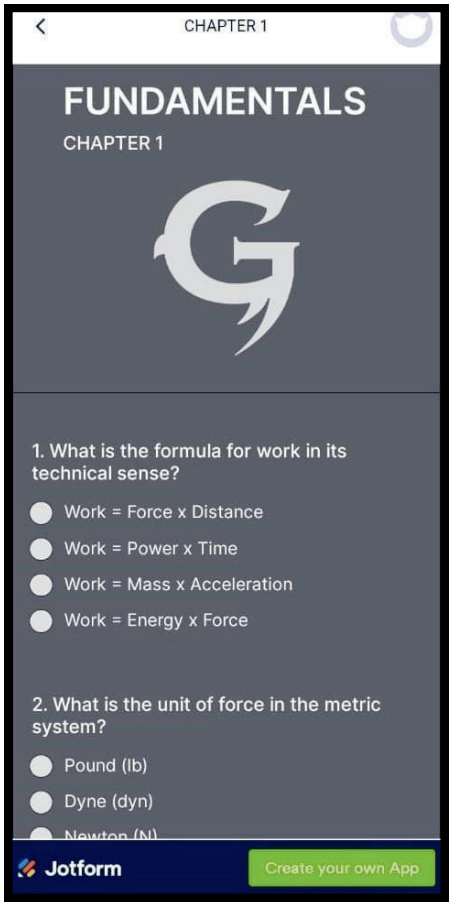
Interface Layout



Chapter's Page



3D Model of a Turbine Page



Quizzes' Page

DESCRIPTION OF INNOVATION

SESSION II 2023/2024

DIPLOMA IN MECHANICAL ENGINEERING (DKM)

AUTOMATED DRAINAGE CLEANER

DEVELOPMENT OF AUTOMATIC SAND SIEVING MACHINE

Supervisor : Asiah binti Yunos

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Students : Meor Alif Aiman, Muhammad Haziq Akmal, Harish Raj, Siti Jashnisha

BACKGROUND

The goal of this study is to develop a fresh concept for a brand-new automatic sand filter and separation equipment. Due to several issues that commonly arise, the development of an automatic sand sieving machine is being made for a modest project in the workshop. Moreover, to achieve our objective in technical advancements based on contemporary ideas. Explosive concepts are based on statements of issues that have been noted in studies on the workload used and fine sand quality. We develop and improve a product that can filter high-quality sand without contaminating it with foreign material, which lessens the labor-intensiveness of sand filtration. This development of an automatic sand-sieving machine has many functions in one innovation.

OBJECTIVE

This project aims to build a sand filter machine to produce a sand filter machine that is smaller and more compact in terms of performance to reduce the weight of the compartment and increase the productivity of the sand filter on the machine.

METHODS

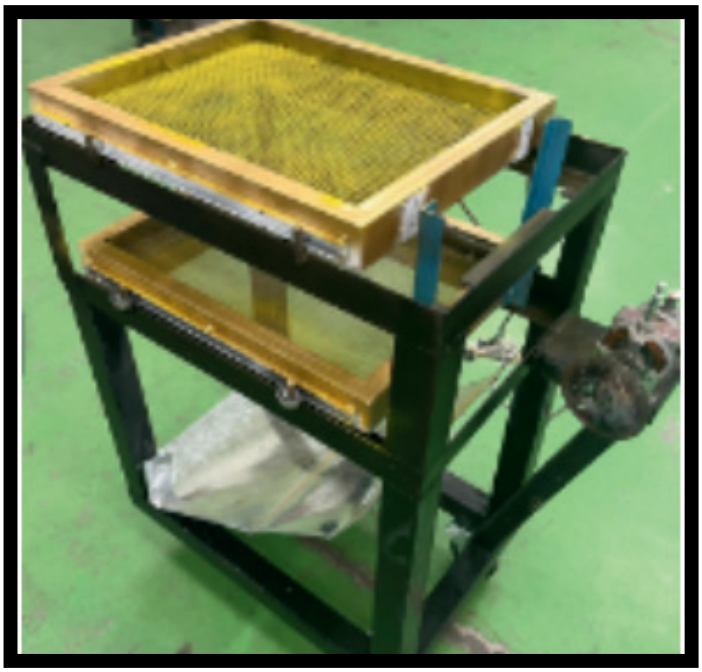
There are two steps to this project which are, Idea Generation and Design and Development. The data from the survey was gathered, analyzed, summarized, and discussed. The project manufacturing process flow chart and project design are discussed. The cost of materials in the manufacturing of this project is reviewed. The design process is conceptual design, which gives an idea a visual form. Making a variety of solutions is part of the project development process so that the design's course can be gradually narrowed down. For the fabrication process, The project was made at the Project Workshop, Mechanical Engineering Department, Polytechnic Banting Selangor. To guarantee the smoothness of the process, each group member is given the scope of their respective tasks.

RESULTS

Development of a Portable Sand Sieving Machine is an excellent alternative to the manual or conventional methods traditionally used. This device achieves our goals of obtaining high-quality sand, reducing workload, and enhancing mobility in the foundry workshop. Furthermore, our research revealed that a very high percentage of respondents favored our solution. This indicates strong social acceptance and highlights the benefits of our highly innovative product.

CONCLUSION AND IMPLICATIONS

The Automation Sand Sieving Machine is an innovation that aims to improve machine design. It is specially designed as an automatic machine that uses electric power. In addition, the difference in this machine is the addition of a speed adjustable. It can provide many benefits to users including. This machine is produced to speed up the sand refining process. To achieve the objectives of this project, different tests were performed to compare the use of the Automation Sand Sieving Machine and manual sand filters.



Final product

3D drawing using CAD mechanical inventor

Fabrication progress of the project

AUTOMATIC BANANA WRAPPER

Supervisor : Asiah binti Yunos
Email : asiahyunos@polibanting.edu.my
Students : Muhammad Adib, Diniy Hakimi, Ahmad Fikri Idhan, Ahmad Zaid Bin Halim

BACKGROUND

Most farmers and ranchers have problems in producing agricultural products such as abundant and high-quality fruits. Various factors affect the problem, for example, attacks, infectious diseases, extreme weather, and many more. Usually, farmers and ranchers wrap the fruits using used newspaper and then cover them with thin, bright-colored plastic. So, this product can help the people who indeed need this. It is just a small project but it might be useful. The main thing for this project is a portable sealer, adjustable aluminum rod, brake lever, a nd hollow aluminum bar. There are two portable sealers which are attached to the framework. When the lever is pulled, the frame that has a sealer attached to it is going to heat and seal the fruit to the plastic.

OBJECTIVE

This project aims to design and fabricate an automatic banana wrapper and to analyze the time consumption of an automatic banana wrapper compared to traditional methods.

METHODS

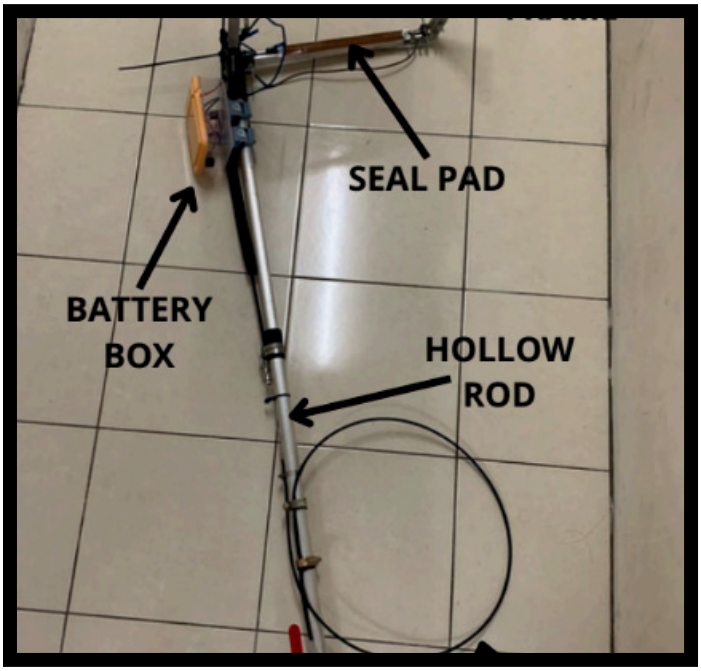
There are two steps to this project which are, Idea Generation and Design and Development. The data from the survey was gathered, analyzed, summarized, and discussed. The project manufacturing process flow chart and project design are discussed. The cost of materials in the manufacturing of this project is reviewed. The design process is conceptual design, which gives an idea a visual form. Making a variety of solutions is part of the project development process so that the design's course can be gradually narrowed down. For the fabrication process, The project was made at the Project Workshop, Mechanical Engineering Department, Polytechnic Banting Selangor. To guarantee the smoothness of the process, each group member is given the scope of their respective tasks.

RESULTS

Our goal of analyzing the duration of mechanical banana wrapping compared to traditional methods has been achieved successfully. The results of our analysis were very encouraging, where we found that using the Automatic Banana Wrapper tool could shorten the time for young banana wrapping work compared to using long-term traditional methods.

CONCLUSION AND IMPLICATIONS

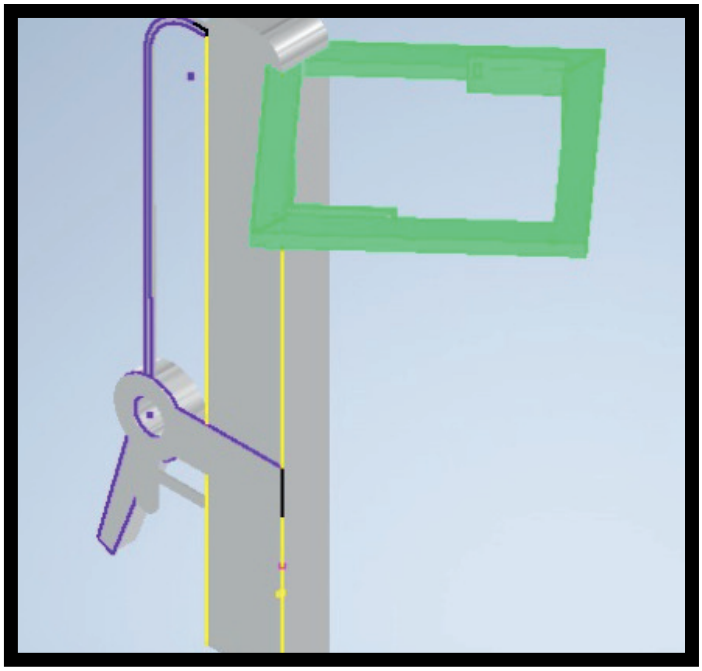
With all the research and information gathering now, it can be concluded that the objectives of the project have been successfully achieved. The purpose of the creation of this Automatic Banana Wrapper tool has shown satisfactory performance. The project can give benefits to the users because this product can reduce the workload and time consumption of banana farmers compared to traditional wrapping methods.



Final product

Aeromech presentation

Site visit to banana farm



3D drawing using CAD inventor

AUTOMATIC SMART DUSTBIN

Supervisor : Ts. Mohd Hazwan bin Mohamed Norli

Email : sirhazwan@gmail.com

Students : Nazrol Syahri Bin Irfan Syah, Muhammad Aimaduddin Al-Hilal Bin Muhd Reezal, Nur Sajidah Binti Azman & Sarvini Dewi A/P Ravi

BACKGROUND

Urbanization has led to significant waste management challenges, including overflowing bins and environmental pollution. Traditional waste disposal methods are inefficient and unhygienic and contribute to various health risks. There is an urgent need for innovative solutions to enhance waste management systems in both urban and residential settings.

OBJECTIVE

The primary aim of this project is to design and develop an Automatic Smart Dustbin that improves waste disposal efficiency through automation, optimizes resource usage, and maintains a hygienic environment. The smart dustbin leverages sensors and connectivity to enable hands-free operation, waste level monitoring, and real-time notifications for timely waste removal.

METHODS

The smart dustbin incorporates ultrasonic sensors to detect garbage levels and motion sensors for automated lid operation. It integrates a notification system that alerts authorized personnel when the bin is full. The project also emphasizes eco-friendly design, using compact and durable materials for optimal usability. Data from prototypes were analyzed for functionality, efficiency, and user satisfaction through surveys and performance testing.

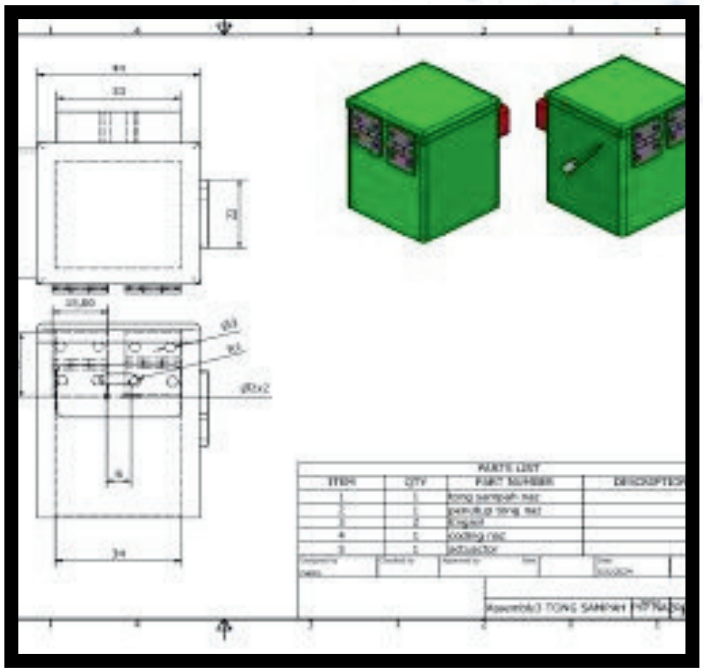
RESULTS

The smart dustbin demonstrated high reliability in automated operation, reducing manual handling and maintaining hygienic conditions. Surveys indicated strong user approval for features such as waste level monitoring, odor control, and automated lid opening. The design met efficiency and cost-effectiveness benchmarks, with a significant reduction in labor and operational costs.

CONCLUSION AND IMPLICATIONS

The Automatic Smart Dustbin represents a transformative approach to waste management, offering a cleaner, more sustainable, and efficient solution. Its integration into urban and residential waste systems can significantly enhance cleanliness and promote eco-friendly practices. Future iterations could incorporate AI for advanced waste sorting and energy-efficient designs for broader applicability.

Project testing



Engineering drawing

Body assembly

Final product

DESCRIPTION OF INNOVATION
SESSION II 2023/2024

DIPLOMA IN MECHANICAL ENGINEERING (MANUFACTURING) (DTP)

A20

AUTOMATED LEFTOVERS EGG SHELL SHREDDER MACHINE FOR ORGANIC FERTILIZER

Supervisor : Zulkarnain Bin Jamak

Email : zulkarnainjamak@polibanting.edu.my

Students : Noralya Maisarah Binti Md Azhar, Nurul Afiqah Binti Amran, Mu'az Bin Ariffin

BACKGROUND

The Automated Leftover Eggshells Shredder Machine integrates a shredding process that accelerates the decomposition of food waste, thereby fostering an optimal environment for the growth of beneficial microorganisms. Recognizing the detrimental impact of haphazard food waste disposal on the environment, conventional methods like composting and landfilling are considered unsustainable and inefficient in terms of space utilization. Additionally, existing shredding machines often suffer from bulkiness and high costs..

OBJECTIVE

Our primary objective is to develop a shredding mechanism specifically engineered to efficiently break down leftover food items, with a particular emphasis on materials such as eggshells. The ultimate goal is to produce a shredding machine that empowers farmers to create their own fertilizer. The assessment of the machine's sustainability impact revolves around reducing food waste through composting.

METHODS

The overarching aim of the project is to elucidate the purpose and benefits of the "Leftover Eggshells Shredder Machine," emphasizing its role in providing fertilizer solutions for small-scale farmers who utilize organic waste like eggshells. Furthermore, the project delves into material selection, features, and the machine's capacity to shred three eggshell boards simultaneously, thereby optimizing efficiency and productivity.

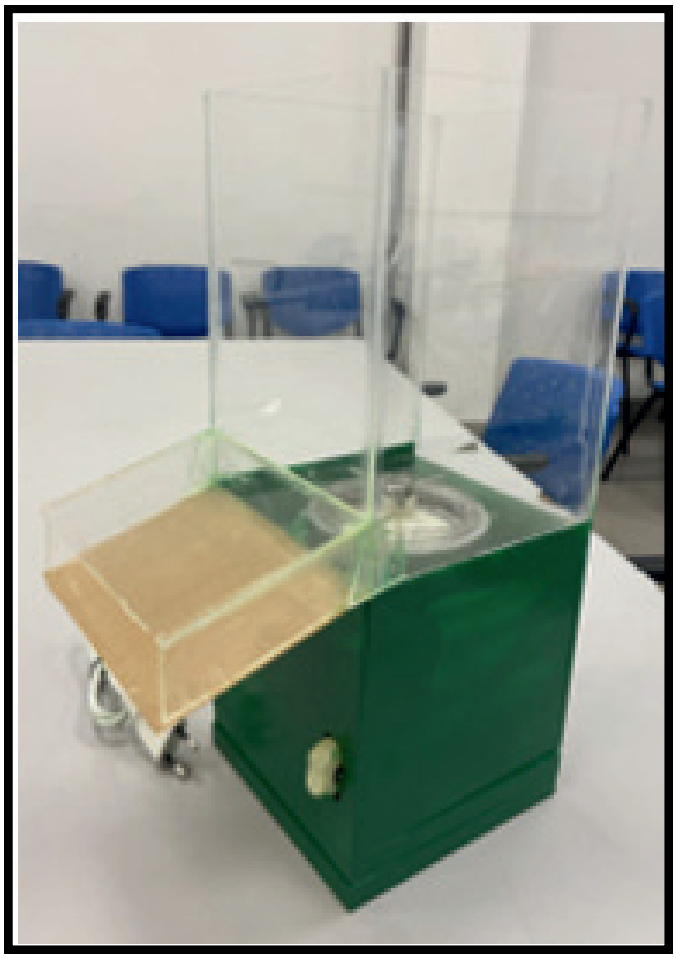
RESULTS

The shredding process in this machine accelerates the decomposition of food waste, creating an ideal environment for beneficial microorganisms to thrive. These microorganisms break down the organic matter, converting it into a valuable resource – organic fertilizer. This nutrient-rich fertilizer can be used in agriculture, horticulture, and gardening, offering a sustainable alternative to chemical fertilizers that harm the environment.

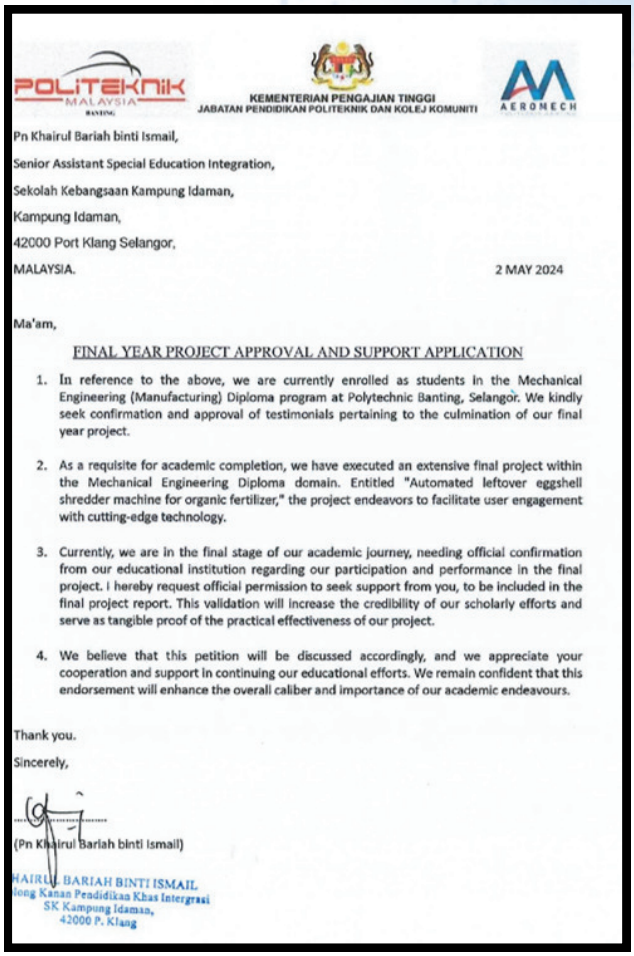
CONCLUSION AND IMPLICATIONS

By repurposing food waste into a valuable resource like fertilizer, the leftover food shredder machine not only reduces the burden on landfills but also contributes to soil enrichment, improving crop yields, and promoting sustainable farming practices. It's a win-win solution that benefits both the environment and agriculture.

AUTOMATED LEFTOVERS EGG SHELL SHREDDER MACHINE FOR ORGANIC FERTILIZER



Full assembly



POLITEKNIK MALAYSIA BANTING

KEMENTERIAN PENGAJIAN TINGGI
JABATAN PENDIDIKAN POLITEKNIK DAN KOLEJ KOMUNITI

AEROMECH

Pn Khairul Bariah binti Ismail,
Senior Assistant Special Education Integration,
Sekolah Kebangsaan Kampung Idaman,
Kampung Idaman,
42000 Port Klang Selangor,
MALAYSIA.

2 MAY 2024

Ma'am,

FINAL YEAR PROJECT APPROVAL AND SUPPORT APPLICATION

1. In reference to the above, we are currently enrolled as students in the Mechanical Engineering (Manufacturing) Diploma program at Polytechnic Banting, Selangor. We kindly seek confirmation and approval of testimonials pertaining to the culmination of our final year project.
2. As a requisite for academic completion, we have executed an extensive final project within the Mechanical Engineering Diploma domain. Entitled "Automated leftover eggshell shredder machine for organic fertilizer," the project endeavors to facilitate user engagement with cutting-edge technology.
3. Currently, we are in the final stage of our academic journey, needing official confirmation from our educational institution regarding our participation and performance in the final project. I hereby request official permission to seek support from you, to be included in the final project report. This validation will increase the credibility of our scholarly efforts and serve as tangible proof of the practical effectiveness of our project.
4. We believe that this petition will be discussed accordingly, and we appreciate your cooperation and support in continuing our educational efforts. We remain confident that this endorsement will enhance the overall caliber and importance of our academic endeavours.

Thank you.

Sincerely,

(Pn Khairul Bariah binti Ismail)

HAIRUL BARIAH BINTI ISMAIL
Guru Kanan Pendidikan Khas Intergrasi
SK Kampung Idaman,
42000 P. Klang

Approval from company

KEMENTERIAN BELIA DAN SUKAN

CERTIFICATE
OF ACKNOWLEDGEMENT

PROUDLY PRESENTED TO

ZULKARNAIN BIN JAMAK

FOR THE ACHIEVEMENT OF

SILVER
AUTOMATED LEFTOVER EGGSHELLS SHREDDER MACHINE FOR ORGANIC FERTILIZER.

IN
INNOVATION DEVELOPMENT THROUGH EDUCATIONAL ACTIVITIES 2024 (iDEA'24)
ON
06-07 JULY 2024

SHAHRUL AFFENDI BIN BAHARUDIN
Skills Director
Youth Skills Development Division
Ministry of Youth and Sports Malaysia

MALAYSIA MADANI iDEA'24

Silver Award for competition

MAIN SPONSORSHIP: BSN
COLLABORATION OF: POLITEKNIK, SWM ENVIRONMENT

CERTIFICATE
OF AWARD

This is to certify that
ZULKARNAIN BIN JAMAK, NORALYA MAISARAH BINTI MD AZHAR, MUAZ BIN ARIFFIN, NURUL AFIQAH BINTI AMRAN

Have been awarded the
BRONZE MEDAL

For the invention of
AUTOMATED LEFTOVERS EGGSHELL SHREDDER MACHINE FOR ORGANIC FERTILIZER
in category Agriculture and Food Technology at the Green Action For Environment (ENcEm) Innovation Competition 2024 on 22 September 2024 organized by SWM Environment Sdn. Bhd. and Politeknik Tun Syed Nasir Syed Ismail (PTSN), Pagoh

Mohd Norlisam bin Mohd Nordin
General Manager Corporate
SWM Environment Sdn. Bhd.

ENcEm 2024

Bronze Medal for Competition

PROCESSING OF DURIAN PEEL FOR ORGANIC FERTILIZER

Supervisor : Zulkarnain Bin Jamak

Email : zulkarnainjamak@polibanting.edu.my

Students : Abdul Khaliq Bin Airul Nizam, Muhammad Danish Ariff Bin Edi Azhar, Nurnazatul Aina Binti Nordin.

BACKGROUND

Durian peel is a valuable organic material that can be repurposed to create nutrient-rich organic fertilizer. Traditionally, the process of converting durian peel into fertilizer has been labor‐intensive and time-consuming, involving manual shredding and composting methods. However, with the increasing demand for sustainable agricultural practices and organic products, there has been a shift towards more efficient processing methods.

OBJECTIVE

An innovative project focusing on the machine processing of durian peel for organic fertilizer production has emerged. The goal is to streamline the conversion process, making it easier and faster for farmers and agricultural businesses to utilize durian peel as a valuable resource for soil enrichment.

METHODS

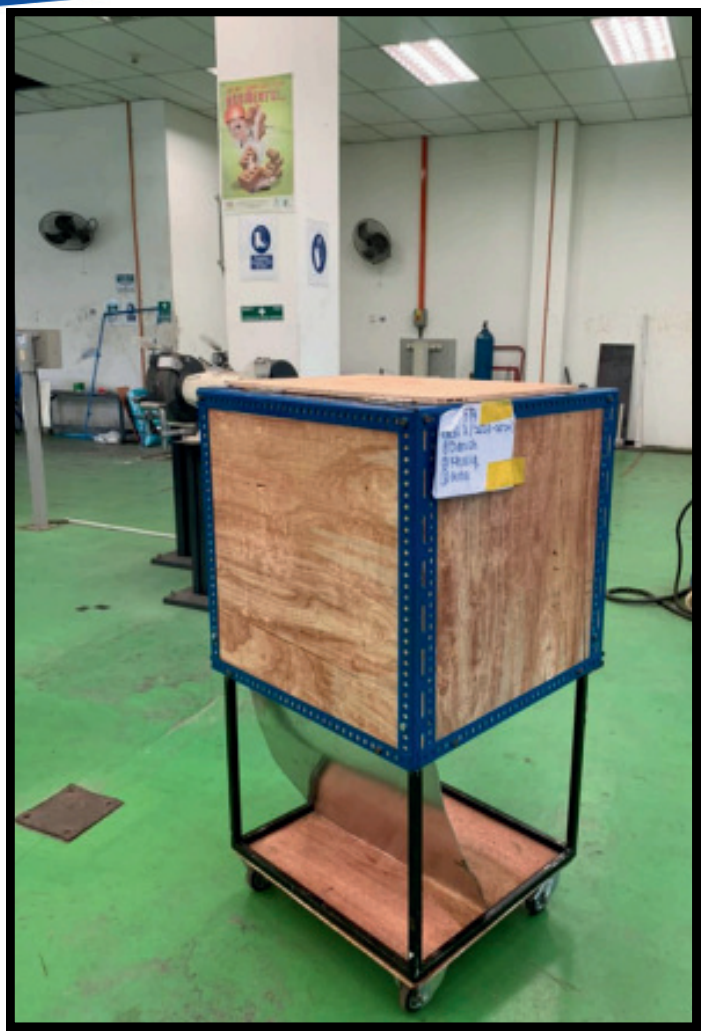
The fabrication of the Automatic Durian Peel Fertilizer Machine took place at the Agricultural Technology Research Center, collaborating with experts in organic farming and agricultural engineering. The machine is constructed using durable materials such as stainless steel, ensuring longevity and adherence to food safety standards.

RESULTS

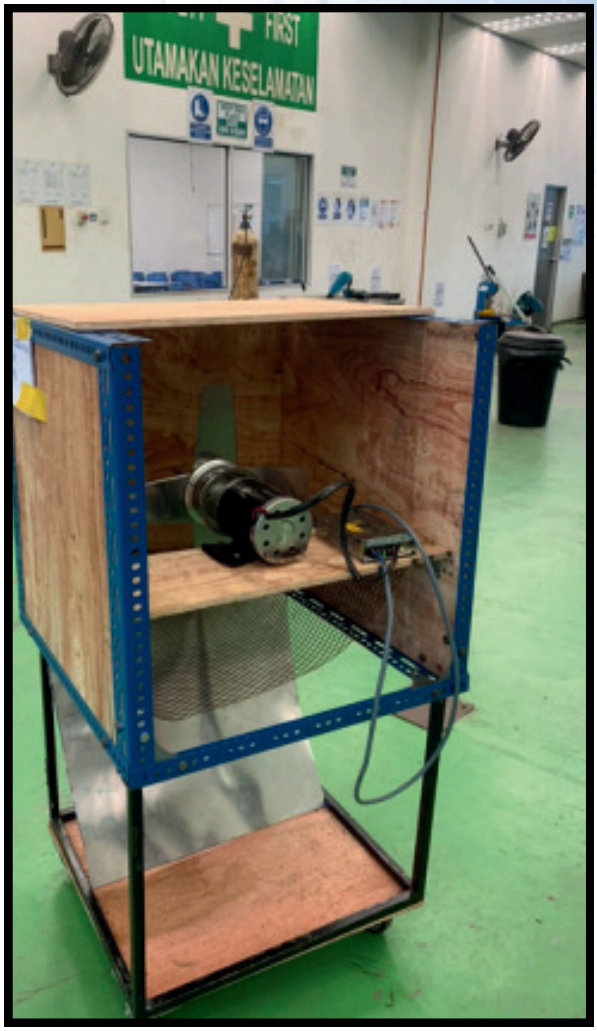
Equipped with advanced features like a powerful shredding mechanism, adjustable composting settings, and temperature control, the Processing Durian Peel Fertilizer Machine optimizes the decomposition process, accelerating the breakdown of durian peel into nutrient-rich compost suitable for organic farming practices.

CONCLUSION AND IMPLICATIONS

Initial testing of the machine has shown promising results. It can efficiently process a substantial amount of durian peel and convert it into organic fertilizer in a significantly reduced time frame compared to traditional manual methods. For example, the machine can convert ten kilograms of durian peel into compost in just 24 hours, a task that would take several days using manual composting techniques.



Full assembly



Mechanism Machine
Operated Driven by Motor

Group photo with SV for competition

WIND TURBINE MODEL

Supervisor : Ts. Mohd Hazwan bin Mohamed Norli

Email : sirhazwan@gmail.com

Students : Mohamad Darwisy Bin Mohamad Zulkifli, Kavilen A/L Tharmakumar & Foong Zhi Pei

BACKGROUND

The global transition to renewable energy highlights the need for efficient and sustainable technologies like wind turbines. These devices convert wind energy into clean electricity, offering a viable alternative to fossil fuels. Despite their potential, wind turbines are underutilized in regions like Malaysia due to limited exposure and adaptation challenges.

OBJECTIVE

This project aims to design, fabricate, and evaluate a small-scale wind turbine system capable of generating sufficient energy for powering a 12V LED lamp, with a focus on efficiency and adaptability to low wind speeds.

METHODS

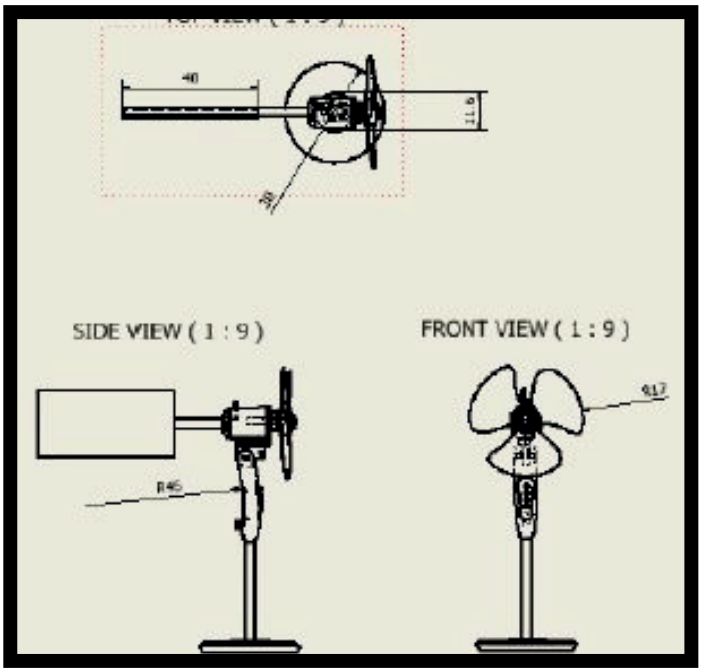
The wind turbine was developed using a systematic design process, incorporating key components such as a rotor, generator, and magnetic enhancements to optimize energy conversion. The fabrication involved cutting, drilling, wiring, and assembling the turbine. Safety measures and appropriate tools, including grinding and cutting machines, were employed throughout. The system's performance was evaluated by analyzing energy output and efficiency under varying wind conditions.

RESULTS

The fabricated wind turbine successfully generated power to illuminate a 12V LED lamp under low wind speed conditions. Analysis revealed efficient energy conversion capabilities, and the system demonstrated adaptability for small-scale, sustainable applications. Cost analysis showed the project was affordable, emphasizing its suitability for wider adoption.

CONCLUSION AND IMPLICATIONS

The wind turbine project has proven effective in harnessing wind energy, offering a cost-effective and environmentally friendly solution for renewable power generation. While current limitations include basic functionality and limited power output, future enhancements such as incorporating solar panels and storage systems could further improve the system’s usability and efficiency, making it an attractive option for households and small-scale users.



Engineering drawing

Wiring process

Rotor modification

Final product

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