KEMENTERIAN PENDIDIKAN TINGGI
JABATAN PENDIDIKAN POLITEKNIK DAN KOLEJ KOMUNITI

POLITEKNIK MALAYSIA
SULTAN SALAHUDDIN ABDUL AZIZ SHAH

PSATECX

PSA INNOVATION, TECHNOLOGY, ENGINEERING & COMMERCIALIZATION COMPETITION

SESI II 2025/2026

INNOVATING TVET, EMPOWERING IDEAS FOR REAL WORLD IMPACT

15 APRIL 2026 • RABU • DEWAN AL-JAZARI, PSA

E-BUKU PROGRAM

MALAYSIA MADANI
POLYCC TVET For All

BUKU PROGRAM

PSA INNOVATION, TECHNOLOGY, ENGINEERING AND COMMERCIALIZATION COMPETITION (PITEC 10) SESI II: 2025/2026

"Innovating TVET, Empowering Ideas for Real World Impact"

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E-BUKU PROGRAM
PSA INNOVATION, TECHNOLOGY, ENGINEERING & COMMERCIALIZATION COMPETITION
SESI II 2025/2026

Inisiatif oleh :
Pusat Penyelidikan & Inovasi
Politeknik Sultan Salahuddin Abdul Aziz Shah

eISBN No: 978-629-7667-73-7

Penerbitan pertama pada 2026 oleh :

UNIT PENERBITAN
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PSA INNOVATION, TECHNOLOGY, ENGINEERING & COMMERCIALIZATION COMPETITION SESI II 2025/ 2026

eISBN 978-629-7667-73-7

9 786297 667737

KATA ALU-ALUAN

Bismillahirrahmannirahim, Assalamualaikum Warahmatullahi Wabarakatuh dan Salam Sejahtera.

Syukur ke hadrat Allah SWT kerana dengan izin-Nya, ***PSA Innovation, Technology, Engineering and Commercialization Competition (PITEC 10) Sesi II: 2025/2026*** dapat dilaksanakan dengan jayanya. Saya ingin merakamkan setinggi-tinggi penghargaan kepada seluruh jawatankuasa pelaksana, barisan juri daripada institusi dan industri, serta semua pihak yang terlibat dalam menjayakan pertandingan ini. Penganjuran PITEC yang bermula sejak Mac 2022 bertujuan menjadi platform utama bagi membudayakan penyelidikan dan inovasi dalam bidang TVET.

Sejajar dengan tema pada kali ini, ***"Innovating TVET, Empowering Ideas for Real World Impact"***, PSA komited dalam memastikan setiap idea dan produk yang dihasilkan bukan sahaja berkualiti tinggi, malah mampu memberi impak nyata kepada masyarakat dan dunia sebenar.

Tahniah diucapkan kepada para pelajar daripada empat Jabatan Akademik yang telah terpilih untuk mempertaruhkan 36 projek terbaik di peringkat PSA. Syabas juga kepada para penyelia yang sentiasa memberi bimbingan. Semoga platform ini menjadi pemangkin kepada anda untuk terus meneroka ilmu, mencabar diri, dan menjadi pemimpin masa hadapan yang inovatif. Teruskan berinovasi demi kecemerlangan TVET.

Sekian, terima kasih.



Ts. DR. AHMAD AFTAS BIN AZMAN

Timbalan Pengarah (Akademik)

KATA ALU-ALUAN

Bismillahirrahmannirahim, Assalamualaikum Warahmatullahi Wabarakatuh dan Salam Sejahtera.

Alhamdulillah, dengan penuh rasa bangga dan syukur, saya merakamkan setinggi-tinggi tahniah dan penghargaan kepada Pusat Penyelidikan dan Inovasi, Politeknik Sultan Salahuddin Abdul Aziz Shah (PSA) atas kejayaan menganjurkan **PSA Innovation, Technology, Engineering and Commercialization Competition (PITEC 10).**

Penganjuran kali ini yang bertemakan **"Innovating TVET, Empowering Ideas for Real World Impact"** amat bertepatan dengan hasrat kita untuk melahirkan generasi pelajar yang berani berinovasi dan menterjemah idea kepada penyelesaian yang berimpak tinggi. PITEC merupakan platform penting untuk mengangkat potensi pelajar melalui idea-idea yang segar dan kreatif.



Sebagai sebuah institusi TVET yang proaktif, PSA sentiasa komited dalam mendokong budaya penyelidikan dan inovasi yang lestari bagi membuktikan bahawa pelajar kita mampu bersaing serta menyumbang kepada kemajuan teknologi selari dengan aspirasi Malaysia MADANI.

Saya yakin dan percaya, setiap projek yang diketengahkan mencerminkan dedikasi, kerjasama, serta bimbingan cemerlang daripada para pensyarah dan penyelia. Semoga usaha ini menjadi inspirasi kepada semua pelajar untuk terus meneroka, mencabar diri, dan sentiasa menimba ilmu demi masa depan yang lebih cemerlang.

Akhir kata, syabas kepada semua peserta, penganjur, dan seluruh jawatankuasa pelaksana yang telah menjayakan PITEC 10. Teruskan menyemarakkan budaya inovasi kerana masa depan adalah milik mereka yang berani mencipta.

Sekian, terima kasih.

DR. SULAIMAN BIN MOHAMMED KHALID

Timbalan Pengarah (Sokongan Akademik)



TENTATIF PROGRAM

Tarikh : Rabu, 15 April 2026

Masa : 8.00 pagi - 4.30 petang

Lokasi : Dewan Al-Jazari

AKTIVITI

8.00 pg - 8.30 pg	Pendaftaran Peserta di Dewan Al-Jazari
8.15 pg - 8.30 pg	Pendaftaran Juri di Anjung Bestari
8.30 pg - 8.45 pg	Taklimat Penjurian di Anjung Bestari
9.00 pg - 12.00 t/hari	Sesi Penilaian Projek oleh Juri PITEC10
12.10 t/hari - 1.00 t/hari	Mesyuarat Penilaian Akhir Dan Pengesahan Keputusan Pemenang
1.00 t/hari - 1.50 ptg	Rehat & Solat
2.00 ptg	Ketibaan Peserta, Pensyarah Penyelia, Pensyarah Jabatan, Panel Juri Dan Ketua Juri
2.15 ptg	Ketibaan TPA, TPSA dan AMT PSA
2.30 ptg	Doa Pembuka Ucapan Perasmian & Penutup PITEC10 oleh TPA
3.00 ptg - 4.30 ptg	Ulasan Ketua Juri Pengumuman Keputusan Rasmi Pertandingan PITEC10 Penyampaian Anugerah Sesi Bergambar Majlis bersurai

JAWATANKUASA KERJA

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Timbalan Pengerusi

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Penasihat Program

TS DR NORANI BINTI ABD KARIM

Penyelaras Program

TS. ILYA BINTI ISMAIL

Pengarah Program

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PN NUR HADIANA BINTI NASRUDDIN

Setiausaha II

DR. SITI ASMIZA BINTI MUZAFAR

Bendahari

PUAN KHASNIZA BINTI ABDUL KARIM

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- PN SHARIZA AZWIN YAHYA
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- EN MOHD FIRDAUS SEDET
- EN MOHD NORAQMAL RAZALI
- EN MUHAMMAD HAFISZUDDIN MOHD NOR

PITEC - X
SESI II : 2025/2026

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- EN NANTHAKUMAR SUBRAMANIAM
- EN MOHD IRWAN IBRAHIM
- PN MARZIANA MAHAMUD
- EN KHAIRUL AZIZI SADERI

JAWATANKUASA KERJA PELAJAR

- NURSYAFIAH BT SUKIMIN
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- SYAKIRAH QISTINA BT SHARIZAN
- SITI ZULAIKA BT MOHD FAUAD
- NUR'AIN SYUHADA BT KHOIRI
- KRESHA A/P RAVI
- NURIN NAJWA BT SHOEID
- TENGKU NUR AMIRAH DAMIA BT TENGKU AZHARIZAM
- MUHAMMAD WIDAD AKID PUTRA B MOHD AZLAN
- AL-LIEYA SAFFIEYA BT MOHD ROZI
- MUHAMMAD SYAHIDDUL RAHMAN B H RAHMAN
- NUR IMANINA NAFEESA BT ANUAR
- NUR AWANIS BT ROSMAN
- DANIA FARISHA BT MOHAMED FADIL
- ALVEENA DEVI A/P JAMES
- WARDAHTUN NUHA BT MOHAMMAD RAJIB

PITEC - X
SESI II : 2025/2026

Senarai

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En Mohd Firdaus Sedet
Juri Poster



En Mohd Nor Aqmal Razali
Juri Poster

PITEC X

Senarai

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- HARITH SYAZWAN BIN MOHD HAFIZ
- MUHAMMAD ADAM HARRIS MOHD SAIFUL HAZIRI
- MUHAMMAD DANISH QAYYIM BIN ZAMRI

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- TANESKUMAR A/L MUTHUVEAL SIVAKUMAR


POLITEKNIK
PITEC X
PSA INNOVATION, TECHNOLOGY, ENGINEERING & COMMERCIALIZATION COMPETITION
SESSION II 2025/2026
15 APRIL 2026 • WEDNESDAY • DEWAN AL-JAZARI, PSA
INNOVATING TVET, EMPOWERING IDEAS FOR REAL WORLD IMPACT
Sr. ZARINA BINTI MAT SAPRI
PUTERIMILAH BINTI ABBAS
MUHD ADAM HARRIS
MOHD MOSTAHDI
MUHD DANISH QAYYIM
HARITH SYAZWAN
Super Hero: Water Spigot 2.0
SMART WUDHUK WITH WATER SAVING'S SPIGOT HANDLE LOCK
EVERY DROP COUNTS !
1 PROJECT BACKGROUND
The Spigot Handle Lock: A simple, mechanical intervention for optimal flow.
Practical
User-Friendly
Behavioural Shift
2 PROBLEM STATEMENT
The Context
The Catalyst
The Consequence
3 OBJECTIVES
To control water flow during the wudhuk process
To reduce water wastage in public places such as mosques and surau.
4 SDG ELEMENTS & IMPACT
Delivering immediate local savings while advancing global sustainability targets
Local Impact
Drastically reduces monthly utility overheads for community centres.
Cultivates mindful consumption habits within the community through physical intervention.
Direct intervention in efficient water resource management.
Utilizing 3D-printed, durable materials to reduce waste and promote sustainable daily habits.
5 METHODOLOGY
Engineered for seamless integration and immediate usability.
Tap-Hugging Clasp
Ergonomic Grip
Rotation-Blocking Arm
6 DATA ANALYSIS & RESULTS
Objective 1 -Flow Control Efficiency
97.2% Agreed water flow is more controlled
Objective 2 -Water Saving Efficiency
100% Agreed the device saves water during wudhuk
62.5% reduction in water usage during product testing
Final Conclusion
Small mechanical changes generate massive environmental impact.
7 COSTING
RM 8
MyIPO
SAVE TODAY, SURVIVE TOMORROWS

ABSTRACT

SMART WUDUK WITH WATER SAVING'S SPIGOT HANDLE LOCK (WATER SPIGOT 2.0)

MOHAMAD MOSTAHDI BIN BASRUDIN, HARITH SYAZWAN BIN MOHD HAFIZ, MUHAMMAD ADAM HARRIS MOHD SAIFUL HAZIRI, MUHAMMAD DANISH QAYYIM BIN ZAMRI

PENYELIA : PN ZARINA BINTI MAT SAPRI

Wudhuk ialah amalan penyucian diri yang wajib dilakukan oleh setiap Muslim sebelum menunaikan solat dengan menggunakan air untuk membasuh anggota tertentu seperti muka, tangan, kepala dan kaki. Namun, penggunaan air secara berlebihan ketika berwudhuk masih berlaku di surau dan masjid akibat aliran air yang tidak dikawal, sekali gus menyebabkan pembaziran air dan peningkatan kos bil air. Bagi mengatasi masalah ini, inovasi Kunci Pemegang Spigot (Water Spigot 2.0) dibangunkan sebagai alat kawalan aliran air yang mengehadkan putaran kepala paip supaya aliran air berada pada kadar optimum semasa berwudhuk. Produk ini serasi digunakan pada empat jenis pili air utama iaitu pili angsa, pili bebola, bib tap dan pili PVC. Ia diperbuat daripada bahan Thermoplastic Polyurethane (TPU) yang tahan lasak, fleksibel dan sesuai untuk persekitaran lembap serta mempunyai reka bentuk ergonomik bagi memudahkan kawalan aliran air. Kajian ini telah dijalankan di Surau Al-Bulkhary, Laman Glenmarie, melibatkan seramai 36 orang responden bagi menilai keberkesanan penggunaan alat Water Spigot 2.0 dalam mengawal penggunaan air semasa wudhuk. Hasil kajian menunjukkan bahawa 97.2% responden bersetuju aliran air lebih terkawal apabila menggunakan alat ini, manakala 100% responden bersetuju alat ini membantu menjimatkan air semasa wudhuk. Selain itu, ujilari turut merekodkan pengurangan penggunaan air sebanyak 62.5%, membuktikan keberkesanan alat ini dalam meningkatkan kecekapan penggunaan air. Secara keseluruhannya, penggunaan Water Spigot 2.0 berpotensi mengurangkan pembaziran air, meningkatkan kesedaran masyarakat terhadap penggunaan air secara berhemah serta menyokong Matlamat Pembangunan Lestari SDG 6 (Clean Water and Sanitation) dan SDG 12 (Responsible Consumption and Production).

Kata Kunci : Penjimatan Wudhuk, Spigot, Pembangunan Lestari, Kawalan Aliran Air



PORTABLE FIRE DRILL TRAINING EQUIPMENT WITH REMOTE CONTROL FOR REALISTIC EVACUATION DRILLS

Leader



MUHAMMAD ZARIF IZMAN BIN MOHD ZAMRI
08DPB23F2008

Team Members



NORHYAZMINA BINTI GYAPIL
08DPB23F1052



PUTRA DANIAL ADAM BIN SALLEHUDDIN
08DPB23F2010



HOOI HOWIN
08DPB23F0216

Supervisors



TS. HAJI MOHD SAFARI BIN JAAFAR



PN. ARFFAAZILA BINTI RAHMAT

This project introduces a portable fire training device equipped with integrated visual cues, specifically designed to assist students with special needs. By combining wireless remote control technology and low - cost components, this innovation bridges the gap in institutional safety procedures, ensuring building evacuation training is inclusive, effective, and affordable for all schools.

Problem Identification

- **Lack of Visual Signals:** Conventional fire drill procedures rely on audible alarms, which are inadequate for students with hearing or sensory impairments.
- **Incompatibility of Procedures:** Current training procedures have lesser alerting components causing emergency warnings to be ineffective for some individuals.
- **Cost Constraints:** Existing safety equipment on the market is often expensive and difficult to operate by non -technical personnel.

Objectives

- To produce a portable fire drill training equipment for fire drill training in institutions.
- To analyse the effectiveness rate of the fire drill training equipment in terms of reaction time of the user to time especially for special needs students.

SDG Elements

Quality Education
Providing a safe and inclusive learning environment for all students.

Sustainable Cities & Communities
Building resilient institutions and improving the safety of school communities.

Methodology

During this project, we had conducted our research on the product needs.

Examples of research done:

- Current fire drill training issues
- Current market on fire drill training equipments/systems
- Product design research

Product Testing & Data Analysis

Product Functionality:

- Product can **last up to 20 minutes** per use
- Condition of the product is **safe to handle** after operating
- Up to **200m distance** tested and fuctionally activated
- Meet **BOMBA** standards

Impact To Society ✨

Cost Reduction on Addition Safety Features | Accomodate Special Needs Students | Allows Seamless Training Organisation

Costing for All Components	
Total Cost for One (1) Set	- RM275.00

ABSTRACT

PORTABLE FIRE DRILL TRAINING EQUIPMENT WITH REMOTE CONTROL FOR REALISTIC SOUND EVACUATION DRILLS

MUHAMMAD ZARIF IZWAN BIN MOHD ZAMRI, NORSYAZWINA BINTI SYAIFUL, PUTRA DANIAL ADAM BIN SALLEHUDDIN, HOOI HOVEN

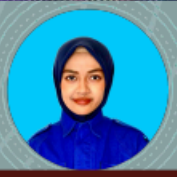
PENYELIA : TS. HJ. MOHD SAFARI BIN JAAFAR, PN. ARFFAAZILA BINTI RAHMAT

Conventional fire drill procedures often lack specialized visual alerts, leaving special needs students vulnerable during emergency evacuations. This project aims to develop a portable, easy-to-operate training device designed to enhance fire drill alertness through integrated visual cues. The product aligns with SDG 4 (Quality Education) and SDG 11 (Sustainable Cities and Communities) by promoting inclusive safety and resilient educational environments. The development process involved structured interviews with Occupational Safety and Health (OSH) officers, Special Needs Advisors, and the Fire Brigade (BOMBA). These insights guided the creation of a compact, battery-operated system tailored for diverse classroom settings. Prototype testing focused on the effectiveness of the visual alert system and its operational simplicity for non-technical users. Data analysis from authority feedback confirmed that the equipment addresses existing gaps in inclusive safety training effectively. This innovation increases building user alertness and ensures that special needs individuals can undergo evacuation drills with confidence. It fosters a safety-conscious culture while accommodating diverse physical requirements in institutional settings. The product is engineered using affordable components to ensure it remains a low-cost solution accessible to all schools. Ultimately, this equipment revolutionizes safety training by making fire drill preparedness inclusive, affordable, and effective for everyone.

Keywords : Fire Training, Portable Equipment, Wireless Remote Control, Institutional Safety, Visual Warni



HYDROLITE FILTER FOR DOMESTIC USE


NORHANIFAH MAISARAH BINTI MUSLIM
08DKA23F1230


NURUL HAIZA BINTI AZIZI
08DKA23F2008


PN SUZLIANA BINTI MARSOM
Supervisor

OBJEKTIF

Menghasilkan HydroLite Filter sistem penapis air domestik dikenali sebagai hydrolite filter.

Menilai keberkesanan sistem penapis air yang dihasilkan melalui ujian Turbidity & Total Suspended Solid.

SDG ELEMENTS

Projek HydroLite Filter menyokong Sustainable Development Goals (SDG) khususnya SDG 6 iaitu Clean Water and Sanitation melalui penambahbaikan kualiti air domestik. Selain itu, projek ini turut menyumbang kepada SDG 3 (Good Health and Well-being) dan SDG 12 (Responsible Consumption and Production) dengan meningkatkan tahap kesihatan pengguna serta menggalakkan penggunaan sumber air yang lebih lestari

METHODOLOGI



RINGKASAN PROJEK

HydroLite Filter ialah sistem penapis air domestik yang dipasang pada saluran masuk mesin basuh.
Penapis ini direka untuk mengurangkan kekotoran dan pepejal terampai dalam air.
Ujian Turbidity dan TSS menunjukkan peningkatan kualiti air.
Sistem ini mudah dipasang dan sesuai untuk kegunaan harian.

IMPAK PRODUK

HydroLite Filter memberi impak positif kepada kualiti air dengan mengurangkan turbidity dan TSS, sekali gus meningkatkan tahap kebersihan dan kesihatan pengguna. Selain itu, produk ini juga membantu mengurangkan kos rawatan air dan menyokong penggunaan sumber air yang lebih lestari di peringkat domestik

PENYATA MASALAH

1. Kualiti air sungai di Selangor dilaporkan semakin merosot akibat pencemaran industri dan domestik yang memberi kesan kepada bekalan air terawat.
2. Air paip domestik berpotensi mengandungi sedimen, karat dan klorin berlebihan yang boleh menjejaskan kebersihan pakaian serta prestasi mesin basuh.
3. Penapis air luar rumah mempunyai kos pemasangan dan penyelenggaraan yang tinggi.

KOS

ITEM	DESCRIPTION	QUANTITY	UOM	PRICE	TOTAL
1	SINGLE HOUSING FILTER	1	UNIT	68.00	68.00
2	FILTER OPENER	1	UNIT	5.00	5.00
3	BRACKET SINGLE HOUSING	1	UNIT	10.00	10.00
4	SOFTENER RESIN	1	L	10.00	10.00
5	COCONUT ACTIVATED CARBON	1	KG	18.00	18.00
6	CUSTAMISED INDUSTRIAL CATRIDGE FILTER	1	UNIT	35.00	35.00
	TOTAL	RM 146			

ANALISIS DATA



ABSTRACT

HYDROLITE FILTER FOR DOMESTIC USE

NORHANIFAH MAISARAH BINTI MUSLIM, NURUL HAIZA BINTI AZIZI

PENYELIA : PN SUZLIANA BINTI MARSOM

Water quality issues in domestic supply, particularly the presence of sediment, rust, and excessive chlorine, may affect laundry cleanliness and washing machine performance. This project aims to develop a HydroLite Filter as a domestic water filtration system and to evaluate its effectiveness through turbidity and Total Suspended Solids (TSS) analysis. The project supports Sustainable Development Goals (SDG 6), which focuses on clean water and sanitation. The HydroLite Filter was designed using materials such as ion exchange resin, coconut activated carbon, and a cartridge filter housed in a single filter casing. The methodology involves product design, installation on a washing machine inlet, and laboratory testing of water samples before and after filtration. The effectiveness of the system was evaluated using turbidity and TSS parameters. The turbidity value was reduced from 96.37 NTU to 0.95 NTU, indicating approximately 99% improvement. Meanwhile, TSS was reduced from 60 mg/L to less than 1 mg/L, showing more than 98% reduction in suspended solids. These results demonstrate that the HydroLite Filter significantly improves water quality. The product offers a simple, cost-effective, and easy-to-install solution for domestic use. The estimated cost of materials is affordable compared to conventional outdoor filtration systems. In conclusion, the HydroLite Filter is effective in enhancing water quality and suitable for household applications.

Keywords : HydroLite Filter, domestic water filtration, turbidity, Total Suspended Solids (TSS), water quality



ALAT SETRIX



Penyelia
Puan Zarinah Binti Zaini



Ketua Kumpulan
Muhammad Amal Aidil Bin Mohamad Aizal (08DKA23F2052)



Ahli Kumpulan
Muhammad Navin Bin Md Kaosar Hossain (08DKA23F2010)

1 Ringkasan Projek

Setrix Tools ialah alat multifungsi yang meningkatkan ketepatan, kecekapan dan pemahaman pelajar dalam kerja setting out dan levelling.

Authors

Don't forget the names of the research authors and co-authors. Use full names and include any titles or honorifics the authors may have, as well as the university or research institution they are representing.

2 Pernyataan Masalah

- Alat kayu tradisional tidak tahan lama dan mudah rosak
- Berat dan sukar dibawa ke tapak kerja
- Sukar disimpan dan kurang praktikal
- Proses setting out mengambil masa yang lama
- Menyebabkan pembaziran bahan
- Ketepatan rendah dan mudah berlaku ralat manusia

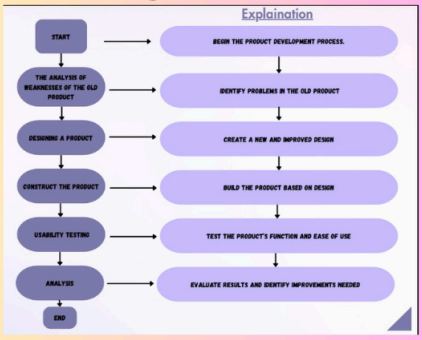
3 Objektif

- Membangunkan alat Setrix yang menggabungkan fungsi setting out dan levelling dalam satu peralatan yang inovatif dan mudah alih.
- Meningkatkan ketepatan, kecekapan kerja, serta ketahanan berbanding kaedah tradisional.
- Menilai dan membandingkan prestasi alat Setrix dengan kaedah setting out konvensional.

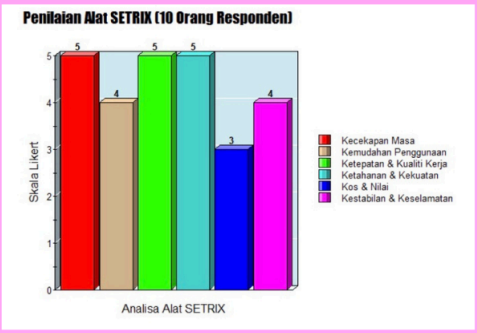
4 Elemen SDG

- SDG 4: Pendidikan Berkualiti
- SDG 9: Industri, Inovasi dan Infrastruktur
- SDG 12: Penggunaan dan Pengeluaran Bertanggungjawab

5 Metodologi



6 Metodologi



7 Impak Produk

- Meningkatkan ketepatan setting out
- Memberi ketepatan levelling yang lebih baik
- Menjimatkan masa kerja amali
- Mudah dibawa dan disimpan
- Tahan lama dan boleh digunakan semula
- Sesuai untuk pelajar dan pensyarah

8 Kos

BIL	JENIS BAHAN	KUANTITI DAN UNIT	JUMLAH HARGA
1	Mild Steel	10 batang	RM 450
2	Braket L boleh laras	2 unit	RM 24
4	Benang	1 gulung	RM 2.50
5	Besi Bar	4 batang	RM 20.00
6	Magnet	1 unit	RM 8.00
			RM 504.50

ABSTRACT

ALAT SETRIX

MUHAMMAD AMAL AIDIL BIN MOHAMAD AIZAL, MUHAMMAD NAVIN BIN MD KAOSAR HOSSAIN

PENYELIA : PN ZARINAH BINTI ZAINI

Projek ini membentangkan pembangunan Setrix Tools sebagai alternatif inovatif kepada kaedah kayu konvensional yang digunakan dalam penetapan pembinaan. Pendekatan tradisional sering menghadapi batasan seperti ketahanan yang rendah, kesukaran untuk mencapai penjajaran 90° yang tepat, proses intensif masa, dan pergantungan yang tinggi pada ketepatan manusia, mengakibatkan ketidakcekapan dan potensi kesilapan. Objektif projek ini adalah untuk membangunkan alat pelbagai fungsi yang meningkatkan ketepatan, kestabilan dan kecekapan dalam menetapkan kerja. Setrix direka bentuk menggunakan keluli ringan untuk memastikan ketahanan dan kestabilan struktur, sambil menyepadukan kedua-dua fungsi penetapan dan meratakan ke dalam satu peranti. Proses pembangunan termasuk reka bentuk, fabrikasi dan ujian lapangan dengan pengamal industri. Hasilnya menunjukkan bahawa Setrix secara konsisten mencapai penjajaran 90° yang tepat, mengurangkan masa pemasangan sehingga 50%, dan hanya memerlukan satu pengendali. Di samping itu, alat ini lebih stabil, boleh diguna semula dan mesra pengguna berbanding kaedah konvensional. Jumlah kos pembangunan adalah kira-kira RM504.50, menjadikannya penyelesaian kos efektif untuk kedua-dua aplikasi industri dan pendidikan. Kesimpulannya, Setrix menawarkan penyelesaian praktikal, cekap dan inovatif untuk meningkatkan produktiviti dan ketepatan pembinaan, sambil menyokong Matlamat Pembangunan Mampan (SDG) melalui pendidikan berkualiti, inovasi dan penggunaan sumber mampan yang dipertingkatkan.

Kata Kunci : Menetapkan Alat, Ketepatan Pengukuran, Inovasi Pembinaan



UTILIZATION OF LINT DRYER WASTE AS PARTIAL SAND REPLACEMENT IN CONCRETE






TS. DR. MASHITAH BINTI ABDUL LATIF

MASHIRA BINTI MAHASAN

NUR HIDAYAH NATASHA BINTI ABDUL HALIM
NO.MATRIK: 1435CA2310122
KP: 030830-11-0090
EMAIL: HIDAYAHNATASHA876@GMAIL.COM

QAMARIATUL KHADEJA BINTI JAFLI AZWAN
NO.MATRIK: 1435CA2310123
KP: 030830-10-1310
EMAIL: MAMAJIZWAN@GMAIL.COM

1 Ringkasan Projek

Projek ini mengkaji sisa dryer lint sebagai pengganti separa untuk pasir dalam konkrit. Kebergantungan berlebihan terhadap pasir semula jadi telah menyebabkan kerosakan alam sekitar dan peningkatan kos, manakala dryer lint dibuang tanpa digunakan semula. Campuran eksperimen dengan 0%, 10% dan 30% penggantian lint telah diuji. Keputusan menunjukkan 10% lint menghasilkan konkrit ringan yang sesuai untuk aplikasi bukan struktur, manakala 30% lint mengurangkan kekuatan dengan ketara. Projek ini menyokong pembinaan lestari dan prinsip ekonomi kitaran.

2 Penyataan Masalah

- Pengambilan pasir semula jadi yang berlebihan → kemerosotan alam sekitar, kekurangan sumber, dan peningkatan kos.
- Sisa dryer lint dihasilkan setiap hari tetapi dibuang tanpa digunakan semula.
- Kekurangan kajian mengenai penggunaan dryer lint sebagai pengganti agregat halus dalam konkrit.

3 Objektif

- Untuk mengkaji kebolehkerjaan konkrit dengan sisa dryer lint sebagai pengganti separa pasir.
- Untuk menentukan kekuatan mampatan konkrit pada pelbagai tahap penggantian lint (10%, 30%).
- Untuk menilai ketumpatan dan penyerapan air konkrit yang diubah suai dengan lint.

4 SDG Elemen

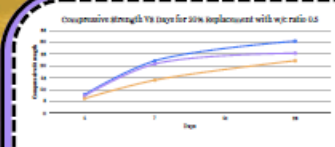
- SDG 11: Bandar dan Komuniti Mampan.
- SDG 12: Penggunaan dan Pengeluaran Bertanggungjawab.
- Menyokong ekonomi kitaran melalui penggunaan semula sisa tekstil.

5 Metodologi

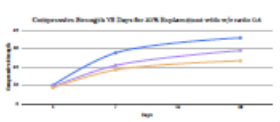
- Pengumpulan bahan: Lint pengering dikumpul, dikeringkan dan diayak sebelum digunakan.
- Reka bentuk campuran: Campuran konkrit disediakan dengan kadar lint 0%, 10% dan 30% sebagai pengganti pasir.
- Penyediaan sampel: Kiub konkrit dibentuk dan dibiarkan mengeras pada 1, 7 dan 28 hari.
- Ujian makmal: Slump, ketumpatan, penyerapan air dan kekuatan mampatan dijalankan mengikut piawaian.
- Analisis data: Keputusan ujian diplot dalam bentuk graf untuk membandingkan kesan lint terhadap sifat konkrit.

6 Impak Kajian

- Alam sekitar: Mengurangkan pengambilan pasir dan sisa ke tapak pelupusan sampah.
- Teknikal: Menghasilkan konkrit ringan yang sesuai untuk aplikasi bukan struktur.
- Praktikal: Berpotensi digunakan dalam blok turapan, dinding sekatan, dan panel ringan.
- Akademik: Memberi asas untuk kajian lanjutan mengenai penggunaan sisa dalam konkrit.



w/c ratio 0.5



w/c ratio 0.6

7 Bajet

- Lint pengering ialah bahan sisa yang percuma, hanya memerlukan proses pengeringan dan pengayakan.
- Kos tambahan adalah minimum berbanding konkrit konvensional.
- Bajet utama meliputi simen, agregat, acuan, dan ujian makmal.

ABSTRACT

UTILISATION OF LINT DRYER WASTE AS PARTIAL SAND REPLACEMENT IN CONCRETE

NUR HIDAYAH NATASHA BINTI ABDUL HALIM, QAMARIATUL KHADEJA BINTI JEFLI EZWAN

PENYELIA : TS. DR. MASIMAWATI BINTI ABDUL LATIF, MASWIRA BINTI MAHASAN

The increasing depletion of natural sand resources and rising construction costs have created an urgent need for sustainable alternative materials in concrete production. This study aims to evaluate dryer lint waste as a partial sand replacement to develop a lightweight and eco-friendly concrete material. The project supports Sustainable Development Goals (SDG 12: Responsible Consumption and Production and SDG 11: Sustainable Cities and Communities) by promoting waste utilisation and reducing reliance on natural resources. Dryer lint was collected from local laundromats, processed through simple drying and sieving, and incorporated into concrete mixes at 10% and 30% replacement levels. The mixtures were prepared and tested in accordance with BS EN 12350 and BS EN 12390 standards, including slump, density, water absorption, and compressive strength at 1, 7, and 28 days. The results demonstrate that 10% lint replacement produces lightweight concrete with acceptable strength for non-structural applications, while 30% replacement significantly reduces strength due to increased porosity. The modified concrete exhibited approximately 19% reduction in compressive strength and 8–12% reduction in density, highlighting a balanced trade-off between performance and weight reduction. Unlike conventional materials such as fly ash, slag, or recycled aggregates, which require industrial processing, dryer lint offers a near-zero-cost, low-processing, and highly accessible solution. This innovation is suitable for paving blocks, partition walls, and lightweight panels, contributing to cost-effective and sustainable construction practices. In conclusion, dryer lint represents a viable waste-to-resource innovation, offering a unique combination of low cost, scalability, and environmental benefit for non-structural concrete applications.

Keywords : Dryer lint, Sand replacement, Sustainable concrete, Compressive strength, Lightweight concrete, Sand replacement, Waste-to-resource

POLITEKNIK

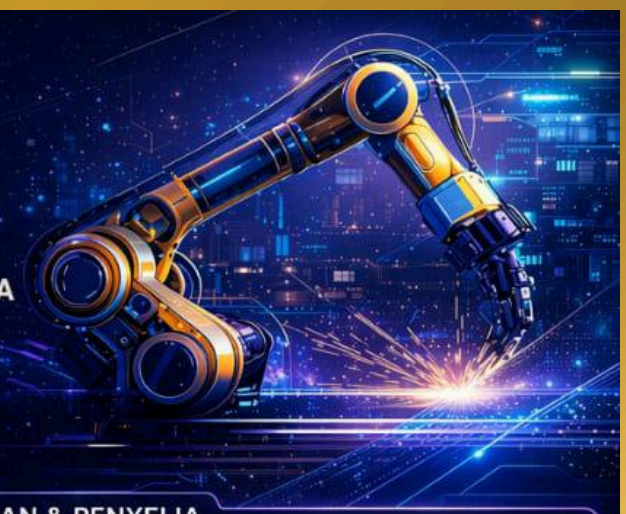
POTECX

PERTANDINGAN INOVASI, TEKNOLOGI, KEJURUTERAAN & PENGKOMERSIALAN PSA

SESI II 2025/2026

15 APRIL 2026 - RABU / DEWAN AL - JAZARI, PSA

INOVASI HARI INI, MEMPERKASA IDEA UNTUK IMPAK DUNIA SEBENAR



AHLI KUMPULAN & PENYELIA



Pn. Salizawati Binti Kamaruzzaman



Pn. Yusnita Binti Yusof



Muhammad Aqil Mifzal Bin Roslan (08DKA23F2006)



Mohamad Nor Ikmal Hakim Bin Salleh (08DKA23F2032)

PENGENALAN

- E-Logbook dibangunkan sebagai alternatif logbook manual.
- Memudahkan pelajar merekod aktiviti latihan industri.
- Membolehkan pemantauan secara masa nyata.

PERNYATAAN MASALAH

- Logbook manual mudah hilang / rosak.
- Kemas kini tidak konsisten.
- Sukar untuk pemantauan oleh penyelia dan pensyarah.

OBJEKTIF

- Membangunkan sistem E-Logbook berasaskan web.
- Menguji keberkesanan sistem terhadap pelajar latihan industri.

METODOLOGI

- Kajian Literatur
- Temubual Bersama Penyelia
- Pembangunan / Pengujian Sistem

Soal Selidik | Prototaip | Pengujian

KEUNIKAN PROJEK

- Pemantauan masa nyata
- Peringatan automatik
- Mengurangkan penggunaan kertas
- Rekod selamat dan berpusat

IMPAK

40% Penjimatan masa penyelia

60% Kurang penggunaan kertas

Pemantauan masa nyata

92% Pengguna berpuas hati



DEMO LANGSUNG

e-logbook-one.vercel.app

4 Pendidikan Berkualiti

Meningkatkan akses pendidikan melalui sistem rekod latihan yang dioptimumkan.

9 Inovasi & Infrastruktur

Menggalakkan penyelesaian teknologi dalam latihan industri.

IMBAS UNTUK CUBA

ABSTRACT

E-LOGBOOK LATIHAN INDUSTRI PELAJAR POLITEKNIK MALAYSIA

MUHAMMAD AQIL MIFZAL BIN ROSLAN, MOHAMAD NOR IKMAL HAKIM BIN SALLEH

PENYELIA : PN SALIZAWATI BINTI KAMARUZZAMAN, PN YUSNITA BINTI YUSOF

Penggunaan logbook manual dalam latihan industri pelajar Politeknik Malaysia sering menimbulkan masalah seperti kelewatan kemas kini, kesukaran pemantauan dan risiko kehilangan data. Kajian ini bertujuan membangunkan serta menilai keberkesanan sistem E-Logbook sebagai alternatif digital yang lebih efisien dan sistematik. Projek ini menyokong SDG 4 (Pendidikan Berkualiti) dan SDG 9 (Inovasi dan Infrastruktur) melalui penggunaan teknologi dalam pengurusan latihan industri. Sistem dibangunkan menggunakan pendekatan prototaip yang melibatkan fasa reka bentuk antaramuka, pembangunan laman sesawang menggunakan HTML, CSS, PHP, JavaScript dan MySQL, serta integrasi modul utama seperti catatan aktiviti dan pengesahan penyelia. Pengujian dijalankan melalui soal selidik melibatkan 46 responden dan data dianalisis menggunakan statistik deskriptif berdasarkan nilai min. Hasil analisis menunjukkan purata min 4.60 pada tahap sangat tinggi, menandakan penerimaan pengguna yang positif. Sistem ini meningkatkan kecekapan pengurusan, memudahkan pemantauan masa nyata dan mengurangkan penggunaan kertas. Kos pembangunan adalah rendah kerana menggunakan platform digital sedia ada. Kesimpulannya, sistem E-Logbook ini berpotensi menggantikan logbook manual secara meluas dan berkesan.

Kata Kunci : E-Logbook, Latihan Industri, Sistem Berasaskan Web, Pemantauan Masa Nyata, Politeknik Malaysia





MADAM CHOONG SIEW LAY



DARSHINII A/P CHANDRASEGERAN (08DKA23F2030)



NORSYAIDATUL SYUHADA BINTI ZAMRI (08DKA23F2016)

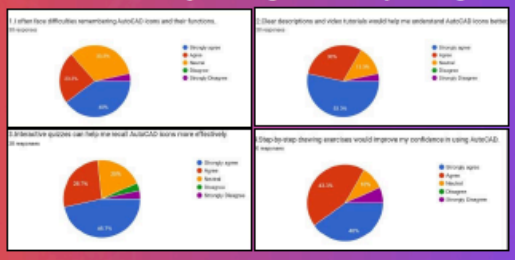
SCAN HERE

LEARNICON CADD

LearnIcon CADD is a mobile learning application developed to assist first semester Civil Engineering students in mastering basic AutoCAD icons and commands . The application integrates visual explanations, tutorial videos, and interactive quizzes to support self-paced learning . It enhances students' understanding, improves memory retention, and increases confidence in using AutoCAD .

PROBLEM STATEMENT

- Students have difficulty remembering AutoCAD icons and functions.
- Learning process is time-consuming and confusing .
- Lack of interactive and engaging learning tools
- Traditional teaching (notes &lectures) is insufficient.
- Limited access to simple and beginner-friendly learning resources.



SDG

SDG 4
Quality Education

SDG 9
Industry, Innovation and Infrastructure

PRODUCT DEVELOPMENT / METHODOLOGY

The application was developed using the Agile Model, which includes:

Analysis	IDENTIFYING STUDENT LEARNING DIFFICULTIES THROUGH SURVEY
Design	PLANNING USER INTERFACE AND LEARNING STRUCTURE
Development	CREATING APPLICATION FEATURES (ICON LIBRARY, TUTORIALS, QUIZZES)
Implementation	DEPLOYING THE APPLICATION FOR STUDENT USE
Evaluation	COLLECTING FEEDBACK FOR IMPROVEMENT

APPS INTERFACE



PRODUCT IMPACT

- Improves students' ability to recognize AutoCAD icons quickly.
- Enhances confidence in using AutoCAD software.
- Supports flexible and independent learning.
- Reduces learning time and confusion.
- Improves overall learning experience in AutoCAD.

OBJECTIVE

- Develop a beginner-friendly AutoCAD learning application.
- Evaluate the usability of the application.

INNOVATION VALUE (NOVELTY)

- Focus on beginner-level AutoCAD learning (not professional users).
- Combines icon recognition, tutorials,and quizzes in one platform .
- Supports self-paced mobile learning (anytime, anywhere).
- Enhances memory retention and learning efficiency.
- Simple and user-friendly interface for new learners.

TESTING / DATA ANALYSIS

- Tested with lecturers and Civil Engineering students.
- Data collected - Google For questionnaire
- Evaluation criteria:



Results show that students responded positively, indicating improved understanding, faster icon recognition, and increased confidence.



COST

ITEM	COST
FLUTTER	RM 0.00
FIREBASE	RM 0.00
CANVA	RM 0.00
TOTAL COST	RM 0.00

ABSTRACT

LEARNICON CADD

DARSHINII A/P CHANDRASEGERAN, NORSYAIDATUL SYUHADA BINTI ZAMRI

PENYELIA : CIK CHOONG SIEW LAY

Many first-semester Civil Engineering students face difficulties in identifying and remembering AutoCAD icons, which affects their learning process and confidence. This project aims to develop a beginner-friendly mobile application and evaluate its usability. The project supports Sustainable Development Goal (SDG 4): Quality Education by promoting accessible digital learning and SDG 9: Industry, Innovation & Infrastructure by encouraging innovative educational technology. The application was developed using the Agile Model, which consists of the planning, designing, developing, testing, deploying, and reviewing phases. LearnIcon CADD was developed using Flutter and Firebase, which includes categorized AutoCAD icons, tutorial videos, and interactive quizzes to support self-directed learning. The application was tested through beta testing involving three AutoCAD lecturers and sixty first-semester Civil Engineering students. Data were collected using a Google Forms questionnaire. The results showed that 84.53%, 85.88%, 87.28%, and 80% of users responded Agree or Strongly Agree for functionality, usability, learning effectiveness, and user satisfaction respectively. The findings indicate that the application improves students' understanding, learning efficiency, confidence, and flexibility in learning. The project was developed using free tools, and no development cost was incurred. In conclusion, LearnIcon CADD is an effective and user-friendly educational tool for beginner AutoCAD learners.

Keywords : AutoCAD, Mobile Learning, Usability Evaluation, Educational Application, First Semester Civil Engineering Students


PITEC-X
PSA INNOVATION, TECHNOLOGY, ENGINEERING & COMMERCIALIZATION COMPETITION
SESSION II 2025/2026
15 APRIL 2026 • WEDNESDAY • DEWAN AL-JAZARI, PSA
INNOVATING TVET, EMPOWERING IDEAS FOR REAL WORLD IMPACT
EPOXY TABLE TOP FOR COFFEE TABLE
i. Project Summary
Develop a durable epoxy coffee table
Reduce production cost compared to market products
Improve scratch & water resistance
Provide modern and practical furniture design
ii. Problem Identification
High price of commercial epoxy tables
Surface easily scratched
Difficult maintenance process
Use of non-sustainable materials
Limited affordable furniture options
iii. Objectives
Design durable epoxy coffee table
Reduce production cost
Improve scratch & water resistance
Apply eco-friendly materials
Enhance usability and aesthetics
iv. SDG Elements
Industry, Innovation and Infrastructure
Responsible Consumption and Production
Climate Action
v. Product Development / Methology
1. Mould Base Preparation
2. Mould Frame Assembly
3. Wood Positioning in Mould
4. Epoxy Resin Mixing
5. Resin Pouring Process
6. Curing Process
7. Surface Sanding Process
8. Final Product
vi. Product Testing
Scratch Test – Surface remains smooth
Water Test – No water absorption detected
Load Test – Strong and stable structure
User Feedback – Positive response
vii. Product Impact
Lower cost compared to commercial tables
Durable and long-lasting structure
Attractive modern furniture design
Suitable for home and office use
Easy maintenance surface finishing
viii. Costing
Wood Material – RM80
Epoxy Resin – RM880
Wax – RM20
Tools & Supplies – RM20
TOTAL COST: RM500
Pn Rafidah Farah Haniim Binti Abd Razak
Daniel Bin Erwan P1018
Tanes Kumar Muthuveal Sivakumar I P1012

ABSTRACT

EPOXY COFFEE TABLE TOP

DANIAL BIN ERWAN, TANESKUMAR A/L MUTHUVEAL SIVAKUMAR

PENYELIA : RAFIDAH FARAH HANIM BINTI ABD RAZAK

This project focuses on the design and production of an Epoxy Coffee Table Top. The main objective is to design and fabricate a high-quality, functional and attractive table surface by combining discarded wood with resin to create a durable, aesthetically pleasing functional art piece. It also aims to improve basic skills in furniture making and finishing techniques. The process involves preparing the wood surface, mixing and pouring epoxy resin, and completing finishing work such as sanding and polishing. Important factors such as proper mixing ratio, curing time, and surface smoothness are considered to ensure a good quality product. The project directly supports SDG 12 (Responsible Consumption and Production) by repurposing waste materials and minimizing raw material consumption through eco-conscious design where this initiative reduces environmental waste by transforming discarded materials into a valuable, modern product. The final epoxy coffee table acts as a sustainable alternative to conventional furniture, encouraging a circular economy. Furthermore, it showcases the creative potential of eco-design in home decor. The total project cost is approximately RM500, with the majority allocated to high-quality epoxy resin and specialized pigments. In conclusion, this project successfully demonstrates that epoxy resin can be used to produce creative and functional furniture suitable for modern use.

Keywords : Epoxy resin, coffee table, wood, finishing, furniture

JABATAN

Kejuruteraan Elektrik

01

PILLAR - PILL ALERT & REMINDER WITH IOT

- THIVYAN A/L ROBERT
- AL-LIEYA SAFFIEYA BINTI MOHD ROZI

02

RAINWATER HARVESTING SYSTEM WITH ROOFTOP STORAGE TANK & FILTRATION UNIT

- DURGASHINI A/P RAGU

03

ENERGY-EFFICIENT SMART FAN WITH AUTOMATIC CONTROL AND IOT

- ALYZDA LAURA IGNATIUS BINTI SAIFUL AZHAR IGNATIUS
- NUR ALIA UMAIRAH BINTI AHMAD NASIR

04

AUTOMATIC LIGHT CONTROL AND SAFETY FOR STAIRCASE

- AHMAD NABIL BIN MOHD NAZRI

05

SOLAR-BASED AI-IOT SMART SHOE FALL DETECTOR USING ESP32 MICROCONTROLLER FOR ELDERLY

- MISHA A/P ELLAPPEN NAIDU

06

IOT SMART FARM CONTROL WITH LEAF DISEASE

- ROZARIDZ AMMAR EIZHAL BIN ROZATULFAZILAN

07

GAS DETECTOR WITH IOT

- MUHAMMAD IZZUDDIN TAFTAZANI BIN DZULKIPLEEY
- MUHAMMAD ALIF SHAH ALAM SHAH

08

COLOR SORTING MACHINE WITH IOT

- MUHAMMAD ZIKRI BIN ZAIDI
- SHAFIRUL AZMI UZAIR BIN SAMINGAN

09

PARKINSON'S GLOVES

- MUHAMMAD QUSYAIRI BIN ADNAN

10

AN INTELLIGENT IOT-BASED SMART INHALER MONITORING SYSTEMS FOR ASTHMA AND COPD

- NUR SYAFIEKA FARISHA BINTI HASMADI
- NURUL IZZAH BINTI AZMI



PILLAR - PILL ALERT AND REMINDER WITH IOT

PROJECT SUMMARY

The Pill Alert and Reminder Box with IoT (PillAR) is designed to help users manage their medication schedule effectively. The system uses an ESP32 microcontroller integrated with an LCD display, LEDs, and a buzzer to provide real-time reminders and alerts. It is especially useful for elderly and forgetful patients, reducing missed doses and improving medication adherence.
The device is low-cost, user-friendly, and suitable for home healthcare applications.

PROBLEM STATEMENT

- struggle to follow their medication schedules due to busy lifestyles, forgetfulness, or managing multiple prescriptions, which can lead to missed or incorrect doses and negatively affect health outcomes.
-Traditional pill boxes do not provide reminders or monitoring features, creating a need for a smart solution that can automatically remind users, track medication intake, and improve overall medication adherence

OBJECTIVES

1. To design and develop a smart pill box using IoT technology
2. To provide automated reminders that help users take medication on time
3. To monitor and track pill intake using sensors and a microcontroller.

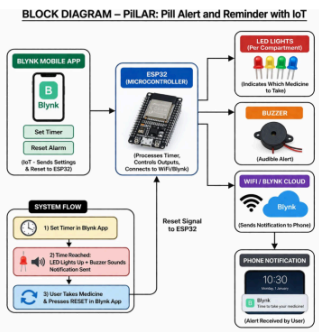
SDG ELEMENT



METHODOLOGY

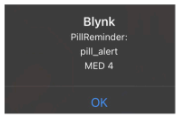
Hardware development stage, where all components are assembled and connected according to the circuit design.
System architecture and required components such as the ESP32, LCD display, LEDs, buzzer, and push button
Next, the software programming stage is carried out to develop the code for medication timing, alert notifications, and display functions. The system is then integrated by combining both hardware and software to ensure proper operation.

BLOCK DIAGRAM

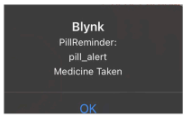


PRODUCT TESTING





Before taking the medicine



After taking the medicine

PROJECT IMPACT

- improving medication adherence through timely and accurate reminders.
- reduce the risk of missed or incorrect dosages, which can lead to serious health complications.
- beneficial for elderly and forgetful users, as it supports independent medication management without constant supervision.
- increases user awareness of proper medication practices and promotes better health outcomes.
- reliable, and user-friendly design makes it accessible for wider community use, contributing to more efficient and inclusive home healthcare solutions.

COSTING

The actual costing refers to the cost incurred in developing our prototype using off-the-shelf components in small quantities and quality components. The total estimated cost of the system is approximately RM150.

The commercial costing estimated cost will be around RM80.

TEAM MEMBERS



THIVYAN A/L ROBERT
08DEP23F1056



AL-LIEYA SAFFIEYA BINTI MOHD ROZI
08DEP23F1056



PUAN NUR SURIYA BINTI MOHAMAD

ABSTRACT

PILLAR – PILL ALERT AND REMINDER WITH IOT

THIVYAN A/L ROBERT, AL-LIEYA SAFFIEYA BINTI MOHD ROZI

PENYELIA : PN NUR SURIYA BINTI MOHAMAD

Medication non-adherence is a common issue, particularly among elderly patients. This project aims to develop a Pill Alert and Reminder Box with IoT (PillAR) to assist users in managing their medication schedule in a more effective and consistent manner. In alignment with the United Nations Sustainable Development Goals (SDGs), this project supports SDG 3: Good Health and Well-being by promoting proper medication adherence and improving patient health outcomes. Additionally, it contributes to SDG 9: Industry, Innovation and Infrastructure through the integration of IoT technology in smart healthcare systems. The device is developed using an ESP32 microcontroller integrated with an LCD display, LEDs, buzzer, and push button, all housed within a project enclosure to provide real-time reminders and alerts for medication intake. The development process involves hardware design, circuit integration, and embedded system programming. Testing is conducted to evaluate the functionality, reliability, and responsiveness of the system under various conditions. The results demonstrate that the system provides accurate reminders and improves medication adherence. This project supports independent healthcare management while increasing user awareness. The estimated cost is approximately RM150. In conclusion, the proposed system is a cost-effective and practical solution for medication management.

Keywords : IoT, Medication Reminder, ESP32, Healthcare System, Medication Adherence, Smart Device

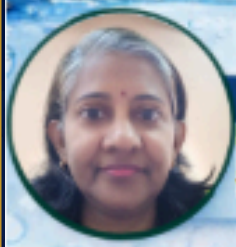
POLITEKNIK

PITEC-X

RAINWATER HARVESTING SYSTEM WITH ROOFTOP STORAGE TANK & FILTRATION UNIT

15 APRIL 2026 • WEDNESDAY • DEWAN AL-JAZARI, PSA

INNOVATING TVET, EMPOWERING IDEAS FOR REAL WORLD IMPACT



Supervisor (Penyelia)
Puan Naagajoothi a/p Adin Naraina



Durgashini a/p Ragu
08DJK23F2012

BACKGROUND

- Rainwater wasted as runoff
- High dependency on municipal water
- Water shortages during dry seasons
- Lack of affordable harvesting systems

PROBLEM STATEMENT

- Rainwater wasted as runoff
- High dependency on municipal water
- Water shortages during dry seasons

OBJECTIVES

- Design a rainwater harvesting system with rooftop collection
- Water flows through pipes into the filtration system
- Provides alternative water during drought
- Environmentally friendly and sustainable solution
- Improves water conservation awareness

METHODOLOGY

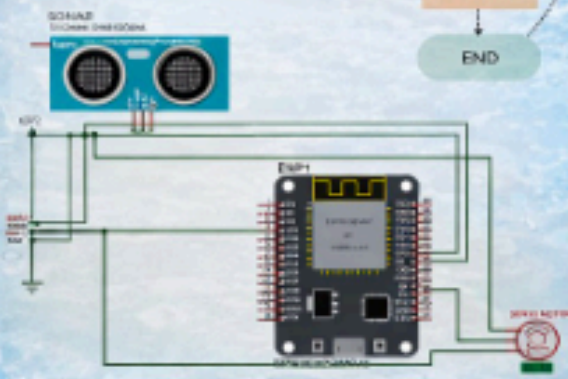
1. Rainwater is ollected from the rooftop using gutters
2. Water flows through pipes into filtration system
3. Filtration unit removes debris and impurities
4. Clean water is directed into the storage tank
5. Water can be used manually via dowrpipes when needed



FLOWCHART OF SYSTEM



SCHEMATIC DIAGRAM



ABSTRACT

RAINWATER HARVESTING SYSTEM WITH ROOFTOP STORAGE TANK & FILTRATION UNIT

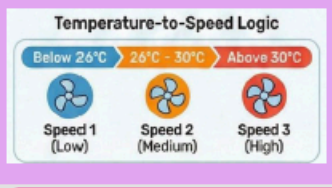
DURGASHINI A/P RAGU

PENYELIA : PN NAAGAJOOTHI A/P ADIN NARAINA

Rainwater scarcity and overreliance on treated municipal water remain major challenges in residential areas. This project aims to design and develop a rainwater harvesting system integrated with a rooftop storage tank and filtration unit for efficient non-potable water usage. This system aligns with SDG 6 Clean Water and Sanitation by promoting sustainable water conservation management. Rainwater is collected from rooftop surfaces through gutters and downpipes into an elevated storage tank. A multi-stage filtration unit is incorporated to remove debris, sediments and impurities before storage. The design utilizes gravity flow to ensure efficient distribution without external energy. Testing was conducted to evaluate collection efficiency, filtration effectiveness, and storage performance under varying rainfall conditions. Observations show improved water clarity and reduced suspended particles after filtration. Data analysis indicates the system can consistently supply usable non-potable water for daily use. The system reduces dependency on treated water and promotes environmental sustainability by minimizing water wastage and runoff. It encourages eco-friendly practices among households and supports long-term water conservation efforts. The estimated cost of the system is kept low through the use of locally available and affordable materials. In conclusion, the developed rainwater harvesting system is an effective and sustainable solution for residential water conservation.

Keywords : Rainwater Harvesting, Rooftop Storage Tank, Filtration Unit, Water Conservation, Sustainable Water System, SDG 6 Clean Water and Sanitation, Gravity Flow, Non-Potable Water Reuse, Eco-Friendly System, Cost-Effective Design.





ENERGY-EFFICIENT SMART FAN WITH AUTOMATIC CONTROL AND IOT



SUPERVISOR: PUAN NUR HADIANA BINT NASRUDIN

I. EXECUTIVE SUMMARY

The Energy-Efficient Smart Fan uses an ESP32 and Arduino Nano to automate cooling and reduce electrical waste. It integrates PIR, DHT22, and ACS712 sensors for real-time monitoring via the Blynk app and I2C LCD.

II. PROBLEM IDENTIFICATION

Traditional fans lack the intelligence to deactivate when rooms are empty or adjust speeds to temperature changes, causing significant energy wastage and high utility costs.

III. OBJECTIVES

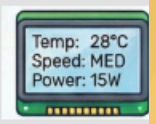
- To develop an automated cooling system using ESP32/Arduino Nano and environmental sensors for precise regulation.
- To integrate IoT monitoring via Blynk and I2C LCD for real-time power tracking.

IV. SDG ELEMENTS

- This project supports SDG 7 (Affordable and Clean Energy) by focusing on Target 7.3: doubling the global rate of improvement in energy efficiency through smart automation.

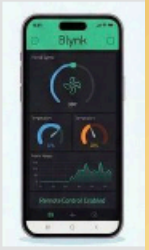
V. PRODUCT DEVELOPMENT

A dual-microcontroller architecture uses the Arduino Nano for sensor polling and ESP32 for Wi-Fi connectivity. It utilizes a 4-channel relay to trigger fan speeds based on PIR (motion) and DHT22 (temperature) data.



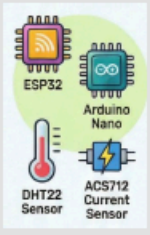
VI. PRODUCT TESTING

Testing from 24°C to 35°C confirmed 100% accuracy in automated speed transitions. The ACS712 sensor successfully tracked power metrics, showing a reduction in standby energy loss.



VII. PRODUCT IMPACT

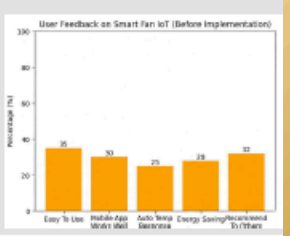
Users gain a smarter, sustainable cooling solution that lowers electricity bills and enhances convenience. The system promotes environmental awareness through accessible, real-time energy data.

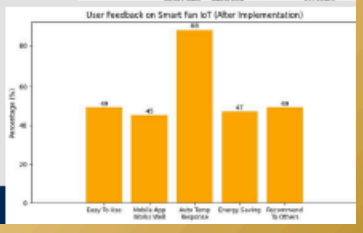


VIII. COSTING/BUDGET

The total project was developed for RM 160, making it a highly cost-effective solution for residential smart home commercialization.

FINDINGS









PRODUCT

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ABSTRACT

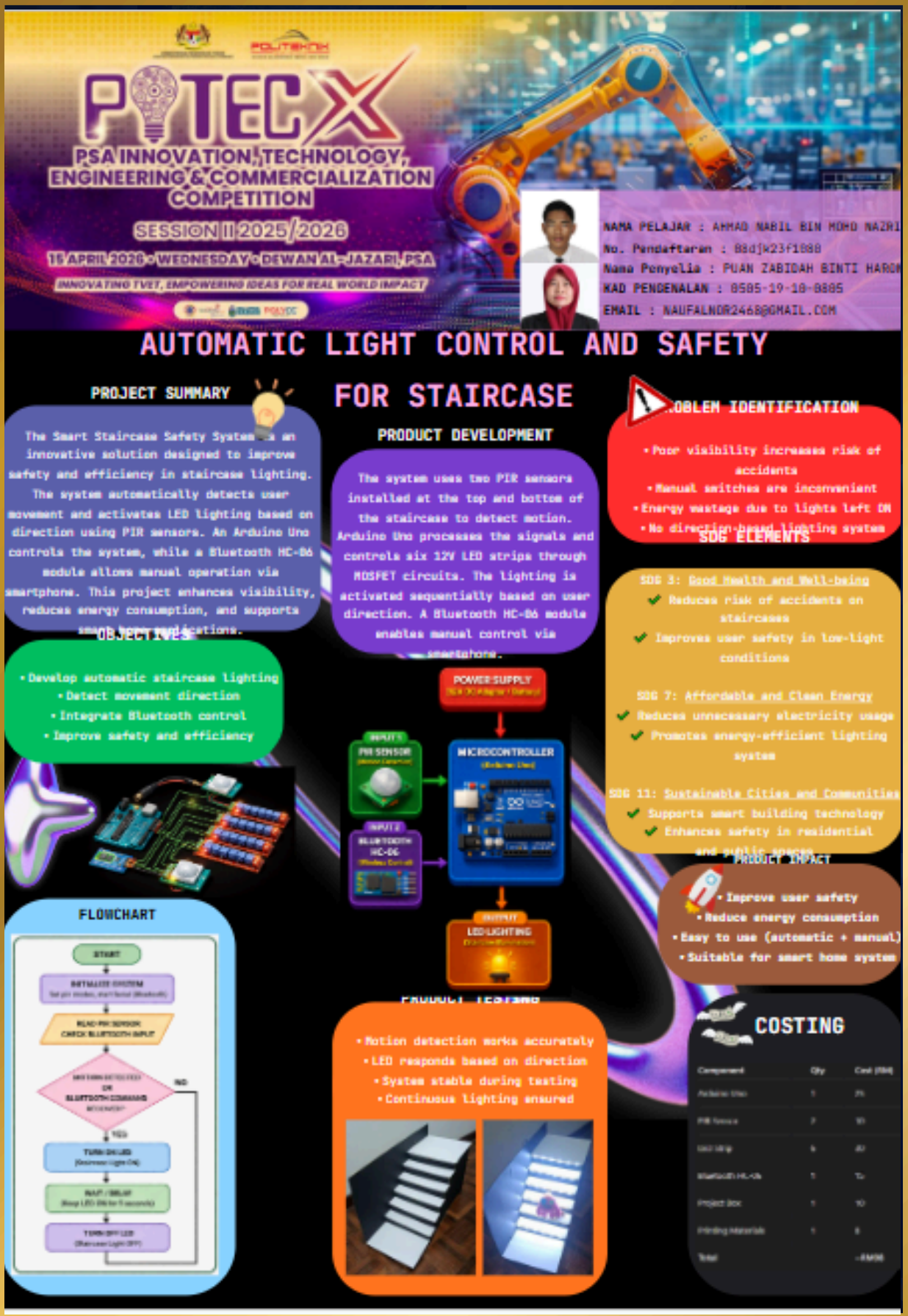
ENERGY-EFFICIENT SMART FAN WITH AUTOMATIC CONTROL AND IOT

ALYZDA LAURA IGNATIUS BINTI SAIFUL AZHAR IGNATIUS, NUR ALIA UMAIRAH BINTI AHMAD NASIR

PENYELIA : PN NUR HADIANA BINTI NASRUDIN

The rapid emergence of IoT technology significantly influences home automation, yet traditional cooling systems often lead to substantial energy wastage in residential settings due to a lack of automated regulation . This project aims to design and develop an automated smart fan using an ESP32 and Arduino Nano to optimize electrical efficiency and user convenience . This initiative aligns with SDG 7 (Affordable and Clean Energy) by promoting sustainable energy management through intelligent device automation. The methodology involves integrating a PIR motion sensor, DHT22 temperature sensor, and ACS712 current sensor to regulate fan speeds via a 4-channel relay module . The system is synchronized with the Blynk mobile app for remote IoT monitoring and utilizes an I2C LCD for local data visualization. Product testing evaluated the system's responsiveness to ambient temperatures ranging from 24°C to 35°C, confirming accurate automated speed adjustments. Data analysis of real-time power consumption metrics demonstrated a significant reduction in standby power and operational wastage. This innovation empowers users with data-driven cooling, providing a smarter and more effective solution than standard fans. The total development cost remains within a cost-effective budget suitable for residential commercialization . Ultimately, the successful implementation of this smart fan system provides a reliable approach to sustainable home automation and reduced utility costs.

Keywords : IoT, Energy Efficiency, Smart Fan, Automation


PITEC-X
PSA INNOVATION, TECHNOLOGY, ENGINEERING & COMMERCIALIZATION COMPETITION
SESSION II 2025/2026
15 APRIL 2026 • WEDNESDAY • DEWAN AL-JAZARI, PSA
INNOVATING TVET, EMPOWERING IDEAS FOR REAL WORLD IMPACT
NAMA PELAJAR : AHMAD NABIL BIN MOHD NAZRI
No. Pendaftaran : 88djk23f1088
Nama Penyelia : PUAN ZABIDAH BINTI HARO
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EMAIL : NAUFALNDR2468@GMAIL.COM
AUTOMATIC LIGHT CONTROL AND SAFETY FOR STAIRCASE
PROJECT SUMMARY
The Smart Staircase Safety System is an innovative solution designed to improve safety and efficiency in staircase lighting. The system automatically detects user movement and activates LED lighting based on direction using PIR sensors. An Arduino Uno controls the system, while a Bluetooth HC-06 module allows manual operation via smartphone. This project enhances visibility, reduces energy consumption, and supports
OBJECTIVES
• Develop automatic staircase lighting
• Detect movement direction
• Integrate Bluetooth control
• Improve safety and efficiency
PRODUCT DEVELOPMENT
The system uses two PIR sensors installed at the top and bottom of the staircase to detect motion. Arduino Uno processes the signals and controls six 12V LED strips through MOSFET circuits. The lighting is activated sequentially based on user direction. A Bluetooth HC-06 module enables manual control via smartphone.
POWER SUPPLY
PIR SENSOR
MICROCONTROLLER
HC-06
LED LIGHTING
OBLEM IDENTIFICATION
• Poor visibility increases risk of accidents
• Manual switches are inconvenient
• Energy wastage due to lights left ON
• No direction-based lighting system
SDG ELEMENTS
SDG 3: Good Health and Well-being
✔ Reduces risk of accidents on staircases
✔ Improves user safety in low-light conditions
SDG 7: Affordable and Clean Energy
✔ Reduces unnecessary electricity usage
✔ Promotes energy-efficient lighting system
SDG 11: Sustainable Cities and Communities
✔ Supports smart building technology
✔ Enhances safety in residential
PRODUCT IMPACT
• Improve user safety
• Reduce energy consumption
• Easy to use (automatic + manual)
• Suitable for smart home system
FLOWCHART
START
NO
YES
PRODUCT TESTING
• Motion detection works accurately
• LED responds based on direction
• System stable during testing
• Continuous lighting ensured
COSTING
Component
Qty
Cost (RM)

ABSTRACT

AUTOMATIC LIGHT CONTROL AND SAFETY FOR STAIRCASE

AHMAD NABIL BIN MOHD NAZRI

PENYELIA : PN ZABIDAH BINTI HARON

Poor visibility on staircases can increase the risk of accidents, especially in low-light conditions.

This project aims to develop an automatic staircase lighting system that detects movement and controls lighting based on user direction. This innovation supports Sustainable Development Goals (SDG), particularly Goal 3 (Good Health and Well-being) and Goal 7 (Affordable and Clean Energy) by enhancing safety and promoting energy efficiency. The system is developed using two Passive Infrared (PIR) sensors placed at the top and bottom of the staircase to detect motion. An Arduino Uno microcontroller processes the sensor inputs and controls six 12V LED strips through MOSFET circuits. A Bluetooth HC-06 module is also integrated to allow manual control using a smartphone. Product testing was conducted to evaluate the accuracy of motion detection and lighting response. The results show that the system successfully activates the LED lights sequentially based on movement direction. The system also maintains lighting until the user reaches the opposite end, ensuring continuous visibility. The product improves safety by reducing the risk of accidents and enhances energy efficiency by operating only when needed. It also provides user convenience through automatic and manual control features. This innovation has strong potential for implementation in residential and commercial buildings. The estimated cost of the project is low and affordable, making it suitable for practical applications. In conclusion, the system successfully demonstrates an effective and smart solution for staircase safety and lighting automation.

Keywords : Smart Staircase System, Motion Detection, PIR Sensor, Arduino Uno, LED Strip, Bluetooth HC-06, Automatic Lighting, Energy Efficiency, Smart Hom





SUPERVISOR:
PUAN AKMARYA SYUKHAIRUNISAH BINTI MOHD AKHIR

NAME: MISHA A/P ELLAPPEN NAIDU
NO MATRIC: 08DEU23F2008



SOLAR-BASED AI-IOT SMART SHOE FALL DETECTOR USING ESP32 MICROCONTROLLER FOR ELDERLY INDIVIDUALS

PROJECT SUMMARY

Solar-Based AI-IoT Smart Shoe Fall Detector designed to detect falls among elderly individuals. The system integrates MPU6050 and FSR sensor to monitor gait patterns and detect abnormal movement. An intelligent threshold-based approach is used to analyze motion and pressure data. When a fall is detected, the system triggers a buzzer and sends real-time alerts via Blynk IoT application.

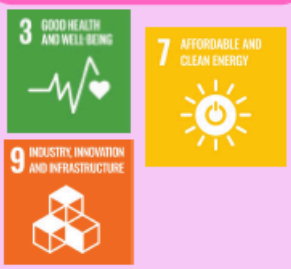
METHODOLOGY

The system utilizes the ESP32 microcontroller, MPU6050 sensor (accelerometer + gyroscope), and FSR pressure sensor to monitor user movement and detect falls. Data is analyzed using threshold-based algorithms, and the system is powered primarily by a mini solar panel with a lithium-ion battery for backup. Alerts are sent to caregivers via the Blynk IoT app.

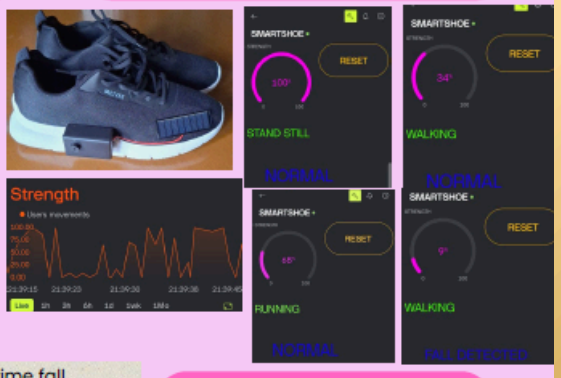
PROBLEM STATEMENTS

1. Charging dependency limits continuous monitoring.
2. Existing systems suffer from low accuracy and false alarms.
3. Lack of a user-friendly, continuous alert system for caregivers.

SDG ELEMENTS



PRODUCT TESTING



OBJECTIVES

1. Design and develop a solar-powered smart shoe with lithium-ion battery and supercapacitor for continuous operation.
1. Create a sensor-based fall detection system using MPU6050 and FSR, applying threshold-based methods with AI integration potential.
1. Implement an IoT-based fall monitoring and alert system using the Blynk platform for real-time notifications to caregivers.

PRODUCT IMPACT

1. Enhanced Safety : Provides real-time fall detection, reducing the risk of delayed response and minimizing injury.
2. Independent Living: Empowers elderly individuals to live independently by offering continuous monitoring and immediate alerts to caregivers.
3. Sustainable Design: Solar-powered system reduces reliance on batteries, making the solution eco-friendly and cost-effective in the long term.

COSTING



ABSTRACT

SOLAR-BASED AI-IOT SMART SHOE FALL DETECTOR USING ESP32 MICROCONTROLLER FOR ELDERLY

MISHA A/P ELLAPPEN NAIDU

PENYELIA : PN AKMARYA SYUKHAIRILNISAH BINTI MOHD AKHIR

Falls among elderly individuals are a leading cause of injuries and loss of independence, posing a significant challenge to healthcare systems. The main objective of this project is to design and develop a solar-powered, AI-IoT-based smart shoe fall detection system for elderly individuals, providing real-time monitoring and alerts. This project supports the United Sustainable Development Goal (SDG) 3: Good Health and Well-being, by improving elderly care through innovative healthcare technology. The system integrates a mini solar panel, a lithium-ion battery, an MPU6050 sensor, an FSR pressure sensor, and an ESP32 microcontroller. It uses a threshold-based algorithm to detect abnormal gait patterns, powered by solar energy to ensure sustainability and continuous monitoring. Data is processed locally and transmitted to caregivers via the Blynk IoT platform. Testing showed that the system effectively detects falls in real-time, with accurate readings from the MPU6050 and FSR sensors. The real-time strength graph displayed in the Blynk app provides caregivers with essential data about the user's movements, and fall detection works reliably in various scenarios. This system offers enhanced safety and independence for elderly individuals, reducing the risk of delayed response. It alleviates the burden on caregivers by providing real-time notifications. Moreover, its eco-friendly design supports sustainable technology in healthcare. The total cost for materials and components for the system is RM180.11, including the ESP32, sensors, and solar panel. The Solar-Based AI-IoT Smart Shoe Fall Detector provides a practical, energy-efficient, and reliable solution to improve fall detection and enhance the quality of life for elderly individuals.

Keywords : AI-IoT, ESP32, Smart Shoe



EXECUTIVE SUMMARY

The IoT Smart Farm with Leaf Disease Detection system is an innovative agricultural solution designed to improve farming efficiency through automation and real-time monitoring. This project integrates Internet of Things (IoT) technology with environmental sensors and image processing techniques to assist farmers in managing crops effectively.

The system utilizes an ESP32 microcontroller to collect data such as soil moisture, temperature, and humidity. This data is transmitted to a cloud platform, allowing farmers to monitor farm conditions remotely using a smartphone or computer. An automated irrigation system is implemented to ensure optimal water usage by activating a water pump when the soil moisture level falls below a predefined threshold.

In addition, a camera module is used to capture images of plant leaves, which are then analyzed to detect early signs of diseases. This feature enables farmers to take preventive actions before the disease spreads, thus reducing crop loss.

Overall, this project demonstrates how modern technology can be applied to agriculture to increase productivity, reduce labor, and promote sustainable farming practices.

OBJECTIVE

The main objective of this project is to develop an IoT-based smart farming system that can monitor environmental conditions such as soil moisture, temperature, and humidity in real time. Additionally, the project aims to implement an automated irrigation system to optimize water usage and to develop a leaf disease detection system using image processing techniques. The system also enables remote monitoring through a cloud platform to improve farming efficiency and crop management.

COSTING/BUDGET

The total estimated cost to develop this prototype is approximately RM193, which includes components such as ESP32, sensors, relay module, water pump, camera module, and other supporting materials, making it a low-cost and affordable solution for small-scale farmers.



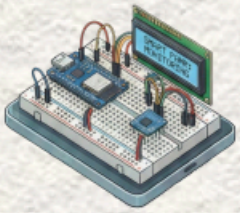
PRODUCT IMPACT

The IoT Smart Farm with Leaf Disease Detection system provides significant benefits by improving farming efficiency, reducing labor costs, and increasing crop yield through early disease detection and automated irrigation. It also contributes to environmental sustainability by minimizing water wastage and reducing the need for excessive pesticide use, while helping farmers adopt modern smart agriculture technologies.

IOT SMART FARM CONTROL WITH LEAF DISEASE







PROBLEM IDENTIFICATION

Agriculture today faces several challenges, especially for small and medium-scale farmers. The key problems identified are:

1. Manual Monitoring
2. Farmers need to physically inspect crops, which is time-consuming and inefficient.
3. Inefficient Water Usage
4. Traditional irrigation systems often result in overwatering or underwatering due to lack of proper monitoring.
5. Late Detection of Plant Diseases
6. Leaf diseases are often detected too late, causing significant crop damage and reduced yield.
7. Lack of Real-Time Data
8. Farmers do not have access to real-time environmental data, making it difficult to make accurate decisions.
9. High Labor Dependency
10. Manual processes increase labor costs and reduce overall efficiency.

PROBLEM IDENTIFICATION

This project supports several United Nations Sustainable Development Goals (SDGs):

SDG 2: Zero Hunger
The system helps increase agricultural productivity and food security by improving crop health monitoring.

SDG 6: Clean Water and Sanitation
Smart irrigation reduces water wastage by supplying water only when needed.

SDG 9: Industry, Innovation and Infrastructure
This project promotes innovation by integrating IoT and smart technologies in agriculture.

SDG 12: Responsible Consumption and Production
Efficient resource usage reduces waste and promotes sustainable farming practices.

SDG 13: Climate Action
Optimized water usage and reduced pesticide application contribute to environmental protection.

PRODUCT DEVELOPMENT

The development of the IoT Smart Farm system is divided into several phases:

1. Planning Phase
   - Identify project objectives and requirements
   - Conduct literature review
   - Select suitable components
2. Design Phase
   - Design system architecture
   - Create block diagram and flowchart
   - Plan hardware and software integration
3. Hardware Development
   - Install soil moisture sensor and DHT22 sensor
   - Connect ESP32 microcontroller
   - Integrate relay module and water pump
   - Install camera module
4. Software Development
   - Program ESP32 using Arduino IDE
   - Develop IoT dashboard (Blynk/Firebase)
   - Implement image processing for disease detection
5. Integration Phase
   - Combine hardware and software components
   - Test communication between sensors and cloud
6. Prototype Development
   - Build small-scale farm model
   - Install system and conduct testing

PRODUCT TESTING

The system was tested to evaluate its functionality and performance:

1. Sensor Testing
   - Soil moisture sensor accurately detects soil condition
   - DHT22 provides stable temperature and humidity readings
2. Irrigation System Testing
   - Water pump activates when soil moisture is below threshold
   - System stops irrigation when moisture is sufficient
3. IoT Communication Testing
   - Data successfully transmitted to cloud platform
   - Real-time monitoring achieved
4. Leaf Disease Detection Testing
   - Camera captures leaf images clearly
   - System detects unhealthy leaves based on color changes
5. System Reliability Testing
   - Continuous operation tested over several hours
   - System performs consistently without major errors


PN.NUR HADIANA BINTI NASRUDDIN


ROZARIDZ AMMAR EIZHAL BIN ROZATULFAZILAN
08DJK23F2004


MUHAMMAD SHAH FIKRI HAFIZ BIN ABDUL JALIL
08DJK23F2008

ABSTRACT

IOT SMART FARM CONTROL WITH LEAF DISEASE

ROZARIDZ AMMAR EIZHAL BIN ROZATULFAZILAN,MUHAMMAD SHAHFIKRI HAFIZ BIN ABDUL JALIL

PENYELIA : PN NUR HADIANA BINTI NASRUDIN

This project proposes an IoT Smart Farm Control System with Leaf Disease Detection designed to improve agricultural productivity through automation, monitoring, and early disease prevention. The system integrates IoT technology, AI-based leaf image analysis, and automated irrigation control to assist farmers in managing their crops more efficiently.The system consists of three main modules: a smart irrigation system using soil moisture sensors, a leaf disease detection system utilizing the ESP32-CAM with AI image processing,and an animal deterrent system using motion detection and ultrasonic sound. All data and control actions are connected through IoT, allowing real-time monitoring via a smartphone or web interface.Through simulation using Proteus software, the proposed system demonstrated the ability to automate watering based on soil conditions, detect leaf diseases early, and alert farmers of any animal activity. These functions aim to save water, reduce manual labor, and prevent croplosses.In conclusion, this project successfully combines IoT, artificial intelligence, and automation to create an innovative, efficient, and sustainable smart farming solution that can benefit small-scale farmers and promote modern agricultural practices.

Keywords : IoT, Smart Farming, Leaf Disease Detection, Automated Irrigation



GAS DETECTOR

WITH IOT



MASLIZAH BINTI MUNAHDAR
SUPERVISOR



MUHD IZZUDDIN TAFTAZANI BIN DZULKIPLEEY
08DJE23F2016



MUHAMMAD ALIF SHAH ALAM SHAH
08DJE23F2014

INTRODUCTION

GAS LEAKAGE IS A SERIOUS SAFETY ISSUE THAT CAN LEAD TO FIRE HAZARDS, EXPLOSIONS, AND HEALTH RISKS. TRADITIONAL GAS DETECTION SYSTEMS ONLY PROVIDE LOCAL ALERTS AND LACK REAL-TIME MONITORING CAPABILITIES. WITH THE ADVANCEMENT OF IOT TECHNOLOGY, GAS MONITORING SYSTEMS CAN NOW BE INTEGRATED WITH MOBILE APPLICATIONS TO PROVIDE REMOTE ACCESS AND INSTANT NOTIFICATIONS.

PROBLEM STATEMENT

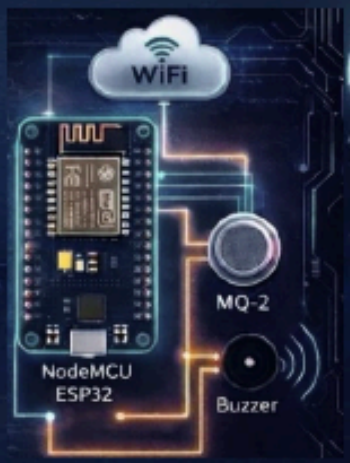
GAS LEAKAGE IS OFTEN UNDETECTED UNTIL IT BECOMES DANGEROUS. EXISTING SYSTEMS LACK REMOTE MONITORING AND AUTOMATIC RESPONSE FEATURES. THEREFORE, A SMART GAS MONITORING SYSTEM IS NEEDED TO DETECT GAS LEVELS EARLY AND PROVIDE REAL-TIME ALERTS.

OBJECTIVES

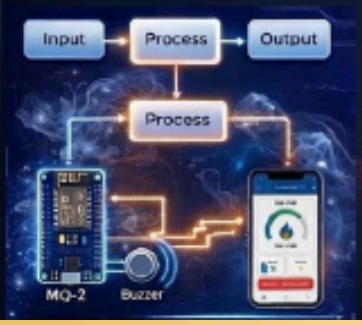
- ☑ REAL -TIME LEAKAGE DETECTION
- ☑ REMOTE IOT MONITORING
- ☑ FIRE RISK WARNING ISSUANCE

IMPACT OF INNOVATION

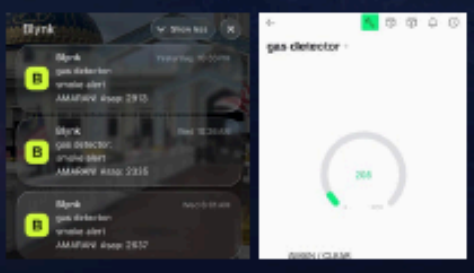
- ENHANCES SAFETY THROUGH EARLY DETECTION OF GAS LEAKS.
- MONITORS GAS LEVELS VIA MOBILE DEVICES OR COMPUTERS.
- PROVIDES IMMEDIATE ALERTS THROUGH NOTIFICATIONS AND ALARMS



METHODOLOGY



RESULTDATA



CONCLUSION & CONTRIBUTION

DEVELOPMENT OF A SMART GAS MONITORING SYSTEM THAT INTEGRATES WITH LOT ENSURES EARLY GAS LEAK DETECTION AND REDUCES POTENTIAL RISKS.

COSTING BUDGET

TOTAL :RM250

ABSTRACT

GAS DETECTOR WITH IOT

MUHAMMAD IZZUDDIN TAFTAZANI BIN DZULKIPLEEY, MUHAMMAD ALIF SHAH ALAM SHAH

PENYELIA : PN MASLIZAH BINTI MUNAHDAR

Gas leakage is one of the major causes of fire and explosion hazards that threaten human safety. This project aims to develop an IoT-based gas detection system that provides early warning and real-time monitoring. This project supports Sustainable Development Goals (SDG), particularly in ensuring safety, health, and well-being. The system is developed using an MQ-2 gas sensor connected to an ESP32 microcontroller to detect gas concentration. The collected data is processed and transmitted to the Blynk application via WiFi for remote monitoring. Additionally, LEDs, a buzzer, and an exhaust fan are integrated to provide automatic responses based on gas levels. System testing shows that the sensor accurately detects gas concentration changes and responds according to predefined thresholds. The data is successfully transmitted in real-time to the mobile application, allowing users to receive instant notifications. The analysis results indicate that the system operates reliably and consistently under different conditions. This project enhances user safety by providing early detection of gas leakage and reducing potential risks. It also enables remote monitoring and automatic response to hazardous situations. Furthermore, the system is suitable for residential and small industrial applications. The development cost of this project is low and utilizes affordable and easily available components. In conclusion, the Gas Detector with IoT system is successfully developed as a practical, effective, and reliable solution to improve user safety.

Keywords : IoT, Gas Detection, ESP32, Real-Time Monitoring, Safety System





PN. ZABIDAH BINTI HARON
PENYELIA

KETUA KUMPULAN



MUHAMMAD ZIKRI BIN ZAIDI
08DJK23F2002



SHAFIRUL AZMI UZAIR BIN SAMINGAN
08DJK23F2010

COLOR SORTING MACHINE WITH IOT

EXECUTIVE/PROJECT SUMMARY

1. Build a machine that can sort objects based on color.
2. Replace manual sorting that is slow and can cause mistakes.
3. Use a color sensor to detect different colors.
4. Use a controller to process the data.

PROBLEM STATEMENT

- Manual color sorting is slow and not efficient.
- High risk of human error during sorting process.
- Lack of affordable automated systems for small-scale use.

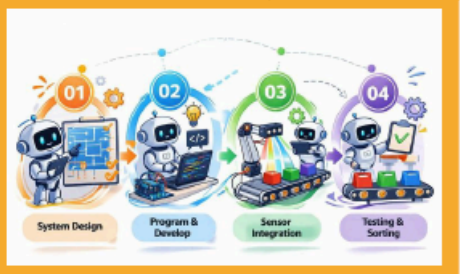
OBJECTIVE

- To design and develop an automated color sorting system using sensor-based detection.
- To enhance sorting accuracy and minimize human error through microcontroller integration.

SDG ELEMENTS

- SDG 9 – Enhances automation and innovation in industrial systems
- SDG 12 – Improves waste sorting for better resource management
- SDG 8 – Increases productivity with reduced manual labor

METHODOLOGY



PRODUCT IMPACT

- Enhances operational efficiency through automated sorting
- Increases accuracy and consistency in object classification
- Reduces labor cost and human intervention

DATA ANALYSIS



SAMPLE PRODUCT



COSTING

Item	Cost (RM)
Color Sensor	40
Microcontroller Unit	70
Servo Motor	30
Power Supply	25
Miscellaneous Components	25
Total	190
	RM190

ABSTRACT

COLOR SORTING MACHINE WITH IOT

MUHAMMAD ZIKRI BIN ZAIDI, SHAFIRUL AZMI UZAIR BIN SAMINGAN

PENYELIA : PN ZABIDAH BINTI HARON

Manual color sorting is inconsistent, time-consuming, and prone to human error. This project aims to develop an IoT-based automatic color sorting machine to improve efficiency and accuracy. This project supports the United Nations Sustainable Development Goals, particularly SDG 9 (Industry, Innovation and Infrastructure). The system uses a color sensor to detect object colors and a microcontroller to process the data. The processed data is transmitted through IoT for real-time monitoring, while a servo motor automatically sorts objects based on detected colors. Testing is conducted using various colored objects to evaluate system accuracy and performance. The collected data is analyzed to determine sorting efficiency and response time. The results show improved performance compared to manual methods. The product reduces human error and increases productivity in industrial processes. It also enables remote monitoring and efficient maintenance through IoT integration. The development cost is low due to affordable electronic components. In conclusion, the system enhances efficiency and automation in color sorting processes.

Keywords : Color Sorting Machine, IoT (Internet of Things), Automation, Color Sensor, Microcontroller, Industrial Efficiency, Smart System



PARKINSON'S GLOVE

Project Summary

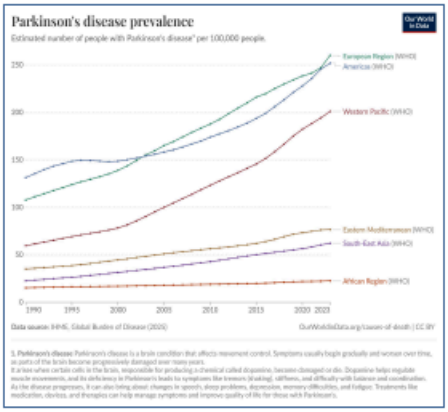
This project is a smart Parkinson's tremor suppression glove designed to detect hand tremor and provide vibration feedback to help reduce involuntary movement. The system uses an ESP32 as the main controller, an MPU6050 sensor for motion detection, four vibration motors as the output response, a 3.7V lithium-ion battery as the power source, a Type-C charger for recharging, and a power switch for manual control. The schematic shows the ESP32, MPU6050, battery supply, USB charging section, switch, and vibration outputs as the main hardware blocks.

The glove is also connected to the Blynk app so that the motion data and system status can be monitored wirelessly in real time. This makes the prototype portable, low cost, and suitable as a wearable assistive device for Parkinson's patients.

Problem Identification and Objectives

Parkinson's disease often causes hand tremors that make daily activities such as holding objects, writing, and eating difficult. These tremors can reduce independence and affect quality of life. A compact and affordable wearable system is needed to detect tremor motion and provide a response in real time.

The objectives of this project are to detect tremor using the MPU6050 sensor, process the data using ESP32, activate vibration motors when tremor is detected, monitor the system through Blynk, and build a portable glove powered by a rechargeable battery.



SDG Elements

This project supports SDG 3: Good Health and Well-Being because it focuses on improving the quality of life of people with Parkinson's disease. By creating a wearable assistive device that can help manage tremor symptoms, the project contributes to healthier and safer daily living.

It also supports affordable healthcare innovation because the prototype uses low-cost embedded components and simple wireless monitoring. This makes the solution more practical for student development and future assistive technology applications.

Table 1. Component Price List.

No.	Component	Quantity	Estimated Price (RM)
1	ESP32 DevKit	1	25.00
2	MPU6050 Sensor	1	8.00
3	Vibration Motor	4	3.00
4	3.7V Li-ion Battery	1	15.00
5	Type-C Charger Module	1	6.00
6	Power Switch	1	2.00
7	Glove	1	10.00
8	Jumper Wires / Connectors	1 set	5.00
9	Miscellaneous	1 set	5.00
	Total Estimated Cost		88.00

Methodology

The glove is built by mounting the MPU6050 sensor on the hand area to measure acceleration and angular movement. The ESP32 reads the sensor data, compares it with a tremor threshold, and controls the four vibration motors when tremor is detected. The power system uses a 3.7V battery, Tyre-C charger, and switch to make the device portable and rechargeable. The schematic layout shows the main electrical connections between these components.

The software flow begins with sensor initialization, followed by continuous reading of motion data, tremor detection, motor activation, and data transmission to the Blynk app. The Blynk interface is used to display sensor readings and system status wirelessly.

Data Analysis

Testing is carried out by wearing the glove and moving the hand under normal and tremor-like conditions. The MPU6050 data is observed to determine whether the system can detect sudden motion changes. When the tremor level exceeds the set threshold, the vibration motors should activate immediately.

Data analysis can be shown using graphs from Blynk or serial output, such as acceleration readings, tremor threshold comparison, and motor response timing. The expected result is that the system responds consistently and quickly when tremor motion is detected.

Costing

The estimated budget for this project is kept low by using common student-level components. The main cost items are the ESP32, MPU6050 sensor, four vibration motors, battery, USB charger module, switch, glove material, wires, and connectors.

A reasonable estimated total budget is RM 80 to RM 150, depending on component quality and glove material. This makes the prototype affordable and suitable for school or college-level development.

Product Impact

This project can help users better manage hand tremor through a wearable and portable solution. It may improve comfort, control, and confidence during daily activities. The wireless monitoring feature also makes the system easier to observe and demonstrate.

From an academic point of view, the project shows the integration of sensors, microcontrollers, motor control, battery charging, and mobile IoT monitoring in one prototype. It is a practical example of embedded system design for healthcare support.

More Information:

IRMA BAIZURI BINTI MOHD AKHIR (PENYELIA)
MUHAMMAD QUSYAIRI BIN ADNAN [08DEU23F2012]
DEPARTMENT OF ELECTRICAL ENGINEERING
POLITEKNIK SULTAN SAHUDDIN ABDUL AZIZ SHAH

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9. National Institute of Neurological Disorders and Stroke, "Parkinson's Disease Information Page," 2024.

ABSTRACT

PARKINSON'S GLOVES

MUHAMMAD QUSYAIRI BIN ADNAN

PENYELIA : PN IRMA BAIZURI BINTI MOHD AKHIR

Parkinson's disease is a progressive neurological disorder that causes involuntary hand tremors, significantly affecting patients' ability to perform daily activities. This project aims to develop a smart tremor suppression glove using an ESP32 microcontroller and MPU6050 sensor to detect and respond to abnormal hand movements. The project supports Sustainable Development Goal (SDG) 3, which focuses on ensuring healthy lives and promoting well-being for all ages. The glove is designed by integrating an MPU6050 accelerometer and gyroscope with an ESP32 to monitor motion data in real time. When tremor activity exceeds a predefined threshold, the system activates four vibration motors embedded in the glove to provide stabilizing feedback. The device is powered by a 3.7V lithium-ion battery with a Type-C charging module and includes a power switch for user control, while the Blynk application enables wireless monitoring and data visualisation. Testing shows that the system is capable of detecting motion changes and activating the motors effectively under tremor conditions. The prototype demonstrates a low-cost and portable solution that can assist users in managing hand tremors. The estimated project cost remains affordable for student-level development. In conclusion, the proposed glove offers a promising wearable assistive technology for Parkinson's patients and has potential for further enhancement.

Keywords : Parkinson's Disease, Tremor Suppression, Smart Glove, ESP32, MPU6050, Wearable Technology



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TEAM MEMBER



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IOT-BASED SMART INHALER FOR REAL TIME MONITORING OF ASTHMA AND COPD PATIENTS

PROJECT SUMMARY

This project presents an IoT-Based Smart Inhaler designed for real-time monitoring of asthma and COPD patients. The system integrates sensors, a mobile application, and cloud connectivity to track inhaler usage, provide reminders and detect environmental hazards. Additionally, it includes an emergency feature that sends alerts and location information to caregivers. This innovation aims to improve patient safety, medication adherence, and overall health management.

OBJECTIVE

- To develop a prototype of IoT-Based Smart Inhaler for Real-Time Monitoring of Asthma and COPD Patients
- To design a mobile application that provides reminders, feedback, alerts, and emergency support features such as GPS location

PROBLEM IDENTIFICATION

01 • Conventional inhalers do not track doses, so patients cannot know the remaining medication

02 • Cannot detect environmental triggers like polluted air or harmful gases.

03 • Patients in respiratory distress may not have a quick way to send emergency alerts for help.

SDG ELEMENTS

- SDG 3: Good Health and Well-being
  Improve patient health
- SDG 9: Industry, Innovation and Infrastructure
  Use of IoT technology
- SDG 11: Sustainable Cities and Communities
  Environmental awareness

PRODUCT IMPACT

- Improve real-time health monitoring
- Help users be more disciplined in using inhalers
- Reduce the risk of asthma attacks
- Provide emergency assistance faster
- Improve patients' quality of life

METHODOLOGY

- Hardware: Sensor + Microcontroller (ESP32)
- Software: Mobile app (MIT App Inventor)
- Cloud: Blynk platform for real-time data monitoring
- System Flow:
- The sensor detects inhaler use
- Data is sent to the cloud
- The application displays data to the user
- Notifications & alerts are sent if necessary
- Emergency button send SMS + call

PRODUCT



COST BUDGETING

Component and materials	Description	Cost(RM)- Batch
1. ESP32 Microcontroller (Wi-Fi + Bluetooth)	Raw Material	RM35.00
2. Force Sensitive Resistor	Raw Material	RM30.00
3. Air Quality Sensor Module (MQ135)	Raw Material	RM8.00
4. ON/OFF Button	Raw Material	RM2.00
5. Rechargeable Li-po Battery (3.7V, 1000mAh)	Raw Material	RM10.00
6. Speaker / Vibration Motor (for Alerts)	Raw Material	RM20.00
7. Battery Charging Module	Raw Material	RM30.00
8. Wires, PCB board, Resistors & Connectors	Raw Material	RM30.00
9. Protective Casing/ Enclosure for Inhaler	Raw Material	RM20.00
10.Emergency Button	Raw Material	RM2.00
Total Estimated Cost		TOTAL RM171.00
Selling Cost		TOTAL RM250.00

DATA ANALYSIS



ABSTRACT

IOT-BASED SMART INHALER FOR REAL-TIME MONITORING OF ASTHMA AND COPD PATIENTS

NUR SYAFIEKA FARISHA BINTI HASMADI, NURUL IZZAH BINTI AZMI

PENYELIA : BAHARUDDIN BIN MUSTAPH

Conventional inhalers lack dose indicators and environmental monitoring, which may compromise the safety of asthma and COPD patients. This project aims to develop an IoT-based smart inhaler for real-time monitoring of medication usage and surrounding air quality. The project supports SDG 3: Good Health and Well-being by enhancing patient safety and health monitoring. The product is developed by integrating a Force Sensitive Resistor (FSR) into the inhaler mechanism to detect actuation pressure and record usage frequency, while an ESP32 microcontroller processes and transmits the data wirelessly to a cloud platform for continuous monitoring. An MQ135 gas sensor is also incorporated to monitor air quality and detect environmental triggers that may worsen respiratory symptoms. Testing is conducted through repeated inhaler activation to verify accurate usage recording and estimation of remaining medication, while air quality data is analyzed to ensure sensor stability and reliability. Alert mechanisms, including a buzzer, vibration motor, emergency button, and mobile notifications, are tested to ensure fast and clear responses in critical situations. This device improves medication adherence, enhances awareness of environmental factors, and increases patient safety through real-time monitoring and alerts. The development cost is currently low but may vary depending on market prices of electronic components. In conclusion, this IoT-based smart inhaler offers a practical and effective solution for real-time respiratory health monitoring.

Keywords : oT-based Smart Inhaler, Real-time Health Monitoring, Air Quality Sensing

JABATAN

Kejuruteraan Mekanikal

01

AUTOFLIP BBQ

- ABDUL AZIZ BIN HUSEN
- ABDUL MUHAMMAD HAFIZ BIN ABDUL RASHID
- MUHAMMAD RAMADHAN BIN MAHMUD
- MUHAMMAD ZAID BIN MOHD ZAKUAN

02

AUTOMATIC SMART WINDOW

- MUHAMMAD NORHAFSHAM ILYASA BIN MOHAMAD HUSAINI
- HIBRY FAZREIN BIN EMRY JASRE
- MUHAMMAD FAYEED HARIZ BIN MIKAEL EDWARD

03

SMART RACK

- MUHAMMAD HAMZI BIN NIZAM
- MUHAMMAD SYARIL AIMAN BIN MOHD SYAFARUDDIN
- HANI DINIE BIN ZAMRI

04

SMART DUSTER

- ABDUL HAKIM BIN AMRAN
- MUHAMMAD HASRUL BIN ROSLAN
- ALIF DANIAL BIN AHMAD MUZAINI

05

AUTONOMOUS TROLLEY SYSTEM

- MUHAMMAD RIDZUAN BIN ABDUL LATIF
- MUHAMMAD AKMAL ALZAM BIN DZULKARNAIN
- MUHAMMAD AIMAN BIN ABDUL RAZAK

06

MINI AQUAPONIC

- SHAIRUL AIMAN BIN SHUHAILEY
- MUHAMMAD NOOR FIKRY BIN ABAS
- NOOR SHAMIMI BINTI BAHARIN

07

TRANSFORMABLE WHEELCHAIR

- MOHAMAD AMZAR BIN MOHD NIDZAM
- AHMAD FAIZARD AMIER BIN AHMAD BAKRI
- MUHAMMAD DANISH AKASHAH BIN MOHD RAZIF
- MUHAMMAD SHAZUL HAKIMI ALIF BIN SYAMZARI

08

INFINITY DESK

- KUHEN A/L PRAKASH
- SIVANESAN A/L P.CHARVANAN
- NAGEN A/L MUNIAM



AUTOFLIP BBQ

PROJECT SUMMARY

AUTOFLIP BBQ is an innovative automated grilling machine designed to replace manual flipping methods. By utilizing a wire rope transmission system powered by an electric motor, it ensures a consistent 360-degree rotation. This project focuses on improving cooking efficiency, reducing labor dependency, and ensuring even heat distribution for a perfect grill every time.





NAMA PENYELIA
TUAN ALIAS BIN OTHMAN

OBJECTIVE

- To design a mechanical rotation system that eliminates the need for manual flipping.
- To integrate a durable wire rope mechanism capable of operating under high-heat conditions.
- To enhance user safety by reducing prolonged exposure to direct heat and smoke.



KETUA KUMPULAN
ABDUL MUHAMMAD HAFIZ BIN ABDUL RASHID
(08DKM23F1085)

DATA ANALYSIS

Traction Stability : The wire rope system demonstrated zero slippage during a 60-minute continuous rotation test.
Load Capacity : The motor maintained a constant RPM even when the grill was loaded with its maximum weight capacity.
Smoothness : Achieved a seamless "hands-free" rotation without any mechanical jerking or vibration.

PROBLEM IDENTIFICATION

- Manual grilling is labor-intensive and requires constant human monitoring.
- Uneven flipping leads to inconsistent food quality and charred surfaces.
- Prolonged heat exposure poses health and safety risks to the operator.
- Conventional automatic grills are often expensive and complex to maintain.



AHLI KUMPULAN 1
ABDUL AZIZ BIN HUSEN
(08DKM23F1262)

METHODOLOGY

Design Phase : Conceptualized and modeled in *Autodesk Inventor* to ensure precise alignment of the pulley and wire rope system.
Fabrication Phase : Construction of a heavy-duty metal frame integrated with a high-torque DC motor.
Transmission Setup : Installation of a *wire rope* (tali dawai) mechanism to provide smooth and slip-free traction for the grill.
Final Assembly : Integration of control switches and safety housing for the electronic components.

SDG ELEMENTS

Goal 9: Industry, Innovation, and Infrastructure
- Promotes the use of affordable automation in small-scale food businesses.

Goal 8: Decent Work and Economic Growth
- Increases productivity and reduces the physical burden on food stall operators



AHLI KUMPULAN 2
MUHAMMAD RAMADHAN BIN MAHMUD
(08DKM23F2018)

COSTING / BUGDET

BIL	KOMPONEN	KUANTITI	HARGA KUANTITI (RM)	HARGA KESELURUHAN (RM)
1	FRAME STEEL	1	180	180
2	STAINLESS STEEL	1	60	60
3	NUT & BOLT	20	16	16
4	CHAIN	1	25	25
5	POWER SUPPLY	1	45	45
6	TIMER SWITCH	1	35	35
7	AC MOTOR	1	280	280
8	LIMIT SWITCH	2	24	24
9	CASTER WHEEL	4	40	40
10	ELECTRICAL WIRING	1	20	20
JUMLAH KESELURUHAN (RM)				755

PRODUCT IMPACT

- **Reduces Labor** : Allows a single operator to manage multiple grills simultaneously.
- **Superior Quality** : Ensures uniform cooking through constant, stable rotation.
- **High Durability** : The wire rope system is more heat-resistant and cost-effective than standard rubber belts.



AHLI KUMPULAN 3
MUHAMMAD ZAID BIN MOHD ZAKUAN
(08DKM23F1369)

ABSTRACT

AUTOFLIP BBQ

ABDUL MUHAMMAD HAFIZ BIN ABDUL RASHID,ABDUL AZIZ BIN HUSEN,
MUHAMMAD ZAID BIN MOHD ZAKUAN,MUHAMMAD RAMADHAN BIN MAHMUD

PENYELIA : EN. ALIAS BIN OTHMAN

Manual food grilling processes often result in uneven cooking and require continuous labor monitoring. This project aims to develop AUTOFLIP BBQ, an automated barbecue grill machine capable of controlling mechanical rotation consistently. In line with Sustainable Development Goal (SDG) 9, this innovation focuses on empowering small industries through the integration of efficient automation technology. The development methodology began with a detailed design using Autodesk Inventor software to ensure mechanical dimensional accuracy. Subsequently, this system integrates an electric motor connected to a wire rope mechanism to pull and rotate the grill in a controlled manner. Product testing was conducted by focusing on the smoothness of the wire rope traction system to ensure no slippage or interruption occurs during rotation. Data analysis was carried out by evaluating the wire rope tension and the stability of the grill rotation at various motor speed levels. The test results show that this traction system is capable of moving the grill smoothly and stably without requiring manual touch assistance. The impact of AUTOFLIP BBQ not only increases food preparation productivity but also significantly reduces the physical workload for users. Furthermore, the use of durable wire rope material makes it highly practical for long-term use. The total cost for this prototype development is estimated at RM700.00, covering motor components, transmission systems, and metal construction materials. In conclusion, this project successfully proves that a wire rope transmission system is effective in automating the food grilling process more systematically.

Kata Kunci : AUTOFLIP BBQ, Autodesk Inventor, Wire Rope Mechanism, Transmission System





PROTOTYPE AUTOMATIC SMART WINDOW

ABSTRACT

Auto Smart Window is an intelligent window system that operates both automatically and manually, and can be controlled via WiFi. This project helps solve the problem of users forgetting to close windows during rain and also assists people with disabilities (OKU). The system uses a rain sensor to detect weather changes and automatically close the window, while manual control can be done through a smartphone. Testing results show that the system responds in less than 1 second, proving its efficiency and effectiveness.

EXECUTIVE/PROJECT SUMMARY

Auto smart Window is an intelligent window system prototype designed to operate both automatically and manually, with additional control via WIFI connectivity. The prototype integrates smart sensing and control technology to enhance user convenience, improve safety, and increase accessibility, making it suitable for modern smart home environments.

PROBLEM IDENTIFICATION

Users often forget to close windows during rainfall, which can lead to property damage such as wet furniture, flooring, and electronic devices. Furthermore, disabled users (OKU) and elderly individuals may face difficulties operating windows manually, creating safety risks and limiting ease of use in daily life.

OBJECTIVES

The main objective of this project is to design and develop a smart window prototype that can automatically close when rain is detected and can also be controlled remotely using a mobile device via WiFi. The project also aims to improve user safety, reduce human error, and enhance accessibility for all users.

SDG ELEMENTS

This project supports SDG 11 (Sustainable Cities and Communities) by improving residential safety, promoting the integration of smart technologies, and enhancing inclusivity by providing easier access for users with physical limitations.

PRODUCT DEVELOPMENT/METHODOLOGY

The prototype is developed by integrating a rain sensor, microcontroller, and WiFi module to detect environmental changes and control the window mechanism. The system operates automatically based on weather conditions and can also be manually controlled through a mobile application. The development process includes system design, hardware integration, programming, and functional testing.

PRODUCT TESTING/DATA ANALYSIS

Testing was conducted under simulated rain conditions to evaluate system performance, response time, and reliability. The results show that the prototype responds in less than 1 second, demonstrating high efficiency and fast response capability. Data analysis also indicates consistent performance and stable system operation under repeated testing conditions.

PRODUCT IMPACT

This prototype significantly reduces the risk of rainwater damage, enhances home safety, and improves convenience for users, especially for disabled individuals. It also promotes the adoption of smart home technology and contributes to a more efficient and user-friendly living environment.

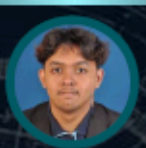
COSTING/BUDGET

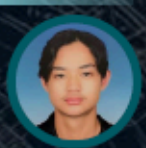
The total estimated cost of the prototype is approximately RM400, making it a cost-effective, practical, and scalable solution for household applications. The low-cost design also provides strong potential for future development and commercialization.



SUPERVISOR
ENCIK ALIAS BIN OTHMAN







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MEMBER
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MEMBER
MUHAMMAD FAYEED HARIZ BIN MIKAEL EDWARD
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CIRCUIT



PRODUCT/PROTOTYPE

ABSTRACT

AUTOMATIC SMART WINDOW

MUHAMMAD NORHAFSHAM ILYASA BIN MOHAMAD HUSAINI, HIBRY FAZREIN BIN EMRY JASRE, MUHAMMAD FAYEED HARIZ BIN MIKAEL EDWARD

PENYELIA : EN. ALIAS BIN OTHMAN

Projek Auto Smart Window ini dibangunkan sebagai satu sistem tingkap pintar yang berfungsi secara automatik dan manual serta boleh dikawal menggunakan sambungan WiFi. Projek ini bertujuan menyelesaikan masalah pengguna yang sering terlupa menutup tingkap, terutama ketika hujan, di samping membantu golongan OKU mengendalikan tingkap dengan lebih mudah dan selamat. Sistem ini menggunakan gabungan sensor hujan (rain sensor) untuk mengesan perubahan cuaca dan menghantar isyarat kepada mekanisme tingkap untuk ditutup secara automatik apabila hujan dikesan. Selain itu, pengguna juga boleh mengawal tingkap secara manual melalui peranti mudah alih menggunakan rangkaian WiFi. Projek ini adalah untuk mereka bentuk dan membangunkan satu produk yang berfungsi secara efisien dengan integrasi teknologi sensor dan kawalan pintar. Hasil pengujian menunjukkan bahawa sistem ini mampu bertindak balas dalam tempoh kurang daripada 1 saat, membuktikan kecekapan dan keberkesanannya dalam situasi sebenar. Bagi penambahbaikan pada masa hadapan, sistem ini dicadangkan untuk diintegrasikan dengan kawalan suara bagi membolehkan arahan diberikan melalui pertuturan, sekali gus meningkatkan lagi kebolehcapaian dan kemudahan penggunaan.

Kata Kunci : Auto Smart Window, sensor hujan, WiFi, kawalan automatik, OKU, tingkap pintar

KEMENTERIAN PENDIDIKAN TINGGI
KEMENTERIAN PENDIDIKAN TINGGI MALAYSIA

POLITEKNIK MALAYSIA
SULTAN SALAHUDDIN ABDUL AZIZ SHAH

PITEC-X

PSA INNOVATION, TECHNOLOGY, ENGINEERING & COMMERCIALIZATION COMPETITION

SESSION II 2025 / 2026

15 APRIL 2026 • WEDNESDAY • DEWAN AL-JAZARI, PSA

INNOVATING TVET, EMPOWERING IDEAS FOR REAL WORLD IMPACT

Malaysia MADANI PoLyCC

Smart Rack



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EXECUTIVE / PROJECT SUMMARY

SMART RACK is an automated tool management system designed to improve safety and inventory efficiency in technical workshops. The system integrates an ESP32 microcontroller with barcode identification, IR sensors, and a solenoid lock mechanism. Data is stored in a cloud-based database, allowing real-time monitoring of tool usage and borrower records. This project supports digital transformation towards Industry 4.0 in workshop management.

OBJECTIVES

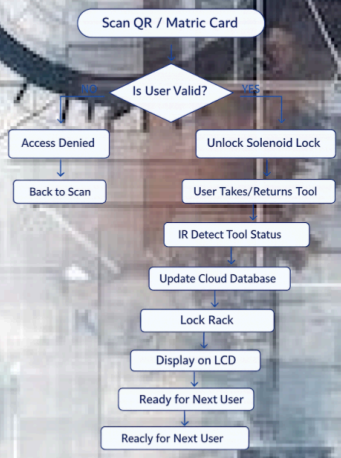
- To develop an automated tool storage system (SMART RACK)
- To improve tool tracking and inventory management efficiency
- To enhance workshop safety and security
- To enable real-time monitoring using cloud technology

SDG ELEMENTS

- **SDG 9 (Industry, Innovation and Infrastructure):** Implementation of smart technology in workshop systems
- **SDG 12 (Responsible Consumption and Production):** Efficient management of tools and resources
- **SDG 16 (Peace, Justice and Strong Institutions):** Promotes accountability and transparency

PRODUCT DEVELOPMENT / METHODOLOGY

- ESP32 microcontroller used as main controller
- Barcode scanner for user identification
- Solenoid lock for rack access control
- IR sensors installed on each hook to detect tool presence
- Cloud database used for storing and monitoring data in real-time



PROBLEM IDENTIFICATION

- Manual tool management leads to frequent tool loss
- Lack of real-time monitoring system
- Difficulty in tracking borrower information
- Poor discipline and accountability among users

PRODUCT TESTING / DATA ANALYSIS

- System successfully detects tool presence using IR sensors
- Barcode system accurately records user identity
- Data is stored and updated in real-time on cloud database
- Data is organized systematically for monitoring and analysis

Test no.	Time taken (s)	Result
1	1.21	Success
2	1.58	Fail
3	1.68	Success
4	0.96	Success
5	1.04	Success
6	3.86	Success
7	1.04	Fail
8	3.46	Success
9	0.86	Fail
10	1.48	success

PRODUCT IMPACT

- Reduces risk of tool loss significantly
- Improves discipline and responsibility among students
- Enhances workshop management efficiency
- Provides real-time monitoring and data transparency

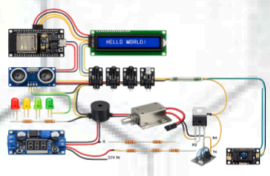
COSTING / BUDGET
Main Components
- ESP32 Dev Board – RM 25
- 16x2 I2C LCD – RM 12HC-SR04 Ultrasonic Sensor – RM 6
- IR Sensors (4 units) – RM 12
- Solenoid Lock – RM 30
- QR Code Scanner Module – RM 70

Supporting Components
Reed Switch (Magnetic Sensor) – RM 4
TIP122 Transistor – RM 3
Resistors – RM 2
LED Indicators (3 units) – RM 2
Active Buzzer – RM 3
Subtotal (Supporting): RM 14

Structure & HardwareRack
Frame / Structure – RM 50 – RM 100
Wiring, Connectors & PCB – RM 15
Subtotal (Hardware): RM 65 – RM 115

Software / Development Cost
Programming, ESP32 Coding, Cloud Integration, Testing & Debugging – RM 150 - 200

TOTAL ESTIMATED COST = RM 384 – RM 484





ABSTRACT

SMART RACK

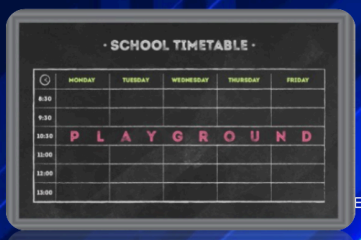
MUHAMMAD SYARIL AIMAN BIN MOHD SYAFARUDDIN, HANI DINIE BIN ZAMRI, MUHAMMAD HAMZI BIN NIZAM

PENYELIA : EN. MOHD FAUZI BIN DERANI

Pengurusan peralatan tangan di bengkel sering berhadapan dengan masalah kehilangan alatan dan rekod peminjaman manual yang tidak sistematik sehingga menjejaskan kelancaran amali. Projek SMART RACK ini dibangunkan dengan objektif utama untuk meningkatkan tahap keselamatan dan kecekapan pengurusan storan peralatan melalui sistem pemantauan automatik. Inovasi ini menyokong elemen SDG ke-9 iaitu Industri, Inovasi, dan Infrastruktur dengan mengintegrasikan teknologi pintar dalam pengurusan aset pendidikan. Metodologi pembangunan melibatkan penggunaan pengimbas kod bar kad matrik sebagai kunci akses utama yang disambungkan kepada kunci solenoid untuk kawalan pintu rak. Setiap cangkuk alatan dilengkapi dengan sensor inframerah dan indikator LED bagi mengesan serta memaparkan status kehadiran peralatan secara masa nyata. Hasil pengujian menunjukkan sistem berjaya berfungsi dengan stabil di mana data peminjam dan status alatan direkodkan secara tepat ke dalam pangkalan data. Analisis data membuktikan bahawa penggunaan sensor ini dapat meminimumkan ralat manusia dan mempercepatkan proses semakan inventori bengkel. Impak projek ini dapat memupuk budaya tanggungjawab dalam kalangan pelajar serta memberikan ketelusan dalam pemantauan aset oleh pensyarah. Dengan kos pembangunan yang efektif, sistem ini mampu mengurangkan risiko kerugian akibat kehilangan peralatan di institusi. Kesimpulannya, SMART RACK adalah penyelesaian inovatif yang memastikan pengurusan bengkel menjadi lebih sistematik, selamat, dan efisien selari dengan perkembangan teknologi semasa.

Kata Kunci : Smart Rack, Kod Bar, Sensor Inframerah, Pengurusan Bengkel, Keselamatan







PENYELI A
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SMART DUSTER

Ringkasan Eksekutif / Projek
Smart Duster ialah alat pembersih papan putih automatik untuk kegunaan kelas atau pejabat yang boleh dikawal menggunakan butang atau telefon

Objektif
- Meningkatkan kecekapan pembersihan.
- Menjimatkan masa dan tenaga.
- Menghasilkan reka bentuk praktikal.

Pengenalpastian Masalah
- Masa tidak efisien: Pembersihan manual mengambil masa yang lama.
- Kesan degil: Dakwat marker sukar dipadam sepenuhnya.
- Pembaziran tenaga: Memerlukan pergerakan fizikal berulang.

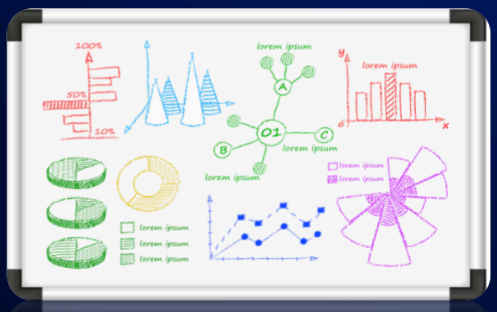
Elemen SDG
- Meningkatkan kesihatan pengguna.
- Mewujudkan persekitaran yang bersih.
- Menggalakkan penggunaan alat yang efisien.

Pembangunan Produk/Metodologi
- Mereka bentuk Smart Duster untuk kegunaan kelas dan pejabat.
- Menggunakan duster biasa dan motor kecil sebagai mekanisme utama.
- Kawalan sistem menggunakan push button atau telefon.

Ujian Produk/Analisis Data
- Ujian dilakukan di kelas dan pejabat .
- Dibandingkan dengan duster manual biasa.
- Smart Duster lebih cepat dan mudah digunakan.

Kesan Produk
- Meningkatkan kebersihan di kelas dan pejabat.
- Mengurangkan masa dan tenaga kerja pembersihan.
- Memudahkan pengguna dalam kerja harian.

Kos/Bajet
- Jumlah keseluruhan: ± RM900





ABSTRACT

SMART DUSTER

MUHAMMAD HASRUL BIN ROSLAN, ALIF DANIAL BIN AHMAD MUZAINI, ABDUL HAKIM BIN AMRAN

PENYELIA : EN. MOHD FAUZI BIN DERANI

Penyelenggaraan papan putih secara manual sering menyebabkan tahap kebersihan tidak konsisten serta memerlukan tenaga fizikal yang tinggi. Smart Duster dibangunkan bagi meningkatkan kecekapan pemadaman, kemudahan penggunaan, dan kualiti kebersihan di bilik darjah. Inovasi ini menyokong elemen Matlamat Pembangunan Mampan (SDG) melalui aplikasi teknologi pintar ke arah persekitaran pembelajaran yang lebih lestari. Pembangunan produk ini menggunakan mikropengawal ESP32 yang digabungkan dengan mekanisme bermotor untuk menggerakkan pemadam secara automatik. Selain itu, sensor inframerah (IR) atau suis had diintegrasikan bagi memastikan kedudukan dan liputan pembersihan dilakukan secara menyeluruh. Hasil pengujian data menunjukkan bahawa sistem ini mampu membersihkan papan putih dengan lebih berkesan berbanding kaedah manual. Analisis juga membuktikan sistem beroperasi secara sistematik dengan campur tangan pengguna yang minimum bagi memastikan ketekalan kebersihan. Smart Duster ini memberi impak besar dalam mengurangkan beban kerja fizikal warga pendidik dan pelajar. Ia juga meningkatkan kecekapan pengurusan masa serta memodenkan fasiliti pendidikan sedia ada. Kos keseluruhan bagi pembangunan projek ini adalah sebanyak RM900.00. Kesimpulannya, ia membuktikan bahawa integrasi automasi mampu memodenkan penyelenggaraan bilik darjah secara lebih efisien dan sistematik.

Kata Kunci : Papan Putih, Automasi, ESP32, Kebersihan



Autonomous Trolley System



Nama Penyelia:
MOHD FAUZI BIN DERANI



Ketua Kumpulan:
MUHAMMAD RIDZUAN BIN ABDUL LATIF
(08DKM23F2028)



Ahli Kumpulan 1:
MUHAMMAD AKMAL ALZAM BIN DZULKARNAIN
(08DKM23F2034)



Ahli Kumpulan 2:
MUHAMMAD AIMAN BIN ABDUL RAZAK
(08DKM23F2040)

1. OBJEKTIF

- Merekabentuk troli pintar yang boleh mengikuti pengguna secara automatik
- Menggunakan penderia untuk mengekalkan jarak selamat
- Meningkatkan keselamatan dan keselesaan pengguna

2. PENGENALPASTIAN MASALAH

- **Kesukaran mengendalikan troli konvensional** – Pengguna perlu menolak troli secara manual, terutamanya apabila troli menjadi berat atau tidak stabil, menjadikan pengalaman membeli-belah kurang selesa.
- **Kesan kepada golongan terdedah** – Warga emas, orang kelainan upaya (OKU), dan ibu bapa dengan anak kecil lebih sukar mengendalikan troli konvensional, meningkatkan risiko ketidakselesaan atau kemalangan kecil.
- **Risiko keselamatan** – Troli yang tidak stabil dan tidak mempunyai sistem pengelakan halangan boleh menyebabkan perlanggaran atau gangguan pergerakan di pasar raya.

3. RINGKASAN EKSEKUTIF/PROJEK

Autonomous Trolley System ini dilengkapi dengan sensor penghalang dan boleh dikawal oleh pengguna hanya melalui pergerakan tangan. Selain itu, troli ini turut mempunyai ciri-ciri keselamatan yang meningkatkan tahap keselamatan serta membantu meningkatkan produktiviti penggunaan.

4. ELEMEN SDG

- Kurangkan beban fizikal pengguna
- Penerapan teknologi automasi
- Sistem membeli-belah lebih selamat
- Troli boleh guna semula & cekap

5. PERKEMBANGAN PRODUK/METODOLOGI

- Reka bentuk troli (mekanikal & elektronik)
- Pemilihan komponen (motor, sensor, Arduino)
- Pemasangan sistem dan litar
- Pengaturcaraan sistem kawalan
- Ujian fungsi (Mengikuti pengguna & mengelak halangan)

6. PENGUJIAN PRODUK / ANALISIS DATA

- Ujian jarak pengesanan pengguna
- Ujian pengelakan halangan
- Analisis kestabilan pergerakan troli
- Sistem diuji untuk ketepatan dan kebolehpercayaan

7. KESAN PRODUK

- Memudahkan pengguna membeli-belah
- Meningkatkan keselamatan di pasar raya
- Mengurangkan keletihan fizikal
- Sesuai untuk warga emas & OKU
- Menyokong teknologi automasi IR 4.0

8. KOS/BAJET

Anggaran kos projek: RM 400

Komponen utama:

- Motor DC
- Motor Driver
- Arduino / Mikropengawal
- Sensor
- Bateri
- Roda & rangka

ABSTRACT

AUTONOMOUS TROLLEY SYSTEM

MUHAMMAD RIDZUAN BIN ABDUL LATIF, MUHAMMAD AKMAL ALZAM BIN DZULKARNAIN, MUHAMMAD AIMAN BIN ABDUL RAZAK

PENYELIA : EN. MOHD FAUZI BIN DERANI

The use of conventional shopping trolleys that are difficult to control has become a major issue, especially for the elderly, disabled individuals, and parents with young children. This project aims to develop an autonomous smart trolley that can follow users automatically while enhancing safety and comfort during shopping. In addition, the project supports SDG elements by reducing users' physical burden and applying automation technology in daily life. The product development involves mechanical and electronic design, selection of components such as motors, sensors, and an Arduino microcontroller, as well as system installation. The system is programmed to detect and follow the user while avoiding obstacles automatically. Testing was conducted on detection distance, obstacle avoidance capability, and movement stability of the trolley. The analysis shows that the system performs effectively with high accuracy and reliability. This product can ease users' movement, reduce physical fatigue, and improve safety in supermarkets. The total project cost is estimated at RM450. In conclusion, this smart trolley has strong potential as a useful innovation in the modern retail sector.

Keywords : Auto Smart Window, rain sensor, WiFi, automatic control, people with disabilities, smart window





En Asri Bin Mat Desa



Shairul Aiman Bin Shuhailey
08DKM23F2042



Muhammad Noor Fikry Bin Abas
08DKM23F2016



Noor Shamimi Binti Baharin
08DKM23F2006

Mini Aquaponic

PROJECT SUMMARY

Projek ini membangunkan sistem penyiraman automatik berasaskan masa, di mana tanaman akan disiram selama 15 saat dan berhenti selama 30 minit secara berulang. Sistem ini direka untuk memastikan penyiraman yang konsisten tanpa pemantauan manual.

PROBLEM IDENTIFICATION

- Penyiraman manual tidak konsisten
- Risiko terlupa menyiram tanaman
- Penggunaan masa dan tenaga yang tinggi
- Jadual penyiraman tidak teratur

OBJECTIVE

- Membangunkan sistem autosiram berjadual
- Menetapkan masa penyiraman yang konsisten
- Menyediakan alternatif pertanian moden yang kos rendah dan sesuai untuk penggunaan pendidikan
- Menjimatkan masa pengguna

SDG ELEMENTS

- SDG 2: Membantu meningkatkan pengeluaran tanaman melalui sistem penyiraman yang lebih efisien.
- SDG 6: Menggalakkan penggunaan air secara optimum dan mengurangkan pembaziran.

PRODUCT DEVELOPMENT

Komponen :
- Pam air
- Relay

Flow sistem:
1. Sistem bermula (power ON)
2. Pam air ON selama 15 saat
3. Pam OFF selama 30 minit
4. Kitaran berulang secara automatik

PRODUCT TESTING

- Ujian tempoh 15 saat penyiraman
- Ujian selang masa 30 minit
- Pemerhatian operasi berulang

Keputusan:
- Sistem berfungsi tepat mengikut masa
- Penyiraman konsisten sepanjang operasi

PRODUCT IMPACT

- Mengelakkan masalah terlupa menyiram
- Menjimatkan masa dan tenaga
- Penyiraman lebih sistematik
- Sesuai untuk tanaman kecil dan rumah

COSTING

- Tank transparent = Rm20
- Battery = Rm30
- Waterpump = Rm30
- Electronic = Rm20
- Pipe fittings = Rm50

Estimated Total = Rm150

Note: Some components were recycled to reduce cost and promote sustainability.

ABSTRACT

MINI AQUAPONIC

SHAIRUL AIMAN BIN SHUHAILEY, MUHAMMAD NOOR FIKRY BIN ABAS, NOOR SHAMIMI BINTI BAHARIN

PENYELIA : EN. ASRI BIN MAT DESA

This project identifies the problems of water wastage and dependence on chemical fertilizers in conventional agricultural systems. The main objective is to develop a mini aquaponics system that is efficient, sustainable, and environmentally friendly. The project supports elements of the Sustainable Development Goals (SDGs), such as sustainable water resource usage and sustainable food production.The product development involves integrating aquaculture and hydroponic systems into a single closed-loop ecosystem using a fish tank, water pump, PVC pipes, and plant containers. Water containing fish waste is circulated to the plants as nutrients before being naturally filtered. The system design ensures continuous water flow and ease of operation.Product testing is carried out through observation of system functionality and the stability of water flow over the period of use. Observations are also made on the general condition of the plants and fish to ensure the system operates properly. The results show that the system can function stably without major disruptions.The impact of the product includes water savings, reduced use of chemical fertilizers, and increased awareness of sustainable agriculture. In addition, this project helps students understand basic biological and engineering concepts in a practical way. The development cost is low and suitable for small-scale applications such as educational purposes.In conclusion, this mini aquaponics system has the potential to be an efficient and sustainable alternative for modern agriculture.

Keywords : Mini Aquaponics System, Sustainable Agriculture, Water Conservation, Aquaculture and Hydroponics Integration, Environmental Sustainability, SDGs (Sustainable Development Goals), Low-cost System, Educational Application





SUPERVISOR

EN. ASRI BIN MAT DESA



TEAM LEADER

MOHAMMAD AMZAR BIN MOHD NIDZAM
08DKM23F2022



MUHAMMAD SHAZUL HAKIMI ALIF BIN SYAMZARI
08DKM23F2030



AHMAD FAIZARD AMIER BIN AHMAD BAKRI
08DKM23F2036



MUHAMMAD DANISH AKASHAH BIN MOHD RAZIF
08DKM23F2020

PROJECT SUMMARY

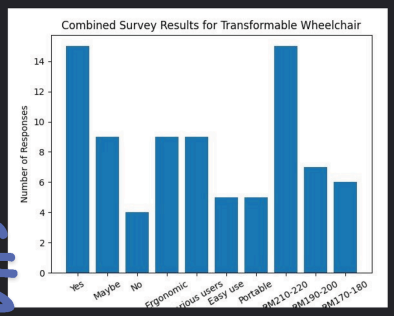
The Transformable Wheelchair is designed to improve mobility and comfort by converting from a wheelchair nto a bed. This feature allows users to rest easily without ransferring to another surface. The project focuses on afety, ease of use, and use independence, making t suitable for both daily useand medical support.

PROBLEM IDENTIFICATION

- Difficulty transferring from wheelchair to bed
- Requires assistance from caregivers
- Risk of injury during transfer
- Causes discomf
- Time-consuming process
- Limited space for separate wheelchair and bed



DATA ANALYSIS



PRODUCT IMPACT

- User: improves life and convenience
- Business: increases profit and market value
- Society: helps people or solves problems
- Environment: affects sustainability and waste

OBJECTIVE

- To design a wheelchair that can transform into a bed
- To improve user comfort and convenience
- To reduce the need for caregiver assistance
- To enhance user safety during use
- To increase mobility and independence for users
- To provide a practical solution for limited space



METHODOLOGY



RESEARCH DESIGN FABRICATION TESTING

COSTING

4x4 Hollow metal	Rm40
PVC Leather	RM35
Adjuster	RM15
Screw and nuts	RM15

ABSTRACT

TRANSFORMABLE WHEELCHAIR

MOHAMAD AMZAR BIN MOHD NIDZAM, AHMAD FAIZARD AMIER BIN AHMAD BAKRI, MUHAMMAD DANISH AKASHAH BIN MOHD RAZIF, MUHAMMAD SHAZUL HAKIMI ALIF BIN SYAMZARI

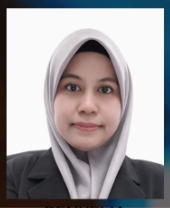
PENYELIA : EN. ASRI BIN MAT DESA

Conventional wheelchairs are typically designed with fixed configurations, which limit adaptability and may lead to user discomfort, poor posture, and long-term musculoskeletal issues. This project aims to design and develop an ergonomically adjustable wheelchair with an optimized backrest and footrest mechanism to enhance user comfort and flexibility. The project aligns with the Sustainable Development Goals (SDGs), particularly Goal 3 (Good Health and Well-being), by improving assistive mobility solutions. The methodology involves
conceptual design, engineering analysis, and material selection to ensure structural strength and durability. A mechanical adjustment system is designed to allow controlled variation of the backrest angle and footrest position based on ergonomic requirements. The design process also integrates basic anthropometric data to achieve optimal user support and safety. Product testing is conducted to evaluate the performance, stability, and adjustability of the wheelchair under different configurations. Experimental observations and user feedback are collected to assess comfort level, posture alignment, and ease of operation. Comparative analysis with conventional wheelchair designs is carried out to validate improvements. The developed wheelchair demonstrates significant enhancement in user comfort, postural support, and functional flexibility. It reduces physical strain and accommodates various user activities such as resting, sitting, and mobility. Furthermore, the design contributes to improving the overall quality of life and independence of users. The overall project cost is minimized through the use of cost-effective materials and a simple mechanical system. In conclusion, the project successfully achieves an ergonomic and adjustable wheelchair design that meets both functional and user-centered requirements.

Keywords : Adjustable Wheelchair, Ergonomic Design, Backrest Mechanism, Footrest Adjustment, User Comfort, Mobility Aid



INFINITY DESK



PENYELIA
PN.NOOR HAYATI BINTI MAT TAIB



NAGEN A/L MUNIAM
(08DKM23F2044)



KUHEN A/L PRAKASH
(08DKM23F1006)



SIVANESAN A/L P.CHARVANAN
(08DKM23F2004)

OBJECTIVE

i. To create a standard normal table into a multipurpose table equipped with integrated plug points for electrical convenience.

ii. To provide additional features such as an LED light and portable fan to improve user comfort and working conditions.

iii. To create a user-friendly, and space-saving solution that is suitable for students, office workers, and general users.

PROJECT SUMMARY

The Infinity Desk is a multifunctional, ergonomic worktable designed to overcome the limitations of traditional desks, which often cause clutter and discomfort. It integrates features such as built-in plug points, LED lighting, a portable fan, and a speaker to improve convenience and comfort. An adjustable height mechanism enhances ergonomics, making it suitable for students, office workers, and home users. Developed through a systematic engineering approach (problem identification, concept development, CAD design, and material selection), the desk ensures practicality and functionality. A survey of 40 respondents shows 77.5% interest in using the Infinity Desk, indicating strong user acceptance. With an estimated cost of RM600, it provides an affordable, space-saving, and efficient workspace solution.

PRODUCT IMPACT

The Infinity Desk enhances user comfort, efficiency, and overall workspace organization. It minimizes clutter by integrating essential features such as plug points, LED lighting, a portable fan, and a speaker into a single unit. The adjustable height function improves ergonomics, helping to reduce body strain during prolonged use. This design creates a more productive and convenient working environment for students, office workers, and home users.
Survey results indicate a 77.5% user interest, demonstrating strong acceptance and promising market potential.

BUDGET / COST

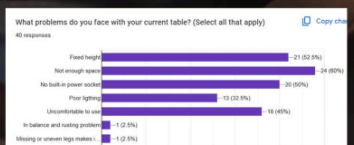
The estimated budget for the Infinity Desk is RM600. This cost covers materials, electrical components, and fabrication processes. The design utilizes affordable and readily available materials to ensure cost efficiency. Its multifunctional features reduce the need for additional devices, offering better value for money. Overall, the project is cost-effective and highly suitable for student-level development.

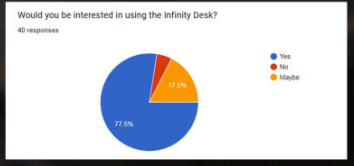
PROBLEM STATEMENT

- Traditional tables are designed only to provide a flat working surface, while modern users require additional features like electrical outlets, lighting, and cooling, leading to cluttered workspaces.
- The lack of portability and multifunctional design limits efficiency, as most tables do not integrate power supply, ergonomic comfort, and mechanical support in one unit.
- Users face difficulty maintaining a comfortable and organized workspace, which the Worktable-Infinity project aims to solve with a smart, adjustable, and multifunctional design.

METHODOLOGY

The project follows a systematic engineering methodology to ensure an effective design. The process begins with problem identification, where limitations of traditional tables are analyzed. This is followed by concept generation, where multiple design ideas are developed and evaluated. The best concept is selected based on functionality and feasibility. Next, detailed design and modeling are carried out using CAD software to visualize the structure. Material selection and cost estimation are then performed to ensure practicality and affordability. Finally, the design is evaluated to ensure it meets user requirements in terms of safety, functionality, and usability.





PROJECT BACKGROUND

- Modern lifestyles require furniture with advanced and multifunctional features.
- Existing designs include adjustable and electrical features but lack full integration and convenience.
- The Infinity Desk improves these designs by combining mechanical and electrical systems into one efficient unit.





ABSTRACT

INFINITY DESK

NAGEN A/L MUNIAM, SIVANESAN A/L P.CHARVANAN, KUHEN A/L PRAKASH,
PN.NOOR HAYATI BINTI MAT TAIB

PENYELIA : PN NOOR HAYATI BINTI MAT TAIB

Traditional tables are limited to providing only a flat surface, which leads to clutter and discomfort due to the lack of integrated features such as power supply, lighting, and cooling. This project aims to develop the Infinity Desk, a multifunctional and user-friendly table that integrates plug points, LED lighting, a portable fan, and a speaker to improve user convenience and working conditions. The project supports Sustainable Development Goal (SDG) 9: Industry, Innovation and Infrastructure by promoting innovative and practical product design. The development process follows a systematic engineering methodology, including problem identification, concept generation, design selection, CAD modeling, material selection, and cost estimation. Testing and survey analysis involving 40 respondents show that 77.5% of users are interested in using the Infinity Desk, indicating strong acceptance and demand. The product improves workspace organization, reduces clutter, and enhances comfort and efficiency for students, office workers, and general users. The estimated cost of development is RM600, making it affordable and practical. In conclusion, the Infinity Desk successfully addresses the limitations of conventional tables by providing a smart, ergonomic, and multifunctional solution suitable for modern lifestyles.

Keywords : Infinity Desk, Multifunctional Table, Ergonomic Design

PTECX

JABATAN

Perdagangan

01

SAGUK CHIPS

- AIMIE BATRISYA BINTI FAZIAN
- JACINTA A/P INNASIMUTHU
- THARSHINI A/P JAMBUNATHAN
- NUR NATASYA ATIRA BINTI ZAUNIDIN

02

SIGN YOUR VOICE

- SARAH MARYA DANI BINTI IWAN DANI
- MUHAMMAD SYAMIM HAMZI BIN MOHD FAUDZI

03

I-SPECTRACKER

- NURUL HIDAYAH BINTI BUIRIN
- NURUL ALEEYA MAISARA BINTI MOHD RAHMAT
- WAN NUR AZERA BINTI WAN ZAINIZAM

04

MOOD TRACKER- POLIMIND

- NUR ADRIANA BALQIS BT MOHAMAD HUSSIN
- SWEE WEI SI
- RAJEESHVARY A/P KRISHNA MURTHY
- NURIN YASMIN BT MOHD DAUD

05

WONDERCOLOUR

- NUR BALQISH ARIESYA BINTI MOHD ROSLAN
- PUTERI SYERINI SOFEA BINTI MOHAMAD DAUD
- NURHAZIANI BINTI HARIS

06

HAND WASH SENSOR

- MUHAMMAD ISKANDAR ZULKARNAIN SHAH BIN ABDULLAH
- ALYA AZMEERA HANIM BINTI AZMIN
- DHARSHINI VARMA A/P RAJAKUMAR
- SHARMENE A/P SALVAM

07

POWERBINDER BATIK

- THIVYA SRI
- RAJAY A/L RAMESH
- TIRANYA RACHELL A/P SOOSAI
- NORFATIN AMIRAH BINTI MUHAMMAD HABIBULLAH

08

GULA BUAH EPAL

- ZURAIN BINTI Z.ZAHARUDDIN
- MUHAMMAD AFIQ HAKIMI BIN MOHD FAROK
- TURGA A/P MURALEY
- SITI NUR AZWA BINTI MOHAMMAD SAUDDI
- MUHAMMAD SYAKIR AIMAN BIN ZULAZMAN

09

VISIONSMART

- NURAZREEN SHAFIRA BINTI AZWAN
- MUHAMMAD KHAIRIL IDHAM BIN MOHD KHALID
- NOOR ARISYA NADIRA BINTI MUHAMAD NIZAM
- ABDUL HANNAN BIN ROOSLEY
- HASYA FAQIHAH BINTI HELLMI

10

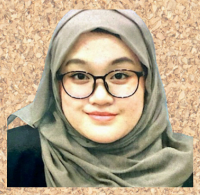
SPEC TRACKER

- MUHAMMAD NAUFAL BIN ROZAIDI
- NUR ALIA BINTI ABDUL GHAFAR
- NURHUMAZAH BINTI BAHARUDDIN
- NURSYAZA IZZATI BINTI MUHAMAD SHALEH
- NURIN NASUHA BINTI MUAZAM





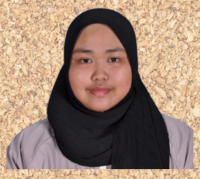
AZMA HUSNAIZA BT ABDUL AZIZ
SUPERVISOR



AIMIE BATRISYIA BT FAZIAN
08DPI23F2019



JACINTA A/P INNASIMUTHU
08DPI23F2022



NUR NATASYA ATIRA BT ZAUNIDIN
08DPI23F2045



THARSHINI A/P JAMBUNATHAN
08DPI23F2008

SAGUK CHIPS

Chewy Inside, Crispy Outside

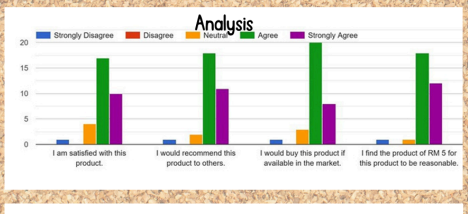
Project Summary

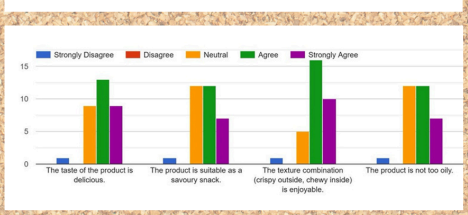
Saguk Chips are a gluten-free frozen snack made from sago flour and tapioca starch. The dough is steamed, shaped, and coated with sago pearls. When fried, it becomes crispy outside and chewy inside, offering a unique texture and convenient ready to fry option.

Problem Statement

- Snacks lack uniqueness
- Limited gluten-free options
- Demand for convenient frozen food
- Sago is underutilized

Data Analysis





Product Development

- Identify Need

Consumers want convenient and unique frozen snacks.

- Introduce Concept

Create gluten-free Saguk Chips using sago.

- Plan & Research

Study ingredients, as well as freezing and frying methods.

- Develop Recipes

Create a product with a chewy inside and crispy outside texture.

- Test & Improve

Refine the taste, texture, and overall product quality.

Costing

Details	Amount (RM)
Sago flour	2.5
Tapioca starch	2
Garlic	1
Daun bawang	1.5
Sago pearls	2.5
Seasoning (salt & pepper)	0.5
Oil + gas + transport	4
Total Cost	14
Total pieces	50 pcs
Pack size	6 pcs
Total packs	8 packs
Cost per pack	1.75
Selling price per pack	5
Profit per pack	3.25
Total profit (8 packs)	26

Objective

- Introduce unique chewy + crispy snack
- Promote gluten-free ingredient (sago)
- Provide convenient ready-to-fry product
- Offer affordable snack option

Product Impact

The product makes a notable impact by introducing a snack with a unique texture that stands out from conventional options. It promotes the use of sago, highlighting its versatility and value in modern cuisine. Additionally, it supports small food businesses by creating opportunities for growth and innovation. At the same time, it appeals to modern consumers who are seeking new, interesting, and culturally inspired food experiences.

SDG Elements



ABSTRACT

SAGUK CHIPS

AZMA HUNAIZA BT ABDUL AZIZ, AIMIE BATRISYIA BT FAZIAN, JACINTA A/P INNASIMUTHU, NUR NATASYA ATIRA BT ZAUNIDIN, THARSHINI A/P JAMBUNATHAN

PENYELIA : PN AZMA HUSNAIZA BINTI ABDUL AZIZ

The lack of variety in gluten-free frozen snacks has limited the use of traditional ingredients such as sago in today's food market. This project has been proposed to develop Saguk Chips as a unique, affordable, and marketable frozen snack using sago-based ingredients. At the same time, the product supports Sustainable Development Goals (SDG), including zero hunger (SDG 2), industry innovation (SDG 9), and responsible consumption and production (SDG 12). To produce this product, sago flour and tapioca starch are mixed with simple seasonings, then steamed and shaped into small balls to create a chewy texture. For the outer layer, sago pearls are partially cooked and dried, allowing the product to be stored and later fried to form a crispy layer, resulting in a distinctive dual-texture snack. Product testing was conducted to evaluate taste, texture, and overall consumer acceptance. The results show that most respondents enjoyed the combination of chewy and crispy textures, making the product stand out from typical snacks. In addition, feedback indicates that the product is affordable, original, and appealing. Saguk Chips has strong potential to attract consumers, especially those looking for convenient and gluten-free snack alternatives. It also promotes the use of local ingredients while supporting small-scale businesses. The production cost is low, allowing a competitive selling price of RM5 per pack. Overall, this product aims to provide a convenient and accessible gluten-free snack while increasing the value of traditional sago.

Keywords: Sago, Gluten-Free Snack, Frozen Food,





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TEAM LEADER:
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08DPI23F1002



TEAM MEMBER:
MUHAMMAD SYAMIM HAMZI BIN MOHD FAUDZI
08DPI22F2004

SIGN YOUR VOICE

Sign Language Board Game

Project Background

The Deaf community in Malaysia uses Bahasa Isyarat Malaysia (BIM) as their primary form of communication. The lack of awareness and lack of exposure to BIM within the public realm limits Deaf community and hearing community interactions and encourages social isolation.

"Sign Your Voice" was developed to provide a practical way for players to learn and practice basic BIM vocabulary, gestures, and signs while providing opportunities for fun in a group context.

Problem Identification

The Deaf population in Malaysia have trouble communicating with the rest of the population

Hearing people are interested in learning sign language but lack exposure and opportunity to practice.

There are **limited resources** to learn Bahasa Isyarat Malaysia (BIM).

Objectives

To **develop an educational board game** that assists in teaching and learning Malaysian Sign Language (BIM).

To **evaluate the effectiveness** of the board game as an interactive learning tool.

SDG Elements

Product Impact

To Learners

Makes learning sign language fun

To the Deaf Community

Helps bridge communication gaps between Deaf and hearing individuals.

To Society

Promotes inclusivity and raises awareness of Deaf Culture

Product Development

DESIGN THINKING



- **EMPATHIZE**
  Understanding the challenges faced by the deaf community
- **DEFINE**
  Identifying the lack of fun learning tools
- **IDEATE**
  Brainstorming ideas for educational games
- **PROTOTYPE**
  Designing and creating game componenets
- **TEST**
  Conducting gameplay sessions to collect feedback



Descriptive Analysis

Item	Mean	Std. Deviation	Level
Learning Effectiveness	4.28	0.780	High
Engagement and Enjoyment	4.23	0.856	High
Game Design and Usability	4.39	0.683	High
Accessibility and Inclusivity	4.25	0.707	High
Purchase Intention	4.15	0.874	High

Costing

Item	Cost per Set (RM)
Board	1.60
Flags	7.00
Player Token	1.20
Dice	0.50
Hourglass	2.00
Decoder	0.60
Cards	8.00
Packaging	5.00
Total	25.90

Conclusion

Sign Your Voice creates an interactive and engaging learning experience, increasing awareness of sign language, and promoting inclusivity between Deaf and hearing individuals.

ABSTRACT

SIGN YOUR VOICE

SARAH MARYA DANI BINTI IWAN DANI, MUHAMMAD SYAMIM HAMZI BIN MOHD FAUZI

PENYELIA : DR. MURUGADAS A/L RAMDAS @ CHELAMUTHU

Bahasa Isyarat Malaysia (BIM) is the primary form of communication for the Deaf Community in Malaysia. However, more than 40,000 deaf individuals face numerous communication barriers due to the lack of awareness and knowledge of BIM among the hearing population of Malaysia. There is also a lack of resources to learn and practice BIM. This project aimed to develop and evaluate an educational board game to support sign language learning and to increase interest among Malaysians to learn BIM, in line with the Sustainable Development Goals of Quality Education (SDG4) and Reduced Inequalities (SDG10). The development of the board game followed the five stages of Design Thinking: Empathize, Define, Ideate, Prototype, and Test. Interviews with Deaf students were conducted to gain insight on their troubles, and a prototype was tested with learners during a beginner sign language class. A survey on the testers showed high levels of engagement and learning effectiveness. Results indicate that the board game can be effective to support sign language learning and encourage more learners of BIM from the hearing population, subsequently bridging the communication gap between the deaf and hearing communities in Malaysia.

Keywords : Sign Language Learning, Design Thinking, Game-Based Learning, Bahasa Isyarat Malaysia


POLITEKNIK MALAYSIA
PITEC-X
PSA INNOVATION, TECHNOLOGY, ENGINEERING & COMMERCIALIZATION COMPETITION
SESSION II 2025/2026
15 APRIL 2026 • WEDNESDAY • DEWAN AL-JAZARI, PSA
INNOVATING TVET, EMPOWERING IDEAS FOR REAL WORLD IMPACT
i-SPECTRACKER
SIR AHMAD YUSRI BIN ABD NASIR
SUPERVISOR
NURUL HIDAYAH BT BUIRIN
08DPI23F2061
WAN NUR AZERA BT WAN ZAINIZAM
08DPI23F2075
NURUL ALEEYA MAISARA BT MOHD RAHMAT
08DPI23F2071
PROJECT SUMMARY
i-SpecTracker is a smart spectacle tracking device designed to help users locate and secure their glasses efficiently. The device combines a compact and lightweight design with Bluetooth Low Energy (BLE) technology to provide real-time tracking and notifications.It also features an alarm system that alerts users when the device is moved out of range, helping to prevent loss or misplacement. Overall, i-SpecTracker enhances asset security while offering a user-friendly and practical solution for everyday use.
PROBLEM IDENTIFICATION
Many existing tracking devices are not suitable for small personal items such as spectacles.
Key Problems:
• Bulky and uncomfortable design for daily use
• Weak attachment methods (adhesive or clips)
• Risk of device detaching from glasses
• Lack of strong security and alert features
• User concerns regarding privacy and tracking safety
OBJECTIVES
The project aims to develop a practical and user-centered tracking solution:
• To identify user challenges in tracking and securing spectacles
• To design a compact, portable, and user-friendly tracking device
• To implement real-time tracking using BLE technology
• To integrate alarm and notification features for security
• To improve overall tracking efficiency and user experience
PRODUCT FUNCTION
How the device works:
• Connects to smartphone via Bluetooth Low Energy (BLE)
• Sends alert when glasses move out of range
• Allows users to trigger sound to locate spectacles
• Stores last known location in mobile app
• Uses flexible silicone band for secure attachment
SDG ELEMENTS
9 INDUSTRY, INNOVATION AND INFRASTRUCTURE
12 RESPONSIBLE CONSUMPTION AND PRODUCTION
COSTING
Estimated cost for i-SpecTracker Prototype
No | Item Component | Quantity | Cost Per Unit (RM) | Total (RM)
1. | Protective Tracker Housing / Accessory Cover | 1 unit | 95.00 | 95.00
2, | Elastic Rubber Connector for Spectacle Frame | 1 unit | 2.00 | 2.00
3. | Protective Tracker Housing / Accessory Cover | 1 unit | 15.00 | 15.00
4. | Assembly & Design Materials | 1 set | 5.00 | 5.00
5. | Packaging Materials | 1set | 3.00 | 3.00
PRODUCT DEVELOPMENT
The development of i-SpecTracker follows the Design Thinking process:
1. Empathize
• Identify user problems through observation and feedback
2. Define
• Analyze key issues such as comfort, usability, and security
3. Ideate
• Generate solutions: compact design, BLE tracking, alarm system
4. Prototype
• Develop initial model and test functionality (battery, alarm, fit)
5. Test
• Evaluate user experience and identify improvements
PRODUCT TESTING
• 30 respondents (student)
• Majority gave positive feedback
• Comfortable & user-friendly
• Alert system effective
• Some improvement needed on app & durability
i-SpecTracker – USER FEEDBACK FORM (AFTER USE)
PRODUCT IMPACT
For Users:
• Reduces risk of losing spectacles
• Improves convenience and daily efficiency
• Enhances sense of security
For Environment:
• Supports reusable materials
• Reduces reliance on disposable products
For Society:
• Promotes use of smart and practical technology
• Encourages better asset management habits

ABSTRACT

I-SPECTRACKER

NURUL HIDAYAH BINTI BUIRIN, NURUL ALEEYA MAISARA BINTI MOHD RAHMAT,
WAN NUR AZERA BINTI WAN ZAINIZAM

PENYELIA : EN. AHMAD YUSRI BIN ABD NASIR

The problem identified in this project is the increasing cases of misplaced or lost spectacles due to inefficient tracking methods. This project aims to develop a smart tracking solution known as i-SpecTracker to help users locate and secure their spectacles more efficiently. The project supports Sustainable Development Goals (SDG) such as Industry, Innovation and Infrastructure (SDG 9) and Responsible Consumption and Production (SDG 12). The development of i-SpecTracker follows the Design Thinking approach, starting with identifying user problems related to comfort, usability, and security. The solution is then designed by integrating Bluetooth Low Energy (BLE) technology, alarm notifications, and a flexible silicone band attachment. A prototype is developed to ensure the device is compact, lightweight, and user-friendly. Testing is conducted among 30 respondents, mainly students, to evaluate usability and effectiveness. The results show positive feedback in terms of comfort, ease of use, and alert system functionality. However, minor improvements are suggested for mobile application performance. The product is effective in reducing the risk of losing spectacles and improving daily convenience. It also promotes smart technology usage and better asset management among users. Additionally, the use of reusable materials supports environmental sustainability. The estimated cost of the product is kept affordable to ensure accessibility to target users. In conclusion, i-SpecTracker is a practical and innovative solution that enhances user convenience, security, and efficiency.

Keywords : Spectacle Tracking, Bluetooth Low Energy (BLE), Smart Device

KEMENTERIAN PENDIDIKAN TINGGI
POLITEKNIK MALAYSIA

PITEC-X

PSA INNOVATION, TECHNOLOGY, ENGINEERING & COMMERCIALIZATION COMPETITION

SESSION II 2025/2026

15 APRIL 2026 • WEDNESDAY • DEWAN AL-JAZARI, PSA

INNOVATING TVET, EMPOWERING IDEAS FOR REAL WORLD IMPACT

MALAYSIA MADANI POLYCC





SUPERVISOR: DR. NURFADILLAH BINTI AHMAD MAHMMUD

LEADER:NUR ADRIANA BALQIS BT MOHAMAD HUSSIN
08DPI23F2085

SWEE WEI SI
08DPI23F2067

RAJEESHVARY A/P KRISHNA MURHTY
08DPI23F2084

NURIN YASMIN BT MOHD DAUD
08DPI23F2087

PoliMind

Recognizing and Understanding our Emotions

PROJECT SUMMARY

PoliMind is a student-centered mood tracking system designed to enhance emotional awareness and counsellor support for Polytechnic students.

It also connects students directly with counselors to provide timely support and intervention when needed.

PROBLEM IDENTIFICATION

Mental health issues like stress, anxiety, and depression are becoming increasingly common among students, but traditional support services are often underused due to stigma, time constraints, and low self-awareness.

OBJECTIVES

OBJECTIVE 1:

To develop a interactive Mood Tracker website application for PSA students.

OBJECTIVE 2:

To identify students satisfaction in using Mood Tracker website application.

COSTING

Item	Description	Estimated Cost (RM)
Google AI Studio Subscription	Platform used to create PoliMind	100
Canva Premium	Design tools for visuals	30
Printing,Props	Materials for presentation	40
Total Estimated Cost		RM 170.00

SDG ELEMENT

3 GOOD HEALTH AND WELL-BEING

PRODUCT TESTING





Product Impact

- Improves Emotional Awareness
- Helps students understand and monitor their moods regularly
- Early Detection of Mental Health Issues
  Identifies signs of stress, anxiety, and depression in early
- Increases Accessibility to Support
  Connects students directly with counselors when safety triggers.

METHODOLOGY

- Research Method: Quantitative approach using questionnaire
- Framework: ADDIE Model (Analyze, Design, Develop, Implement, Evaluate)
- Hypothesis: Tested for significance on app effectiveness in improving mental health awareness
- Data Collection:
  - Respondents use PoliMind app to track mood and emotions
  - Questionnaire distributed after app usage
  - Counselor input to identify mental health needs
- Tools Used:
  - Canva (design & layout)
  - Google AI Studio (app development)

	MEAN	LEVEL
It was easy to use	4.68	HIGH
It was good to use	4.72	HIGH
The time spent using it has been acceptable	4.62	HIGH
The introduction of how to use it was	4.50	HIGH
I can recommend it to others	4.68	HIGH
TOTAL AVERAGE SCORE	4.64	

HIGH SATISFACTION LEVEL

VIDEO USER GUIDELINE

OUR VIDEO

QUESTIONNAIRE

ABSTRACT

MOOD TRACKER- POLIMIND

NUR ADRIANA BALQIS BINTI MOHAMAD HUSSIN, SWEE WEI SI, RAJEESHVARY A/P KRISHNA MURTHY, NURIN YASMIN BINTI MOHD DAUD

PENYELIA : DR. NURFADILLAH AHMAD MAHMMUD

Many students today face unmanaged mental health challenges and limited immediate access to emotional support systems. In response to this issue, this study developed Mood Tracker: PoliMind, a web-based application designed to support students' emotional well-being through daily mood monitoring and timely intervention. The development of the application was guided by the ADDIE model, which provided a systematic framework for the analysis, design, development, implementation, and evaluation of the digital tool.The application supports Sustainable Development Goal 3 (SDG 3): Good Health and Well-being by leveraging technology to improve accessibility to mental health support among students. PoliMind enables users to record their daily emotional states and facilitates timely professional assistance. In addition, the platform introduces an innovative approach to emotional self-management, particularly for students experiencing stress, anxiety, or emotional instability. The system was developed using cost-effective web technologies to ensure sustainability, scalability, and free access for students. 50 respondents from various departments at PSA indicated a high level of satisfaction in enhancing emotional self-awareness. The findings suggest that web-based mood tracking applications offer a practical and innovative solution for strengthening student mental health support services in higher education institutions.

Keywords: Mental Health, Student Well-being, Mood Tracker, PoliMind, ADDIE Model







SUPERVISOR

DR.NOORDINI BINTI ABDULLAH



LEADER

NUR BALQISH ARIESYA BINTI MOHD ROSLAN
08DPM23F2079



MEMBERS

PUTERI SYERINI SOFEA BINTI MOHAMAD DAUD
08DPM23F2024



MEMBERS

NURHAZIANI BINTI HARIS
08DPM23F2053

WONDERCOLOUR



PROJECT SUMMARY

CHILDREN'S EDUCATION IN MALAYSIA HAS EVOLVED TOWARDS A HOLISTIC APPROACH THAT EMPHASISES CREATIVITY AND EARLY LEARNING. HOWEVER, CONVENTIONAL ART MATERIALS MAY CONTAIN HARMFUL SUBSTANCES AND LACK INCLUSIVE DESIGN, RAISING CONCERNS ABOUT CHILDREN'S SAFETY AND ACCESSIBILITY.

WONDERCOLOUR IS INTRODUCED AS A SAFE, ECO-FRIENDLY, AND INCLUSIVE WATERCOLOUR SET MADE FROM NON-TOXIC, NATURAL INGREDIENTS. IT IS DESIGNED TO SUPPORT CHILDREN'S CREATIVITY, COMFORT, AND LEARNING EXPERIENCE.

OBJECTIVES



- To design and develop a watercolour using natural ingredients that are safe for all ages and user-friendly.



- To implement and evaluate the watercolour as a tool for children and individuals with disabilities to express ideas, emotions and creativity anytime, anywhere.



- To determine the market acceptance and potential of the watercolour, especially as a learning-oriented and environmentally responsible product

SDG ELEMENTS







PROBLEM IDENTIFICATION

- NOT SAFE FOR CHILDREN





- ACCIDENTALLY INGEST OR EXPOSE MATERIALS TO SKIN AND EYES
- NOT DISABILITY-FRIENDLY





- LIMITED COMPLIMENTARY ITEM
- TOXIC CHEMICALS





- NON-ECO-FRIENDLY

METHODOLOGY

APPROACH
The Wondercolour product is developed using the Design Thinking process (Empathy, Define, Ideate, Prototype, Test) to ensure it meets children's needs.

DATA COLLECTION
Information is gathered through observations and interviews with parents and teachers regarding children's safety, learning, and usability needs.

PRODUCT DEVELOPMENT
Wondercolour is designed using natural, non-toxic ingredients and eco-friendly materials, with a user-friendly palette, brush, and refillable components.

TESTING
The prototype is tested by children in home or classroom settings to evaluate usability, safety, and functionality.

EVALUATION & IMPROVEMENT
Feedback from users is analysed to improve colour quality, texture, and design for better usability and performance.

BUDGET

ITEM	DESC	COST(RM)
RAW MATERIALS	SUGAR,CORNSTARCH, DISTILLED WATER, FOOD GRADE GLYCERINE, FRUITS & FLOWERS POWDERS	56.77
PACKAGING	10ML SQUEEZE BOTTLE & PAINT BRUSH	7.00
3D PRINTING	SERVICE FEE	60.00
TOTAL		123.77
Selling price		RM 40.00

PRODUCT IMPACT

CHILDREN'S HEALTH AND SAFETY
Made from natural, non-toxic ingredients, reducing risks from ingestion or skin contact.

COGNITIVE & CREATIVE DEVELOPMENT
Enhances creativity, imagination, fine motor skills, and problem-solving.

INCLUSIVE LEARNING
Easy-grip, user-friendly design suitable for all children, including those with disabilities.

ENVIRONMENTAL SUSTAINABILITY
Eco-friendly materials, natural pigments, and refillable components reduce waste.

PRODUCT TESTING

Children use the product to evaluate comfort, handling, and ease of use.

Functionality testing

Assesses colour quality, texture, mixing performance, and cleaning efficiency.

Ensures non-toxic materials are safe for skin and accidental exposure.

Product Improvement

Enhancements made on texture, colour vibrancy, and design usability through testing.

Parents and teachers provide insights on safety, practicality, and learning effectiveness.



ABSTRACT

WONDERCOLOUR

NOORDINI BINTI ABDULLAH, NUR BALQISH ARIESYA BINTI MOHD ROSLAN,
PUTERI SYERINI SOFEA BINTI MOHAMAD DAUD, NURHAZIANI BINTI HARIS

PENYELIA : DR. NOORDINI BINTI ABDULLAH

Conventional watercolours may contain harmful chemicals and are often not designed to be safe, inclusive, or environmentally friendly for children and other users. This project aims to design and develop Wondercolour, a safe, natural, and user-friendly watercolour product that supports creativity, learning, and accessibility. The project also supports SDG 3 (Good Health and Well-being) and SDG 4 (Quality Education) by promoting safe art materials and inclusive learning practices. Wondercolour was developed using the Design Thinking approach, which includes empathy, define, ideate, prototype, and test, to ensure the product meets users' needs effectively. Natural, non-toxic and plant-based materials were used to produce a watercolour set with a user-friendly palette, brush, and refillable components. Product testing was conducted through usability, functionality, and safety evaluations involving children especially with disabilities, in home and classroom settings, and the findings showed that the product is easy to use, produces vibrant colours, and is safe for skin contact and accidental exposure. Feedback from parents and teachers also indicated positive acceptance in terms of practicality, safety, and learning value. Overall, Wondercolour is an affordable, inclusive, and sustainable alternative to conventional watercolours that benefits health, creativity, and environmental responsibility.

Keywords : Plant-Based, Non-Toxic Materials, Inclusive Learning, Accessibility





PUAN YUHAYU (SUPERVISOR)



ALYA AZMEERA 08DPM23F2014



DHARSHINI VARMA 08DPM23F2065



SHARMENE A/P SALVAM 08DPM23F2069



MUHAMMAD ISKANDAR 08DPM23F2083

HAND WASH AUTO DISPENSER

Project Summary

This project focuses on developing an automatic hand wash dispenser using Arduino and sensor technology. The system detects hand movement and dispenses soap without physical contact. It aims to improve hygiene, reduce the spread of germs, and provide a low-cost smart solution suitable for public and personal use.

Product Impact

- Promotes contactless hygiene practices.
- Reduces risk of infection transmission.
- Saves soap usage through controlled dispensing.

Product Testing / Data Analysis

- Tested sensor detection accuracy.
- Measured response time of system.
- Evaluated soap dispensing consistency.

Problem Identification

- Manual soap dispensers require physical contact.
- High risk of bacteria and virus transmission.
- Inefficient soap usage (overuse or waste).



Methodology

- Research on sensor-based automation systems.
- Design system flow (Sensor → Arduino → Relay → Pump).
- Hardware setup (Arduino, sensor, pump, tubing).

Objectives

- To design an automatic, touchless hand wash dispenser.
- To improve hygiene and reduce germ transmission.
- To develop a low-cost and efficient system using Arduino.

SDG Elements

- SDG 3: Good Health and Well-being
- Promotes better hygiene practices.
- SDG 6: Clean Water and Sanitation
- Encourages proper hand washing habits.
- SDG 9: Industry, Innovation and Infrastructure
- Introduces smart technology in daily life.

Product Impact

- Promotes contactless hygiene practices.
- Reduces risk of infection transmission.
- Saves soap usage through controlled dispensing.

Estimated Cost (RM)

Arduino Uno : 35
Ultrasonic Sensor : 10
Relay Module : 8
Water Pump : 15
Tubing & Container : 12
Power Supply : 10
Total : RM 90

ABSTRACT

HAND WASH SENSOR

MUHAMMAD ISKANDAR ZULKARNAIN SHAH BIN ABDULLAH, ALYA AZMEERA HANIM BINTI AZMIN, DHARSHINI VARMA A/P RAJAKUMAR, SHARMENE A/P SALVAM

PENYELIA : PN. SHARIFAH YUHAYU BINTI SYED HAMID

The problem identified is the spread of bacteria through manual soap dispensers that require physical contact. The objective of this project is to develop an Automatic Hand Wash Dispenser that promotes hygiene through a touchless system. This project supports SDG Goal 3 (Good Health and Well-being) by improving cleanliness and reducing health risks. The product was developed using Arduino, sensor, mini pump, and a liquid container, where the sensor detects the hand and activates the pump automatically. Testing was conducted to observe the response and consistency, and the results show that the system functions effectively and reliably. The product helps reduce physical contact, improve hygiene, and minimize soap wastage, making it suitable for daily use. The estimated cost of this project is RM80. In conclusion, this product is a practical and efficient solution for better hand hygiene.

Keyword : System Arduino System , Improve Hand Hygiene , Reduce Bacteria



Project summary

PowerBinder Batik is a multifunctional smart binder that integrates a notebook, built-in power bank, wireless charging, solar charging support, and GPS tracking into a single compact product. It is designed to improve user convenience, reduce dependency on multiple devices, and enhance productivity. The use of batik-inspired design also promotes Malaysian cultural identity while supporting sustainable innovation.

Problem identification

- **Low-battery anxiety among smartphone users**

Users feel stressed when battery levels are low, especially when charging access is limited during classes or work.

- **Need to carry multiple devices (power bank, cables, notebook)**

Carrying separate items increases bag weight and causes inconvenience in daily activities.

- **Risk of losing important items**

Users may misplace notebooks, chargers, or power banks, leading to disruption in work or study.

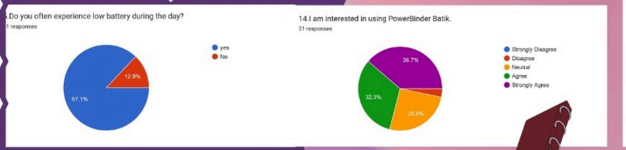
- **Lack of integrated and user-friendly solutions**

Existing products do not combine productivity tools and charging features in one compact system, creating inefficiency.

Objective

- **To Design and Develop a Multifunctional Smart Binder**
- **To Test and Evaluate the Charging Performance and Energy Efficiency**
- **To Identify User Acceptance of Cultural and Technological Integration**

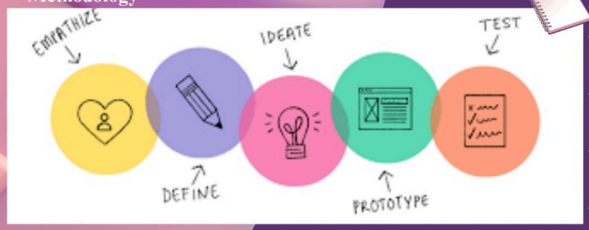
Product data analysis



SDG elements



Methodology



Costing



Product impact

- **Reduces low-battery anxiety**

Provides a reliable built-in charging solution, so users feel less stressed about battery levels.

- **Enhances security through tracking**

GPS tracking allows users to locate misplaced items easily, improving safety and confidence.

- **Supports eco-friendly usage**

Solar charging and multifunctional design reduce energy use and material waste.

- **Promotes Malaysian batik culture**

Incorporates batik design, enhancing cultural identity and product uniqueness.



ABSTRACT

POWERBINDER BATIK

THIVYA SRI, RAJAY A/L RAMESH, TIRANYA RACHELL A/P SOOSAI, NORFATIN AMIRAH BINTI MUHAMMAD HABIBULLAH

PENYELIA : PN RAHIDA BINTI RAMLI

Low battery anxiety and the need to carry multiple devices create significant inconvenience among smartphone users in daily activities. This project aims to design and develop a multifunctional smart binder that enhances productivity, mobility, and user convenience. The project aligns with Sustainable Development Goals (SDG 7, SDG 9, and SDG 12) by promoting clean energy usage, technological innovation and responsible consumption through the PowerBinder Batik. The PowerBinder Batik integrates a notebook, built in power bank, wireless charging, solar panel and GPS tracking into a single compact system. Batik-inspired design elements are incorporated to reflect Malaysian cultural identity while maintaining modern functionality. The product was developed using the Design Thinking approach, consisting of empathize, define, ideate, prototype and test stages to ensure user centered innovation. Product testing was conducted to evaluate charging performance, usability and reliability. Data analysis indicates consistent and stable charging efficiency across different usage conditions. Survey results demonstrate strong user acceptance, particularly in terms of practicality and purchase intention. The product effectively reduces low battery anxiety and minimizes the need to carry multiple devices. It also supports eco-friendly usage through renewable solar energy integration. The estimated production cost is ensuring the product remains cost-efficient and affordable. In conclusion, PowerBinder Batik represents an innovative, practical and sustainable solution for modern users.

Keywords : Smart binder, Wireless Charging, Solar Energy, User-centered Innovation





PUAN ZAKIAH BINTI OTHMAN
SUPERVISOR



ZURAIN BINTI Z.ZAHARUDDIN
08DPR23F2002
LEADER



MUHAMMAD AFIQ HAKIMI BIN MOHD FAROK
08DPR23F2008



TURGAA/P MURALEY
08DPR23F2032



SITI NUR AZWA BINTI MOHAMMAD SAUDDI
08DPR23F2042



MUHAMMAD SYAKIR AIMAN BIN ZULAZMAN
08DPR23F2064

G U L A B U A H E P A L

EXECUTIVE / PRODUCT SUMMARY

Apple fruit sugar is a natural sweetener derived from apple extracts, serving as a healthier alternative to refined white sugar. The product aligns with the growing awareness of healthy lifestyles and the need to reduce processed sugar intake. It is versatile and suitable for use in a wide range of food and beverage applications. Additionally, apple fruit sugar has strong market potential due to the increasing demand for naturally derived products.

PROBLEM STATEMENT

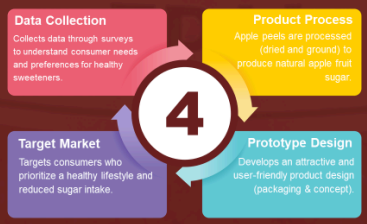
1. Increasing health awareness is driving demand for low-sugar foods.
2. Most existing sugar products are highly processed and have low nutritional value.
3. Natural sweetener options in the market are still limited and lack innovation.
4. The need for products that support a healthy lifestyle is increasing.



OBJECTIVE

- To provide a healthy alternative sweetener
- To raise awareness of sustainable and responsible consumption
- To promote the consumption of natural and nutritious foods
- To expand market reach through digital marketing and e-commerce
- To innovate in the sweetener market

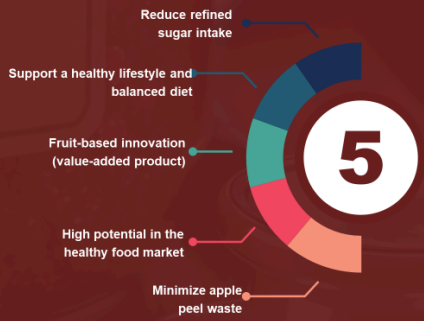
METHODOLOGY



SDG ELEMENTS



PRODUCT IMPACT



COSTING / BUDGET

COST PER UNIT	
RAW MATERIALS	RM 4.17
PACKAGING COST	RM 4.19
OVERALL COST	RM 8.39
PROFIT MARGIN PER UNIT	
UNIT PRICE	RM 19.99
OVERALL COST	RM 8.39
TOTAL PER UNIT	RM 11.60

DATA ANALYSIS

FACTORS INFLUENCING SWEETENER CHOICE	
HEALTH	48 %
TASTE	35 %
PRICE	10 %
PERCEPTION TOWARDS PRODUCT	
HEALTHIER	84 %
REPLACE WHITE SUGAR	20 %



ABSTRACT

GULA BUAH EPAL

ZURAIN BINTI Z.ZAHARUDDIN, MUHAMMAD AFIQ HAKIMI BIN MOHD FAROK, TURGA A/P MURALEY, SITI NUR AZWA BINTI MOHAMMAD SAUDDI, MUHAMMAD SYAKIR AIMAN BIN ZULAZMAN

PENYELIA : PN ZAKIAH BINTI OTHMAN

Apple fruit sugar is a natural sweetener derived from apple peel and flesh as a healthier alternative to refined sugar. This study aims to develop a nutritious and sustainable sweetener that supports healthy dietary practices while aligning with Sustainable Development Goals (SDG) 3 on good health and well-being and SDG 12 on responsible consumption and production. The product is developed through the process of drying and grinding apple peel and flesh into a fine powder. Data were collected using questionnaires to identify consumer needs and preferences toward natural sweeteners. A prototype was then developed with emphasis on functionality and attractive packaging design. Product testing was conducted to evaluate user acceptance in terms of taste, texture, and usability, and the data were analyzed using descriptive analysis. The findings show that 84% of respondents preferred Gula Epal as a natural sweetener. This product demonstrates strong potential to reduce refined sugar consumption, reduce apple peel waste and offer a cost-effective and sustainable natural sweetener with strong commercialization potential.

Keywords : Apple Fruit Sugar, Natural Sweetener, Food Waste Reduction




PUAN NATASYA MARIZ BINTI MOHAMED


MUHAMMAD KHAIRIL IDHAM BIN MUHAMMAD KHALID
08DPR23F2016


ABDUL HANNAN BIN ROOSLEY
08DPR23F2048


NURAZREEN SHAFIRA BINTI AZWAN
08DPR23F2012


NOOR ARISYA NADIRA BINTI MUHAMMAD NIZAM
08DPR23F2020


HASYA FAQIHAH BINTI HELLMI
08DPR23F2050

VISIONWALK: SMART MOTION SENSOR CANE

EXECUTIVE/PROJECT SUMMARY

VisionWalk is a smart assistive cane designed to help visually impaired individuals move more safely and independently. Unlike traditional canes, it uses motion and ultrasonic sensors to detect obstacles up to 5 meters ahead and alerts users through vibration or sound. The cane is lightweight, rechargeable, and designed for comfort, aiming to reduce accidents and boost user confidence.

SDG ELEMENTS

SDG 3 - **Good Health and Well-being**
Improves user safety by reducing the risk of falls and injuries.

SDG 10 - **Reduced Inequalities**
Supports visually impaired individuals to live more independently.

SDG 12 - **Responsible Consumption and Production**
Uses rechargeable battery to reduce waste and support sustainable usage.

PRODUCT IMPACT

- CONFIDENCE
- INDEPENDENCE
- SAFETY
- MOBILITY

COSTING

ITEM	COST
PROGRAMMING & SYSTEM DEVELOPMENT	RM550.00
CANE	RM42.00
TOTAL COST	RM592.00
SELLING PRICE	RM139.90

PRODUCT TESTING & DATA ANALYSIS

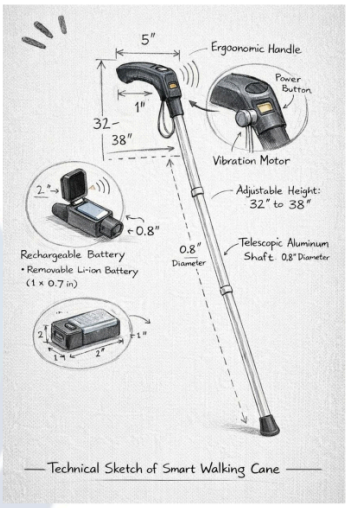
- Test the motion and ultrasonic sensors to ensure accurate obstacle detection up to 5 meter.
- Evaluate the vibration and sound alert system for responsiveness and clarity.
- Conduct user testing with visually impaired individuals to assess usability and comfort.
- Check battery performance, including charging time and usage duration.

Analysis:

- Respondents include individuals with mobility challenges and users of walking aids.
- Many face difficulties detecting obstacles early and feel unsafe when walking alone.
- Prefer a product that is lightweight, easy to use, with sensor detection, vibration or sound alerts, and long battery life.

PROBLEM IDENTIFICATION





OBJECTIVES

- To develop an innovative smart motion sensor cane with advanced obstacle detection technology.
- To assist users in detecting obstacles early through vibration and sound alert systems.
- To reduce the risk of accidents and injuries during daily movement.
- To provide a practical and reliable mobility solution for individuals who rely on walking aids.

METHODOLOGY

- RESEARCH DESIGN
- OBSERVATION
- EVALUATION
- EXPERIMENT/TEST
- PRODUCT CONCEPT AND DEVELOPMENT

ABSTRACT

VISIONWALK: SMART MOTION SENSOR CANE

NURAZREEN SHAFIRA BINTI AZWAN, MUHAMMAD KHAIRIL IDHAM BIN MOHD KHALID, NOOR ARISYA NADIRA BINTI MUHAMAD NIZAM, ABDUL HANNAN BIN ROOSLEY, HASYA FAQIHAH BINTI HELLMI

PENYELIA : PN NATASYA MARIZ BINTI MOHAMED

Vision Walk is an innovative smart assistive cane designed to enhance mobility and safety for visually impaired individuals by using motion and ultrasonic sensors to detect obstacles up to 1 meters ahead, alerting users through vibration and sound for early detection and accident prevention. This project aims to develop a practical, lightweight, and user-friendly walking aid that improves daily movement and independence. The development process involves system design, sensor integration, and prototype construction with emphasis on functionality and comfort. followed by product testing to evaluate sensor accuracy, alert responsiveness, usability, and battery performance. The findings show that Vision Walk effectively improves user safety, confidence, and independence while addressing common challenges faced by users of traditional canes. In addition, the product aligns with Sustainable Development Goals (SDG), particularly SDG 3 (Good Health and Well-being), SDG 10 (Reduced Inequalities), and SDG 12 (Responsible Consumption and Production), demonstrating strong potential for commercialization as a reliable smart mobility solution for the visually impaired.

Keywords : Smart Cane, Motion Sensor, Assistive Technology, Visually Impaired, Obstacle Detection





PN LILIS SERI YANA BINTI SIRUN
SUPERVISOR



MUHAMMAD NAUFAL BIN ROZAIDI
08DPR23F2010



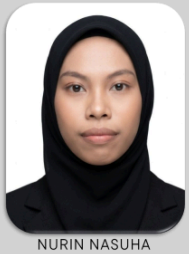
NUR ALIA BINTI ABDUL GHAFAR
08DPR23F2028



NURHUMAZAH BINTI BAHARUDDIN
08DPR23F2030



NURSYAZA IZZATI BINTI MUHAMAD SHALEH
08DPR23F2038



NURIN NASUHA BINTI MUAZAM
08DPR23F2046

PROJECT SUMMARY

Spec Tracker is a smart eyewear product equipped with an integrated Bluetooth tracking system that allows users to locate their glasses through a smartphone application.
It helps solve the common problem of misplacing glasses, saving time and reducing replacement costs.
The tracking chip is embedded in the glasses frame, making it suitable for students, professionals, and elderly users in their daily lives.

SDG ELEMENTS

SDG 9 – INDUSTRY, INNOVATION AND INFRASTRUCTURE
Promotes innovation through smart wearable technology.

SDG 12 – Responsible Consumption and Production
Reduces waste caused by frequent replacement of glasses.

PRODUCT IMPACT

- CONVENIENCE
- TIME EFFICIENCY
- IMPROVED LIFESTYLE
- COST SAVINGS

COSTING

ITEM	COST
SPEC	RM100
GPS TRACKER	RM9.00
TOTAL	RM109
SELLING PRICE	RM150

SPECTRACKER



PRODUCT TESTING & DATA ANALYSIS

The prototype concept focuses on usability, functionality, and practicality.
Testing includes:
• Test Bluetooth connection with smartphone app.
• Evaluate comfort and design usability.
• Check tracking accuracy and sound alert feature.
Analysis:
* Respondents aged 18–24, wear glasses
* Many frequently lose their glasses and face difficulties
* Prefer a product that is lightweight, with GPS, notifications, smartphone connectivity & sound/alarm
* The product has potential to make life easier and has high market potential

METHODOLOGY

- Market research
- Product Concept Development
- Technology Integration
- Prototype Design
- Marketing StrategyPlanning

OBJECTIVE

- To develop an innovative smart eyewear product with built-in tracking technology.
- To assist users in locating misplaced glasses through a smartphone application
- To reduce the cost and inconvenience associated with replacing lost glasses.
- To provide a practical technological solution for individuals who rely on glasses daily

PROBLEM IDENTIFICATION



ABSTRACT

SPEC TRACKER

MUHAMMAD NAUFAL BIN ROZAIDI, NUR ALIA BINTI ABDUL GHAFAR, NURHUMAZAH BINTI BAHARUDDIN, NURSYAZA IZZATI BINTI MUHAMAD SHALEH, NURIN NASUHA BINTI MUAZAM

PENYELIA : PN LILIS SERI YANA BINTI SIRUN

Misplacing glasses is a common daily problem that causes inconvenience and time wastage among users. This project aims to develop Spec Tracker, a smart solution designed to help users easily locate their misplaced glasses while supporting Sustainable Development Goals (SDG) through innovation and improved quality of life. Spec Tracker is developed as a pair of smart glasses integrated with a Bluetooth tracking system that connects to a mobile application, allowing users to view the last known location and activate a sound alert feature for quick detection. The product is designed to be lightweight, comfortable, and suitable for daily use without affecting vision or style. Product testing focuses on tracking accuracy, connectivity, and responsiveness of the sound alert, where results show that the device effectively reduces the time taken to locate glasses. This product provides significant impact by improving convenience, reducing stress, and lowering replacement costs, with a moderate production cost due to integrated smart components. In conclusion, Spec Tracker is an innovative and practical solution that enhances user efficiency and daily experience.

Keywords : Spec Tracker, Smart Glasses, Bluetooth Tracking, Wearable Technology, Location Tracking

SENARAI EDITOR



PN SARAH AFZAN BINTI ABD KARIM
Jabatan Kejuruteraan Awam



PN NAAGAJOOTHI A/P ADIN NARAINA
Jabatan Kejuruteraan Elektrik



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Ketua Unit Perpustakaan



PN SYARIFAH AZMIRINA BINTI SYED BANIAMIN
Pustakawan S9



PN SALINAH BINTI SALLEH
Pembantu Pustakawan S2



PN AZLEENA BINTI BASIRON
Pembantu Pustakawan S2



PN NORLINA BINTI AHMAD
Pembantu Pustakawan S2



PN NUR ZUHAIDA IZWANI BINTI ZAMBRI
Pembantu Pustakawan S1

PENGHARGAAN EDITOR

Setinggi-tinggi penghargaan dan ucapan terima kasih dirakamkan kepada semua pihak yang telah memberikan kerjasama, sokongan serta komitmen yang padu dalam menjayakan penerbitan Buku Program bagi PSA Innovation, Technology, Engineering and Commercialization Competition (PITEC 10), Sesi II: 2025/2026.

Sekalung penghargaan ditujukan khusus kepada pihak penganjur, jawatankuasa pelaksana, para penaja, peserta serta semua individu yang terlibat secara langsung mahupun tidak langsung dalam menyumbang idea, maklumat dan tenaga sepanjang proses penyediaan buku program ini.

Sesungguhnya, segala usaha dan sumbangan yang diberikan amat bermakna dalam memastikan penyampaian maklumat yang jelas, teratur dan berkualiti kepada semua pihak yang terlibat.

Akhir kata, semoga program ini mencapai objektif yang telah ditetapkan serta memberi impak yang positif kepada semua peserta dan pihak berkepentingan.

Sekian, terima kasih.

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eISBN 978-629-7607-73-7