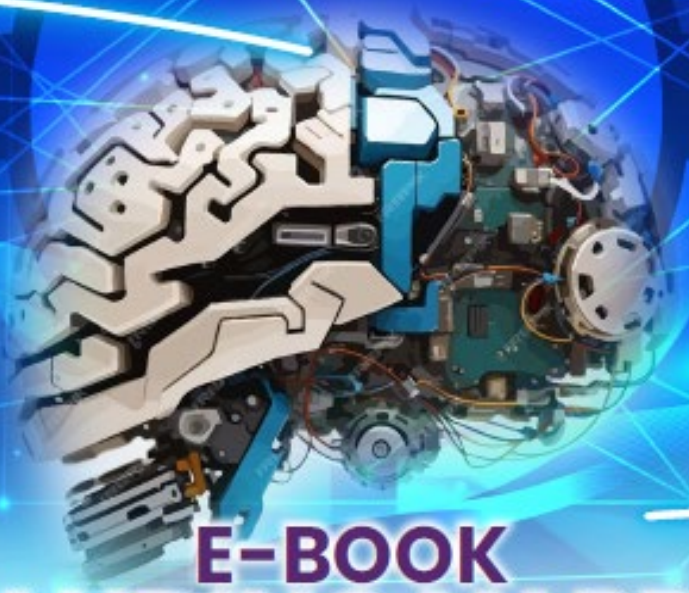
KEMENTERIAN PENDIDIKAN TINGGI
JABATAN PENDIDIKAN POLITEKNIK DAN KOLEJ KOMUNITI

POLITEKNIK MALAYSIA
SULTAN SALAHUDDIN ABDUL AZIZ SHAH



E-BOOK
PERTANDINGAN PROJEK AKHIR PELAJAR
SESI 1 : 2024/2025

PSATEC 7

PSA INNOVATION, TECHNOLOGY, ENGINEERING & COMMERCIALIZATION COMPETITION

'RESILIENCE AND SUSTAINABILITY IN EDUCATION'

KEMENTERIAN PENDIDIKAN TINGGI

POLITEKNIK MALAYSIA
SULTAN SALAHUDDIN ABDUL AZIZ SHAH

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POLITEKNIK SULTAN SALAHUDDIN ABDUL AZIZ SHAH

RESILIENCE AND SUSTAINABILITY IN EDUCATION

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ISI KANDUNGAN

SEKAPUR SIREH PENGARAH PSA

Assalamualaikum warahmatullahi wabarakatuh dan
Salam Malaysia MADANI.

Pertandingan Projek Akhir Pelajar dan Pameran Inovasi (PITEC 7) Politeknik Sultan Salahuddin Abdul Aziz Shah bagi Sesi 1: 2024/2025 yang bertemakan *"Resilience and Sustainability in Education"* ini sangat bertepatan dalam mendukung pembangunan pendidikan TVET yang berdaya tahan dan lestari. Di samping itu, ia juga selaras dengan aspirasi *Sustainable Development Goals (SDG)* bagi memenuhi keperluan masa hadapan berlandaskan Revolusi Industri ke-4 (IR4.0) dan teknologi kecerdasan buatan (AI).

Saya berterima kasih kepada jawatankuasa penganjur atas komitmen dan dedikasi dalam memastikan kelancaran PITEC 7, yang membuka ruang dan peluang kepada para pelajar untuk mempamerkan hasil inovasi serta meneroka teknologi terkini seperti AI, automasi dan data raya yang mana kesemuanya merupakan komponen kritikal dalam IR4.0. Para pelajar dilihat telah menunjukkan kebolehan mereka dalam menghasilkan idea-idea kreatif yang menyumbang kepada penyelesaian cabaran dunia sebenar serta berpotensi menyokong kelestarian pendidikan berkualiti.

Tahniah dan syabas diucapkan kepada para pelajar atas kesungguhan dan daya kreatif yang ditunjukkan melalui penghasilan projek akhir yang berimpak tinggi. Anda bukan sahaja tampil sebagai generasi yang memahami kepentingan ketahanan diri dan kemampuan beradaptasi dalam menghadapi cabaran pendidikan TVET, tetapi juga menunjukkan kesediaan untuk mengharungi dunia yang semakin maju dan kompleks dengan teknologi pintar.

Sekalung penghargaan juga kepada para juri yang terlibat dalam PITEC 7 atas pandangan membina dan kepakaran yang dikongsi dalam penilaian yang boleh memperkayakan pengalaman serta memberikan inspirasi kepada pelajar untuk terus berinovasi dan bersaing di peringkat global.

Dengan komitmen dan kerjasama semua, PSA yakin dapat melahirkan generasi pelajar yang berupaya memberi sumbangan kepada komuniti, industri dan negara melalui inovasi yang lestari.

Sekian, terima kasih.

ZAINAH BINTI RUJIHAN
Pengarah
Politeknik Sultan Salahuddin Abdul Aziz Shah

SEULAS PINANG
TIMBALAN PENGARAH AKADEMIK PSA

Assalamualaikum warahmatullahi wabarakatuh dan Salam Malaysia MADANI.

Tahniah dan syabas diucapkan kepada semua peserta Pertandingan Projek Akhir Pelajar dan Pameran Inovasi (PITEC 7) Politeknik Sultan Salahuddin Abdul Aziz Shah bagi Sesi 1: 2024/2025 yang telah memberikan sepenuh komitmen dalam pertandingan projek pada kali ini. Program ini bukan sahaja memberi peluang untuk memperlihatkan bakat, tetapi turut mengembangkan kemahiran dan minat pelajar terhadap inovasi yang bernilai. Setiap projek melambangkan daya cipta yang berpotensi membawa manfaat nyata kepada masyarakat dan negara. Mengikut tema "*Resilience and Sustainability in Education*", PITEC 7 menggalakkan pelajar untuk memperkukuhkan ketahanan diri dan memupuk sikap lestari dalam pendidikan TVET, sesuai dengan cabaran masa kini.

Politeknik Sultan Salahuddin Abdul Aziz Shah (PSA) akan terus berusaha melahirkan graduan yang mampu bersaing di era IR4.0 dan menyumbang kepada ekonomi negara. Kami komited dalam memajukan kemahiran teknikal, penguasaan teknologi, kreativiti, dan inovasi dalam kalangan pelajar agar mereka bersedia menjadi peneraju masa depan yang berdaya tahan dan menyokong pembangunan lestari. Selain memberi pengiktirafan kepada usaha pelajar, PITEC 7 juga mendorong mereka untuk mencipta penyelesaian yang relevan dalam mendepani cabaran teknologi dan ekosistem moden.

Penghargaan tulus ikhlas juga diucapkan kepada para juri yang berkongsi masa dan kepakaran serta kepada jawatankuasa penganjur atas komitmen jitu mereka. Semoga usaha hari ini menjadi pemangkin kepada kemajuan yang lebih besar dalam pendidikan TVET dan terus membawa manfaat kepada pembangunan negara.

Sekian, terima kasih.

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Politeknik Sultan Salahuddin Abdul Aziz Shah

KATA ALUAN PENGARAH PROGRAM

Assalamualaikum warahmatullahi wabarakatuh dan Salam Malaysia MADANI.

Alhamdulillah syukur ke hadrat Ilahi atas limpah kurnia-Nya, Pertandingan Projek Akhir Pelajar dan Pameran Inovasi (PITEC 7) Politeknik Sultan Salahuddin Abdul Aziz Shah (PSA) bagi Sesi 1: 2024/2025 yang bertemakan *"Resilience and Sustainability in Education"* berjaya dizahirkan. Penganjuran PITEC 7 bukan sahaja mencerminkan komitmen PSA terhadap pendidikan TVET mampan, tetapi juga mengiktiraf usaha dan inovasi para pelajar dalam mencari penyelesaian bagi cabaran masa hadapan.

Tema ini sangat relevan dalam era globalisasi dan perubahan teknologi yang pesat, *kerana* aspek ketahanan (*resilience*) dan kelestarian (*sustainability*) amat penting dalam setiap aspek kehidupan, khususnya dalam pendidikan TVET. Melalui PITEC 7, pelajar mempamerkan kreativiti dalam menghasilkan idea-idea inovatif yang selari dengan keperluan semasa serta selaras dengan *Sustainable Development Goals* (SDG). Projek yang dihasilkan juga memberi tumpuan kepada kemahiran abad ke-21, seperti pemikiran kritikal, penyelesaian masalah, dan kesedaran terhadap teknologi, termasuk kecerdasan buatan (AI) dan elemen Revolusi Industri ke-4 (IR4.0).

Tahniah dan syabas diucapkan kepada para pelajar atas usaha, daya kreatif, dan komitmen yang telah dipersembahkan. Setiap projek yang dihasilkan bukan sahaja mencerminkan bakat dan dedikasi pelajar tetapi juga menjadi tanda awal kepada kemampuan generasi masa hadapan untuk menyumbang kepada pembangunan negara secara lestari dan berdaya tahan.

Ucapan penghargaan terima kasih kepada jawatankuasa penganjur, para pensyarah pembimbing, barisan juri dalam dan luar, serta semua pihak yang telah menyumbang tenaga, masa, dan idea dalam menjayakan PITEC 7. Kejayaannya adalah hasil kerjasama dan komitmen yang tidak berbelah bahagi daripada semua pihak yang terlibat.

Semoga PITEC 7 ini menjadi platform yang bermakna dan memberi inspirasi untuk terus berusaha mencipta impak positif dalam dunia pendidikan TVET dan seterusnya. Diharapkan agar nilai-nilai murni yang disemai dalam PITEC 7 akan terus dibawa oleh para pelajar dan staf PSA dalam perkembangan personal dan profesional masing-masing untuk menjadi agen perubahan yang positif dalam masyarakat.

Sekian, terima kasih.

WAN MOHD ZAMRI BIN WAN AB RAHMAN
Pengarah Program
Pertandingan Projek Akhir Pelajar dan Pameran Inovasi (PITEC 7)
Sesi 1 : 2024/2025
Politeknik Sultan Salahuddin Abdul Aziz Shah

PENGENALAN

PITEC 7 merupakan satu inisiatif program yang signifikan dalam ekosistem Pendidikan dan Latihan Teknikal dan Vokasional (TVET) negara. Ia bertujuan untuk menyediakan platform kepada pelajar untuk menerapkan pengetahuan dan kemahiran yang diperoleh sepanjang pengajian mereka ke dalam projek inovatif selaras dengan keperluan kurikulum program pengajian Politeknik Malaysia melalui pelaksanaan kursus Projek (pendekatan pembelajaran berasaskan masalah, projek dan hasil) yang ditawarkan kepada pelajar Semester 5 program Diploma Politeknik.

Tema *"Resilience and Sustainability in Education"* yang dipilih kali ini menekankan kepentingan ketahanan dan kelestarian dalam pendidikan TVET sebagai persediaan untuk menghadapi cabaran dunia semasa. Dalam konteks tema tersebut, PITEC 7 mendorong pelajar untuk tidak hanya mengasah kemahiran teknikal tetapi juga memperkukuhkan nilai-nilai afektif seperti kerjasama, etika profesional, dan daya tahan. Melalui pendekatan pembelajaran yang berpusatkan pelajar, mereka diberi peluang untuk mengembangkan kreativiti dan idea yang inovatif, di samping memperlihatkan kebolehan dalam menghasilkan penyelesaian berdaya saing yang dapat menyumbang kepada kelestarian pendidikan TVET dan kemajuan masyarakat.

Pensyarah memainkan peranan penting sebagai fasilitator dan penyelia dalam membimbing pelajar sepanjang proses penghasilan projek mereka. Bimbingan dan sokongan yang diberikan oleh pensyarah bukan sahaja membantu dalam memperkukuhkan asas teknikal projek, tetapi juga memupuk sikap profesional dan kemahiran insaniah pelajar. Penilaian yang dilakukan oleh panel penilai yang berpengalaman memastikan bahawa projek yang dihasilkan tidak hanya memenuhi kriteria akademik tetapi juga mempunyai potensi untuk diaplikasikan dalam dunia nyata dan seterusnya memberi pengiktirafan dan penghargaan kepada pelajar yang telah mencurahkan idea dan keringat dalam mencipta keunikan dalam penghasilan inovasi projek mereka.

OBJEKTIF

- Melaksanakan bengkel penyediaan kertas teknikal untuk pertandingan projek akhir projek pelajar dan pameran inovasi mengikut panduan yang betul;
- Memberi pendedahan kepada pelajar persediaan pertandingan akhir projek pelajar dan pameran inovasi mengikut panduan yang betul;
- Memperkasa daya kreatif, ciptaan dan inovasi dalam kalangan mahasiswa TVET bagi mencapai tahap reka cipta terkini dari segi reka bentuk dan kebolehfungsian;
- Berperanan sebagai platform kepada pelajar bagi membentangkan idea dan inovasi atau pengetahuan dalam bidang untuk menunjukkan kemampuan mereka mencipta atau menemui sesuatu yang baharu; *dan*
- Penggalakan budaya reka cipta dan inovasi dalam usaha membangunkan produk reka cipta yang kompetitif berupaya bersaing ke pertandingan berimpak tinggi.

KESIMPULAN

PITEC 7 menjadi platform yang amat signifikan dalam pembinaan generasi yang mampu mengadaptasi perubahan dan menyumbang kepada pembangunan negara secara mampan. Dengan mengintegrasikan aspek ketahanan dan kelestarian dalam setiap projek, pelajar dilatih untuk melihat pendidikan bukan sahaja sebagai satu perjalanan akademik tetapi sebagai persediaan total ke arah kerjaya dan kehidupan yang berdaya tahan serta lestari. PITEC 7 turut mencerminkan komitmen PSA dalam melahirkan pelajar yang bukan sahaja inovatif tetapi juga mampu memberi impak positif kepada masyarakat dan negara, selaras dengan tema *"Resilience and Sustainability in Education"*.

JAWATANKUASA INDUK

PENGERUSI	*Puan Zainah binti Rujihan* *Pengarah PSA*
TIMBALAN PENGERUSI I	*PgKB II (K) Ts. Dr. Ahmad Aftas bin Azman* *Timbalan Pengarah Akademik*
TIMBALAN PENGERUSI II	*Ts. Mohd Firdauz bin Mhd Radzi* *Timbalan Pengarah Sokongan Akademik*
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PENYELARAS PROGRAM	*Ts. Dr. Norani binti Abd Karim* *(Penyelaras Projek Pelajar PSA (CRI)*
PRNGARAH PROGRAM	*En. Wan Mohd Zamri bin Wan Ab Rahman* *Penyelatas Projek Pelajar JKE*
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PSA INNOVATION TECHNOLOGY & COMMERCIALIZATION

TENTATIF PROGRAM

MASA	AKTIVITI
Penjurian Projek	
8.00 – 8.30 am	Pendaftaran peserta di Dewan Al-Jazari
8.15 – 8.30 am	Pendaftaran Juri di Anjung Bestari
8.30 – 8.45 am	Sarapan Pagi
8.45 – 9.00 am	Taklimat kepada Juri di Anjung Bestari
9.00 – 11.00 am	Proses Penilaian oleh Juri (40 projek)
11.00 – 12.00 pm	1. Proses perbincangan oleh Juri bagi penentuan kumpulan projek terbaik berdasarkan markah rubrik tertinggi. 2. Pengiraan markah oleh urusetia 3. Keputusan penganugerahan pingat /pemenang setiap projek bertanding.
Majlis Perasmian & Penutup PITEC 7 Sesi 1: 2024/2025	
12.00 pm	Ketibaan Ketua Juri, Ahli Mesyuarat Tertinggi (AMT, PSA), Pensyarah dan Pelajar
12.05 pm	Ketibaan Pengarah PSA
12.05 – 12.36 pm	Lawatan ke Tapak Pameran Projek PITEC 7 oleh Pengarah PSA dan Barisan AMT
12.35 – 12.45 pm	Lagu Negaraku dan Lagu Politeknik Malaysia
12.45 – 12.50 pm	Taklimat Keselamatan
12.50 – 12.55 pm	Bacaan Doa
12.55 – 1.10 pm	Ulasan Ketua Juri
1.10 – 1.30 pm	Ucapan Perasmian & Penutup PITEC 7 oleh Pengarah PSA
1.30 – 1.35 pm	Penyampaian Cenderahati kepada Ketua Juri
1.35 – 1.55 pm	Pengumuman Keputusan Pertandingan dan Penyampaian Hadiah
1.55 pm	Sesi Bergambar Majlis Bersurai

TAJUK PROJEK JKA

KUMPULAN	TAJUK PROJEK
JKA 1	**TAJUK: AIR GUN VALVE** NUR MAISARAH BINTI MUHAMAD NUR FARISAH AISYAH BINTI MOHD ALI AMIRUL HAZIM BIN RAZALI PENYELIA: EN. MIOR AMRAN NOOR BIN MIOR AHMAD NOOR
JKA 2	**TAJUK: EFFECTIVE LEARNING USING FLUIDA MASTER APPS** NUR NAJWA AINAA BINTI RADZNEE MAUHIBAH BINTI MIFTAHUDDIN PENYELIA: TS. DR. AINUL HAEZAH BINTI NORUZMAN
JKA 3	**TAJUK: WASTE WATER FILTER FROM THE SINK USING CORN HUSK ORGANIC MATERIAL** MUHAMAD SAIFUL HASNIZAM BIN ABU HASAN WAN MUHAMMAD ALIF SYAWAL BIN WAN SEMAN PENYELIA: PN. MARLIZA ASHIQIN BINTI KHAZALI
JKA 4	**TAJUK: PENGHASILAN AR MUDBALL SEBAGAI AGEN PENJERNIH AIR TERCEMAR** AMIR ASHRAF BIN MOHAMAD SALEHUDDIN RAHIM SLAMAT BIN OLLAH PENYELIA: PN. NORLIZA BINTI MD JAHID
JKA 5	**TAJUK: SMART RUBBISH COLLECTOR** MUHAMMAD IZUDDIN BIN MOHD BIN RAZALI MUHAMMAD SYAKIR AIMAN BIN MOHD SYUKRI PENYELIA: PN. YUSNITA BINTI YUSOF
JKA 6	**TAJUK: MACKTOSH ENGINEERING LEARNING APPLICATION** ADIB UZAIR BIN ISTAMAM MUHAMMAD ASHRAF HAKIMI BIN MAHMUD PENYELIA: PN. CHOONG SIEW LAY

TAJUK PROJEK JKA

KUMPULAN	TAJUK PROJEK
JKA 7	**TAJUK: PENDIGITILAN PELAN BANGUNAN JKA DAN DEWAN AL -JAZARI** MUHAMAD AZHAD HAIKAL BIN BADROL AKMAM MUHAMAD HAFIZAM BIN MAZLAN MUHAMMAD ALIF BIN ISMAIL MUHAMMAD AZIM BIN MOHD AMIZUL PENYELIA: EN. ABDUL RAZLI BIN ABDUL RAHIM TS. DR. NORANI BINTI ABD KARIM
JKA 8	**TAJUK: MAG -IQ (VAKUM MAGNETIK PINTAR)** NUR FATIN AZZUA BINTI BHARUDIN AN NAJIHAH BINTI AZMEE KHAN FAHRIZAL BIN MUSHALLI AQIL IRFAN BIN ADNAN PENYELIA: SR. ZARINA BINTI MAT SAPRI
JKA 9	**TAJUK: GLOW GUARD PAINT** SUGANYA A/P RAVICHANTHAR LECHANA RANI A/P MURUGAYAH JAGANISWARAN A/L JOHNSON PENYELIA: PN. NUR HAZLINA BINTI LAMLI
JKA 10	**TAJUK: ARWOODBASE** AWANG NOR HUZAIRI BIN AWANG ZAKARIA MUHAMAD DANISH HAIKAL BIN SABARUDDIN MUHAMMAD HAFIY JAUHAR BIN JAMALULLAIL NASUHA HANI BINTI MD NIZAM PENYELIA: EN. MUHAMAD FAIRUZZAIRI BIN ABDUL HAMID

TAJUK PROJEK JKE

KUMPULAN	TAJUK PROJEK
JKE 1	**TAJUK: SPINESYNC: AN IOT -BASED WEARABLE POSTURE MONITORING DEVICE** MIROSHA A/P VEETHASALAM NUR FARAH SHAKIRAH BINTI SHAHRUL AMIN PENYELIA: DR. FAZIDA BINTI ADLAN
JKE 2	**TAJUK: BREATHAWARE: LUNGS BREATH RESPIRATORY MONITORING OVER IOT** HANNAN UMAIRAH BINTI MUHAMAD ZAINUDIN HUDA BINTI MOHD RIZAL PENYELIA: PN. ASLINDA BINTI ZAMAH SHARI
JKE 3	**TAJUK: EPILEPSY MONITORING SYSTEM** LAALITA A/P SEGARAN AMNI NAJIAH BINTI ROZANI PENYELIA: PN. EMY SATIRA AZRIN BINTI MOHAMED HAKKE
JKE 4	**TAJUK: MEDI -BOX WITH PROGRAMMABLE REMINDER** MUHAMMAD ALIEF IDHAM BIN MOHD FAATIH KATHIRESH A/L KRISHNAN PENYELIA: PN. NIK RABIAHTUL MUJAHADAH BINTI ABD RAHMAN
JKE 5	**TAJUK: HYDROSOLAR** MUHAMMAD SYAHIR AZRAN BIN MUSTAFFA BAKRI MOHAMMAD AIMAN BIN ZULKIFLY MUHAMMAD HANIF DANIAL BIN KAMARUL AZLAN PENYELIA: PN. SALIZAHANIM BINTI LEMAN

TAJUK PROJEK JKE

KUMPULAN	TAJUK PROJEK
JKE 6	**TAJUK: IOT EMPOWERED PARALYSIS CARE** NUR SYAHIRAH BINTI SHAMSUL BAHARI MAGDELYN JODIN MAJJIHIL MUHAMMAD AIMAN IZZUDDIN BIN MOHD ROZI PENYELIA: PN. EMY SATIRA AZRIN BINTI MOHAMED HAKKE
JKE 7	**TAJUK: MONITORING INDICATOR FOR OUTDOOR WATER FILTER** NUR ATHIRAH BINTI AHMAD TAMRIN MOHAMMED IKMAR HAKIM BIN ISMAIL PENYELIA: TS. DR. AHMAD AFTAS BIN AZMAN
JKE 8	**TAJUK: DESIGN OF IOT BASED ON ELECTRIC MASSAGING DEVICE WITH HOT COMPRESSION** NURZIANA NATASHA BINTI MOHD KHOZIN AIN HUMAIRAH BINTI MOHD HAMDAN PENYELIA: PN. ASLINDA BINTI ZAMAH SHARI
JKE 9	**TAJUK: SMART RFID DOOR ACCESS WITH NOTIFY** NUR SYUHADA BINTI ABDUL RAFAR NUR AMIRAH BINTI AZMI PENYELIA: PN. EMY SATIRA AZRIN BINTI MOHAMED HAKKE
JKE 10	**TAJUK: DYNOLEG SYNERGY - DEVELOPMENT OF AUTOMATED CRUTCH USING LINEAR ACTUATOR** NUR ILYANA IZZATIE BINTI MOHD ZAMAN MUHAMMAD ILHAN MANSIZ BIN NOOR AZLAN PENYELIA: PN. NUR SHAHEERA MUMTAZ BINTI SAHADAN

TAJUK PROJEK JKM

KUMPULAN	TAJUK PROJEK
JKM 1	**PROJEK: TITANGRIT SANDER** MUHAMMAD NAIM BIN ABDUL HALIM MUHAMMAD SYAKIR BIN SAFUAN NAZIFATIN NAJWA BINTI ROSHANIZAM PENYELIA: PN. ANI BINTI YAAKUB
JKM 2	**PROJEK: DEVELOPMENT OF A SOLAR -POWERED AUTOMATIC IRRIGATION SYSTEM** NURFARHANA BINTI PAWAKKANGI NURIN BATRISYA BINTI ZAMRI NUR SHAZWANI BINTI ABD. HALIM PENYELIA: TS. WAN MAJDAH BINTI TON MAMAT
JKM 3	**PROJEK: SMART STEP INTEGRATED WITH IOT SYSTEM** NAZRAN ZAFRAN BIN JAMALUDDIN HARIS IZUDDIN BIN HARON MUHAMAD ARIF BIN AHMAD FAHMI PENYELIA: PN. NOOR HAZNIDA BINTI BAKAR
JKM 4	**PROJEK: SMART DIGITAL COOKING GAS METER** HARYTHASAN A/L SIVASINGAM KUMARAVEL A/L SANGAR PENYELIA: TS. MUHAMMAD HANIF BIN SELAMAT
JKM 5	**PROJEK: EXTENABLE FLOOD BARRIER DOOR** MUHAMAD AZIM RAZWAN BIN ABDUL RAZAK MUHAMMAD HAZIM BIN MOHAMAD HALIM NOR ALIF FARHAN BIN NORHAN PENYELIA: EN. MOHD SHARIZAN BIN MOHD SHARIFF

TAJUK PROJEK JKM

KUMPULAN	TAJUK PROJEK
JKM 6	**PROJEK: AUTOMATIC SCARECROW** DEEVASHANT A/L THAMIL MANY AIZAT BUKHAIRY BIN MOHD AZRAIE JAGATHISAN A/L NADARAJAN PENYELIA: DR. KHAIRULNIZAM BIN KASIM
JKM 7	**PROJEK: DRINK SHAKER MACHINE** MUHAMMAD NAZMI BIN NORWAHIDI MOHAMAD HAZIM BIN IDRIS MUHAMMAD AZRIH BIN HASAN PENYELIA: EN. MOHD ZULKARNAEN BIN MOHD IBRAHIM
JKM 8	**PROJEK: SEMPERIT PRESSER** NISRINA SYAFIENA BINTI ZOHAIDI NUR UMAIRAH SYAHMINA BINTI SHAHARULAZMAN PENYELIA: PN. NURUS SADIQIN BINTI ABDUL RAZAK KHAN
JKM 9	**PROJEK: RICE WASHER** MUHAMMAD DANIEL BIN MOKHTAR RASYAD BIN SULAIMAN PENYELIA: TS. ASMIRA BIN ASHARI
JKM 10	**PROJEK: AUTOMATED SOLAR DRAIN CLEANING SYSTEM (ASDCS)** MUHAMMAD HANNAN BIN MOHD SUHADA MUHAMMAD LUTH HAKIMI BIN HALIM MUHAMMAD RIFAEI BIN LIMANSAH PENYELIA: DR. NORASIAH BINTI MUHAMMAD

TAJUK PROJEK JPG

KUMPULAN	TAJUK PROJEK
JPG 1	**PROJEK: BLEND GUSTO** IMAN SYUHADA BINTI ROSLAN NUR IZZAH ATHIRAH BINTI MOHD HAMIDI AHMAD FARHAN BIN RIDZWAN MUHAMMAD ARIF SYAKIR BIN SABRUDDIN PENYELIA: PN. SITI RAWAIDAH BINTI MOHD RAZIKIN
JPG 2	**PROJEK: EDUMANIS** MOHAMAD AZRAI HAYAT BIN AHMAD YAZID MUHAMMAD FAYYADH HARITH BIN MOHD ALI SAIFUZIN MUHAMMAD KHAIR QAYYUM BIN MUHAMAD MARYUS MOHAMAD IKMAL RIZAL BIN SHAHRULAIZAM PENYELIA: EN. AHMAD YUSRI BIN ABD NASIR
JPG 3	**PROJEK: MULTIPURPOSE BTB** KHAYRIN NADHIRA BINTI MOHD SUDDIN AHGELYA A/P MOHAN SIVALETCHUMI A/P CHANDRAN MUHAMMAD AIDIL HAZIMIE BIN HASHIM PENYELIA: PN. PUSHPALATHA A/P APPANAIDU
JPG 4	**PROJEK: PLANTACCES KIT** MUHAMMAD ZULHISHAM BIN HASNAN MUHAMMAD FAHMI SHOLIHIN BIN MOHAMAT SAMIM SYABEIL BATRISH BIN KAMAL BAHAREIN MUHAMMAD ZULHELMI BIN OSMAN PENYELIA: PN. HARYANTI BINTI ABDULLAH
JPG 5	**PROJEK: TAKINO FILE** BOHESH MITHA A/P BASKARAN SUNTHERII A/P RAJU SUGANTI A/P RAJU MAASHINI A/P BALA SUBRAMANIAN PENYELIA: EN. MOHD NOR HAFIZ BIN SALLEH

TAJUK PROJEK JPG

KUMPULAN	TAJUK PROJEK
JPG 6	**PROJEK: PERFUME STICK** NUR ATIQAH BINTI NASARUDDIN NUR ZULAIQHA NAJIHA BINTI MOHD NAJIB NURUL AINA SHANNAZ BINTI BORHAN AINAA SYARAFINA BINTI RIZUAN PENYELIA: PN. NORHAYATI BINTI OTHMAN
JPG 7	**PROJEK: SERENITY SMART BAG** ANIS ANIZA BINTI AZENI YUNIZAR SITI SHAHIRA BINTI ABDULLAH MUHAMMAD HAIKAL BIN MOHD RAMZZANI SITI HUSNA BINTI MORAD NURUL SYAZANA BINTI ZAMRI PENYELIA: PN. MAZIHARITA BINTI MOHAMOOD
JPG 8	**PROJEK: ZIYARAH** ISHQI BINTI NOREMEY NOR AIMAN HAIKAL BIN NORAZMI MUHAMMAD HARRIS BIN ADNAN WAN NUR FARZANAH BINTI WAN SHAHRUL NURYASMIN BINTI MOHD YUSOFF PENYELIA: EN. MUHAMAD HASHIM BIN AHMAD
JPG 9	**PROJEK: LAUNDJEANS BAG** NUR ADILAH BINTI MOHD KAMARUDDIN QISTINA BINTI RUDIE NUR FARAH AFIFAH BINTI HASNIZAM ANITA BINTI ABBAS PENYELIA: PN. SARIMAH BINTI CHE HASSAN
JPG 10	**PROJEK: VERDENTAGE** NURUL IZZATULNAJWA BINTI HADIS PUTRI ALYA MAISARAH BINTI SHARUDDIN NUR EDRYNA BINTI EDZY DEVAN NESAN A/L SINNASAMY PENYELIA: PN. SHARIFAH YUHAYU BINTI SYED HAMID

PSA INNOVATION TECHNOLOGY & COMMERCIALIZATION

ABSTRAK & POSTER

JABATAN KEJURUTERAAN AWAM

PSA INNOVATION, TECHNOLOGY, ENGINEERING & COMMERCIALIZATION COMPETITION | PITEC 7 SESI 1: 2024/2025

AIR GUN VALVE: AN INNOVATIVE SOLUTION FOR EFFICIENT DRAINAGE MANAGEMENT

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ABSTRACT

In the era of globalization, Malaysia faces persistent issues related to clogged floor traps and rain gutters, causing discomfort and unpleasant odors for users. To address these challenges, this study introduces an innovative product, the Air Gun Valve, designed to efficiently and sustainably clear blockages in floor traps and rain gutters. Unlike conventional solutions that rely on acidic substances with inherent limitations, the Air Gun Valve offers a user-friendly and eco-friendly approach. The innovation, tested at Polytechnic Sultan Salahuddin Abdul Aziz Shah, focuses on cleanliness, odor-free operation, and ease of use while enhancing productivity and user comfort. The research methodology included material selection, design sketches, problem identification, analysis, interviews, and product testing. These steps validated the tool's functionality and effectiveness. Results revealed a significant advancement in modern drainage management. The Air Gun Valve demonstrated optimal performance with minimal air pressure compared to existing market tools, achieving a productivity increase of up to 68.75% in resolving drainage issues efficiently and safely. In conclusion, the Air Gun Valve offers a cost-effective solution that optimizes system flow and pressure management, improving overall operational efficiency. Its exceptional performance enhances resource and energy utilization, making it a smart and sustainable investment for the future. This innovative product holds great potential to transform drainage management, providing both environmental and practical benefits.

***Keywords*:** Air Gun Valve, Drainage management, Clogged floor trap solution, Sustainable innovation, Productivity enhancement

PERTANDINGAN PROJEK AKHIR PELAJAR

SESI 1:2024/2025

'RESILIENCE AND SUSTAINABILITY IN EDUCATION'

PITEC 7

PSA INNOVATION, TECHNOLOGY, ENGINEERING & COMMERCIALIZATION

AIR GUN VALVE

LATAR BELAKANG

- Produk ini adalah penyelesaian revolusioner untuk menangani masalah tersumbat pada *floor trap* dan *gutter* menyebabkan bau busuk dan ketidakselesaan dengan perciptaan alat inovasi yang mesra pengguna dalam memperkasakan produktiviti sehingga 68.75%.
- Alat canggih ini bukan sahaja berdaya tahan menjadikannya solusi unggul dalam memastikan kelestarian kebersihan bangunan

OBJEKTIF KAJIAN

- Mencipta alat berteknologi dan mesra pengguna dalam menagani isu saliran *floor trap* dan *gutter* tersumbat
- Meningkatkan produktiviti pengguna dalam menyelesaikan masalah saluran *floor trap* dan *gutter* tersumbat

PERNYATAAN MASALAH

- Kefungsian optimum saluran *floor trap* dan *gutter* sering terjejas akibat kecuaian manusia menyebabkan pencemaran bau dan pembiakan serangan perosak akan mengundang pelbagai penyakit serta mengurangkan nilai estatika bangunan Method yang tidak produktif dan
- berbahaya boleh mengakibatkan kecederaan secara kekal, pembaziran kewangan dan tenaga manusia serta tidak menyelesaikan isu utama

KEPENTINGAN PROJEK

Penggunaan alatan inovasi yang mesra pengguna dapat dikendalikan oleh petugas kebersihan menangani saliran tersumbat dengan selamat tanpa kehadiran juruteknik

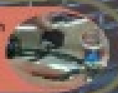
Mampu meningkatkan 68.75% produktiviti penyelenggaraan bangunan. Penggunaan alat inovasi yang mesra pengguna dapat dikendalikan oleh petugas juruteknik

METODOLOGI

Mengenal pasti penyataan masalah

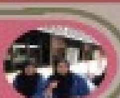
Membuat lakaran dan penyelidikan tentang reka bentuk produk

Pelaksanaan pemilihan bahan dan pemasangan produk

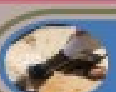


Pengujian tahap keberkesanan produk

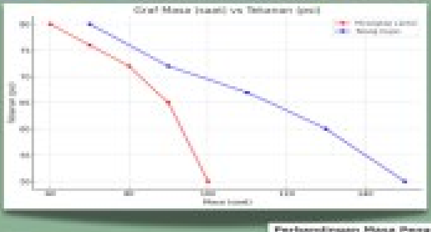
Membuat analisis dan temu bual



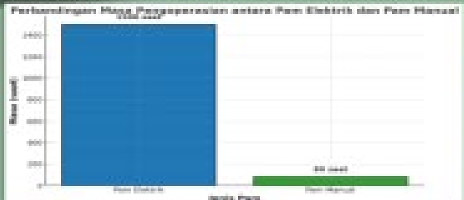
Produk siap dan boleh digunakan



DATA UJI LARI



PAM ELEKTRIK BEROPERASI LEBIH CEPAT 68.75% BERBANDING DENGAN PAM MANUAL



KESIMPULAN

Alat inovasi mesra pengguna ini adalah langkah transformasi mendepani cabaran semasa dalam pengurusan saluran tersumbat dengan keupayaan produktiviti sehingga sekitar **68.75%**, alat ini menjanjikan keberkesanan tinggi dalam menyelesaikan masalah tersumbat malah menepati prinsip kelestarian. Pendekatan yang cekap, berkesan dan lestari meningkatkan nilai estetika bangunan serta menyumbang kepada kesejahteraan dan kemajuan produktiviti negara secara menyeluruh.

https://youtu.be/J2AUl2bbWn8?si=NQIx0gd5BVDFzDiR

SUBSCRIBE

AMIRUL HAZIM BIN RAZALI
08DPB22F1108

NUR FARISAH AISYAH BINTI MOHD ALI
08DPB22F1027

NUR MASARAH BINTI MUHAMAD
08DPB22F1056

EN. MIOR AMRAN NOOR BIN MIOR AHMAD NOOR

FLUIDA MASTER: ENHANCING FLUID MECHANICS LEARNING THROUGH A MOBILE APP SOLUTION

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ABSTRACT

The "Fluida Master" mobile app addresses the high failure rates in fluid mechanics among Civil Engineering students at Polytechnic Sultan Salahuddin Abdul Aziz Shah. Developed as a user-friendly and accessible learning tool, the app bridges the gap between theoretical knowledge and practical application, enabling students to study fluid mechanics at their own pace. Fluida Master features interactive modules designed to simplify complex topics and enhance understanding. The app significantly reduces problem-solving time, allowing users to complete calculations within seconds compared to the 10-15 minutes required for manual methods. Feedback from users highlights improved comprehension, increased confidence, and greater motivation to engage with fluid mechanics through the app's intuitive design. In addition to supporting academic performance, Fluida Master promotes sustainable learning by reducing reliance on physical textbooks, contributing to eco-friendly education. Results from this project demonstrate that Fluida Master is an effective resource for improving fluid mechanics learning, offering a comprehensive and innovative solution for Civil Engineering students.

Keywords: Fluid mechanics learning, Mobile learning app, Civil Engineering Education, Interactive learning tools, Sustainable education solutions.

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AKHIR PELAJAR
SESI 1:2024/2025
'RESILIENCE AND SUSTAINABILITY IN EDUCATION'

POLITEKNIK MALAYSIA

PTEC 7
INNOVATION, TECHNOLOGY, ENGINEERING & COMMERCIALIZATION

EFFECTIVE LEARNING USING FLUIDA MASTER APPS


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Ts. Dr. Ainul Haezah binti Noruzman


Mauhibah binti Miftahuddin

BACKGROUND OF PROJECT

Fluida Master is a mobile educational app that helps Civil Engineering students learn about fluid mechanics more effectively. The apps helps students to check the answer for complicated concepts such as fluid characteristics, pressure measurement, hydrodynamics, and fluid flow by ownself. Its user-friendly design and tailored learning paths provide an engaging experience, enabling students to bridge the gap between theoretical knowledge and practical application. Fluida Master seeks to boost academic achievement, minimize failure rates, and spark a greater interest in fluid mechanics.

OBJECTIVE

- To produce smart application Fluida Master for student effectiveness in learning.
- To determine the effectiveness of the apps.
- To evaluate student learning performance while using smart application (Fluida Master)

METHODOLOGY

- Developed using new software call **Net MAUI**
- Can develop apps that can run on Android, iOS, macOS, and Windows from a single shared code-base.

FINDINGS

- The app helps students understand fluid mechanics better, increasing their confidence and comprehension.
- Students using the app perform better academically, with fewer calculation errors and higher success rates.

STATEMENT OF PROBLEMS

- Civil Engineering students at Polytechnic Sultan Salahuddin Abdul Aziz Shah struggle with understanding fluid mechanics, a subject known for its complex theories and calculations.
- Traditional teaching methods may not provide enough interactive or practical learning experiences, which are essential for understanding this subject.

SIGNIFICANCE OF PROJECT

- **Enhanced Learning**: The app provides an interactive learning platform that simplifies complex fluid mechanics concepts, making it easier for students to grasp challenging material.
- **Accessible Education**: The app allows students to learn at their own pace, anytime and anywhere, supporting independent study outside the classroom.

PRODUCT PICTURE

WASTE WATER FILTER FROM THE SINK USING CORN HUSK ORGANIC MATERIAL

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ABSTRACT

A water filter is a system designed to remove impurities and contaminants from water to ensure it is clean and safe for use or release into the environment. Wastewater from sinks contains impurities such as food residues, oil, and chemicals generated from human activities like cooking and washing dishes. If not filtered properly, this wastewater can pollute the drainage system. Typically, unfiltered wastewater leads to problems such as water pollution, foul odors, and clogged drains. To address these issues, a sink wastewater filter product incorporating corn husks and other organic materials was developed. This water filter combines effective materials for filtering dirty water, including gravel, river sand, charcoal, and corn husks. Two filter samples were created, differing in the thickness of the corn husks: Sample A with an 8 cm thickness and Sample B with a 5 cm thickness. Test results for both samples showed different outcomes, with Sample A demonstrating lower values compared to Sample B, indicating that Sample A is more effective in filtering dirty water. In conclusion, water filters using corn husks can filter wastewater from sinks and reduce pollution, thereby mitigating its adverse effects on the environment.

Keywords: Water pollution, odor pollution, clogged drains, dirty water, corn husks

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'RESILIENCE AND SUSTAINABILITY IN EDUCATION'

PSA INNOVATION, TECHNOLOGY, ENGINEERING & COMMERCIALIZATION

WASTE WATER FILTER FROM THE SINK USING CORN HUSK ORGANIC MATERIAL

BACKGROUND OF PROJECT

The wastewater filtering project from sinks was developed to address pollution issues caused by untreated wastewater being discharged straight into drains or water sources such as rivers, lakes, and reservoirs. As we all know, improperly filtered sink wastewater can cause clogged drains, water contamination, and bad odors. This project entails conducting extensive study on appropriate water filtering technologies, selecting effective filter materials, and designing a functional and efficient wastewater treatment system. As a result, the sink-based wastewater filtering project is an endeavor to minimize pollution while also protecting human health and the environment.

STATEMENT OF PROBLEMS

Pollution caused by partially filtered waste water from sinks is a common problem in water catchment areas. One of the major issues is air pollution, which can have a harmful influence on drinking water supplies. In addition, odor pollution can develop, resulting in unpleasant aromas in the environment and causing public discomfort. Finally, food waste that is not properly screened might cause clogged drains.

OBJECTIVES

1. Producing water filter products using recycled materials which are corn husks.
2. Test the effectiveness of filtered water using a water filter

METHODOLOGY

FINDINGS

Parameter	Sampel Air Original (sebelum ditapis)	Sampel Air (selepas ditapis)	Sampel Air Original (sebelum ditapis)	Selepas (Minggu) (selepas ditapis)	Class
Dissolved Oxygen (DO), mg/L	0.366	0.366	6.0	6.4	V-IV
Biological Oxygen Demand (BOD), mg/L	80	80	200	360	V
Chemical Oxygen Demand (COD), mg/L	365	359	550	550	V
Turbidity, NTU	345	45.0	97	180	-
PH	9.0	9.8	6.7	7.8	IV

Parameter	Sampel Air Original (sebelum ditapis)	Sampel Air (selepas ditapis)	Sampel Air Original (sebelum ditapis)	Selepas (Minggu) (selepas ditapis)	Class
Dissolved Oxygen (DO), mg/L	0.366	0.366	6.0	6.4	V-IV
Biological Oxygen Demand (BOD), mg/L	80	80	200	360	V
Chemical Oxygen Demand (COD), mg/L	365	359	550	400	V
Turbidity, NTU	345	505	97	180	-
PH	9.0	9.8	6.7	7.8	IV

SIGNIFICANCE OF PROJECT

1. **Reduction of Environmental Pollution**:
By filtering wastewater from sinks, this method helps prevent pollutants from entering rivers, lakes, and other water sources, thereby reducing air pollution.
2. **Cost-Effective Source**:
Corn husk is an agricultural by-product that is easy to obtain and cheap. Its use in filtration systems provides a low-cost option for wastewater treatment, especially in older residential areas or villages that may not have sophisticated treatment facilities.
3. **Encouraging Waste Reuse**:
The use of corn husks encourages the recycling of agricultural waste, supporting a circular economy where organic waste can be reused rather than thrown away.

CONCLUSION

In conclusion, the stated objective was achieved because we were able to produce a water filter product using corn husks and test the effectiveness of the filter against waste water from the sink, the proof of which we have done tests based on several parameters, including DO, BOD, COD, turbidity, and pH.

Based on the data presented, it can be concluded that the filter material needs to be changed after 3 weeks because the test results after a period of 3 weeks show a value that is too high compared to the value on the first day of filtration. In addition, physical observations also show that the condition of corn husks that change after 3 weeks will reduce the effectiveness of corn husks in the filtering

PENYELIA
PUAN MARLIZA ASHIQIN BINTI KHAZALI

KETUA KUMPULAN
MUHAMMAD SAIFUL HASNIZAM BIN ABU HASAN

AHLI KUMPULAN 1
WAN MUHAMMAD ALIF SYAWAL BIN WAN SEMAN

PRODUCTION OF AR MUDBALL AS A POLLUTED WATER CLARIFYING AGENT

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ABSTRACT

This mudball product aims to address the turbidity of water in the Sriamera Fish Pond, Meru, Klang, which has led to the death of aquatic life due to pollution and the accumulation of organic and inorganic substances. Made from banana peels and rice husks and enriched with EM1 and EMAS microorganisms, these mudballs accelerate the decomposition of organic matter. Efficacy tests, which monitored turbidity, dissolved oxygen (DO), and pH, showed that this method successfully reduced turbidity, increased dissolved oxygen, and stabilized water pH. Before treatment, water turbidity in the Sriamera Fish Pond was recorded at 102.55 NTU. After one and two weeks of using mudballs with EM1 Solution, turbidity values decreased to 11.19 NTU and 16.18 NTU, respectively. Similarly, with the EMAS Solution, turbidity values decreased to 12.84 NTU after one week and 11.13 NTU after two weeks. This study, conducted at Sriamera Fish Pond and Bukit Cerakah Pond over a two-week observation period, included both qualitative and quantitative analyses. Results indicated that the EM1 method provided the best outcomes in reducing turbidity and increasing dissolved oxygen, particularly in the more polluted Sriamera Pond. These mudballs present a sustainable water purification alternative, promoting balance within the aquatic ecosystem.

Keywords: *Water turbidity reduction, Aquatic ecosystem restoration, EM1 and EMAS microorganisms, Sustainable water purification, Organic waste treatment*

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Penghasilan AR Mudball sebagai agen penjernih air tercemar

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Statement of Problem

The problem is that aquatic life such as fish die due to the turbidity of the water in the water reservoir area which is Sriamera Meru Klang Fish Pond.

Sriamera Fish Pond.

Bukit Cerakah Fish Pond.

Findings

Previous studies in this research include various literature and field studies on the use of natural materials and EM (Effective Microorganisms) technology in water purification. This study focused on materials such as topsoil, banana peels, rice husks, and EM solutions to produce mud balls that have great potential in purifying water. According to six literature studies, the effectiveness of the "AR Mudball" product has been proven by adding two main ingredients, namely rice husks and banana peels. Rice husks and banana peels are widely used by others so we took an alternative to combine rice husks and banana peels for greater effectiveness.

Rice husk.

Banana peels.

Methodology

This study is a mixture of qualitative and quantitative, as it involves objective measurement of water parameters and subjective observation of a qualitative nature. The methodology of this study is to test water parameters, namely turbidity test, pH test and dissolved oxygen content test. This test was conducted to find out the effectiveness of using mudballs on two types of pond water namely Sriamera Fish Pond and Bukit Cerakah Fish Pond after mixing two organic materials namely banana peel and rice husk in the mudball.

Background of Project

Problems detected in the Sriamera Fish Pond include unpleasant odors, cloudy water with a greenish tint, algae growth, and excessive aquatic plants. This situation reflects the pollution and lack of oxygen that causes the death of aquatic life. Water samples were taken from the Sriamera Fish Pool to compare the water quality with the Jalan Bukit Cerakah Fish Pool. This will help assess the difference between the two waters after the use of mudballs in the area and determine the necessary remedial measures.

Tubidity test.

pH test.

Objective

- To produce AR Mudball using a mixture of banana peels and rice husks as a purifier for polluted water.
- To determine the effectiveness of AR Mudball by conducting water parameter tests.

Conclusion

This project showed the largest and most stable increase in dissolved oxygen content and decrease in turbidity in both ponds using the EM1 method, particularly the Sriamera Fish Pond which is dirtier than Bukit Cerakah Fish Pond. Mud balls with a mixture of two organic materials, such as rice husks and banana peels, proved to be more effective because of the diverse nutrient and microorganism content. However, this project has several limitations, including budget constraints, lack of adequate technology at Sultan Abdul Aziz Shah Polytechnic due to malfunctioning oxygen testing equipment, and communication barriers between team members that can lead to misunderstandings and mistakes.

Significance of Project

The study of mudballs has significant importance in the context of water purification and water resource management. Mudballs have been shown to be effective in reducing turbidity in water, which is an important indicator of water quality. By reducing turbidity, water becomes cleaner and safer to use for various purposes such as consumption, irrigation and industry. Mudballs are made from natural materials such as clay and sand, so they are an environmentally friendly solution to the chemicals often used in water purification processes. Using mud balls reduces reliance on chemicals that can have a negative impact on the environment.

Product Picture

Sample Picture

SMART RUBBISH COLLECTOR: ECO-FRIENDLY DRAINAGE SOLUTION

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ABSTRACT

The Smart Rubbish Collector is an innovative waste trap designed to address the issue of clogged drains in the lake area of Polytechnic Sultan Salahuddin Abdul Aziz Shah. The primary objective of this product is to simplify the manual cleaning process of drains without relying on electricity or fuel. The effectiveness of the product is assessed based on its design, functionality, safety and marketability. The product is limited to use on flat surfaces and is designed to trap physical waste only, excluding oil spills. It is particularly suitable for drains measuring 0.42m x 1m. The materials used in constructing the device include hollow mild steel, angled iron, a hand winch puller, wire rope, wire mesh, and pulleys. These components are measured, cut, and assembled using a MIG welding machine to create a sturdy and efficient waste-trapping system. Research findings show that the Smart Rubbish Collector effectively traps an average of 1.186kg of waste over 14 days. The amount of waste collected varies with weather conditions, such as rain or sunshine. A feedback survey conducted with 30 respondents indicated a high level of satisfaction with the product, achieving an average effectiveness score of 3.54.In conclusion, the Smart Rubbish Collector is a practical and eco-friendly solution for preventing waste from entering drainage inlets and causing blockages. Its design offers a low-cost, manual alternative for maintaining cleaner drainage systems and improving water flow in urban areas.

Keywords: Smart Rubbish Collector, Drainage system maintenance, Waste trapping device, Eco-friendly cleaning solution, Clogged drain prevention

PTEC 7
PSA INNOVATION, TECHNOLOGY, ENGINEERING & COMMERCIALIZATION

PERTANDINGAN PROJEK AKHIR PELAJAR
SESI 1:2024/2025
'RESILIENCE AND SUSTAINABILITY IN EDUCATION'

SMART RUBBISH COLLECTOR

BACKGROUND OF PROJECT

After looking into PSA Lake's drainage problems, it was discovered that too much litter had accumulated, polluting the ecosystem and producing offensive odours. People's reckless behaviour, which involves dumping rubbish into the drains, is the cause of this predicament. As a result, a Smart Rubbish Collector was created to make it easier to maintain these drains, hence lowering maintenance expenses and preventing obstructions.

PROBLEM STATEMENT

1. Trash accumulation and jams have resulted from careless trash dumping in sewers.
2. The research area's drain cleaning has been postponed due to high maintenance costs and a shortage of labourers.
3. Cleaning these enormous drains effectively requires a lot of work and assistance from other workers.

OBJECTIVE

1. To build a device that is easy to operate, without the use of electricity or fuel.
2. To determine the effectiveness of the product in terms of design, functionality, safety, and marketability.

METHODOLOGY


Smart Rubbish Collector

SIGNIFICANCE OF PROJECT

- In just five to eight minutes, a single worker may use this gadget to remove a significant amount of debris from the drain.
- When utilising this device instead of a drain hoe by hand, labour savings are achieved.
- By keeping rubbish in the drain from getting into the lake area at PSA, the product works successfully.

FINDING

According to the study's findings, over the course of 14 days, the average weight of trash trapped in the Smart Rubbish Collector was 1.186 kg. It was discovered that the weight of the imprisoned trash varied according to the weather, whether it was hot or rainy.

Results from the examination of 30 respondents' feedback questionnaires indicate that the product's efficacy level is high, at 3.54.


Before


After

CONCLUSION

In conclusion, installing a Smart Rubbish Collector in the drain can assist in preventing trash from getting into the drain and clogging it.


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MACKTOSH ENGINEERING LEARNING APPLICATION

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ABSTRACT

The rapid advancement of smartphone technology offers immense potential to enhance teaching and learning. This project harnesses these advancements through the development of the "MackTosh Engineering Learning Application," a mobile tool designed to support Civil Engineering students in conducting Mackintosh Probe experiments. The application provides interactive notes and instructional videos, leveraging YouTube as a Web 2.0 resource for content delivery. Developed using the ADDIE instructional model—which includes analysis, design, development, implementation, and evaluation phases—the project addressed three main objectives. Objectives 1 and 2 focused on the application's development and functionality, which were validated through user feedback. Results showed that an average of 94% of users agreed or strongly agreed on the design layout, responsiveness, ease of navigation, and overall performance, confirming its effectiveness as an instructional tool. For objective 3, a comprehension assessment revealed an 18% improvement in quiz scores among app users compared to traditional lab sheets, with students expressing increased confidence and satisfaction. The application addresses key challenges in lab-based learning, such as group-focused sessions and limited instructor demonstration time, fostering greater student autonomy and instructional efficiency. Its significant market potential stems from the rising demand for digital learning tools in higher education, especially within STEM disciplines. Future enhancements will include audio support, multi-language options, and data analysis features, allowing the app to be marketed to engineering programs globally and contributing to quality education goals. In conclusion, the MackTosh application exemplifies the transformative role of mobile technology in education, promoting safer, more efficient lab environments and setting a standard for digital learning tools in engineering.

Keywords: Mackintosh Probe, Civil Engineering education, Mobile learning application, ADDIE instructional model, Digital learning in STEM

KEMENTERIAN PENDIDIKAN TINGGI

POLITEKNIK

PERTANDINGAN PROJEK AKHIR PELAJAR SESI 1:2024/2025

'RESILIENCE AND SUSTAINABILITY IN EDUCATION'

POTEC 7

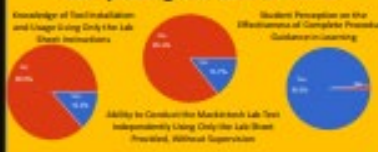
PSA INNOVATION, TECHNOLOGY, ENGINEERING & COMMERCIALIZATION

MACKTOSH ENGINEERING LEARNING APPLICATION

This initiative addresses the changing landscape of education and the growing use of technology, especially in engineering. Hands-on learning in labs is now seen as an important addition to classroom learning. However, providing this experience is challenging due to limited lab hours, resource shortages, and safety issues, which make it harder for students to get enough practical learning time.

PROBLEM STATEMENT

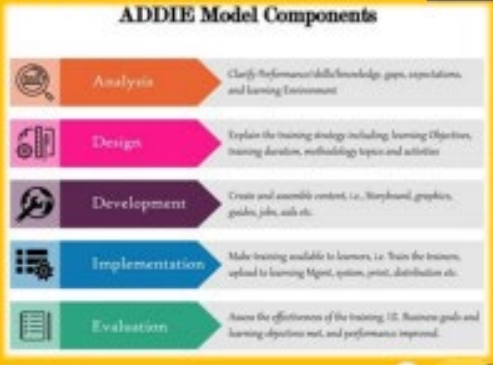
1. Students struggle to understand the process or procedure described in the lab sheet
2. Students face difficulty using the tools correctly
3. Students face difficulty completing the task on time



OBJECTIVE

1. To develop an application for Mackintosh Probe experiment " MackTosh Engineering Learning Application"
2. To determine the functionality of the application
3. To assess students' comprehension of operating mackintosh probe laboratory instruments and conducting laboratory procedures

METHODOLOGY



SIGNIFICANCE OF PROJECT

The lab learning application is significant because it enhances safety, independence, and efficiency in lab-based education. By providing easy-to-access instructions and safety guidance, the app reduces reliance on instructors, freeing up time for more advanced learning.

FINDINGS

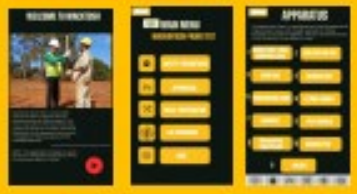
The considerable increase in average scores, from 68% to 86%, highlights the app's role in reinforcing knowledge and making lab protocols more accessible. This improvement suggests that providing students with real-time guidance and interactive tools within the lab setting can effectively support learning outcomes.

18% Increase

CONCLUSIONS

- Demonstrates the positive impact of mobile technology in education.
- Promotes safer, more efficient lab environments.
- Enhances students' understanding and autonomy in lab settings.
- Provides immediate access to guidance, improving performance.
- Highlights potential for tailored digital tools in lab-based learning.
- High market potential due to rising demand for digital learning tools in STEM education.
- Future enhancements: audio, multi-language support, and data analysis to reach global engineering programs.

APPS INTERFACE



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PSA INNOVATION TECHNOLOGY & COMMERCIALIZATION

DIGITIZING BUILDING PLANS WITH BIM TECHNOLOGY FOR ENHANCED INFRASTRUCTURE MANAGEMENT

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ABSTRACT

The digitization of building plans for the Civil Engineering Department (JKA) and Al-Jazari Hall (DAJ) aims to convert existing paper-based building plans into digital formats using Autodesk Revit, a leading software for Building Information Modelling (BIM). This project was initiated following a field study at the Building and Infrastructure Unit (UBI) office to identify issues with the current plans. The study revealed that the original plans were worn, faded, and outdated, necessitating an initiative to digitize them for better preservation and usability. The digitized plans provide multiple benefits, including aiding UBI in maintenance planning, reducing reliance on physical document storage, and enabling improvements to existing buildings. For instance, changes such as repainting walls and creating a refreshed environment can be visualized and planned effectively. The project involved interviews with a Civil Engineering Assistant Engineer at JKA, providing insights into the challenges and expectations of plan digitization. The project successfully achieved its primary objective by digitizing all building plans for JKA and DAJ. Furthermore, additional outputs were generated, such as emergency evacuation plans and layouts for seating arrangements, supporting various activities at Polytechnic Sultan Salahuddin Abdul Aziz Shah (PSA).This initiative not only modernizes the management of building plans but also enhances the planning and maintenance process, contributing to the overall efficiency and functionality of campus facilities. The project demonstrates the potential of BIM technology in preserving, visualizing, and optimizing building information for improved infrastructure management.

Keywords: Digital Building Plans, Building Information Modelling (BIM), Civil Engineering Department (JKA), Al-Jazari Hall (DAJ), Infrastructure Management

PTEC 7

PSA INNOVATION, TECHNOLOGY, ENGINEERING & COMMERCIALIZATION

PERTANDINGAN PROJEK AKHIR PELAJAR

SESI 1:2024/2025

'RESILIENCE AND SUSTAINABILITY IN EDUCATION'

PENDIGITALAN PELAN BANGUNAN JKA DAN DEWAN AL-JAZARI

LATAR BELAKANG PROJEK

Projek mendigitalkan pelan bangunan JKA dan Dewan Al-Jazari menggunakan Autodesk Revit bertujuan untuk meningkatkan efisiensi melalui penggunaan Building Information Modelling (BIM). Kelebihan BIM termasuk pengurangan kemungkinan senario reka bentuk semula, penjimatan masa dan kos, serta penyelenggaraan data aset yang tepat. Kajian lapangan di Unit Bangunan dan Infrastruktur (UBI) mendapati pelan asal dalam keadaan kurang memuaskan, mendorong inisiatif pendigitalan. Ini membantu perancangan penyelenggaraan dan mengurangkan penyimpanan pelan.

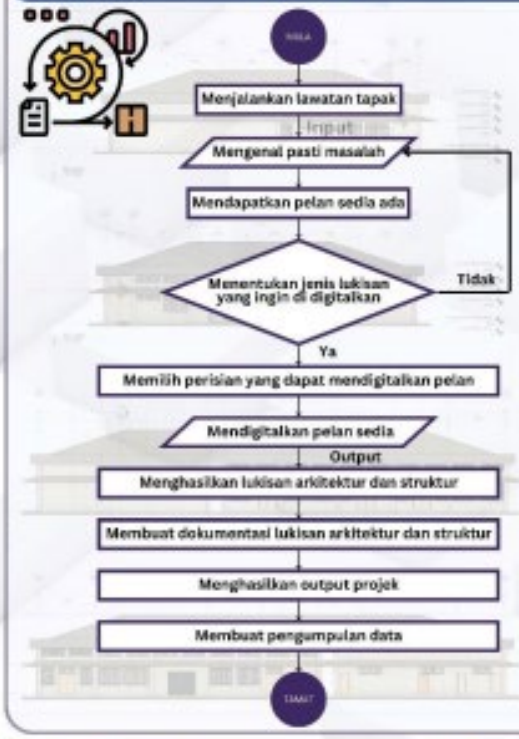
PENYATAAN MASALAH

Pelan JKA dan Dewan Al-Jazari yang lusuh dan kusam menyumbang masalah kepada pihak Unit Bangunan dan Infrastruktur (UBI) seperti menyukarkan mereka untuk mengenalpasti dan merancang ketika menjalankan penyelenggaraan terhadap kawasan yang mengalami kerosakan tertentu di bangunan Jabatan Kejuruteraan Awam (JKA) dan Dewan Al-Jazari.

OBJEKTIF

Menghasilkan lukisan digital 2D dan 3D bangunan JKA dan Dewan Al- Jazari.

METODOLOGI



PENEMUAN

Penyerahan Pelan Digital kepada Ketua Pusat Pembangunan Dan Penggurusan Infrastruktur & Ketua Unit Bangunan Dan Infrastruktur

Imbas kod QR ini untuk melihat projek kami dengan lebih terperinci

SIGNIFIKASI PROJEK

- Memberi kemudahan untuk mengakses lukisan bangunan JKA dan Dewan Al-Jazari dalam bentuk 2D dan 3D
- Memudahkan pihak pengurusan untuk merancang pelbagai acara dengan lebih teratur

AUTODESK

RVT

KESIMPULAN

- Berjaya kerana telah menghasilkan output lain
- Berdasarkan kemudahan yang telah dijalankan, terdapat beberapa cadangan penambahbaikan projek yang boleh dibuat. Antaranya, menambah keluasan bumbung pada lukisan digital arkitektur.
- Cadangan kedua yang dikemukakan oleh penolong jurutera Jabatan Kejuruteraan Awam (JKA) ialah membuat pembaharuan warna bangunan asal melalui proses simulasi di dalam Autodesk TwinMotion

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MAG-IQ: ELECTROMAGNETIC VACUUM FOR WORKSHOP CLEANING

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ABSTRACT

MAG-IQ is an innovative product designed to efficiently remove iron dust and metal debris using a combination of vacuum suction and electromagnetic technology. Cleaning workshops, particularly in pipe and welding areas, often involves the challenge of metal fragments sticking to brushes and cloths, making the process inefficient and time-consuming. The primary objective of MAG-IQ is to streamline the separation of iron dust, saving time and effort while improving user efficiency. The product features a 24-volt electromagnetic system installed at the front, enabling it to effectively collect metal dust and fragments. To evaluate its effectiveness, a study was conducted with 52 respondents, including workshop and laboratory users from Polytechnic Sultan Salahuddin Abdul Aziz Shah and Kolej Vokasional Sungai Buloh, Selangor. Product testing was carried out across four workshop locations, employing both quantitative (surveys) and qualitative (observations and interviews) research methods. The findings revealed that 98.1% of respondents agreed that MAG-IQ performs effectively, and 90.4% noted that it reduces health risks associated with metal dust exposure. Furthermore, MAG-IQ proved to be significantly faster, achieving an average cleaning time of 2 minutes and 4 seconds compared to 4 minutes and 4 seconds using conventional method. In conclusion, MAG-IQ received highly positive feedback and demonstrated great potential for improving workshop cleaning processes. Its efficient design reduces health risks and enhances productivity, making it a valuable tool for workshop environments. With further improvements, MAG-IQ could become a leading solution for efficient and safe workshop cleaning.

Keywords: Magnetic Vacuum, Iron Dust Removal, Workshop Cleaning Innovation, Electromagnetic Cleaning Technology, Efficient Dust Management

KEMENTERIAN PENDIDIKAN TINGGI

POLITEKNIK MALAYSIA

PERTANDINGAN PROJEK AKHIR PELAJAR

SESI 1:2024/2025

'RESILIENCE AND SUSTAINABILITY IN EDUCATION'

PSA INNOVATION, TECHNOLOGY, ENGINEERING & COMMERCIALIZATION

MAG-IQ

"SMART MAGNETIC VACUUM"

CRLY2024W07278

MyIPO

1 INTRODUCTION

"PRODUCT BACKGROUND"

MAG-IQ is an innovative product designed to remove metal dust and debris with vacuum suction and electromagnetic technology. Powered by a 24-volt electromagnetic system, MAG-IQ collects dust and metal particles quickly, improving cleaning efficiency in workshops where metal particles often stick to broom bristles

2 WHY ?

"PROBLEM STATEMENT"

SUSTAINABLE DEVELOPMENT GOALS

Let's Share!

Metal shavings and dust in workshops stick to brooms, brushes, and cloths.

Cleaning takes a long time and is difficult because dust and metal particles mix together.

3 WHAT ?

"OBJECTIVES"

1. Designing an innovative vacuum suction device (Vacuum) that can suck dust and metal.
2. Produce a vacuum cleaner more efficiently in terms of saving time and energy.

4 HOW ?

"METHODOLOGY"

Power Relay: Sends power to the WiFi board and electromagnetic system.

WiFi Board (ESP 266-01): Turns on the system and logs usage data to Google Sheets.

Electromagnetic System: Activates to pick up metal debris from the floor.

5 HOW IT WORK ?

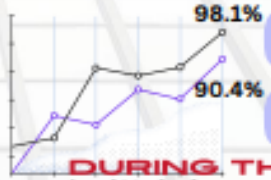
"COMPONENT ABILITY"

The vacuum head removes dust from different surfaces and reaches tight spaces

The electromagnetic system picks up metal debris from the floor.

6 RESULT AND FINDINGS

"PRODUCT TESTING"



Respondents agreed that MAG-IQ effectively absorbs dust and metal fragments without losing performance.

Respondents agreed that it can help lower health risks, like breathing in dust or metal fragments.

DURING THE RUN TEST

Conventional Methods ⟶ 4 minutes 4 seconds

MAG-IQ ⟶ 2 minutes 4 seconds

7 WHERE ?

"COMMERCIAL POTENTIAL"

- Ideal for workshops and industries needing quick, easy cleaning of metal dust and debris.
- Suitable for schools, training centers, and factories focused on safety and efficiency.

KOLEJ VOKASIONAL

8 CONCLUSION

"PROJECT SIGNIFICANCE"

Great Potential - Reduced cleaning time by 49.2%

User Friendly Operation - Improved safety by reducing dust inhalation

Easy to Monitor - Equipped with an Internet Of Things (IOT) system to help users.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GLOW GUARD PAINT: SUSTAINABLE EMERGENCY WAYFINDING SOLUTION

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ABSTRACT

This project focuses on the development of Glow Guard Paint, a glow-in-the-dark paint designed to facilitate wayfinding in dark or low-light environments. It specifically addresses visibility challenges during emergency evacuations or power outages, where clear guidance is essential for safety. Glow Guard Paint provides an innovative, sustainable solution by eliminating the need for electricity or external light sources. The primary objective of Glow Guard Paint is to assist with wayfinding in dark spaces or emergency situations. This project aims to address the gap in sustainable, cost-effective, power-free safety solutions for building facilities. By developing a paint that offers a visible guide in low-light conditions, we seek to enhance safety measures, supporting better navigation during emergencies such as power outages or evacuations. The paint formulation includes specialized phosphorescent pigments, which absorb light energy and gradually emit it in darkness to ensure a strong and lasting glow. The development process involved multiple trials to optimize glow intensity, smooth application, and durability. We tested the paint's effectiveness by monitoring the duration and brightness of its glow over time, recording data to confirm its practical viability. Using the Visual Luminescence Estimation method, we monitored the glow performance of Glow Guard Paint over a 7-day period. Results showed that the paint performed best on plaster walls, maintaining higher glow intensity for longer durations compared to other materials. After a one-hour charge, the glow lasted up to three hours. Although the brightness gradually diminished, it remained visible from a distance of 6 meters, proving effective in power outages, complete darkness, and fire evacuation scenarios. Glow Guard Paint demonstrated a substantial glow duration, remaining visible for hours in darkness. Testing confirmed its effectiveness as a low-maintenance, energy-free solution that enhances safety in emergency pathways and exit routes, achieving the project's core objectives. The Glow Guard Paint project contributes to building safety and aligns with sustainable development goals by providing a reliable, eco-friendly solution for emergency wayfinding. Its practical applications span various sectors, including public spaces, transportation hubs, and residential buildings, enhancing safety protocols and reducing reliance on electrical lighting in emergencies.

Keywords:
Glow-in-the-dark paint, Emergency wayfinding, Sustainable safety solutions, Phosphorescent pigments, Building safety innovation

PERTANDINGAN PROJEK AKHIR PELAJAR SESI 1:2024/2025

'RESILIENCE AND SUSTAINABILITY IN EDUCATION'

PSA INNOVATION, TECHNOLOGY, ENGINEERING & COMMERCIALIZATION

GLOW GUARD PAINT

Target Locations: Public spaces, buildings, transportation hubs, and residential areas needing emergency wayfinding solutions.

Objective

To help wayfinding in dark spaces or in emergency situations

Background

Innovative, Sustainable Safety Solution Glow Guard Paint is designed to provide reliable, non- electric wayfinding in dark or emergency situations, enhancing safety and aiding evacuation without relying on power.

Before: Space without glow-in-the-dark visibility

Statement of Problem

In emergencies or power outages, traditional lighting systems fail, making exits difficult to locate. Glow Guard

After: Improved visibility with Glow Guard Paint

Methodology From Formulation to Application:

1.Paint Formulation: Mixed phosphorescent pigments for long-lasting glow.

2. Testing & Evaluation: Used Visual Luminescence Estimation to measure glow intensity in low, medium, and high levels.

3. Application: Tested on walls and floors for durability and effectiveness.

The evaluation is based on the effectiveness in wayfinding ,Glow intensity measurement using Visual luminescence method

The result is the GGP successfully provided a bright glow that is visible in dark conditions, making it highly suitable for wayfinding

Key Features:

Rapid Charging: 1-hour charge for...
Enduring Glow: Up to 3 hours of illumination
Far-Reaching Visibility: Visible up to 6 meters
Versatile Application: Suitable for various surfaces

Benefits:

Enhanced Safety: Improved visibility in low-light conditions
Emergency Preparedness: Aids in wayfinding during power outages or fires
Peace of Mind: Provides reassurance and security

Findings

Glow Guard Paint provides a durable, smooth finish that glows effectively in the dark. Testing shows it maintains visibility long enough to guide people to safety during emergencies.

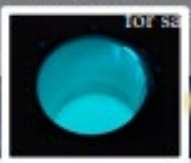
Significance of Project

Enhancing Safety, Reducing Power Dependency:
By creating a sustainable, power-free solution for wayfinding, Glow Guard Paint contributes to resilient and eco-friendly emergency planning. It's adaptable for various public and private settings.

Conclusion

Glow Guard Paint demonstrates a practical, non-electric wayfinding solution that supports sustainability and enhances emergency safety. Its long lasting glow in the dark marks pathways for safe evacuation, providing peace of mind in emergencies.

SUPERVISOR:
PUAN NUR HAZLINA BINTI LAMLI



GGP Paint

Light painted wall

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Recommended Design

ARWOODBASE: AUGMENTED REALITY FOR IDENTIFYING MALAYSIAN WOOD CHARACTERISTICS

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ABSTRACT

This study explores the integration of Augmented Reality (AR) technology with dendrology and databases to develop a more interactive and visual learning method for identifying the characteristics and properties of trees and wood. By combining 3D AR technology with an informative database, this study enables the construction of interactive 3D tree models. Through AR, users can view the physical structure of wood and gain a deeper understanding of tree features, including physical attributes, composition, and the uses of various types of wood. The database developed in this study stores detailed information about various tree species, their characteristics, and wood properties, providing users with systematic and easily accessible information. This approach aims to enhance users' understanding of physical properties through a more engaging and visually appealing medium. The results of this study are expected to benefit students by providing comprehensive, accessible, and easy-to-understand information. With this AR-based approach, users can experience clear and detailed visualizations, enriching their learning experience and appreciation of dendrology and wood anatomy.

Keywords: Augmented Reality, Dendrology, Wood Anatomy, Interactive Learning, Physical Structure of Wood

POLITEKNIK

PERTANDINGAN PROJEK AKHIR PELAJAR

SESI 1:2024/2025

'RESILIENCE AND SUSTAINABILITY IN EDUCATION'

POTEC 7

ARWOODBASE

Innovative learning in Dendrology using AR technology

Background of project

Arwoodbase is designed to enhance understanding in the field of dendrology through Augmented Reality (AR) technology. It displays 3D models of trees, providing detailed information on each type and its unique characteristics. The project aims to help students and the general public understand and recognize various types of trees in a more engaging and interactive way.

Statement of problem

First-semester Wood Based Technology (DBK) students struggle to understand dendrology with just text and images. Without clear visuals, they find it hard to recognize tree types and lose interest. Arwoodbase offers an interactive AR experience, making it easier for students to connect theory with real applications.

Objektive

- Create an AR app with 3D tree models.
- Help students better understand tree types and characteristics.

Methodology

- Blender for 3D models.
- Unity for AR application development.

Significance of project

Arwoodbase supports dendrology education, encourages interest in the environment, and offers a modern learning tool for students and teachers.

Finding

AR has proven to increase student engagement and understanding, giving them a more realistic and interactive way to learn about trees.

Conclusion

Arwoodbase has the potential to expand with more tree species and information, making it a valuable AR tool for helping students learn and recognize trees effectively in dendrology studies.

Supervisor

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PSA INNOVATION TECHNOLOGY & COMMERCIALIZATION

ABSTRAK & POSTER

JABATAN KEJURUTERAAN ELEKTRIK

PSA INNOVATION, TECHNOLOGY, ENGINEERING & COMMERCIALIZATION COMPETITION | PITEC 7 SESI 1: 2024/2025

SPINESYNC: AN IOT-BASED WEARABLE DEVICE FOR POSTURE MONITORING

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ABSTRACT

In today's digital era, poor posture has become a prevalent issue, contributing to discomfort, pain, and long-term musculoskeletal problems. This project aims to address this concern by developing a posture monitoring device that empowers users to improve their posture and reduce health risks. The primary objectives of this device are to detect poor posture and deliver immediate haptic feedback through vibrations for posture correction, incorporate a time-limit function with audible alerts to encourage breaks after the maximum usage time, and develop a web-based IoT platform that provides valuable metrics, including device usage duration, posture check reminders, and angle readings. The project adopts an integrated hardware-software approach, beginning with a circuit simulation on Tinkercad and evolving into a wearable device housed in a vest. Key components include an Arduino Uno microcontroller and flex sensors to monitor posture, with software developed in MIT App Inventor that enables IoT-based posture tracking via an IoT platform. Coding in Arduino IDE further ensures real-time posture correction. The expected outcomes include increased awareness of posture habits, reduction in poor posture occurrences, decrease in discomfort and pain associated with prolonged sitting, and improved musculoskeletal health. Through this innovative approach, the project seeks to promote ergonomic principles and foster long-term improvements in posture and overall well-being.

Keywords: Posture Monitoring Device, IoT Platform for Posture Tracking, Arduino Uno Microcontroller, Musculoskeletal Health, Ergonomic Solutions, Flex Sensor.

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PTEC 7

PSA INNOVATION, TECHNOLOGY, ENGINEERING & COMMERCIALIZATION

SPINESYNC: AN IOT- BASED WEARABLE POSTURE MONITORING DEVICE

PROJECT BACKGROUND

A wearable device equipped with sensors that tracks and analyzes an individual's posture in real-time. It provides vibration alerts for poor posture and audible reminders when time limits are exceeded. The data is transmitted to an IoT platform, delivering insights on posture degree, device usage duration, and reminders to enhance posture habits and overall well-being.

PROBLEM STATEMENT

- Sitting too long
- Weak Muscle
- Bad Desk Setup
- Posture Issues

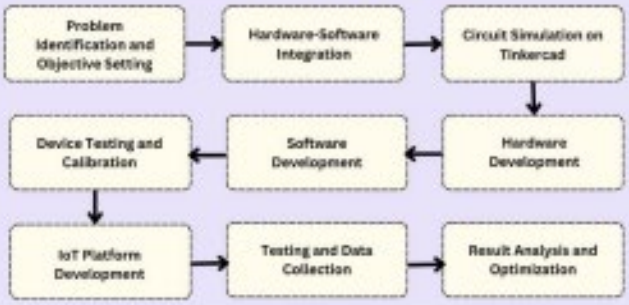
OBJECTIVES

- To design a posture monitoring device that vibrates when poor posture is detected.
- To provide a time limit feature with audible alerts using a buzzer.
- To develop a web-based IoT platform to display reminders, show posture degree, and track device usage duration.

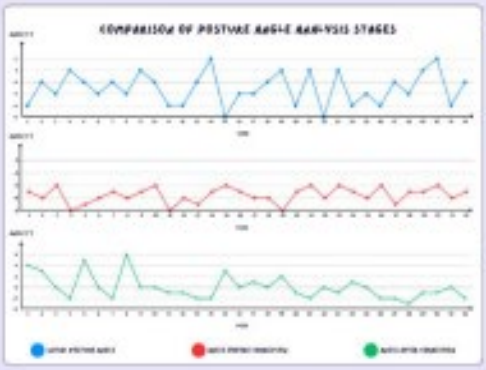
CONCLUSION

- This posture monitoring device combines wearable technology, real-time feedback, and an IoT platform to help users improve posture, reduce discomfort, and support musculoskeletal health.
- The project promotes ergonomic awareness and encourages healthier habits for long-term well-being.

METHODOLOGY



FINDINGS



- Blue line: Initial posture angles fluctuate around 0°.
- Red line: Slouching before correction, with angles between -6° to -8° (poor posture).
- Green line: Improved posture after correction, with angles closer to 0° or positive values.

PROJECT SIGNIFICANCE

Health and Well-being

- Reduces Back Pain and Discomfort
- Boosts Focus and Productivity
- Promotes Long-term Musculoskeletal Health

Technological and Societal Impact

- Advances Wearable Health Technology
- Encourages Ergonomic Practices in Daily Life

PENYELIA

DR FAZIDA (BINTI) ADLAN

KETUA KUMPULAN

AHLI KUMPULAN 1

BREATHAWARE: AN IOT-ENABLED PORTABLE SPIROMETER FOR REAL-TIME RESPIRATORY HEALTH MONITORING

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ABSTRACT

Respiratory health is a critical aspect of overall well-being, yet it often goes unnoticed until symptoms become severe. The increasing prevalence of respiratory diseases, coupled with the recent global health crisis, underscores the urgent need for accessible and efficient lung function monitoring devices. Conventional lung diagnostic tools are often costly and inaccessible to many, particularly in remote areas. The pandemic has further highlighted the necessity for remote respiratory monitoring solutions. To address this need, BreathAware aims to develop an affordable, portable spirometer integrated with IoT capabilities using the ESP32 microcontroller. This device offers real-time tracking and early detection of respiratory conditions. It uses IR sensors to collect data as the patient exhales, which is then processed by the ESP32 and displayed on an LCD screen. IoT connectivity enables seamless data transfer for continuous monitoring and medical check-up proposals. The system also provides notifications and alerts to patients, promoting proactive respiratory health management. BreathAware is a comprehensive, cost-effective solution for assessing and monitoring respiratory health, making lung function diagnostics more accessible and convenient for patients worldwide. Its portability, affordability, and ease of use make it a valuable tool for early intervention and real-time respiratory health tracking, particularly in underserved communities.

Keywords: Respiratory health monitoring, IoT-enabled spirometer, ESP32 microcontroller, Real-time lung function tracking, Remote respiratory diagnostics

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BREATHAWARE : LUNG BREATH RESPIRATORY MONITORING OVER IOT

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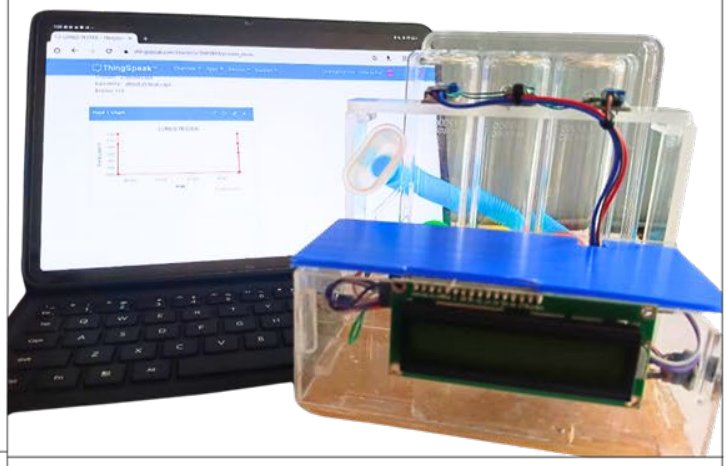
BACKGROUND PROJECT

Respiratory health is a critical aspect of overall well-being, yet it often goes unnoticed until symptoms become severe. With the increasing prevalence of respiratory diseases and the recent global health crisis highlighting the importance of monitoring lung function. There is a growing need for accessible and efficient respiratory health devices especially when conventional lung diagnostic cost and limited access for many, especially in remote areas. The pandemic highlighted the need for remote respiratory monitoring. There's an urgent demand for affordable, portable, and easy-to-use analyzers for real-time tracking and early intervention. Therefore, BreathAware aims to develop an affordable spirometer integrated with IOT capabilities using ESP 32 for monitoring data, provide a simple measurement and display data for breathing rate to gather and present databased for medical checkup proposal.The project offers a comprehensive solution for assessing and monitoring respiratory health. By using the capabilities of ESP 32 that have IoT connectivity, the system provides real-time monitoring of lung function parameters. With the help of IR sensors, data can be collected as a patient starts blowing, and data will transfer to ESP 32 and will be displayed on the LCD through the IoT communication. This project is expected to help breathing rate, show sensor data, and send notifications to patients for alertness.



PROBLEM STATEMENT

- Increasing Demand for Accessible Respiratory Health Devices
- Pandemic Highlighted Need for Remote Monitoring
- Urgent Need for Affordable, Portable, and User-Friendly Devices

OBJECTIVE

- To develop an affordable spirometer integrated with IOT capabilities using ESP 32 for monitoring data
- To provide a simple measurement and display data
- for breathing rate
- To gather and present databased for medical checkup proposal

METHODOLOGY

The methodology for BreathAware involves designing a compact, IoT-enabled spirometer using the ESP32 microcontroller for data processing and transmission. The device uses infrared (IR) sensors to detect airflow as the user exhales, capturing real-time breathing data. When airflow is detected, the IR sensors measure the exhalation rate and transfer the data to the ESP32, which processes and sends it through IoT connectivity to an LCD display for immediate viewing. Additionally, data is stored for future analysis and shared with connected devices for remote monitoring. The system provides notifications to alert patients when specific respiratory thresholds are reached, supporting timely intervention and continuous respiratory health management.

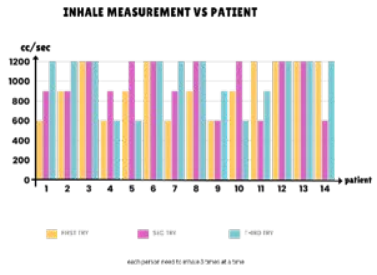
PROJECT SIGNIFICANT

The significance of the BreathAware project lies in its potential to make respiratory health monitoring more accessible, affordable, and effective. By combining IoT technology with a low-cost spirometer, BreathAware addresses the limitations of conventional lung diagnostic tools, which can be costly and difficult to access, especially in remote or underserved areas. The project provides a user-friendly solution for tracking respiratory health in real time, enabling patients and healthcare providers to monitor lung function conveniently. Additionally, the alert system for inhalation thresholds supports timely intervention, which is crucial for managing respiratory conditions. Overall, BreathAware contributes to proactive healthcare by facilitating early detection and regular respiratory monitoring for broader patient accessibility.

RESULTS/FINDINGS

The BreathAware project found that the developed spirometer effectively monitors breathing in real time and provides accurate data at a low cost. The IR sensors accurately measured inhalation rates, and the ESP32 successfully processed and displayed the data on the LCD. Through IoT connectivity, the device allowed remote monitoring, making respiratory data easily accessible for both patients and healthcare providers. The system's alert feature worked well, helping prompt timely responses when breathing thresholds were reached. Overall, BreathAware proved to be a reliable, affordable tool for respiratory health monitoring, especially in remote or underserved areas.

DATA ANALYSIS:



CONCLUSION

- The project successfully developed an affordable IoT-integrated spirometer using ESP32 for real-time breathing rate monitoring
- Provides accurate measurements, displays data clearly, and organizes it for medical checkups.
- Making the device practical for ongoing respiratory health management.

EPILEPSY MONITORING SYSTEM: AN IOT-BASED SEIZURE DETECTION AND ALERT SOLUTION

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ABSTRACT

Epilepsy is a neurological disorder characterized by recurrent seizures, affecting millions worldwide. While existing devices provide valuable information about seizures, they often lack user-friendliness, accuracy, and integration with medical care. This project focuses on developing a user-friendly and efficient epilepsy monitoring device to assist patients and healthcare providers in better understanding and managing epilepsy. The device incorporates key features such as seizure detection, data collection, an alerting mechanism, and patient interaction capabilities. Components used include an ESP-32 (Wi-Fi + Bluetooth), a Lithium Polymer Battery, a Gyroscope (MPU6050), an Arduino Raspberry LCD Display (20x4), and a Push Button. The device detects seizure movements within approximately 60 seconds and immediately sends alerts to caregivers and healthcare providers. During evaluation, the device demonstrated a seizure detection accuracy of 95%, significantly outperforming existing devices. This improvement highlights its potential to enhance seizure management, provide timely intervention, and improve the quality of care for epilepsy patients. The integration of real-time alerts ensures that critical notifications reach caregivers and healthcare providers, enabling swift action during emergencies. The results underscore the significant benefits of this epilepsy monitoring device in addressing unmet needs in epilepsy care. It enhances patient outcomes, reduces caregiver burden, and improves healthcare provider efficiency. This innovation exemplifies the importance of leveraging advanced technologies to enhance healthcare delivery for individuals living with epilepsy.

Keywords: Epilepsy Monitoring, Seizure Detection Device, IoT Healthcare Solutions, ESP-32 Technology, Gyroscope MPU6050

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EPILEPSY MONITORING SYSTEM

01 BACKGROUND OF PROJECT

Epilepsy is a neurological disorder caused by abnormal electrical activity in the brain, leading to recurrent seizures that affect sensations, behaviors, and muscle movements. Monitoring seizures accurately is critical for effective epilepsy management, as it allows caregivers and medical professionals to respond quickly and appropriately. This project leverages IoT technology to improve epilepsy care by enabling real-time monitoring and alerts, offering a more reliable and immediate response during seizure events.

02 PROBLEM STATEMENT

- Current epilepsy monitoring systems lack accuracy, leading to frequent false alarms or missed seizures.
- The absence of IoT connectivity restricts real-time monitoring and immediate alerts.
- Devices are bulky and uncomfortable.

03 OBJECTIVE

- Improve device accuracy and reliability using IoT to reduce false alarms.
- Enhance the comfort for longer wearability to enable continuous monitoring data.
- Develop a comprehensive IoT-enabled epilepsy monitoring system that provides real-time seizure detection.

04 METHODOLOGY

System Initialization and Data Collection

↓

Data Filtering and Preprocessing

↓

Seizure Detection Algorithm

↓

Real-Time Notification via IoT

↓

System Testing and Optimization

05 FINDINGS

Graph Analysis of Seizure Detection Time.

Continuous contraction monitoring from app.

06 SIGNIFICANCE OF PROJECT

- Enhances epilepsy care with improved seizure detection accuracy.
- Offers a comfortable, wearable device, improving patient quality of life.
- Generates valuable data on seizure patterns for research.

07 CONCLUSION

In conclusion, this project demonstrates the potential of IoT technology in healthcare by providing an accurate, wearable solution for epilepsy monitoring. The system's real-time capabilities and user-friendly design make it an effective tool for both patients and caregivers. Future improvements could focus on enhancing sensor accuracy, extending battery life, and adding additional features to further improve user experience.

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MEDI-BOX: AN IOT-ENABLED SMART MEDICATION MANAGEMENT SYSTEM

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ABSTRACT

This project addresses the challenge of ensuring patients adhere to prescribed medication schedules, particularly for individuals who may forget or lack support to remind them. The **Medi-Box** is designed to assist patients in taking their medication on time while notifying caregivers when medication has been taken, promoting adherence and reducing risks associated with missed doses. The primary objectives are to develop a device that reminds patients at the prescribed time and provides real-time notifications to caregivers. The system integrates an Arduino UNO and ESP32 microcontrollers, ultrasonic sensors, an LCD display, a buzzer, LED indicators, and buttons to create a functional and user-friendly solution. Medi-Box generates reminders through an alarm and detects medication intake using sensors. Notifications are sent to caregivers via Telegram, ensuring timely communication. Testing confirmed that Medi-Box effectively meets its objectives. It accurately detects medication intake, sends caregiver notifications, and allows programming of reminder alarms. The system demonstrated reliability in reducing the risks of missed doses, ensuring timely medication adherence, and bridging the communication gap between patients and caregivers. In summary, the Medi-Box with programmable reminders successfully achieves its goal of supporting medication adherence. It combines IoT-enabled technologies with practical design to create a reliable solution for patients and caregivers. The system performs its intended functions, including medication detection, notification sending, alarm settings, and buzzer activation. With further enhancements, Medi-Box has potential for advanced features and broader applications, representing a significant contribution to healthcare. By improving adherence and offering peace of mind to caregivers, it demonstrates how IoT technology can address challenges in medication management.

Keywords: Medication adherence, IoT in healthcare, Arduino UNO, Caregiver notification system, Medi-Box innovation

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'RESILIENCE AND SUSTAINABILITY IN EDUCATION'

MEDI-BOX WITH PROGRAMMABLE REMINDER

1 PROJECT BACKGROUND

The project aims to improve patient compliance with medical prescriptions by providing a reminder system that allows individuals to set alarms based on their own schedule. Additionally, the system can notify caretakers if the patient has taken their medication, reducing the likelihood of dishonest responses. The use of ESP32 and Arduino UNO for processing, along with the integration of an LCD display and sensors, provides a user-friendly interface for setting alarms and interacting with the system. The end goal is to ensure proper medication adherence and promote honesty in reporting medication intake.

2 PROJECT OBJECTIVES

- To construct a device that will help patients to take medicine on time.
- To develop a system that will be able to set a reminder, also send a message to caretaker when patient take a medicine.

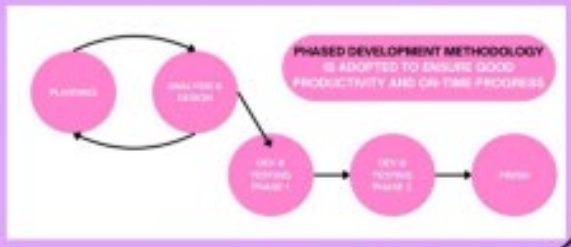
3 PROBLEM STATEMENT

The problem that we encounter is there are a patient that forgot to take their medicine within medicine prescribe time and there are no other people to remind them nearby them when they forget. Some of the medicine these days have a prescribe time when to take it. If the patient didn't take it at the exact same as prescribe time they are exposed to risk and the side effect because of the disease they had.

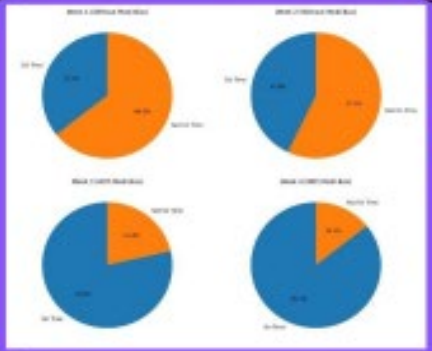
4 PROJECT SIGNIFICANT

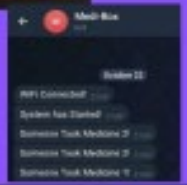
The project has been designed to assist individuals who are ill and tend to forget to take their medication, whether they are at home or in a hospital. This device aims to simplify medicine intake by reminding patients of their designated medication times. By setting up the alarm time, users can easily learn to control the device, and the alarm will prompt them to take their medicine. Furthermore, the device can notify caretakers or others who are attending to the sick patient, and it can monitor whether or not the patient has taken their medication, providing valuable information and support.

5 PROJECT METHODOLOGY



6 PROJECT FINDINGS





7 PROJECT CONCLUSION

In summary, the Medi-Box with programmable reminder has achieved its goal by effectively reminding patients to take their medication. The project utilizes Arduino UNO and ESP32 as microcontrollers, ultrasonic sensors, LCD display, buzzer, LED, and buttons to create a device that reminds patients and monitors their medication intake. Testing and evaluation have proven that the system functions as intended, featuring sensor detection, notification reception, alarm time setting, and triggering the buzzer. The system has potential for further improvements and advanced features.

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PSA INNOVATION TECHNOLOGY & COMMERCIALIZATION

HYDROSOLAR

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ABSTRACT

The **Hidrosolar** project addresses the urgent need for sustainable farming in the face of climate change, resource scarcity, and growing food demand. By combining hydroponics with solar energy, Hidrosolar provides a resource-efficient alternative to traditional farming, reducing environmental impact and conserving water and energy. The project's primary goal is to develop a hydroponic system powered by solar energy, offering a scalable and cost-effective solution for sustainable agriculture. Designed for regions with limited soil and water availability, the system helps address challenges in resource-limited and urban farming contexts. Hidrosolar integrates solar panels, a charge controller, battery, inverter, water pump, water level sensor, and an ESP32 microcontroller for automation. Solar panels capture and store renewable energy, powering the water pump to circulate nutrients through the hydroponic system. The ESP32 facilitates real-time water level monitoring and notifies users via a mobile app, ensuring optimal resource management. Testing demonstrated the system's reliability and efficiency. It accurately monitored and managed water levels, triggered alerts for high or low levels, and operated continuously for two days on solar energy without recharging. The use of renewable energy and automation resulted in significant cost savings and reduced environmental impact compared to conventional farming methods. In conclusion, Hidrosolar combines renewable energy and smart farming to create a sustainable, efficient, and scalable agricultural solution. Its innovative integration of solar energy and hydroponics enhances food security, reduces environmental impact, and promotes energy efficiency. Hidrosolar is a significant step forward in addressing global agricultural challenges, offering a promising pathway toward resource-efficient and environmentally friendly farming practices.

Keywords: Sustainable farming, Hydroponics, Solar energy integration, IoT-enabled agriculture, ESP32 automation

PERTANDINGAN PROJEK AKHIR PELAJAR

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HYDROSOLAR

BACKGROUND

- Remote Monitoring: The system can be monitored and controlled in real-time via a mobile app, improving convenience and efficiency.
- Water Level Alerts: Automated water level sensors trigger alerts if water falls below or exceeds optimal levels, ensuring ideal conditions for plant growth.
- Solar Power Integration: Solar panels, batteries, and an inverter power the system, reducing dependence on non-renewable energy.

PROBLEM STATEMENT

- Not portable and difficult to change position.
- Power supply placement does not reach the system.
- Cant control remotely and dont know if the system is working or not remotely

OBJECTIVE

- Develop sustainable hydroponic system powered by solar energy.
- Increase food production efficiency.
- Reduce enviroment impact.

FINDINGS

- Accurate Water Monitoring: The system effectively monitored water levels, preventing plant dehydration or overflow.
- Reliable Alerts: Real-time notifications kept users informed, ensuring ideal conditions for plant growth.
- Efficient Solar Power Use: The system operated continuously on solar power for two days, showing good energy efficiency.

METHODOLOGY

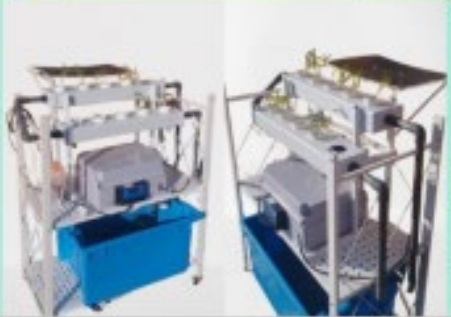
- ALERT SYSTEM

SIGNIFICANCE OF PROJECT

- Supports Sustainable Farming: Reduces environmental impact by using solar energy and conserving water.
- Cuts Farming Costs: Lowers energy and water expenses, making it affordable for various farming setups.
- Boosts Food Security: Allows efficient crop growth in areas with limited resources

CONCLUSION

- The Hidrosolar project demonstrates a sustainable, cost-effective approach to agriculture by combining solar energy with hydroponics. It reduces reliance on traditional energy sources, conserves water, and lowers operational costs, making it suitable for both urban and rural farming. The use of IoT for real-time monitoring ensures optimal growing conditions, enhancing efficiency and crop yield. Overall, Hidrosolar offers a scalable solution that addresses environmental and food security challenges, showing the potential of renewable energy and smart technology in modern



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IOT EMPOWERED PARALYSIS CARE: A GESTURE-BASED COMMUNICATION SYSTEM

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ABSTRACT

Stroke is a leading cause of disability and mortality globally, affecting over 68.16 million people, with more than 62% experiencing paralysis, according to the Global Burden of Diseases (GBD) survey. Paralysis patients often require constant care for their daily needs, but caregivers face challenges providing continuous support due to modern-day constraints. This communication gap significantly impacts patient quality of life, as their inability to express basic needs leads to frustration and discomfort. To address this, IoT Empowered Paralysis Care was developed as a wearable healthcare solution to enable communication through hand gestures. Designed for patients with partial hand movement control along the X, Y, and Z axes, the system uses a four-channel gesture recognition mechanism. Gestures like "I need to go to the toilet," "I need water," "I need help," and "I'm hungry" are detected using an MPU-6050 sensor and processed by an ESP32 microcontroller. The system triggers visual and audio notifications via LED indicators, an LCD display, and buzzer alerts. A standout feature is the ESP32's hotspot capability, offering a Wi-Fi range of 50m to 200m, ensuring caregiver alerts over longer distances. While fall detection is not included, the system empowers patients to express their needs independently, reducing reliance on close physical proximity to caregivers. IoT Empowered Paralysis Care is a lightweight, cost-effective, and practical solution that enhances communication between paralysis patients and caregivers. By bridging the care gap and reducing caregiver burden, it fosters patient autonomy and improves quality of life. With further refinement, this system has the potential to benefit a broader range of individuals with disabilities, promoting dignity and independence in daily living.

Keywords: IoT in healthcare, Gesture recognition system, ESP32 microcontroller, Paralysis communication aid, Wearable assistive technology

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POLITEKNIK
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IOT EMPOWERED PARALYSIS CARE

01 PROJECT BACKGROUND

IoT Empowered Paralysis Care is a device designed to help disabled individuals communicate their needs through simple body movements. It displays messages on an LCD screen, and if no caregiver is present, it can send messages through the Blynk app. Using motion sensors, it allows patients to request help from healthcare providers, making it easier for them to assist paralyzed individuals. While the goal is to promote independence for people with paralysis, the current devices are often too large and expensive, limiting their use to hospitals instead of being conveniently available in patients' homes.

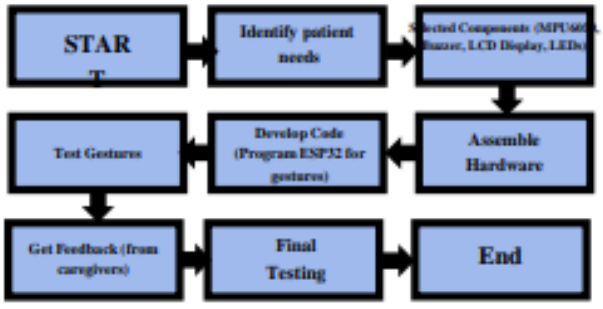
02 PROBLEM STATEMENTS

Hospitals that treat paralyzed patients whose paralysis attack has incapacitated all or part of their body are common. Most of the time, people who are paralyzed are unable to express what they need because they are either unable to speak normally or are unable to use sign language because their brains have lost control. Allowing a paralyzed patient to be left alone in an emergency situation such as a stroke or other medical crisis carries a significant risk as well.

03 OBJECTIVES

1. **Help Patient Communicate Needs Using Hand Gestures.**
2. **Send Instant Alerts to Caregivers Through IoT.**
3. **Give Patients Independence and Dignity.**

04 METHODOLOGY



05 FINDINGS

1. Effectiveness of Gesture Detection
2. Feedback from Users
3. Reliability of Notifications
4. Future Improvements

06 SIGNIFICANCE OF PROJECT

1. Improving Quality of Life
2. Supporting Caregivers
3. Potential for Future Development
4. Inspiration from Global Advances

07 CONCLUSION

In conclusion, this project offers a practical solution to support caregivers in attending to paralysis patients' needs. By utilizing a smart glove with gesture recognition, it allows patients to communicate essential needs through simple hand movements. This system provides instant alerts using the LCD, LEDs, and a buzzer, ensuring caregivers are notified even if a smartphone notification is missed. Although the current design isn't wireless, feedback has shown interest in adding this feature in the future to enhance convenience. This project represents a step forward in improving quality of care and responsiveness for paralysis patients.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PSA INNOVATION TECHNOLOGY & COMMERCIALIZATION

IOT-BASED TURBIDITY MONITORING SYSTEM FOR OUTDOOR WATER FILTERS

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ABSTRACT

As technology advances in the 21st century, environmental issues such as pollution and climate change have intensified, leading to the depletion and deterioration of water resources. With diminishing resources and a growing population, real-time water quality monitoring has become increasingly critical. This project focuses on designing a low-cost IoT-based turbidity monitoring device for outdoor water filters. Turbidity, measured in Nephelometric Turbidity Units (NTU), is an indicator of water quality, where higher NTU values signify more particles in the water and poorer quality. The project aims to ensure water cleanliness based on Malaysia's NTU standards by developing an IoT-enabled turbidity sensor device for outdoor water filters. The system uses cost-effective components, including an Arduino Uno, a turbidity sensor, and a Bluetooth module, housed in a waterproof casing designed for outdoor conditions. The device collects real-time turbidity data, which is transmitted to the Arduino Bluetooth Controller app, providing users with live updates and notifications when water quality meets cleanliness standards. The system was tested under various water conditions, demonstrating its ability to distinguish between clean and polluted water accurately. The device reliably provided NTU readings over a continuous 24-hour period and proved to be cost-effective, robust, and user-friendly. It is designed to be affordable for household use, ensuring accessibility for a wider range of consumers. In conclusion, this IoT turbidity monitoring device is a practical, budget-friendly solution that complies with Malaysia's water cleanliness standards. It contributes to improved household water management and promotes safer water for daily use, making it a valuable tool for addressing water quality issues in residential environments.

Keywords: IoT turbidity monitoring, Water quality management, Arduino Uno-based sensor, NTU water standards, Outdoor water filter monitoring

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MONITORING INDICATOR FOR OUTDOOR WATER FILTER

BACKGROUND

- Outdoor water filters lack indicators for water cleanliness, leaving users unsure about filter maintenance needs.
- Without turbidity monitoring, filters are often backwashed at random times, potentially wasting water and reducing efficiency.
- Unmonitored water cleanliness raises concerns about water safety for drinking and household use.
- This project aims to develop an IoT-based turbidity monitoring solution to ensure timely maintenance and safer water quality.

PROBLEM STATEMENT

- Lack of Turbidity Awareness: Users cannot determine if the filtered water is clean, resulting in inefficient filter maintenance and possible consumption of unsafe water.
- Inconsistent Water Quality Monitoring: Without real-time data, users are unsure of the water's suitability for drinking or washing, posing health risks.
- Need for Efficient Filter Maintenance: Ineffective backwashing practices lead to wasted resources and reduced filter effectiveness, requiring a monitoring system for optimal performance.

OBJECTIVE

1. To verify the water cleanliness (NTU) according to Malaysia Water Standard (SNTU).
2. To design a sensor device that will connect with outdoor water filter.
3. To build the low cost turbidity sensor with IOT information application.

METHODOLOGY

- Review Malaysia's NTU standards and similar IoT-based turbidity monitoring systems.
- Select turbidity sensor, Arduino Uno, Bluetooth module, and IoT platform (Arduino Bluetooth Controller).
- Design waterproof, durable housing for outdoor use.
- Test in different water conditions to verify accuracy and reliability.
- Develop Arduino Bluetooth Controller interface to display NTU levels and alert users on cleanliness status.
- Assess device for cost-effectiveness and low-cost design.
- Conduct outdoor trials and deploy device in real-world conditions.

FINDINGS

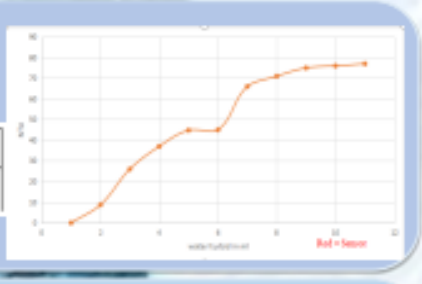
The developed turbidity sensor is accurate, cost-effective, and well-suited for continuous monitoring of water quality, particularly in domestic outdoor filtration systems, to ensure clean, safe drinking water.

SIGNIFICANCE OF PROJECT

- Provides a low-cost, easy way to monitor water turbidity (cloudiness) and ensure clean water.
- Helps users know when to maintain their water filters, improving filter efficiency and reducing health risks.
- User-friendly and affordable, making it suitable for households, especially in rural or remote areas.
- Supports healthier lifestyles by ensuring safe drinking water.

RESULT

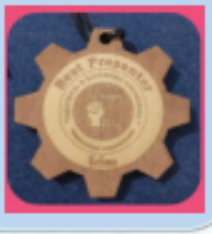
	Clean Water	Dirty Water
Voltage	3.59 V	2.04 V
Byte	575	259



CONCLUSION

- Developed an IoT turbidity monitoring device to address water cleanliness for outdoor filters.
- Utilized turbidity sensors, IoT integration, and low-cost design for effective water quality monitoring.
- Achieved project goals of verifying cleanliness, creating an outdoor-compatible sensor, and ensuring affordability.
- Provides a basis for improved water quality management, contributing to safer water for household use.

ACHIEVEMENT



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PSA INNOVATION TECHNOLOGY & COMMERCIALIZATION

DESIGN OF AN IOT-BASED ELECTRIC MASSAGING DEVICE WITH HOT COMPRESSION

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ABSTRACT

Muscle fatigue and soreness are common issues experienced by individuals of all ages due to daily activities, exercise, or chronic conditions. Conventional massage therapy often faces limitations, such as high costs, difficulty in scheduling, inconsistent pressure application, lack of personalization, and accessibility challenges for individuals with limited mobility. To address these shortcomings, this project focuses on the design of an IoT-based electric massaging device with hot compression.The primary objectives are to develop an electric massaging device that promotes relaxation, integrate software for customizable massage control, and implement an efficient heat distribution system for enhanced therapy. Using an ESP32 microcontroller and a temperature sensor, the device enables remote control via Wi-Fi connectivity. The microcontroller adjusts the power supplied to the heating element, ensuring a safe and comfortable temperature for users, thereby preventing overheating and potential burns.This innovative device offers multiple benefits, including muscle cramp reduction, improved relaxation, pain relief, enhanced blood circulation, and tension and stress reduction. The IoT-enabled features allow users to personalize massage settings conveniently, making it suitable for diverse needs and improving accessibility for people with mobility challenges.In conclusion, this IoT-based massaging device with hot compression provides a cost-effective, safe, and customizable solution for muscle pain relief and relaxation. Its integration of remote control and temperature regulation demonstrates the potential of technology to enhance traditional massage therapy, making it more accessible and efficient for users.

Keywords: IoT-Based Massaging Device, Muscle Pain Relief, Hot Compression Therapy, Remote-Controlled Massage, Temperature Regulation

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DESIGN OF IOT BASED ON ELECTRIC MASSAGING DEVICE WITH HOT COMPRESSION

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PROJECT'S BACKGROUND

MUSCLE SORENESS AND FATIGUE ARE COMMON PROBLEMS FROM DAILY ACTIVITIES OR EXERCISE, BUT REGULAR MASSAGE THERAPY IS OFTEN EXPENSIVE AND HARD TO ACCESS. WITH NEW TECHNOLOGY, WE CAN NOW CREATE A SIMPLE DEVICE THAT BRINGS MASSAGE AND HEAT THERAPY INTO THE HOME. THIS PROJECT USES AN ESP32 MICROCONTROLLER AND A TEMPERATURE SENSOR TO BUILD A MASSAGING DEVICE WITH SAFE, ADJUSTABLE HEAT, CONTROLLED REMOTELY THROUGH AN APP. THIS MAKES IT EASIER AND MORE AFFORDABLE FOR PEOPLE TO MANAGE MUSCLE PAIN, RELAX, AND IMPROVE BLOOD CIRCULATION ANYTIME THEY NEED.

OBJECTIVES

- TO DESIGN AN ELECTRIC MASSAGING DEVICE WITH HOT COMPRESSION.
- To implement an EFFICIENT HEAT DISTRIBUTION SYSTEM.
- TO DEVELOP SOFTWARE THAT CAN CONTROL THE MASSAGE AND HEAT LEVEL.

FINDINGS

THE FINDINGS OF THE "DESIGN OF IOT-BASED ELECTRIC MASSAGING DEVICE WITH HOT COMPRESSION" PROJECT DEMONSTRATE THAT THE DEVICE EFFECTIVELY REDUCES MUSCLE FATIGUE AND SORENESS THROUGH TARGETED MASSAGE AND HEAT THERAPY. THE ESP32 MICROCONTROLLER SUCCESSFULLY INTEGRATES WITH TEMPERATURE SENSORS TO PROVIDE SAFE, ADJUSTABLE HEAT LEVELS, AND WI-FI CONNECTIVITY ENABLES EASY REMOTE CONTROL VIA MOBILE APPS. TESTING SHOWS THE DEVICE MAINTAINS CONSISTENT HEATING WITHOUT OVERHEATING, ENSURING USER SAFETY. ADDITIONALLY, USERS REPORT IMPROVEMENTS IN RELAXATION, PAIN RELIEF, AND OVERALL COMFORT, MAKING THE DEVICE A PROMISING SOLUTION FOR PERSONALIZED AND AT-HOME MUSCLE CARE.

PROJECT SIGNIFICANT

THE SIGNIFICANCE OF THIS PROJECT LIES IN ITS POTENTIAL TO OFFER AN ACCESSIBLE, AFFORDABLE, AND EFFECTIVE SOLUTION FOR MUSCLE RELIEF AND RELAXATION, DIRECTLY ADDRESSING THE LIMITATIONS OF TRADITIONAL MASSAGE THERAPY. BY INTEGRATING IOT CAPABILITIES WITH AN ELECTRIC MASSAGING DEVICE, USERS CAN ENJOY PERSONALIZED MASSAGE AND HEAT COMPRESSION THERAPY FROM THE COMFORT OF THEIR OWN SPACE. THIS PROJECT ENABLES REAL-TIME REMOTE CONTROL, ADJUSTABLE SETTINGS FOR SAFETY AND COMFORT, AND EFFECTIVE HEAT DISTRIBUTION TO ALLEVIATE MUSCLE FATIGUE, REDUCE PAIN, AND IMPROVE BLOOD CIRCULATION. ULTIMATELY, IT PROMOTES OVERALL WELL-BEING AND CONVENIENCE FOR USERS, PARTICULARLY THOSE WITH LIMITED MOBILITY OR ACCESS TO IN-PERSON THERAPY.

PROBLEM STATEMENT

CONSTRICTION OF BLOOD VESSELS IS CAUSED BY EXCESSIVE ACCUMULATION OF LACTIC ACID AND TOXIC SUBSTANCES AND AT THE SAME TIME THE OXYGEN AND NUTRIENT CONTENT IN THE MUSCLE DECREASES. CONVENTIONAL MASSAGE THERAPY PROVIDES LIMITATIONS IN ACCESSIBILITY DUE TO COST AND SCHEDULING, INCONSISTENCY IN PRESSURE APPLICATION BY THERAPISTS, LACK OF PERSONALIZATION FOR INDIVIDUAL NEEDS, AND DIFFICULTY FOR THOSE WITH LIMITED MOBILITY.

METHODOLOGY

THE METHODOLOGY FOR THIS PROJECT INVOLVES DESIGNING, DEVELOPING, AND TESTING AN IOT-BASED MASSAGING DEVICE WITH HOT COMPRESSION. KEY COMPONENTS INCLUDE AN ESP32 MICROCONTROLLER FOR REMOTE CONTROL, TEMPERATURE SENSORS TO MONITOR HEAT LEVELS, AND MOTORS FOR MASSAGING FUNCTIONS. THE DEVICE IS ENCLOSED IN A HEAT-RESISTANT CASING, WITH THE ESP32 PROGRAMMED TO REGULATE TEMPERATURE AND MOTOR SPEED BASED ON USER PREFERENCES, WHICH ARE CONTROLLED VIA A MOBILE APP. AFTER ASSEMBLY, THE DEVICE UNDERGOES TEMPERATURE CALIBRATION, MOTOR TESTING, AND USABILITY TRIALS TO ENSURE SAFETY, EFFECTIVENESS, AND COMFORT. FEEDBACK AND PERFORMANCE DATA ARE COLLECTED TO MAKE ITERATIVE IMPROVEMENTS, RESULTING IN A RELIABLE, USER-FRIENDLY DEVICE FOR MUSCLE PAIN RELIEF.

CONCLUSION

- IOT BASED MASSAGE DEVICE HAS SUCCESSFULLY DESIGNED AND DEVELOPED.
- EFFICIENT HEAT DISTRIBUTION SYSTEM HAS BEEN APPLIED AND TESTED DURING PROJECT DEVELOPMENT.
- THE IOT ELEMENT MANAGED TO CONTROL THE MASSAGE AND HEAT LEVEL.

RFID-ENABLED IOT DOOR LOCK SYSTEM: A SECURE AND EFFICIENT ACCESS CONTROL SOLUTION

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ABSTRACT

The growing demand for secure access control systems has positioned Radio-Frequency Identification (RFID) technology as a reliable and efficient solution. This study presents the design and implementation of an RFID-based door lock access control system, addressing the limitations of traditional methods, such as vulnerabilities, challenges in access management, and the lack of real-time monitoring. The system consists of an electromagnetic lock, a microcontroller unit, and an RFID reader, integrated with Blynk IoT for enhanced functionality. The core components include an Arduino NANO as the microcontroller, an RFID MFRC-522 module for tag reading, a 12V solenoid door lock, a buzzer, an LM2596 buck converter, a green LED, a battery, and connectors. Users carry unique RFID tags (e.g., key cards or fobs) for authentication. Upon presenting an authorized tag, the system cross-references stored credentials to grant secure and touchless entry. Unauthorized tags are denied access, keeping the door locked. This RFID door lock system, enhanced by IoT integration, provides a reliable, efficient, and secure solution for controlling access to restricted areas. Its user-friendly design is particularly appealing to women and families, offering increased peace of mind. By deterring unauthorized access and potential break-ins, the system contributes to crime prevention and community safety. Its versatility, scalability, and ease of use make it suitable for diverse applications, including offices, retail stores, and educational institutions.

Keywords: RFID access control system, Arduino NANO, RFID MFRC-522 module, IoT-enabled security, Blynk IoT integration

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SMART RFID DOOR ACCESS WITH NOTIFY

1 BACKGROUND OF PROJECT

SMART RFID DOOR ACCESS WITH NOTIFY is Utilizing Radio Frequency Identification (RFID) technology, provides a reliable and approachable substitute. It makes use of an RFID reader placed close to the door and RFID tags carried by authorized users and users can control history data access door lock by using the smartphone since it is (Internet of Thing) IOT based project. Plus, card's unique code is recognized by the reader and limiting access to only authorized individuals. In this extend, it is counting five sections of the full model. First, the sections are the RFID section, display section, alarm section using buzzer, ignition system section using LED, and the history data module section which is by application.

2 PROBLEM STATEMENT

When it comes to physical security, conventional lock and key systems are becoming less and less effective at meeting the changing needs of both individuals and businesses. It is obvious that an access control system that is more technologically advanced, secure, and efficient is needed.

1. To overcome security vulnerabilities which is lost or stolen keys and key copying. These situations pose a significant security risk.

2. To design a limited flexibility because conventional access methods offer limited flexibility in adjusting access privileges dynamically.

3. To decrease a Lack of Real-Time Monitoring and Response because Traditional access control systems do not provide real-time alerts or notifications when unauthorized access is attempted

3 OBJECTIVE PROJECT

1) To develop a project that can monitor and review access history, enabling a proactive approach to security management.

2) To design a project that can bolster security measures by replacing conventional keys with RFID cards or tags

3) To implement the feasibility of integrating the RFID system with existing security infrastructure.

4 METHODOLOGY

Setup Key Components: Install the RFID reader, Arduino Nano, buzzer, LED, and relay to control door access.

Configure System: Set up the RFID reader to detect authorized tags and send access data to the Arduino, which controls door lock and notifications.

Connect to Blynk App: Link the system with the Blynk app so users can monitor door access and get instant alerts on their phones.

Test System: Check the RFID reader's range and test notification accuracy to ensure everything works smoothly.

Optimize Security: Review access logs to improve security, making the system easy to use, reliable, and secure.

5 FINDINGS

Real-Time Monitoring and Notifications

Effective Access Logging and Data Analysis

User Convenience and Scalability

6 SIGNIFICANCE PROJECT

DATA COLLECTION AND ANALYSIS:

1) Enables tracking of access patterns to identify potential security risks and improve response strategies.

2) Provides valuable insights into usage trends, supporting proactive security management.

ENHANCED SECURITY

1) Replaces vulnerable key-based systems with RFID technology, reducing risks from lost or duplicated keys.

2) Sends real-time notifications for any access attempt, improving response to unauthorized entries.

COMMERCIAL VALUE

1) Reduces maintenance costs by eliminating the need for rekeying.

2) Enhances security for large institutions, preventing unauthorized access and reducing potential losses.

7 CONCLUSION

The RFID door lock access control system with email and phone notifications offers improved security and convenience compared to traditional RFID systems. It sends real-time alerts whenever someone tries to access the door, allowing users to monitor entry attempts remotely. This added feature enhances security by keeping users informed of any authorized or unauthorized access. The system also provides better control and traceability, making it ideal for homes or offices that need reliable access monitoring. Overall, it significantly upgrades older RFID systems by adding smart, connected features for modern security needs

DYNO LEG SYNERGY : DEVELOPMENT OF AN AUTOMATED CRUTCH USING LINEAR ACTUATOR

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ABSTRACT

Temporary leg injuries, such as fractures or post-surgical recovery, often require patients to use crutches or canes for support. However, manually adjusting these devices' height can be inconvenient and physically demanding. This project, Dyno Leg Synergy, focuses on developing an automated crutch system that adjusts its height automatically to enhance user comfort and convenience. The system utilizes a Linear Actuator and an Arduino UNO microcontroller to enable precise and effortless height adjustments. The Arduino UNO is programmed to control the actuator and manage all connected circuits, ensuring seamless operation. This design prioritizes user accessibility, portability, and cost-effectiveness, making the automated crutch practical for daily use. Testing demonstrated that the system successfully provides users with the ability to customize the crutch height without manual effort. This automated feature not only improves user experience but also reduces the physical strain typically associated with manual adjustments. Additionally, the device's lightweight and portable design ensures ease of transportation. In conclusion, Dyno Leg Synergy offers a significant advancement in assistive technology for individuals with temporary leg conditions. By automating height adjustments, it enhances comfort, usability, and mobility for patients, making it an ideal solution for individuals recovering from leg injuries or surgeries.

Keywords: Automated Crutchm, Linear Actuator Technology, Assistive Devices, Arduino UNO Applications, Mobility Support Solutions

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DYNOLEG SYNERGY

DEVELOPMENT OF AUTOMATED CRUTCH USING LINEAR ACTUATOR

BACKGROUND OF PROJECT

The project aims to provide an easy-to-use interface, allowing people with temporary or permanent mobility issues to adjust their crutch height easily. The height adjustment uses a low-energy system, keeping power use low. It also uses eco-friendly materials, making the crutch both efficient and environmentally friendly.

STATEMENT OF PROBLEM

People with foot problems in therapy often find crutches expensive, and it takes time to get stable using them. This project offers a comfortable, easy-to-use solution that helps users who can't put much effort into adjusting the crutch height for their comfort.

OBJECTIVE

- Automated Control System
- Energy Efficiency and Sustainability:
- Enhanced Usability

SIGNFICANT OF PROJECT

- Enhanced User Comfort and Convenience
- Improved Mobility
- Accessibility and Independence

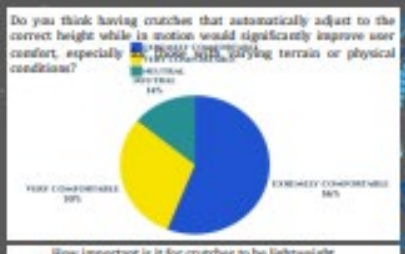
METHODOLOGY

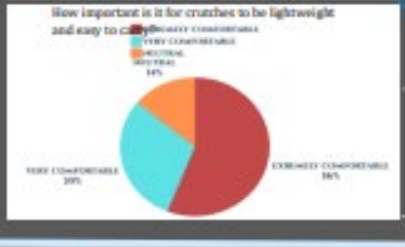
- **Hardware:** Linear actuator A motor that moves a rod up and down.
- **Software:** Arduino code the motor how much to move to adjust the cane's height.
- **User Interaction:** Button or remote for user presses a button to control the height.
- **Benefits: Easier to use** no manual adjustment needed.
- **More comfortable:** The cane adjusts to the user's height.

CONCLUSION

The DynoLeg Synergy aims to provide a practical, affordable, and user-friendly solution for improving mobility assistance, enhancing comfort, convenience, and quality of life for individuals with mobility challenges.

FINDINGS





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ABSTRACT & POSTER

JABATAN KEJURUTERAAN MEKANIKAL

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PSA INNOVATION TECHNOLOGY & COMMERCIALIZATION

TITAN GRITSANDER: REVOLUTIONIZING PRECISION SANDING WITH ADVANCED TECHNOLOGY

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ABSTRACT

This project presents the design, optimization, and analysis of the Titan Gritsander, an advanced belt sander engineered to deliver efficient and precise sanding across various surfaces. Belt sanders are essential tools in woodworking, metalworking, and finishing industries, widely used for shaping, smoothing, and polishing materials. The Titan Gritsander addresses common issues such as vibration, uneven sanding, and high energy consumption often seen in conventional sanders. Constructed from lightweight yet durable materials, the Titan Gritsander's frame ensures stability and reduced vibration, offering maximum control during prolonged use. Powered by a medium-torque motor, it delivers consistent performance across materials such as wood, metal, and composites, enhancing its versatility for industrial applications. An integral feature is its advanced vacuum system, which captures dust and debris effectively, ensuring a cleaner workspace and reducing health risks associated with dust inhalation. Additionally, the sander includes safety features such as an emergency stop button for immediate shutdown and a variable speed adjustment mechanism, allowing users to tailor operations to specific materials. Performance was optimized using the Taguchi method, focusing on parameters like belt tension, motor speed, and sanding angle. This process ensured uniform material removal and high-quality surface finishes. Experimental testing demonstrated a 30% improvement in efficiency, reduced material waste, and superior operational performance. The Titan Gritsander provides a cost-effective and reliable solution for industrial and commercial sanding needs. Its innovative design and optimized functionality represent a significant advancement in precision surface finishing technology, offering improved safety, efficiency, and user experience in demanding work environments.

Keywords: Medium-torque motor, Vacuum system, Emergency stop button, Taguchi optimization, Precision sanding technology

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DEPARTMENT OF MECHANICAL ENGINEERING (PACKAGING)

TitanGrid SANDER

BACKGROUND OF PROJECT

The background of this project focuses on improving the safety and efficiency of the existing belt sander machine. The machine previously faced issues such as inadequate wood dust ventilation, inefficient energy use, and excessive noise. Thus, this project aims to redesign the machine with enhanced ventilation, an effective dust collection system, and an emergency stop button to create a safer and more productive work environment.

PROBLEM STATEMENT

- The existing machine has the problem of wood dust being released in the air
- Energy use on inefficient motors
- The problem of noise that is too loud and disturbs people around when using it

OBJECTIVES

- Designing a systematic TitanGrid sander machine
- Reducing the level of machine vibration to the minimum
- Improving the air suction facility of the Titangrid sander machine

FINDINGS

The new design of the belt sander machine successfully solves the problem of dust ventilation and high noise, making it safer and more efficient. A flexible ventilation system and dust collection mechanism improve air quality, while an emergency button improves operator safety.

SIGNIFICANCE OF PROJECT

The significance of this project is in improving the safety and operational efficiency of belt sander machines. By overcoming problems such as insufficient dust ventilation and excessive noise, the project not only protects the health of users but also improves work productivity. Innovations such as dust collection systems and emergency buttons ensure a safer working environment.

CONCLUSION

The conclusion of this project emphasizes that the new design of the belt sander machine has led to significant improvements in safety and performance. With a solution to the issue of dust ventilation and high noise, this machine is now more efficient and user-friendly. The use of a dust collection system and emergency button not only protects the health of the operator, but also improves overall productivity. This project proves the importance of innovation in machine design to achieve higher industry standards, and it can be used as a reference for future projects in the engineering field.

METHODOLOGY

Organizing the tools and cleaning of work areas to which you're about to operate a clean slate are essentials for operation, thus start with picking proper grits then sticking those with a machine, ensure one uses his goggles and masks provided at all times due to the massive amounts of dust which this particular piece causes while using the equipment by making it start as then to allow yourself smooth operations through friction rather than rubbing your woods thus make the finishing to fine-gift to smooth ending. Finally, clean the site and check the sander for maintenance before you pack it away.

NAMA PENYELIA
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PSA INNOVATION TECHNOLOGY & COMMERCIALIZATION

DEVELOPMENT OF SOLAR-POWER AUTOMATIC IRRIGATION SYSTEM

Wan Majdah binti Ton Mamat, Nurfarhana binti Pawakkangi, Nur Shazwani binti Abd Halim & Nurin Batrisya binti Zamri*

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ABSTRACT

With the increasing demand for agricultural production amid concerns over water scarcity and high energy consumption, this project presents a solar-powered automatic irrigation system aimed at improving irrigation efficiency. The system autonomously controls water distribution based on real-time soil moisture data, utilizing moisture sensors, a microcontroller, and a water pump to deliver water only when needed. By leveraging solar power, the system reduces reliance on non-renewable energy sources, aligning with sustainability goals and offering a cost-effective solution, especially in rural or remote areas where electricity access is limited. The modular, scalable design allows for adaptation in diverse agricultural settings, from home gardens to large-scale farms. The system's real-time monitoring ensures customization for various crops, soil types, and environmental conditions, optimizing water use across different environments. The solar setup includes energy storage to maintain operation during low-sunlight conditions, such as at night or on cloudy days. Initial testing showed a 30% reduction in water consumption compared to traditional irrigation methods, demonstrating its potential to enhance sustainable water management. Additionally, the use of solar energy resulted in significant energy savings, proving the system's viability in resource-scarce areas. Future advancements may include wireless communication for remote monitoring and weather prediction algorithms to optimize water usage further. This project contributes to sustainable farming practices by integrating innovative technology that balances agricultural productivity with environmental responsibility.

Keywords: Solar-powered irrigation, Automated irrigation, Water conservation, Sustainable agriculture, Renewable energy

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POLITEKNIK MALAYSIA
SULTAN SALAHUDDIN ABDUL AZIZ SHAH

PERTANDINGAN PROJEK AKHIR PELAJAR
SESI 1:2024/2025
'RESILIENCE AND SUSTAINABILITY IN EDUCATION'

POTEC 7
PSA INNOVATION, TECHNOLOGY, ENGINEERING & COMMERCIALIZATION

DEVELOPMENT OF SOLAR-POWERED AUTOMATIC IRRIGATION SYSTEM

No. my IPO: CRLY2024W07452

Significance of the Project:

This solar-powered irrigation system conserves water by using moisture sensors to optimize irrigation, reducing waste and ensuring healthy crop growth. By relying on renewable solar energy, it lowers energy costs and environmental impact. The automated system saves labor and enhances yields, making it a valuable tool for farmers, especially in remote areas with limited electricity access, promoting sustainable agriculture and resource conservation.

Background of Project:

With the rapid growth of global agriculture and rising concerns over water scarcity and energy use, sustainable irrigation solutions are increasingly essential. This project introduces a solar-powered automatic irrigation system designed to tackle these challenges. By utilizing solar energy, moisture sensors, and automated controls, the system reduces dependency on non-renewable resources and ensures efficient water use. Scalable for various agricultural needs, this eco-friendly solution minimizes water waste and promotes sustainable farming practices, particularly benefiting rural areas with limited access to conventional power sources.

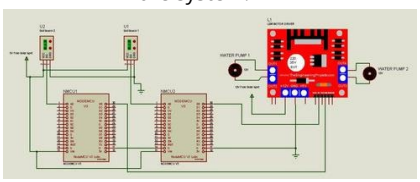
Problem Statement:

Conventional irrigation methods lead to water wastage, high energy consumption, and labor-intensive practices. There is an urgent need for a sustainable, cost-effective solution to optimize water use and energy efficiency, especially for rural areas with limited electricity access.

Objectives:

- Design and build a solar-powered irrigation system that monitors soil moisture level.
- Create a control algorithm that automates watering based on real time sensor data.
- Develop an easy-to-use interface for monitoring and controlling the system.

Methodology:



- **Design & Analysis**: Identified system needs, focusing on renewable energy and automated water management.
- **Component Selection**: Chose reliable, cost-effective components (solar panel, moisture sensors, microcontroller, pump, and battery).
- **System Development**: Programmed microcontroller to automate irrigation based on soil moisture, powered by solar with battery backup.
- **Testing & Optimization**: Tested prototype in varied conditions, achieving 30% water savings.
- **Future Enhancements**: Plan to add wireless monitoring and remote control.

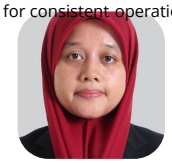
Findings:

1. Water Usage and Irrigation Efficiency:
- Sandy Soil: Frequent, short irrigation cycles due to quick drainage, resulting in 25% water savings.
- Loamy Soil: Highest water savings of 35%, with optimal moisture levels maintained by controlled irrigation.
- Clay Soil: Less frequent irrigation required due to high water retention, leading to 20% water savings.
- Overall: The system reduced water consumption by an average of 30%, with highest efficiency in loamy soil.

2. Solar Energy Consumption and Efficiency:
- Full Sunlight: Generated 120Wh, sufficient for daily irrigation and partial battery charge.
- Partial Sunlight: Produced 60Wh, allowing about 1 hour of irrigation with limited battery charge.
- No Sunlight: Battery-only operation provided about 1.7 hours of irrigation.
- Conclusion: The solar panel and battery setup were effective in full sunlight but required additional capacity for consistent operation in cloudy or rainy conditions.

CONCLUSION

The solar-powered automatic irrigation system promotes sustainable agriculture by conserving water, reducing energy costs, and increasing efficiency. It's a practical, eco-friendly solution that benefits farmers, especially in remote areas, by ensuring optimal crop health and resource use.



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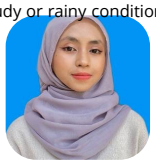

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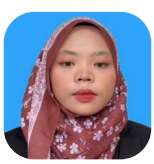

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SMART STEP: AN IOT-ENABLED MOBILITY AID WITH ADVANCED FALL DETECTION AND PERSONALIZED COMFORT

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ABSTRACT

The SMART STEP sets a new standard for mobility assistance, revolutionizing the design of smart walking aids. Equipped with advanced gyro and vibration sensors, this device accurately detects falls and provides rapid responses, enhancing safety and reassurance for users and caregivers. Beyond its safety features, the SMART STEP integrates a sophisticated communication system that can send SMS notifications or make calls to designated contacts during emergencies. This innovative functionality not only bolsters user safety but also fosters a sense of security and connection for both users and caregivers. The device further prioritizes user comfort and convenience by offering customizable features such as adjustable seat firmness and versatile storage configurations. These personalized settings allow users to tailor the SMART STEP to their specific preferences and requirements, ensuring a more comfortable and user-friendly experience. By combining cutting-edge sensor technology with advanced communication capabilities, the SMART STEP represents the future of mobility aids. It offers unparalleled safety, connectivity, and user-focused design, empowering individuals to navigate their environments with confidence and independence. This innovation aims to redefine mobility assistance, promoting freedom and enhancing the quality of life for its users.

Keywords: Smart Walking Aid, Fall Detection, IoT Technology, Personalized Comfort, Emergency Communication System

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'RESILIENCE AND SUSTAINABILITY IN EDUCATION'

SMART STEP INTEGRATED WITH IOT SYSTEM

Abstract

The SMART STEP revolutionizes mobility assistance with advanced gyro and vibration sensors that quickly detect falls, enhancing user safety and caregiver reassurance. It features a communication system for calling contacts or receiving SMS alerts during emergencies, fostering security and connection. Prioritizing comfort, the device offers customizable settings, including adjustable seat firmness and storage options. By combining cutting-edge sensors with innovative communication technology, the SMART STEP empowers users to navigate their surroundings confidently and independently.

Objective

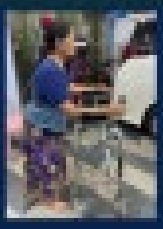
- TO DESIGN A MULTIFUNCTIONAL WALKING FRAME THAT INTEGRATES INNOVATIVE FEATURES TO ENHANCE MOBILITY , SAFETY AND CONVENIENCE FOR THE ELDERLY
- TO FABRICATE A WALKER FRAME WITH ADD OF GYRO SENSOR
- TO STUDY MECHANICAL STRUCTURE THAT FULFILLS EXPECTED FUNCTIONALITIES AND SUPPORTS FOR A USER.

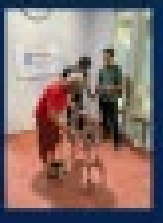
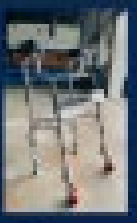
Project Description

The Smart Step project is an IoT-integrated system designed to enhance patient mobility and safety in hospitals. It uses real-time data and sensors to track movements, providing timely assistance and optimized navigation to key areas like emergency rooms and laboratories. Additionally, it features health monitoring, enabling caregivers to track vital signs remotely. By integrating with hospital infrastructure, Smart Step improves patient experiences, reduces accident risks, and enhances resource management for more efficient, patient-centered care.

Conclusion

THE SMART STEP INTEGRATED IOT SYSTEM REPRESENTS A MAJOR LEAP IN ASSISTIVE TECHNOLOGY, COMBINING SENSORS AND COMMUNICATION FEATURES IN A MOBILITY AID FOR INDIVIDUALS WITH MOBILITY CHALLENGES. ENHANCING SAFETY AND AUTONOMY, IT OFFERS PROACTIVE FALL DETECTION, IMMEDIATE ALERTS, AND EASY ACCESS TO HELP. THROUGH USER-CENTERED DESIGN, SMART STEP DEMONSTRATES THE POWER OF TECHNOLOGY TO IMPROVE ACCESSIBILITY, SETTING A BENCHMARK FOR INCLUSIVE INNOVATIONS AND EQUAL OPPORTUNITIES FOR ALL.



Problem Statement

- CHAIRLESS CHALLENGES: MANY PLACES LACK SEATING FOR OLDER ADULTS.
- SILENT STRUGGLES: SENIORS OFTEN CAN'T CALL FOR HELP WHEN ALONE.
- INACCESSIBLE TOILETS: NOT ALL LOCATIONS HAVE ACCESSIBLE (OKU) TOILETS.

Impact

- Enhanced safety
- improvement communication
- medicine efficiency

Sustainability

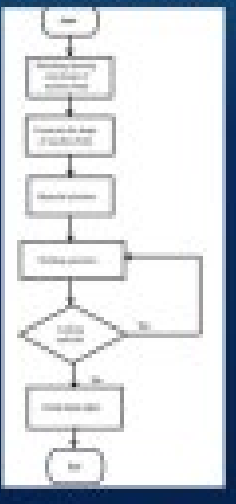
- Energy efficiency
- Predictive maintenance
- Data-driven decision

Achievements

1) Awarded the Gold Medal in the 2024 Virtual Innovation Competition organized by UiTM Pulau Pinang Branch in collaboration with DIGIT 360

2) Awarded the Gold Medal in the 2024 International Invention Innovation and Design Competition organized by Kolej Vokasional Tanah Merah in collaboration with DIGIT 360

Methodology



List Of Part

1)Arduino
2)linear actuator
3)Push Button
3)Gyro sensor
4)Tyre
5)Battery
6)Potty seat
7)Arm Rest


MUHAMAD ARIF BIN AHMAD FAHMI


NAZRAN ZAFRAN BIN JAMALUDDIN


HARIS IZZUDDIN BIN HARON


NOOR HAZNIDA BINTI ABU BAKAR

SMART DIGITAL COOKING GAS METER: AN IOT SOLUTION FOR REAL-TIME MONITORING AND SAFETY

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ABSTRAK

The Smart Digital Cooking Gas Meter presents an innovative solution for real-time management and monitoring of cooking gas usage. Utilizing sensor technology and Internet of Things (IoT) connectivity, the system provides precise measurements of gas consumption, predicts depletion rates, and enhances safety by detecting gas leaks or irregularities. Users receive timely alerts via mobile applications or connected devices for low gas levels, enabling proactive refills and preventing unexpected shortages. This system also promotes energy efficiency by offering insights into gas usage patterns, allowing users to optimize consumption and reduce waste. Integrating smart meters into the cooking gas supply chain minimizes costs, enhances safety, and ensures a seamless user experience through real-time notifications in case of gas leaks. The Smart Digital Cooking Gas Meter is highly beneficial for households, restaurants, and industries reliant on gas as a primary energy source, providing a reliable, intelligent, and cost-effective approach to gas management.

Keywords: IoT-enabled gas monitoring, Gas leakage detection, Real-time gas usage tracking, Energy efficiency, Smart gas management

SMART DIGITAL COOKING GAS METER

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BACKGROUND OF PROJECT

The global demand for natural gas necessitates more accurate, efficient, and safe gas measurement methods, especially in household and commercial cooking environments. Traditional gas meters lack accuracy, real-time monitoring, and safety features, leading to billing discrepancies, wasteful consumption, and potential hazards. A Smart Digital Cooking Gas Meter integrates IoT sensors for real-time monitoring, safety alerts, and energy consumption analytics, empowering users to manage gas usage effectively and contribute to environmental sustainability.

PROBLEM STATEMENT

The global demand for natural gas necessitates more accurate, efficient, and safe gas measurement methods. Traditional meters lack real-time monitoring, safety features, and automation, necessitating the development of a Smart Digital Cooking Gas Meter.

OBJECTIVE

The Smart Digital Cooking Gas Meter enhances household gas usage efficiency, safety, and convenience by providing real-time data, alerting users to hazards, and integrating with smart home systems for remote management.

METHODOLOGY

FINDINGS

Accuracy and Reliability:
- Digital meters provide precise gas flow measurements, minimizing billing discrepancies.
- Safety features like leak detection and abnormal flow alerts identify potential hazards early, reducing risks.

Energy Efficiency and Conservation:
- Real-time tracking encourages energy conservation, leading to cost savings and reduced environmental impact.

User Convenience and Satisfaction:
- Automated data reporting and wireless connectivity improve user convenience.
- Data analytics support demand forecasting and operational planning.

Economic Impact:
- Users observe reduced gas bills due to accurate usage tracking and waste reduction.

Technological Feasibility and Scalability:
- Integration of IoT and sensor technology is effective, but scalability may require more robust network solutions.

SIGNIFICANCE OF PROJECT

A smart digital cooking gas meter offers enhanced accuracy, safety features, energy conservation, automation, convenience, and economic benefits for users and providers. It utilizes IoT technology, integrating sensors, data processing, and wireless communication, contributing to advancements in energy metering technology. The meter also aids in data-driven decision making, enabling users to optimize gas usage and improve service reliability.

CONCLUSION

A Smart Digital Cooking Gas Meter enhances household gas usage management by providing safety alerts, tracking consumption, and integrating with smart home technology. It optimizes gas use, ensures cost efficiency, and provides real-time data, enhancing cooking safety and efficiency

EXTENDABLE FLOOD BARRIER DOOR: A COMPACT SOLUTION FOR RESIDENTIAL FLOOD PROTECTION

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ABSTRACT

Malaysia frequently experiences floods, especially during the monsoon season on the east coast of Peninsular Malaysia, Sabah, and Sarawak. These floods result in significant property damage, economic disruption, and public safety risks. Urban areas, with limited space, are particularly vulnerable as existing infrastructure often fails to handle the increased water levels from heavy rains. This study introduces an extendable flood barrier door designed to offer flexible and adaptable flood protection. Current flood barriers are typically large, expensive to install, and impractical for small residential areas. This project focuses on creating a compact, portable, and easy-to-use solution that is also simple to store. The proposed flood barrier is tailored for residential use, particularly in areas with blocked drainage. It has a maximum water level capacity of 50 cm and is designed to fit single-door openings (70–90 cm wide). The materials used include a car jack, chipboard, bolts, iron, waterproof fabric, and door rubber. This innovative design helps minimize floodwater entry into homes during flood events, effectively reducing damage to property and furniture. In conclusion, this project provides a practical, cost-effective flood protection solution that enhances resilience for residential areas. By preventing water from entering homes and damaging walls, furniture, and other items, the extendable flood barrier door addresses a critical need for affordable and efficient flood mitigation in urban and rural settings.

Keywords: Extendable flood barrier, Flood protection innovation, Portable flood solution, Residential flood mitigation, Water damage prevention

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SESI 1:2024/2025
'RESILIENCE AND SUSTAINABILITY IN EDUCATION'

PSA INNOVATION, TECHNOLOGY, ENGINEERING & COMMERCIALIZATION

EXTENDABLE FLOOD BARRIER DOOR

BACKGROUND OF PROJECT

Malaysia is often hit by floods, especially during the monsoon season on the east coast of the Peninsula as well as in Sabah and Sarawak. These flooding events have significant negative impacts, including property damage, economic disruption, and threats to public safety. The existing infrastructure is often not able to accommodate the amount of water that increases sharply due to heavy rains, especially in urban areas with limited space. Therefore, this study presents an extendable flood barrier design that aims to provide more flexible and adaptable flood protection.

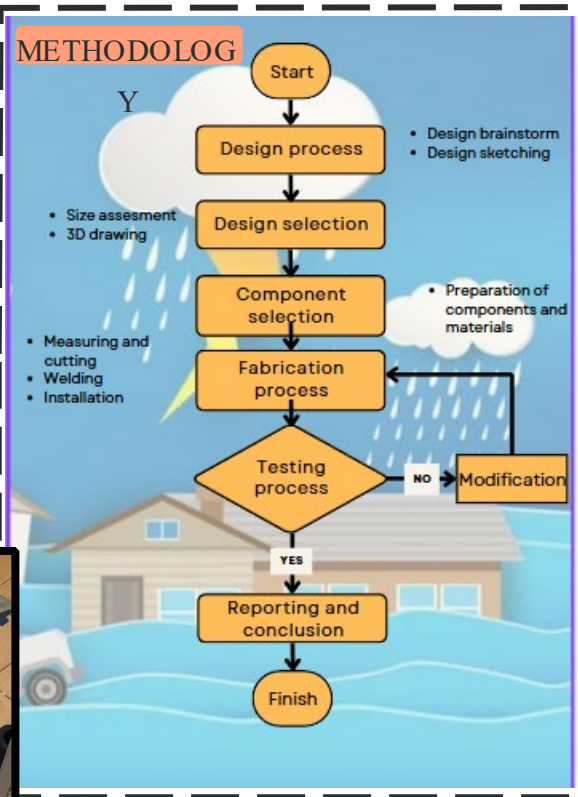
PROBLEM STATEMENT

Flood water enters the residence, shop or house through the door.

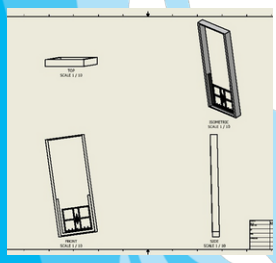
OBJECTIVE

Designing a door flood barrier.

METHODOLOGY



FINDINGS



SIGNIFICANT

- Easy installation
- Economic Value
- Enhance flood protection for property owner
- Adaptable and scalable solution

CONCLUSION

In conclusions, the Extendable Flood Barrier Door provides a practical, adaptable flood protection solution suited for various door sizes in residential and commercial spaces. Its durability, ease of installation, and cost-effectiveness make it accessible and reliable for flood defense, while its sustainable design contributes to responsible resource use. This project offers a valuable tool for enhancing flood resilience, with strong potential for positive impact in flood-prone areas.

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PSA INNOVATION TECHNOLOGY & COMMERCIALIZATION

AUTOMATIC SCARECROW: AN INNOVATIVE SOLUTION FOR PEST MANAGEMENT

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ABSTRACT

The Automatic Scarecrow is an innovative agricultural tool designed to protect crop fields from pests using automated systems. Unlike traditional scarecrows, which are static and passive, the automatic scarecrow actively detects and repels animals such as birds and small mammals through the use of sensors and motion. This system incorporates moving parts that are triggered by motion sensors, enhancing its effectiveness in deterring pests. The automation ensures continuous, reliable protection without the need for constant human intervention, making it a more efficient solution for crop fields. Moreover, the system can be easily adapted to different environments, providing flexibility in various agricultural settings. By integrating modern technology into traditional pest control methods, the automatic scarecrow offers a more dynamic and proactive approach to safeguarding crops. This device addresses the limitations of conventional scarecrows, offering greater adaptability, effectiveness, and convenience. It not only reduces the labor required for pest control but also minimizes the use of chemicals and other pest deterrents, promoting a more sustainable and eco-friendly approach to agriculture. In conclusion, the automatic scarecrow is a modern solution to the ongoing challenge of crop protection. By combining automation and motion detection, it provides an efficient, eco-friendly, and adaptable tool for farmers seeking to improve their pest management strategies.

Keywords: Automatic Scarecrow, Automated Systems, Motion Sensors, Pest Control, Sustainable Agriculture

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METHODOLOGY

Many methodologies and findings from this field mainly generated into journal for others to take advantages and improve as upcoming studies. The method is used to achieve a perfect result for this project. The most important planning for Automatic Scarecrow is to determine how effective it will on the field to protect the crops from pests and small mammal. After the entire journal has been read, some method has been selected to carry out this feasibility study. The selection of the method depends on the available materials and equipment. Some of the materials and equipment are easy to get and available. The selected method will be use and the data will be recorded. The feasibility study conducted to see the difference between our scarecrow and the traditional one also to find both the weaknesses and how ineffective the traditional scarecrow and at once to compare with our Automatic Scarecrow to make it most valuable yet affordable for our market target.

STATEMENT OF PROBLEM

As we known using the old scarecrow is can't reduce the crop damage caused by birds and small animals can significantly impact agricultural yields and farmer income. By using the old scarecrow farmers find it hard to make a profit because the birds and small animals are destructive their field. Lastly, the old scarecrow can't be move or make sound when the bird or animal besides the scarecrow.

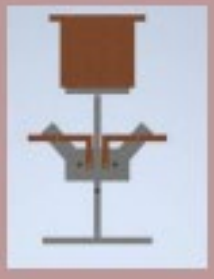
SIGNIFICANCE OF PROJECT

The Automatic Scarecrow project is significant for several reasons. It provides a dynamic, effective solution to a longstanding problem in agriculture—protecting crops from pests. Unlike traditional methods, this system adapts to the behavior of wildlife, using randomized responses to prevent pests from becoming accustomed, thereby maintaining its effectiveness over time. By using renewable solar power and reducing the need for chemical pesticides, it supports eco-friendly practices and minimizes environmental impact. Additionally, this low-maintenance system reduces labor costs and frees farmers from frequent pest control interventions, allowing them to focus on other essential tasks. Overall, the project enhances crop protection, promotes sustainable farming, and contributes to increased crop yield and profitability.

BACKGROUND OF PROJECT

The Automatic Scarecrow is a smart solution for protecting crops by using motion sensors to detect pests in real-time. Unlike traditional scarecrows, which lose effectiveness as animals get used to them, this system responds with random movements and sounds, keeping pests away. Powered by solar energy, it operates continuously and reduces the need for chemicals, providing an eco-friendly, low-maintenance way to support sustainable farming and boost crop protection.

PICTURE OF PROJECT



FINDINGS

OBJECTIVE

1. To design , automated scarecrow that can actively detect and deter pests using motion sensors and sound.
2. To ensure that the project produced works well
3. Create a portable Automatic scarecrow that uses solar energy as a power source to inrease efficiency in power saving.

CONCLUSION

The Automatic Scarecrow is a sustainable, effective solution for modern crop protection. By using motion sensors and renewable energy, it actively deters pests without chemicals or constant maintenance. This innovative approach supports eco-friendly farming, reduces labor, and helps farmers protect their crops more reliably and efficiently.

AUTOMATED BEVERAGE SHAKER MACHINE: REVOLUTIONIZING DRINK PREPARATION WITH PRECISION AND EFFICIENCY

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ABSTRACT

The beverage industry is experiencing increasing demand for efficiently prepared and consistently flavored drinks in cafes, bars, and restaurants. To meet this need, the Automated Beverage Shaker Machine has been developed as an innovative solution to revolutionize drink preparation. This machine offers a standardized and automated method for mixing beverages, ensuring precision and efficiency. The machine's design features a robust, user-friendly interface that allows easy operation. Key functionalities include customizable shaking intensity, duration, and patterns, providing precise control over the mixing process. Its compact design ensures suitability for diverse environments, including those with limited space. Incorporating the Automated Beverage Shaker Machine into beverage establishments provides significant advantages. By automating the shaking process, it reduces preparation time and effort, enhancing operational efficiency. The machine also ensures consistency in drink quality, eliminating variations caused by human error. This consistency not only boosts customer satisfaction but also strengthens the establishment's brand reputation. In conclusion, the Automated Beverage Shaker Machine is a cutting-edge innovation that streamlines drink preparation, improves efficiency, and maintains consistent quality. Its innovative design and operational benefits make it a valuable asset for establishments aiming to optimize their beverage offerings and elevate the customer experience.

Keywords: Automated Beverage Shaker Machine, Operational Efficiency, Consistent Drink Quality, User-Friendly Interface, Beverage Industry Innovation

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AKHIR PELAJAR
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'RESILIENCE AND SUSTAINABILITY IN EDUCATION'

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BEVERAGE SHAKER MACHINE

INTRODUCTION

The Beverage Shaker Machine is a fast, easy-to-use device for mixing drinks like smoothies and juices. Perfect for cafes and booths, it blends ingredients smoothly every time. With simple controls, it saves time and ensures great-tasting, well-mixed drinks for customers.

METHODOLOGY

The Beverage Shaker Machine starts with researching customer needs and existing shakers to design a model with key features like, durability, and easy cleaning. After designing CAD models, we select food-safe and reliable components like motors and gears. A prototype is then built to test stability and performance with different drink types. Testing allows us to optimize vibration, and timing for consistent results while fixing any issues like spillage. The machine undergoes safety checks to ensure food compliance. Once the final design is refined, we prepare for mass production and source parts. After launch, the machine is marketed to cafes and juice bars, and we gather feedback for future updates.

OBJECTIVE

- Workforce management
- Customer satisfaction
- Time management

PROBLEM STATEMENT

- Lack of workers
- many order
- require a lot of time
- require lots of energy

FINDING

Beverage Shaker Machine automates the shaking process, increasing efficiency and ensuring consistent quality in drinks, which enhances customer satisfaction. Its versatility allows it to handle various beverages, while user-friendly controls and safety features make it a reliable and easy-to-use solution for busy drink-serving environments.

SIGNIFICANCE OF PROJECT

The Beverage Shaker Machine project is important because it makes drink preparation faster, more consistent, and easier for cafes, juice bars, and booths. By automating shaking, it saves time, cuts down on manual work, and ensures every drink has the same great taste and texture. This leads to better customer satisfaction, faster service, and lower costs by reducing the need for extra tools and minimizing waste.

CONCLUSION

Beverage Shaker Machine improves efficiency and consistency in drink preparation, making it an essential tool for busy cafes and juice bars. Its ease of use and safety features ensure a reliable and high-quality service, ultimately enhancing customer satisfaction.

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PSA INNOVATION TECHNOLOGY & COMMERCIALIZATION

DEVELOPMENT OF THE SEMPERIT PRESSER MACHINE

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ABSTRACT

This project focuses on the design and development of a semperit presser machine utilizing a linear actuator mechanism to improve the efficiency of semperit cookie production. The machine is carefully engineered to extrude dough uniformly through molds, ensuring consistent shape and high-quality output. Designed with user-friendliness in mind, it allows operators to control the process with minimal physical effort, making it accessible even to those with limited technical experience. The linear actuator mechanism provides stable and consistent pressure, a crucial factor for achieving optimal results in cookie production. Specifically developed for small and medium-sized enterprises (SMEs) in the food industry, this innovative machine can produce 14 cookies at a time, significantly increasing productivity and consistency. By automating key steps, it reduces reliance on manual labor, optimizes production time and costs, and minimizes the risk of human error. Additionally, the machine allows operators to focus on other critical areas, such as marketing and product innovation, contributing to overall business efficiency. This solution is particularly advantageous for SMEs aiming to enhance their production capacity while maintaining high product quality. In conclusion, the semperit presser machine offers practical benefits for food industry entrepreneurs, boosting productivity and ensuring uniform quality. Its impact is expected to support the growth of small-scale food producers, helping them remain competitive in a challenging market.

Keywords: Food processing technology, Linear actuator mechanism, Semi-automation in food production, Small and medium-sized enterprises (SMEs)

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SEMPERIT PRESSER MACHINE


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1. PROJECT BACKGROUND

The production of semperit cookies in small and medium industries (SMEs) often faces challenges related to labor intensity, consistency, and efficiency. Traditional methods of making these cookies require significant manual effort, which can lead to variations in quality and slow down the production process. For SMEs, maintaining productivity while managing production costs and labor demands is essential. Recognizing these challenges, the development of a specialized machine, known as the semperit presser was initiated. This machine aims to streamline the production process, reduce reliance on manual labor, and enhance the consistency and output of semperit cookies, making it a valuable asset for SMEs in the food industry.

2. PROBLEM STATEMENT

- Inefficient production methods that rely heavily on manual labor, resulting in slow output and increased operational costs.
- The manual production process of semperit cookies requires a long time and involves a lot of labor, leading to slow and inefficient production.

3. OBJECTIVE

- To design a semi automation semperit machine that minimizes the need for manual labor in the cookie production process.
- To develop a semperit machine that integrates a linear actuator mechanism for enhanced efficiency in cookie production.

4. METHODOLOGY

- Begins with defining the problem statement and objectives, followed by a literature review to gather relevant information.
- Next, the design concept is created, materials are selected, and a detailed design is drawn on CAD software.
- The fabrication process then takes place, producing a prototype.
- The prototype undergoes product testing, and if modifications are needed, adjustments are made before retesting.
- Once the product passes testing, an analysis is conducted, followed by final touches, leading to the completion of the process.

5. FINDINGS

- Specification
  - Could produce 14 semperit cookie prints at a time
  - Designed to hold 2 - 3kg dough per batch
  - Control: Using a remote to control the presser
- Market potential
  - SME's business

6. SIGNIFICANCE OF PROJECT

For small and medium industries (SMEs) in biscuit production, this machine enhances productivity, quality, and product consistency. It reduces reliance on manual labor, thereby saving time and production costs. With this innovation, SMEs can compete more effectively in the broader market while offering high-quality, uniform products.

7. CONCLUSION

The semperit presser helps SMEs overcome challenges in making semperit cookies by reducing manual labor, improving consistency, and increasing production speed. This machine provides a practical way for small businesses to boost productivity and maintain quality, supporting growth in the food industry.

PSA INNOVATION TECHNOLOGY & COMMERCIALIZATION

SUSTAINABLE RICE WASHING: A MOTORIZED SOLUTION FOR HOUSEHOLDS AND SMALL-SCALE PROCESSORS

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ABSTRACT

This project presents an innovative rice washer designed to improve the efficiency and effectiveness of rice washing, addressing the common challenges faced by households and small-scale rice processors. Traditional methods of rice washing often involve extensive manual labor and excessive water usage, resulting in inefficiencies and potential hygiene concerns. Our system features a motor-driven mechanism that rotates an ergonomically designed tong drum filled with rice, ensuring thorough cleaning while reducing water consumption. Key components of the rice washer include a durable table with wheels for easy mobility, allowing users to effortlessly transport the unit within the kitchen or processing area. The motor powers the system, while a robust chain drive ensures smooth, consistent operation. The tong drum's design optimizes agitation, washing the rice uniformly and effectively, removing impurities without damaging the grains. Beyond improving the washing process, this rice washer significantly reduces the physical effort required from users, reducing the strain of manual labor. Its eco-friendly design minimizes water waste, making it a sustainable choice for environmentally conscious users. This project not only offers a practical and efficient solution for rice preparation but also contributes to improved food quality and hygiene. By streamlining the washing process, we aim to enhance the overall culinary experience, allowing users to prepare cleaner, healthier rice. Ultimately, this innovative rice washer represents a major advancement in kitchen technology, combining convenience, efficiency, and sustainability in one solution.

Keywords: Eco-friendly rice washer, Motor-driven mechanism, Water efficiency, Sustainability

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'RESILIENCE AND SUSTAINABILITY IN EDUCATION'

RICE WASHING MACHINE

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INTRODUCTION

TRADITIONAL RICE WASHING METHODS ARE TIME-CONSUMING AND LABOR-INTENSIVE. TO ADDRESS THIS, WE'VE DEVELOPED A SPECIALIZED RICE WASHER DESIGNED TO STREAMLINE THE PROCESS FOR FOOD OPERATORS, CATERERS, AND RESTAURANTS. OUR INNOVATIVE TOOL SIGNIFICANTLY REDUCES PROCESSING TIME, CONSERVES ENERGY, AND ENSURES THOROUGH CLEANING, ULTIMATELY ENHANCING EFFICIENCY AND HYGIENE.

METHODOLOGY

THIS PROJECT INTRODUCES A NEW RICE WASHING MACHINE THAT SIMPLIFIES THE PROCESS FOR FOOD ENTREPRENEURS. IT UTILIZES AC MOTORS AND A ROTATING BLADE WITHIN A WATER-FILLED DRUM TO EFFICIENTLY CLEAN RICE WITHOUT REQUIRING FREQUENT WATER CHANGES. THE MACHINE'S STURDY DESIGN WITH FOUR TIRES AND BRAKES ENSURES STABILITY DURING OPERATION.

OBJECTIVE

- DESIGN USER-FRIENDLY AND AFFORDABLE TOOLS.
- REDUCE LABOR COSTS AND TIME FOR FOOD ENTREPRENEURS.
- ENSURE CLEANLINESS AND INCREASE EFFICIENCY OF RICE WASHING.
- CREATE A DESIGN WITH A LID TO PREVENT SPILLAGE.

PROBLEM STATEMENT

MALAYSIANS HEAVILY RELY ON RICE AS A STAPLE FOOD, CONSUMING IT DAILY. HOWEVER, TRADITIONAL RICE WASHING METHODS, ESPECIALLY FOR LARGE-SCALE OPERATIONS, ARE TIME-CONSUMING, LABOR-INTENSIVE, AND OFTEN RESULT IN INCOMPLETE CLEANING. THIS PROJECT AIMS TO ADDRESS THESE CHALLENGES BY INTRODUCING A MORE EFFICIENT AND HYGIENIC RICE WASHING SOLUTION.

CONCLUSION

OUR RICE WASHER OFFERS A CONVENIENT AND EFFICIENT SOLUTION FOR LARGE-SCALE RICE WASHING. IT ENSURES THOROUGH CLEANING WHILE REDUCING LABOR AND TIME. BY AUTOMATING THIS PROCESS, WE AIM TO IMPROVE HYGIENE STANDARDS AND OVERALL PRODUCTIVITY IN FOOD SERVICE ESTABLISHMENTS.

SMART DRAIN MANAGEMENT: AN AUTOMATED SOLAR-POWERED CLEANING SOLUTION

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ABSTRACT

Clogged drains in stormwater and street systems pose significant infrastructure, environmental, and health risks, often resulting in flooding and pollution. Traditional cleaning methods are labor-intensive, inefficient, and expose workers to safety hazards. To address these challenges, this project introduces the Automated Solar-Powered Drain Cleaning System (ASDCS), an innovative solution that combines solar power and IoT integration to facilitate efficient debris removal. The system utilizes ultrasonic sensors to monitor water levels within the storm drain. When debris accumulates, the water level rises, triggering the conveyor belt to scoop the debris into a detachable trash bin once a predefined threshold is reached. Additionally, the system uses two 20kg straight bar load cells with an HX711 amplifier to monitor the weight of the trash bin. When the bin reaches its weight limit, a notification is sent to the user via a Telegram bot, using an ESP-01S Wi-Fi module for communication. All sensors and components are controlled by an Arduino R3. Testing has demonstrated that the system significantly reduces the need for manual intervention in drain maintenance, improving the overall management of storm drains. The ASDCS not only enhances the efficiency of debris removal but also contributes to the sustainability of urban drainage systems by reducing labor costs and environmental impact. This technology offers great potential for revolutionizing urban drain management, making it a safer, more efficient, and sustainable solution for cities worldwide.

Keywords: Automated Drain Cleaning System, IoT, Arduino, Ultrasonic Sensors, Sustainability

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POLITEKNIK MALAYSIA
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AUTOMATED SOLAR DRAIN CLEANING SYSTEM (ASDCS)

Abstract

Clogged drains in storm drains and street systems present significant infrastructure, environmental, and health challenges, often leading to flooding and pollution. Traditional cleaning methods are inefficient and labor-intensive, exposing workers to safety hazards. To address these issues, this project presents the Automated Solar-Powered Drain Cleaning System (ASDCS), an innovative, solar-powered, IoT-integrated solution designed to facilitate efficient debris removal. The system employs ultrasonic sensors to monitor water levels inside the storm drain. When debris accumulates in front of the conveyor belt, it causes the water level to rise. Once the water level reaches a certain threshold, the ultrasonic sensor triggers the conveyor belt to scoop up the debris into a detachable trash bin. Additionally, two 20kg straight bar load cells with an HX711 amplifier monitor the weight of the trash bin. When the weight reaches a predefined limit, the system sends a notification to the user via a Telegram bot using an ESP-01S Wi-Fi module. All sensors and components are controlled by an Arduino R3. Testing revealed that the system significantly reduces the need for manual intervention in drain maintenance, improving overall drain management. The potential impact of this technology on urban drain management and sustainability is also discussed.

Keywords: Automated Drain Cleaning System, IoT, Arduino, ultrasonic sensors, sustainability.

Problem Statement

- Inefficiency of manual cleaning: Manual, schedule-based cleaning can't adapt to changing conditions and is often disrupted by weather.
- Health and safety risks: Workers face exposure to pathogens, pollutants, and physical injuries.
- Environmental impact: Debris in drains pollutes waterways, harms aquatic life, clogs drainage, and increases flood risk.

Objective

1. To design and develop an innovative solar power automated drain cleaning system with IOT.
2. Uses sensor based cleaning to remove debris, reducing intervention to routine maintenance and garbage collection.

Findings

- Collection Efficiency: The sensor-based cleaning mechanism will effectively collect debris in the manhole, reducing manual intervention.
- IoT Integration: IoT technology enables real-time monitoring of debris levels and system status, allowing for timely alerts and proactive maintenance.
- Environmental Impact: The Automated Solar-Powered Drain Cleaning System (ASDCS) aims to prevent waste from entering water systems, reducing pollution and mitigating flood risks.

Significance of Project

- Reduce pollution: Tackles environmental pollution directly.
- Lower manual labor: Automates cleaning, reducing labor needs and costs.
- Boost efficiency: Speeds up drain cleaning, enhancing efficiency and cutting costs.
- Prevent floods: Keeps drains clear, reducing flood risks and enhancing safety

Conclusion

This solar-powered, automated drain cleaning system with IoT integration offers a sustainable, efficient solution to urban drainage issues. With sensor-based cleaning, real-time monitoring, and a targeted 90% uptime, it reduces manual intervention and supports timely maintenance. The system effectively minimizes pollution, improves drain functionality, and mitigates flood risks, showcasing smart technology's potential in urban waste management.

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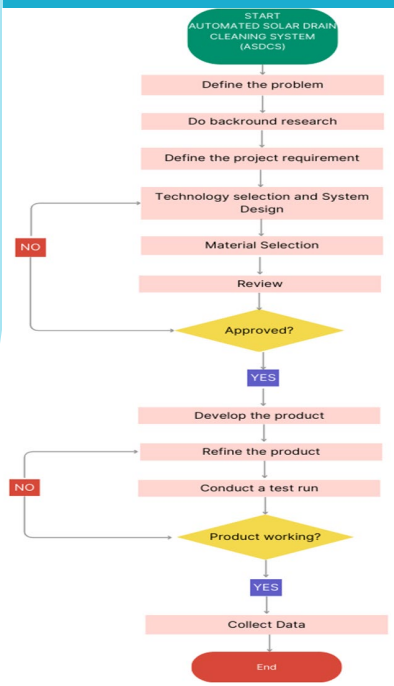
CRLY2024W00173

Methodology



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PSA INNOVATION TECHNOLOGY & COMMERCIALIZATION

ABSTRACT & POSTER

JABATAN PERDAGANGAN

PSA INNOVATION, TECHNOLOGY, ENGINEERING & COMMERCIALIZATION COMPETITION | PITEC 7 SESI 1: 2024/2025

BLEND GUSTO: A HEALTHIER CHOICE WITH NUTRIENT-RICH, LOW-SODIUM SEASONING FOR BETTER EATING

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ABSTRACT

In today's health-conscious society, addressing dietary concerns is vital for promoting overall well-being. Excessive consumption of salt, sugar, and additives is a leading contributor to chronic diseases such as hypertension, diabetes, and obesity. This project introduces Healthy Seasoning Powder, a low-sodium, nutrient-rich alternative designed to support healthier eating habits without sacrificing flavor. The Design Thinking approach was used to develop this product, focusing on understanding user needs and incorporating feedback for iterative improvement. The result is a seasoning that provides great taste while promoting health-conscious choices. Made from natural ingredients free from harmful additives, the seasoning received positive feedback during preliminary trials, confirming its potential as a healthy and flavorful alternative. This product is versatile and can be used in a variety of dishes, making it easier for consumers to incorporate healthier seasonings into their meals. By reducing sodium intake, Healthy Seasoning Powder helps mitigate the risk of lifestyle-related diseases, such as high blood pressure and heart disease. Additionally, the product supports sustainable eating practices by using natural, additive-free ingredients, promoting long-term wellness and health. In conclusion, the Healthy Seasoning Powder provides a practical solution for individuals looking to enhance their diets with flavorful, nutrient-rich ingredients. It represents a step forward in promoting healthier eating and preventing chronic diseases, while encouraging sustainable, conscious dietary choices.

Keywords: Healthy Seasoning Powder, Low-Sodium, Nutrient-Rich, Healthy Eating, Sustainable Diet

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BLEND GUSTO

PRODUCT BACKGROUND

We are developing a healthy seasoning powder to meet rising demand for natural, low-sodium alternatives. Free from MSG and synthetic additives, our product promotes better health, aligning with SDG 3 by using organic herbs rich in nutrients.
In support of SDG 12. We prioritize sustainable sourcing, fair trade, and community development. Our goal is to enhance flavor while encouraging healthier diets and responsible consumption, fostering long-term well-being and environmental care.

STATEMENT OF PROBLEM

The rising demand for healthier food choices, consumers face a challenge in finding seasoning solutions that enhance flavor without compromising nutritional integrity. Monosodium glutamate (MSG) is a common flavor enhancer, but its artificial nature and potential for causing sensitivities or allergic reactions make it unsuitable for those seeking healthier options. This reliance on artificial additives is particularly problematic for people with dietary restrictions or health-conscious individuals aiming to prepare nutritious home-cooked meals. Many find it difficult to achieve rich, satisfying flavors without MSG or similar additives, often requiring substantial time, effort, and culinary expertise to cook meals that are both healthy and flavorful.

SIGNIFICANT OF THE PROJECT

The healthy seasoning powder project promotes healthier eating with a natural, MSG-free alternative that reduces sodium and supports public health. It enhances flavor with herbs, supports local agriculture, and raises awareness about avoiding artificial additives, driving sustainable growth and business opportunities.

OBJECTIVE

- To implement the idea that can promote healthier meal options for consumers.
- To develop meal solutions that enhance flavor while requiring minimal effort from the user.
- To provide materials to help households prepare a nutritious meal.

FINDINGS

Content	Mean	Interpretation
How much do you know about the health effects of using MSG in food?	3.73	Agree
Do you know the ingredients contained in MSG?	3.36	Neutral
Overall Average Mean:	**3.55**	**Agree**

METHODOLOGY

CONCLUSION

The development of Blend Gusto, a healthy seasoning powder, provides a flavorful, convenient, and nutritious alternative to traditional seasonings. Made with natural ingredients and free from artificial additives, Blend Gusto meets the demand for health-conscious products that enhance meal quality without compromising on taste. Designed to make it easy for consumers to prepare delicious, balanced meals, Blend Gusto encourages healthier cooking habits and promotes overall wellness, offering the perfect blend of taste and health in every sprinkle.

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EDUMANIS: A DIGITAL SOLUTION FOR STREAMLINING CLASSROOM ATTENDANCE AND TIME MANAGEMENT

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ABSTRACT

This project focuses on the development of **Edumanis**—short for "Education Manage Time and Self"—a digital solution designed to enhance classroom attendance efficiency and empower students with improved time-management skills. Edumanis addresses common challenges in educational settings, such as the time-consuming and error-prone traditional name-calling method of tracking attendance. Our solution integrates a QR-based system where students can scan personalized QR-coded cards to instantly mark their attendance. The data is automatically recorded in a Google Sheet, allowing lecturers to easily monitor and manage attendance. In addition to attendance tracking, Edumanis provides tools for students to prioritize academic tasks, helping them stay organized and focused on their academic goals. Results from implementing Edumanis demonstrate a streamlined attendance process that saves valuable classroom time and reduces administrative burden. More importantly, it fosters a culture of self-management among students by promoting proactive time management and prioritization - skills that are crucial for academic success and personal development. Edumanis not only enhances administrative efficiency in educational institutions but also encourages students to take responsibility for their time, improving both their academic performance and personal growth.

Keywords: Digital Attendance System, Time Management, QR Code Technology, Student Organization, Academic Efficiency

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EduManis System
for more effectiveness management

Background

We are chose to develop the Edumanis education app because in educational institutions, both students and lecturers face challenges that hinder productivity and efficient classroom management. Students often struggle with managing their time, balancing academic tasks, and meeting deadlines. Without proper tools to organize their schedules and prioritize tasks, many students miss deadlines, leading to academic stress and underperformance. On the other hand, lecturers continue to rely on traditional methods of taking attendance, such as calling names one by one. This outdated approach is not only time-consuming but also prone to errors, leading to inaccurate attendance records and lost class time.

Objective

Develop an efficient attendance tracking system:
Implement a QR code- based system that automates student attendance and integrates with Google Sheets for real-time tracking.

Improve classroom efficiency:
Reduce the time spent on manual attendance processes, allowing lecturers to focus more on teaching.

Enhance student time management:
Provide students with tools to organize their schedules, prioritize tasks, and set reminders for deadlines.

Conclusion

The Edumanis app combines time management tools with a QR code-based attendance system to:

Help students manage their tasks efficiently and meet deadlines.
Save class time by automating attendance tracking.
Provide lecturers with accurate, real-time attendance data, improving classroom management and student monitoring.

Product

EduManis student identity card

EduManis apps

Probelem statement

The problem faced by many educational institutions is the difficulty in accurately tracking student attendance, which is crucial for monitoring academic performance and engagement. Traditional methods are often time consuming, prone to errors, and do not provide real-time data. This can lead to issues such as untracked absences, poor student performance, and challenges in maintaining academic records. Therefore, there is a need for a solution that simplifies and automates the attendance tracking process, ensuring that students' presence in class is effectively monitored and managed.

Significant of project

The Edumanis app tackles two big problems in education:
Students often struggle with keeping up with tasks, deadlines, and schedules. At the same time, lecturers waste time taking attendance by calling names, which can be inaccurate.

Edumanis offers two main solutions:
1.Time management:
The app helps students organize tasks and keep track of deadlines more easily.
2.Automated attendance:
A QR code system makes attendance faster and more accurate for lecturers.

Methodology

- Research & developement
- Testing phase
- Implementation
- Data analysis

Finding

Finding that weakness of student identity card

Table above show that 93.3% answered "Yes", and 6.7% answered "No" for the question is 'has the EduManis card improved attendance tracking at your institution?'

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MULTIPURPOSE BOTTLE TOP BRILLIANCE (BTB): AN INNOVATIVE SOLUTION FOR PLASTIC WASTE REDUCTION

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ABSTRACT

This project tackles the growing issue of plastic pollution by developing the Multipurpose Bottle Top Brilliance (BTB), a product made from recycled plastic bottle caps. This initiative aims to reduce the environmental impact of plastic waste in Shah Alam, Malaysia, where improper disposal contributes to pollution and flooding. The primary objective is to design and develop BTB as a versatile multipurpose basket—suitable as a plant pot, grocery basket, picnic basket, or market trolley—while also addressing plastic pollution.Additionally, the project seeks to assess consumer interest in sustainable products in Seksyen 13, Shah Alam. A quantitative research approach was used, with Google Forms surveys distributed to measure environmental awareness, green values, and purchase intentions. Responses from 305 participants showed strong interest in recycled products, with high reliability (Cronbach's alpha above 0.9 for all variables). The mean scores for each section exceeded 3.5, indicating a positive view of recycled products and their environmental impact.The results suggest that the BTB product is a viable solution for managing plastic waste, as it aligns with consumer values and demonstrates practical utility. Participants expressed significant importance on the environmental benefits of products made from recycled materials. This indicates that creating useful items from bottle caps can inspire broader community efforts to address plastic waste.In conclusion, this project provides valuable insights into the potential of creative recycling solutions to benefit both society and the environment. The BTB product not only raises awareness about plastic pollution but also highlights how innovative design can promote sustainability and waste reduction in communities.

Keywords: Plastic Pollution, Recycled Materials, Sustainable Design, Waste Reduction, Environmental Innovation

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PERTANDINGAN PROJEK AKHIR PELAJAR

SESI 1:2024/2025

'RESILIENCE AND SUSTAINABILITY IN EDUCATION'

Multipurpose BOTTLE TOP BRILLIANCE (BTB)

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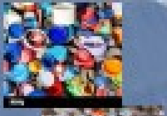
Background of project

The Multipurpose Bottle Top Brilliance (BTB) transforms recycled bottle caps into practical, eco-friendly products like ventilated grocery baskets and balanced plant pot. Designed to reduce plastic pollution in Shah Alam, BTB promotes sustainable living by upcycling waste into durable items for daily use. With community bottle cap collection points, BTB actively raises awareness and encourages participation in reducing plastic waste for a cleaner, greener future.



PROBLEM STATEMENT

01 Severe Pollution: Bottle caps take hundreds of years to decompose, causing long-term environmental damage.

02 Overlooked in Recycling: Bottle caps are often missed in recycling, leading to accumulation in landfills and waterways.

03 Microplastic Threat: Decomposing plastics become microplastics, harming marine life and entering the food chain.

04 Local Impact in Shah Alam: Discarded caps block drains, contributing to flooding issues.

05 Gap in Solutions: Most repurposing efforts are limited. BTB addresses this by creating functional items that reduce waste and benefit communities.

06 Previous studies have demonstrated creative repurposing of plastic bottle caps for sustainable purposes. For instance, Rupert Valeni's project involved making toys from bottle caps to engage children in learning about plastic waste reduction (Valeni, 2020).

RESEARCH OBJECTIVES

To design and develop a Multipurpose bottle top brilliance using recycle bottle cap to reduce the plastic pollution.	**To determine the level of purchase intention among consumers is seksyen 13, Shah Alam toward Multipurpose BTB.**

METHODOLOGY

ADDIE

Analyse
Assess types of product that will reduce plastic pollution. Conduct exploratory survey on plastic pollution

Design
• Design a sustainable solution by using thrown plastic bottle caps that will help to reduce the percentage of plastic waste in Malaysia

Develop
Develop a multipurpose BTB by using recycled plastic bottle cap

Implement
• The product is reasonably priced and appropriate for all age group.
• A survey will be carried out with user to gather their opinions.

Evaluate
• Evaluate the results from the survey questions to determine the efficiency of the BTB built of plastic bottle caps.

FINDINGS

VARIABLE	CRONBACH'S ALPHA	NUMBER OF ITEMS
Environment concern	0.920	4
Green value	0.917	3
Functional value	0.909	3
Product attitude	0.904	3
Purchase intention	0.958	8

VARIABLE	OVERALL MEAN SCORE	EXPLANATION
Environment concern	3.907	In this variable the mean score is 3.9 majority of the respondent answer agree for this variable. Mean of 3.907 suggests that respondents are generally positive in their view on recycled product and their environmental impact. Most respondents have favourable attitude toward the benefits and responsibilities associated with buying recycled products.
Green value	3.849	Mean score for this variable is 3.8. The high mean for green value indicates that respondents place significant importance on the environmental benefits of products. They agree that sustainable products are worth supporting and may view such choices as morally right or essential.
Functional value	3.886	In this variable the mean score is 3.8. The positive response for functional value suggests that respondents find the product useful and believe it serves its intended purpose effectively
Product attitude	3.886	In this variable the mean score is 3.886. Agreement on product attitude implies that respondents have a positive perception of the product, seeing it as desirable, well-designed, or beneficial.
Purchase intention	3.983	Mean score for this variable is 3.9.A high mean for purchase intention indicates that respondents are likely to buy the product, assuming it is available and meets their expectations. Agreement on this variable suggests that the audience is receptive to sustainable products.

SIGNIFICANCE OF PROJECT

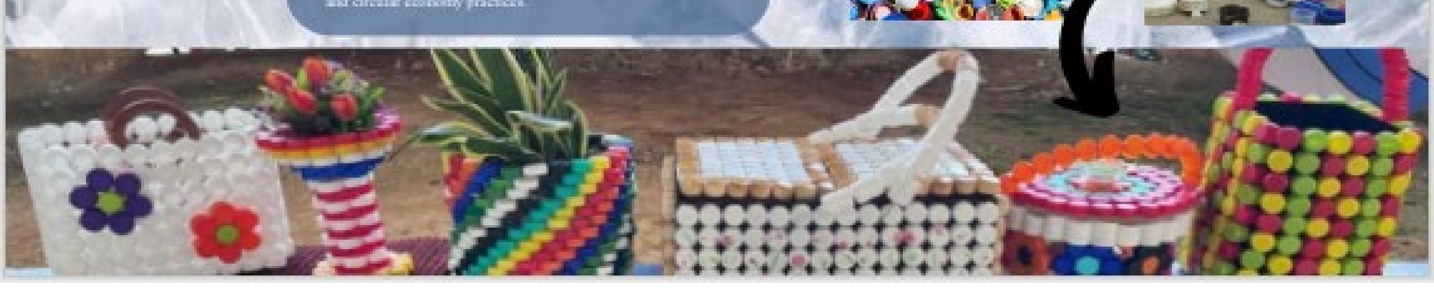
Environmental Impact
Reduces plastic pollution by repurposing bottle caps into household items, supporting global sustainability efforts.

Economic Benefits
Enables cost-effective production of eco-friendly products, promoting local entrepreneurship and a circular economy.

Social Awareness
Encourages community participation in recycling and raises awareness about sustainable practices to address environmental issues.

CONCLUSION

- BTB successfully upcycles plastic waste into functional, appealing products that reduce pollution.
- It meets consumer demand for sustainable, socially responsible items, creating environmental and economic benefits.
- The project's success stems from its innovative design, quality craftsmanship, and strong community involvement.
- BTB has potential to become a model for sustainable innovation and circular economy practices.



PLANTACCESS KIT: A SUSTAINABLE GARDENING SOLUTION FOR URBAN LIVING

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ABSTRACT

This research evaluates the acceptance and user response to the Plantaccess Kit, designed to meet the needs of users and provide a practical solution for home gardening. The primary aim of this product is to simplify the planting process, enabling users to grow crops in any residential setting, including apartments, flats, terraces, and homes without yards. It is particularly suitable for individuals with little or no agricultural knowledge. The Plantaccess Kit combines essential materials for farming, utilizing sustainable resources. The kit's "planting boxes" are made from recycled waste materials, reducing environmental impact. For soil, the kit includes a blend of black soil, organic soil, red soil, and compost, which not only enhances plant growth but also helps reduce food waste. This combination makes the farming process easier, more eco-friendly, and adaptable to different living environments. With the Plantaccess Kit, users no longer need to purchase separate pots and fertilizers. The kit is complete with all necessary materials, requiring only seeds and water to start planting. This feature saves users time, energy, and money. Furthermore, the product aims to promote environmental awareness by encouraging the recycling of waste materials, such as boxes and food waste, and repurposing them for gardening. In conclusion, the Plantaccess Kit is designed not only to solve practical problems for users but also to raise awareness about sustainable living and waste reduction.

Keywords: Plantaccess Kit, Home Gardening, Sustainability, Recycling, Gardening Kit

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PLANTACCESS KIT

ABSTRACT

This research evaluates user acceptance of the "Plantaccess Kit" as a solution for easy, accessible urban farming. Designed for residents in various housing types, this product enables gardening without needing prior agricultural knowledge. The kit uses sustainable materials, such as recycled boxes for planters, and includes a soil mix with compost to reduce food waste. By providing all essential materials except seeds, it saves users time, energy, and costs. Additionally, it promotes environmental awareness by reusing waste materials, making farming eco-friendly and accessible in any home space.

OBJECTIVE

- To design & develop Plantaccess Kit for various urban living spaces.
- To test and evaluate the Plantaccess Kit functionality.
- To determine the level of acceptance of product in market.

PROBLEM STATEMENT

Starting a vegetable garden faces two main challenges: soil quality and space limitations. Poor soil can harbor pests, diseases, and nutrient imbalances that harm plant growth. Testing and adjusting soil nutrients are essential for healthy plants. In urban areas, space constraints due to dense infrastructure often discourage gardening, as limited land is available for planting. Despite urban areas being economic and social hubs, they lack the open spaces found in rural areas, making it harder for residents to start a garden.

SIGNIFICANCE OF PROJECT

This study promotes reducing kitchen waste and encourages home gardening, especially for those with limited space. The Two-in-One Plantaccess Kit provides a sustainable alternative to industrial soil and chemical fertilizers, offering tools and soil types free from chemical additives. The research highlights the benefits of compost fertilizer over chemical options, supporting eco-friendly gardening and waste reduction in Malaysia.

METHODOLOGY

In this project, we use design thinking technique for process was used to design the product in this project. It takes a significant amount of time to empathize, define, prototype, and test to guarantee that the product development process follows all the necessary procedures. Next is having clearly defined stages makes it simple to produce excellent flower pots and soil for plants, which in turn help our product follow all the requirements necessary to fulfil the purpose of creating flower pot and soil. This technique is very helpful in building our product.

FINDINGS

"Our survey on the Plantaccess Kit, conducted via Google Forms, received five responses, including feedback from a nursery owner and a customer. The responses matched our expectations, and demographic details were collected to understand the respondents' profiles."

CONCLUSION

In conclusion, Plantaccess Kit is an invention that combine innovation and agriculture technology that being tailor into fit in the urban area and compact to be use. The designated compact and recyclable packaging encourages environmentally friendly and sustainable gardening methods by providing all you need in a single recyclable package that are designated for those who living in limited spaces or in urban area without a need to buy separate types soils and fertilizer just to start gardening in your house.

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INNOVATIVE MULTIFUNCTIONAL FILE FOR STUDENTS: THE TAKINO SOLUTION

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ABSTRACT

This project introduces the TAKINO file, a multifunctional organizational tool designed to meet the unique needs of students. TAKINO, which means "multifunction" in Japanese, combines multiple features into one portable file, including a charger socket, clock, whiteboard, mirror, and clipboard. The primary goal of this project is to reduce the need for students to carry multiple stationery items while addressing ergonomic concerns, such as back pain caused by heavy bags filled with traditional supplies. Our research utilized quantitative data collection through structured questionnaires, focusing on aspects such as visual appeal, durability, efficiency, environmental impact, perceived functional value, and purchase intention. The TAKINO file is designed to improve academic efficiency and support students' physical well-being by consolidating essential resources into a compact, functional device. This innovation has the potential to transform educational tools, promoting more sustainable and user-friendly product designs. By reducing the need for separate items, TAKINO aims to streamline students' daily routines, making it easier for them to stay organized while minimizing the physical strain of carrying heavy loads. In doing so, it could influence the development of future educational tools, encouraging greater integration of multifunctional features and sustainability.

Keywords: Multifunctional File, Educational Tool, Sustainable Innovation, Student Efficiency, Ergonomic Design

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'RESILIENCE AND SUSTAINABILITY IN EDUCATION'

Takino File

Multifunctional File

Background of Project

The Takino file addresses the limitations of traditional files by providing a multifunctional tool designed for modern students. According to The Malaysian Student Journal (2021), traditional stationery often lacks the versatility needed to support students' efficiency and organization. The Takino file combines essential tools like a charger, clock, whiteboard, mirror, and clipboard into one compact design, reducing the need for multiple items and easing the physical strain of heavy backpacks. This streamlined approach improves students' productivity and overall well-being, making it a valuable addition to the educational landscape.

Statement of Problem

- Challenges with Traditional Tools where students manage multiple tools like files, digital devices, and stationery, leading to inefficiencies and disorganization.
- Heavy backpack loads and traditional files contribute to physical strain and back pain
- Disorganized school supplies negatively affect student performance, with quality and management of supplies playing a critical role.
- A multifunctional file, such as the Takino file, consolidates essential tools, improves organization, reduces ergonomic strain, and boosts productivity and health for students.

Objectives

- To design and develop the Takino file as a multifunctional tool that integrates essential academic and personal utilities into a single design.
- To investigate the purchase intention of Takino file among students at Politeknik Sultan Salahuddin Abdul Aziz Shah.

Methodology

Findings

PERCEIVED FUNCTIONAL VALUE	The combination of features like powerbank, whiteboard in the Takino file is highly useful.	4.50	0.797
	The Takino file provides better functionality compared to other file products available on the market.	4.39	0.790
	The multifunctionality of the Takino file makes it highly useful for my daily needs.	4.53	0.647
	The features of the Takino file are well integrated, contributing to its overall usability.	4.39	0.755

PURCHASE INTENTION	I am likely to purchase the Takino file in the near future.	4.45	0.645
	The Takino file is a product I would recommend to others.	4.50	0.647
	I have a positive attitude toward buying the Takino file.	4.47	0.687

Significance of Project

- Enhances student productivity: Tackles disorganization, lack of tools, and inefficiency in managing academic materials.
- Multifunctional tool: Combines essential functions to streamline daily tasks.
- Improves academic experience: Simplifies study material management and provides easy access to necessary tools.
- Promotes Organization: Reduces clutter by combining essential tools into one file.

Conclusion

In conclusion, the Takino file represents a practical and innovative solution designed to address organizational and efficiency needs. It combines user-friendly features with quality performance to provide a seamless experience. The product's affordability and adaptability make it suitable for a wide range of users, including students, professionals, and businesses. Takino file is committed to continuous improvement, ensuring that user feedback drives future enhancements to better meet user demands and stay relevant in an evolving market.

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THE PERFUME STICK: A PORTABLE, SPILL-PROOF FRAGRANCE INNOVATION

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ABSTRACT

In today's fast-paced world, maintaining personal grooming and freshness throughout the day can be challenging, especially with traditional liquid perfumes that are bulky, spill-prone, and often fade quickly. The Perfume Stick offers a convenient and innovative solution, designed for portability and ease of use. Unlike liquid fragrances, this solid format is compact, travel-friendly, and can be applied with precision, eliminating the risk of leaks or over-application. The Perfume Stick is ideal for individuals with busy lifestyles who want to maintain a long-lasting fragrance without carrying heavy bottles or worrying about frequent reapplication. It also caters to those seeking a mess-free, eco-friendly alternative with minimal packaging waste, aligning with modern sustainability trends. The primary objective of this project is to develop the Perfume Stick as a convenient, spill-proof fragrance solution, allowing users to refresh their scent anytime and anywhere. The product development process applies Design Thinking principles, ensuring the product meets user needs such as ease of use, portability, and mess-free application. While its fragrance longevity is still a work in progress, ongoing improvements are being made to enhance its lasting effect. Feedback from respondents in our questionnaire indicated that the Perfume Stick is a practical and convenient fragrance solution. The product's key benefits include easy application, portability, and spill-proof design, making it ideal for use in offices, events, or while traveling. By bridging the gap between convenience and personal care, the Perfume Stick empowers users to stay fresh throughout the day. Continued improvements aim to further enhance its fragrance longevity and overall performance.

Keywords: Portable Perfume, Eco-Friendly Fragrance, Solid Perfume, Personal Care, Sustainable Design

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★ PERFUME STICK ★

BACKGROUND

A perfume balm stick is an innovative and eco-friendly alternative to traditional liquid perfumes, emphasizing sustainability and aligning with the principles of the United Nations' Sustainable Development Goals (SDGs). Its compact, solid form minimizes the use of single-use plastics by opting for biodegradable or recyclable packaging, contributing to SDG 12 (Responsible Consumption and Production). Additionally, the formulation process often involves natural, organic ingredients that are less harmful to the environment, supporting SDG 15 (Life on Land) by reducing the ecological footprint. By combining luxury with a commitment to environmental stewardship, the perfume balm stick offers a greener choice for fragrance enthusiasts who prioritize both self-care and the planet's well-being.

STATEMENT OF PROBLEM

1. Traditional perfumes are prone to spills, limiting their portability. A spill-free fragrance solution is needed for safe and convenient carrying.
2. Conventional perfume packaging contributes to waste. A sustainable packaging alternative is required that maintains quality and luxury.
3. The fragrance industry faces ethical sourcing challenges. A perfume with ethically sourced ingredients and a long-lasting scent is in demand

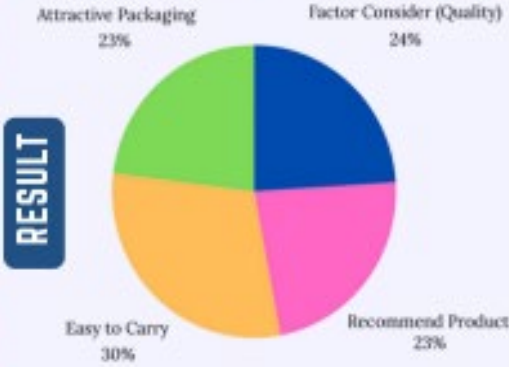
OBJECTIVE

1. Develop a solid perfume balm stick that is spill-free, portable, and easy to use daily.
2. Evaluate sustainable and recyclable materials to reduce environmental impact.
3. Ensure ethically sourced, high-quality natural ingredients for a long-lasting fragrance for consumer satisfaction.

SINGNIFICANCE

1. To ensure eco-friendly practices in the fragrance industry by offering a sustainable, spill-free alternative to traditional perfumes.
2. To promote ethical ingredient sourcing and fair labor practices, supporting a more responsible and transparent supply chain.
3. To enhance consumer convenience and portability with a solid perfume that's easy to carry and apply without risk of spills or leaks.

RESULT



METHODOLOGY

CONCLUSION

In conclusion, the perfume balm stick project presents an innovative approach to the fragrance industry, merging luxury with sustainability. By creating a portable, spill-free product crafted from ethically sourced ingredients, this balm stick addresses the growing demand for eco-conscious options. With its minimal and recyclable packaging, it not only reduces environmental impact but also sets a standard for responsible consumer products. Through rigorous testing and consumer feedback, the perfume balm stick aims to deliver a long-lasting, high-quality fragrance that aligns with sustainability goals, positioning itself as an inspiring alternative to conventional perfumes and paving the way toward a greener future.

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PSA INNOVATION TECHNOLOGY & COMMERCIALIZATION

SERENITY SMART BAG: WHERE COMFORT MEETS CUTTING-EDGE OUTDOOR GEAR

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ABSTRACT

The Serenity Smart Bag is an innovative outdoor gear solution designed to enhance the camping and hiking experience by merging comfort, convenience, and safety. This multifunctional smart sleeping bag addresses common outdoor challenges with advanced features, including temperature control, an aromatherapy system, a built-in first aid kit, and a compass tracker. Constructed from lightweight, sustainable materials, it ensures portability, durability, and eco-friendliness, making it ideal for extended adventures. The project aimed to develop a compact and practical solution that redefines outdoor sleeping gear by integrating essential tools and comfort-enhancing features. Traditional sleeping bags often fail to provide versatile solutions for outdoor enthusiasts. In contrast, the Serenity Smart Bag's innovative design improves sleep quality, addresses safety concerns, and supports relaxation through calming aromatherapy pockets. Its compact and user-friendly structure caters to diverse users, from young adventurers to safety-conscious older individuals. The development process included detailed sketches, sustainable material selection, and precise assembly of key components such as a built-in pillow, aromatherapy pocket, and first aid pouch. The resulting prototype is lightweight, portable, and highly functional, offering both comfort and safety for users. Initial testing showed high user satisfaction, especially among those seeking better rest and convenience in outdoor settings. Backed by a strategic marketing plan featuring value-based pricing, social media campaigns, and influencer collaborations, the Serenity Smart Bag is positioned as a premium product in the outdoor gear market. Created by Cozy Camp, a company committed to sustainability, the product reflects eco-friendly manufacturing practices and environmental responsibility. By setting a new standard for innovation and sustainability, the Serenity Smart Bag offers adventurers a practical, stylish, and environmentally conscious choice, revolutionizing the outdoor experience.

Keywords: Innovative outdoor gear, Smart sleeping bag, Sustainable camping solutions, Multifunctional outdoor accessory, Eco-friendly adventure equipment


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SERENITY SMART BAG
01 BACKGROUND OF PROJECT
02 STATEMENT OF PROBLEM
03 OBJECTIVE
04 METHODOLOGY
METHODOLOGY
05 FINDINGS
06 SIGNIFICANCE OF PROJECT
Innovative Serenity Smart Bag combines comfort and safety for outdoor adventures.
Aroma Therapy System in sleeping bags offers relaxation and stress relief in nature.
First Aid Kit and Compass Tracker ensure preparedness during outdoor activities.
Serenity Smart Bag's unique value proposition attracts diverse outdoor enthusiasts.
07 CONCLUSION
PUAN MASHARITA BINTI MAHMOOD
MUHAMMAD HAIKAL BIN MOHAMMAD RAMZIZAN
ANIS ARIZA BINTI AZENI YUNIZAR
SITI SHAMIRA BINTI ABDULLAH
SITI HUSNA BINTI MORAD
NURUL SYAZANA BINTI ZAMRI

ZIYARAH: A GPS-BASED APPLICATION FOR EFFICIENT CEMETERY NAVIGATION

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ABSTRACT

Cemeteries hold historical and emotional significance, but due to population growth, vacant land in city centers is scarce. Visitors face challenges such as unclear pathways, creating hazards and confusion when locating cemeteries. Traditional methods of finding graves, such as paper maps, can be outdated and inefficient, often leading to frustration and an inability to offer real-time directions. This project aims to develop Ziyarah, a mobile application designed to simplify cemetery navigation, particularly for Muslim communities. Ziyarah utilizes GPS technology to pinpoint specific graves, enabling family members to easily locate and visit their loved ones' resting places. Research and case studies on cemetery navigation apps in Singapore and for non-Muslim cemeteries provided valuable insights. The app's development was carefully planned, focusing on navigation layout and the inclusion of features relevant to the Islamic community. Before development, a thorough evaluation was conducted, gathering feedback from the community in Kg Bukit Cerakah, as well as from mosque management and cemetery caretakers. The survey results showed that the app's navigation system is highly useful, providing clear and effective guidance. Ziyarah successfully addresses the need for a user-friendly, culturally sensitive navigation tool that guides individuals to cemeteries with respect and accuracy. By integrating traditional Islamic practices with modern technology, Ziyarah not only simplifies the process of visiting graves but also promotes cultural awareness and religious observance. Looking ahead, Ziyarah holds the potential to become an essential tool for individuals wishing to engage in acts of remembrance and prayer for their loved ones.

Keywords: Cemetery Navigation, GPS Application, Islamic Practices, Cultural Awareness, User-Friendly Technology

KEMENTERIAN PENDIDIKAN TINGGI

POLITEKNIK

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SESI 1 : 2024/2025

"RESILIENCE AND SUSTAINABILITY IN EDUCATION"

ziyarah.

KUBUR

BACKGROUND STUDY

- Cemeteries are valuable historical and serve as memorials
- Ziyarah.kubur used to develop authoritative cemetery
- Rarely visits family cemetery due to lack of info
- Unclear pathways create hazards and confusion to find
- This project building an application to navigate

STATEMENT OF PROBLEM

01 Visitors find difficulties and timeconsuming to navigate big cemeteries area.

02 Conventional techniques are ineffective and unable to offer realtime direction.

03 These problems cause the condition of this property to become more critical from time to time.

04 The construction of a multi-store cemetery is a step to overcome the issue of the density.

05 There are a few studies on the cemeteries management but slightly differ from Ziyarah.

06 Ziyarah lacks an efficient method for locating cemeteries.

07 Made for the Muslim community in Kg Bukit Cerakah Jaya Seksyen U15 Shah Alam, Selangor

RESEARCH OBJECTIVES

- To develop a Ziyarah application for managing the graveyard coordinates
- To determine the level of effectiveness of the Ziyarah application

METHODOLOGY

A D D I E

Analysis

Design

Development

Implementation

Evaluation

SIGNIFICANCE OF PROJECT

01 Ziyarah application will cover the area of cemeteries in Pusara Kg Bukit Cerakah Jaya Seksyen U15 Shah Alam, Selangor

02 The primary focus of the study includes the development of a comprehensive database system within the application - capable of storing detailed information.

03 Involve comprehensive system testing and the collection of user feedback from Bukit Cerakah residents.

RESEARCH FINDINGS

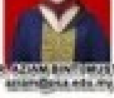
Ziyarah User Quality Satisfaction

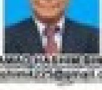
(Based on 317 respondances)

CONCLUSION

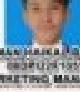
This study focuses on developing a mobile application named Ziyarah to manage cemetery coordinates. The app provides an efficient solution for locating and documenting information. The app will digitize and preserve records which will enhance accessibility for users and improve the management of graves. By leveraging GPS technology, the project aims to address the limitations of traditional paper-based systems and support community needs, ensuring that cemetery information is securely stored and easily accessible.

PROJECT MEMBERS

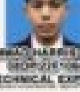




PROJECT LEADER

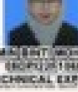


MARKETING MANAGER



TECHNICAL EXPERT

MARKETING MANAGER



TECHNICAL EXPERT

PSA INNOVATION TECHNOLOGY & COMMERCIALIZATION

THE LAUNDJEANS BAG: A SUSTAINABLE SOLUTION FOR EFFICIENT LAUNDRY MANAGEMENT

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ABSTRACT

The Laundjeans Bag is an innovative solution designed to simplify laundry management, particularly for individuals with busy lifestyles, limited mobility, or other constraints. In a world where cleanliness and organization are essential, this product aims to make laundry tasks more efficient, reliable, and eco-friendly. Unlike traditional laundry bags, the Laundjeans Bag features customizable compartments that help users organize laundry based on their needs. This design promotes a structured approach to laundry throughout the week. Developed using Design Thinking principles, the bag includes adjustable sections for separating different fabrics, ensuring both functionality and ease of use. Crafted from repurposed denim, the Laundjeans Bag combines sustainability with durability and style. By reducing waste and supporting eco-friendly practices, it aligns with modern environmental initiatives. Feedback from surveys confirms the bag's practicality and effectiveness in enhancing laundry organization. The Laundjeans Bag is portable, user-friendly, and stylish, making it suitable for homes, dorms, and laundry facilities. Beyond its functional benefits, the product's design and practicality make it an appealing market solution, bridging environmental awareness with social impact. Additionally, the Laundjeans Bag supports social entrepreneurship by incorporating sewing projects that benefit economically disadvantaged communities, particularly the B40 group. By transforming waste materials into valuable, user-centered solutions, the Laundjeans Bag contributes to both environmental and economic sustainability, enabling individuals to manage laundry more efficiently and with ease.

Keywords: Laundry Management, Sustainable Design, Repurposed Denim, Social Entrepreneurship, Eco-Friendly Solutions

PTEC 7

PSA INNOVATION, TECHNOLOGY, ENGINEERING & COMMERCIALIZATION

PERTANDINGAN PROJEK AKHIR PELAJAR

SESI 1:2024/2025

'RESILIENCE AND SUSTAINABILITY IN EDUCATION'

LAUNDJEANS BAG

"FROM WASTE TO WEALTH"

BACKGROUND OF PROJECT

LB teams is "Laundjeans bag". LB is an eco-friendly laundry solution made from recycled denim, appealing to green-minded consumers. With wheels and compartments, it's perfect for small spaces like dorms and apartments. Its sustainable design and practicality give it strong commercial potential in the market for eco-friendly home products.

STATEMENT OF PROBLEM

Laundry can be tough, especially with heavy loads, sorting, and limited space. Regular baskets are bulky and lack compartments. A well-designed laundry bag can help by being easy to carry, compact, and durable, making laundry faster and more organized, saving time and effort.

OBJECTIVE

- To develop a durable laundry bag from recycled jeans to cut down waste
- To make the laundry bag that can hold a reasonable amount of clothes and withstand the weight.
- To use recycled materials efficiently to ensure the project remains cost-effective and eco-friendly.

SIGNIFICANT OF PROJECT

LB combines style and function while supporting local tailors and artisans. Through sustainable production, we minimize waste by repurposing leftover denim into new products. This commitment to ethical practices reduces our environmental impact and offers unique, high-quality laundry organization solutions.

METHODOLOGY

Design Thinking

FINDING

CONCLUSION

This product demonstrates how innovation can drive sustainability, much like MR DIY and IKEA, by turning waste into stylish, functional items. Choosing LB products made from waste materials supports sustainable practices and helps reduce environmental impact.

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VERDENTAGE: A SMART, SUSTAINABLE PLANT-CARE SYSTEM FOR URBAN GARDENING

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ABSTRACT

Urban gardening is increasingly popular as city dwellers seek sustainable ways to grow plants in limited spaces like apartments and balconies. This project, Verdentage, focuses on designing and developing a compact, automated smart plant-care system tailored for urban environments. The system is powered by solar energy, reducing reliance on traditional power sources and promoting sustainability. Verdentage uses IoT technology to monitor essential environmental factors such as soil moisture and light levels, providing real-time data to ensure optimal plant health. The main objectives of this project are to create a space-efficient plant-care solution, enable consistent monitoring of plant health for urban gardeners, and promote sustainable living practices. The research questions guiding this project include evaluating whether urban gardens can yield adequate crops, determining if interior urban gardens offer better growth observation, and assessing how technology, like Verdentage, can improve urban agriculture quality. This project is significant in improving the practicality and efficiency of urban gardening while reducing its environmental impact. By integrating automation and renewable energy, Verdentage addresses common challenges in urban farming, offering a smart solution for apartment-based gardeners. The system not only enhances gardening efficiency but also encourages eco-friendly practices in urban areas, contributing to a sustainable approach to food production in cities.

Keywords: Urban Gardening, Smart Plant-Care System, IoT Technology, Solar Energy, Sustainability

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PERTANDINGAN PROJEK AKHIR PELAJAR

SESI 1:2024/2025

'RESILIENCE AND SUSTAINABILITY IN EDUCATION'

VERDENTAGE

(Smart Plant-Care)

BACKGROUND

Urban gardening has become a practical solution for city dwellers who wish to grow plants within limited apartment spaces. However, common challenges like irregular watering, limited access to sunlight, and time constraints can make it difficult for urban gardeners to maintain healthy plants.To address these issues, Verdentage integrates smart technology with a sustainable design. Equipped with soil moisture and light sensors, the system provides real-time data through the Blynk mobile app, helping users monitor their plants' needs. The plant care setup includes a simple wick-based watering method, ensuring consistent moisture without frequent watering. Solar power supports the system, making it environmentally friendly and ideal for urban living. Aligned with Sustainable Development Goals (SDGs) 11, 12, 13, and 15, Verdentage promotes sustainable urban gardening by conserving resources and supporting a greener lifestyle.

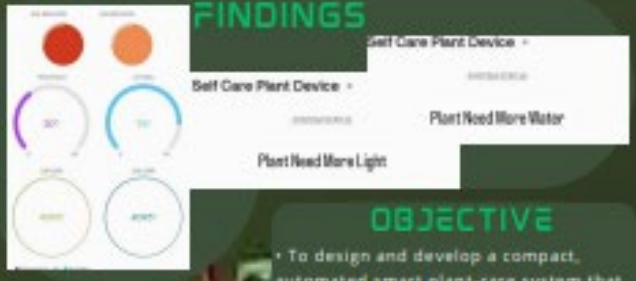
PROBLEM STATEMENT

The majority of the urban population lives in apartments with limited space, making traditional plant cultivation challenging. Indoor plants are often over-watered or under-watered, leading to poor plant health and high mortality rates. Current plant care methods are water-intensive and frequently rely on non-renewable resources, conflicting with sustainable living practices. A more efficient, compact, and eco-friendly solution is needed to support urban gardeners in maintaining healthy plants within small living spaces while conserving water and minimizing environmental impact.

METHODOLOGY

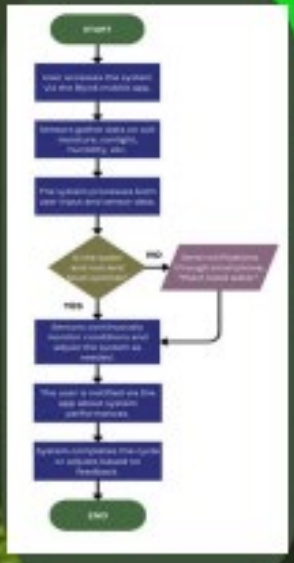
PROTOTYPE

FINDINGS



OBJECTIVE

- To design and develop a compact, automated smart plant-care system that can fit into small urban spaces like apartments and balconies.
- To create a system that monitors environment's condition such as soil moisture and light via timely information, ensuring consistent and optimal plant health.
- To implement solar energy to power the system, reducing reliance on traditional energy sources and supporting sustainability efforts.



SIGNIFICANCE OF THE PROJECT

Verdentage addresses the challenges faced by urban gardeners, promoting sustainable practices and enhancing the enjoyment of indoor gardening. This project contributes to the Sustainable Development Goals by encouraging greener living and efficient resource use in urban settings.

CONCLUSION

Verdentage offers an innovative solution for urban gardeners, making plant care accessible and efficient. By leveraging IoT and solar technology, this project demonstrates the potential for smart solutions to enhance urban living and support environmental sustainability

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SENARAI PEMENANG

Anugerah Produk Terbaik

BREATHAWARE: LUNGS BREATH RESPIRATORY MONITORING OVER IOT

Pelajar:
HANNAN UMAIRAH BINTI MUHAMAD ZAINUDIN
HUDA BINTI MOHD RIZAL

Penyelia:
PN. ASLINDA BINTI ZAMAH SHARI

JKE

VERDENTAGE

Pelajar:
NURUL IZZATULNAJWA BINTI HADIS
PUTRI ALYA MAISARAH BINTI SHARUDDIN
NUR EDRYNA BINTI EDZY
DEVAN NESAN A/L SINNASAMY

Penyelia:
PN. SHARIFAH YUHAYU BINTI SYED HAMID

JPG

GLOW GUARD PAINT

Pelajar:
SUGANYA A/P RAVICHANTHAR
LECHANA RANI A/P MURUGAYAH
JAGANISWARAN A/L JOHNSON

Penyelia:
PN. NUR HAZLINA BINTI LAMLI

JKA

SENARAI PEMENANG

Anugerah Khas Juri

EXTENABLE FLOOD BARRIER DOOR

Pelajar:
MUHAMAD AZIM RAZWAN BIN ABDUL RAZAK
MUHAMMAD HAZIM BIN MOHAMAD HALIM
NOR ALIF FARHAN BIN BORHAN

Penyelia:
EN. MOHD SHARIZAN BIN MOHD SHARIFF

JKM

BLEND GUSTO

Pelajar:
IMAN SYUHADA BINTI ROSLAN
NUR IZZAH ATHIRAH BINTI MOHD HAMIDI
AHMAD FARHAN BIN RIDZWAN
MUHAMMAD ARIF SYAKIR BIN SABRUDDIN

Penyelia:
PN. SITI RAWAIDAH BINTI MOHD RAZIKIN

JPG

SMART RUBBISH COLLECTOR

Pelajar:
MUHAMMAD IZUDDIN BIN MOHD BIN RAZALI
MUHAMMAD SYAKIR AIMAN BIN MOHD SYUKRI

Penyelia:
PN. YUSNITA BINTI YUSOF

JKA

SENARAI PEMENANG

Anugerah Pembentangan Terbaik

1

ARWOODBASE

Pelajar:

AWANG NOR HUZAIRI BIN AWANG ZAKARIA
MUHAMAD DANISH HAIKAL BIN SABARUDDIN
MUHAMMAD HAFIY JAUHAR BIN JAMALULLAIL
NASUHA HANI BINTI MD NIZAM

Penyelia:

EN. MUHAMAD FAIRUZZAIRI BIN ABDUL HAMID

JKA

AUTOMATED SOLAR DRAIN CLEANING SYSTEM

2

Pelajar:

MUHAMMAD HANNAN BIN MOHD SUHADA
MUHAMMAD LUTH HAKIMI BIN HALIM
MUHAMMAD RIFAEI BIN LIMANSAH

Penyelia:

DR. NORASIAH BINTI MUHAMMAD

JKM

3

SPINESYNC: AN IOT-BASED WEARABLE POSTURE MONITORING DEVICE

Pelajar:

MIROSHA A/P VEETHASALAM
NUR FARAH SHAKIRAH BINTI SHAHRUL AMIN

Penyelia:

DR. FAZIDA BINTI ADLAN

JKE

SENARAI PEMENANG

Anugerah Poster Terbaik

1

ZIYARAH

Pelajar:
ISHQI BINTI NOREMEY
NOR AIMAN HAIKAL BIN NORAZMI
MUHAMMAD HARRIS BIN ADNAN
WAN NUR FARZANAH BINTI WAN SHAHRUL
NURYASMIN BINTI MOHD YUSOFF

Penyelia:
EN. MUHAMAD HASHIM BIN AHMAD

JPG

2

EPILEPSY MONITORING SYSTEM

Pelajar:
LAALITA A/P SEGARAN
AMNI NAJIAH BINTI ROZANI

Penyelia:
PN. EMY SATIRA AZRIN BINTI MOHAMED HAKKE

JKE

3

AIR GUN VALVE

Pelajar:
NUR MAISARAH BINTI MUHAMAD
NUR FARISAH AISYAH BINTI MOHD ALI
AMIRUL HAZIM BIN RAZALI

Penyelia:
EN. MIOR AMRAN NOOR BIN MIOR AHMAD NOOR

JKA

PENGHARGAAN

Terima Kasih

KEPADA PIHAK PENGANJUR,
JAWATANKUASA PELAKSANA SERTA SEMUA PIHAK YANG TERLIBAT
SAMA ADA SECARA LANGSUNG ATAU TIDAK LANGSUNG
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