

MELAKA  
INTERNATIONAL  
INTELLECTUAL EXPOSITION

# MIIEX'24

12 JUNE '24

Dewan Taming Sari,  
Universiti Teknologi MARA Caw. Melaka,  
Kampus Alor Gajah, Melaka

*"Empowerment of Special  
Needs through Invention  
& Innovation"*

**EXTENDED  
ABSTRACT**

# MiiEX'2024

**MELAKA INTERNATIONAL INTELLECTUAL EXPOSITION 2024**

**“EMPOWERMENT OF SPECIAL NEEDS THROUGH INVENTION AND  
INNOVATION”**

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UiTM Cawangan Melaka

KM26 Jalan Lendu,

78000 Alor Gajah

Melaka Bandaraya Bersejarah

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**MELAKA INTERNATIONAL INTELLECTUAL EXPOSITION 2024**

**“EMPOWERMENT OF SPECIAL NEEDS THROUGH INVENTION AND  
INNOVATION”**

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## **CONTENTS**

**FOREWORD BY THE RECTOR OF UITM CAWANGAN MELAKA**

**FOREWORD BY THE DEPUTY RECTOR (RESEARCH & INDUSTRIAL LINKAGES)**

**FOREWORD BY THE PROJECT DIRECTOR**

**FOREWORD BY MELAKA STATE EXCO OF SCIENCE, TECHNOLOGY, INNOVATION AND  
DIGITAL COMMUNICATIONS**

**MIIEX'24 ORGANISING COMMITTEE**

**ABOUT MIIEX'24**

**INNOVATION, INVENTION, AND DESIGN**

## **FOREWORD BY THE RECTOR OF UiTM CAWANGAN MELAKA**



**Professor Ts. Dr. Mohd Rasdi bin Zaidi**

**Rector, Universiti Teknologi MARA (UiTM)**

**Cawangan Melaka**

Welcome to the Melaka International Intellectual Exposition 2024 (MIIEX '24). It is an honour for me, on behalf of UiTM Cawangan Melaka, to thank all of you for joining MIIEX '24. We are proud to inform you that this is the 13th consecutive year that UiTM Cawangan Melaka is organizing this exposition. Since 2009, UiTM Cawangan Melaka has successfully hosted this innovation exposition. Not only have we succeeded in organizing the exposition, but we have also successfully embarked on commercialized products.

2024 is a special year where MIIEX 2024 emphasizes the development of special needs. As we know, special needs indicate a limitation in a person's ability to engage in and benefit from various aspects, such as daily activities and education. Hence, with the theme "Empowering Special Needs Through Invention and Innovation," it is a platform for industries, professionals, academicians, students, and communities to share their innovative ideas and products to increase accessibility for those with special needs.

The successful implementation of MIIEX '24 is our joint success. This event was supported by the Melaka state government through YB Datuk Fairul Nizam bin Roslan, the EXCO of Science, Technology, Innovation, and Digital Communication. I also want to express my

gratitude to Universitas Negeri Padang, Indonesia, Universitas Muhammadiyah, Makassar, Indonesia, the International Association of Economic and Businesses (IAEB), Universiti Sains Islam Malaysia, Ibnu Umami Maktum Research Center (UMMI), USIM, and The Southeast Asia Minister of Education Organization Regional Centre for Special Educational Needs (SEAMEO SEN) as our co-collaborators for MIIEX 2024.

The collaboration from various parties in MIIEX '24 is a platform that will improve cooperation and interweaving among industries, professionals, academicians, students, and communities in shaping their potential in developing innovation products. This exposition also serves as a platform to cultivate and uphold the nation's innovation culture by presenting new ideas and research by young people, especially from academia and universities. Indirectly, MIIEX '24 will encourage all inventors towards empowering Science, Technology, Engineering, and Mathematics (STEM), especially in primary and secondary schools.

The new digital landscape also inspires more innovation and new ideas that contribute to various activities, such as business and industries. As a university that encourages "Research and Innovation," we aim to foster more innovative products that benefit scholars, industries, and communities, addressing issues to improve our present and future life.

This exposition would never happen without dedication, teamwork, and commitment. A round of applause should be given to the committee teams, who are the backbone of this exposition. Their hard work, effort, and time made this exposition possible.

Finally, I would like to conclude this brief remark by thanking all the participants and stakeholders for joining the exposition. We hope that this collaboration never ends here.

Thank you.

**FOREWORD BY THE DEPUTY RECTOR (RESEARCH & INDUSTRIAL  
LINKAGES)**



**Associate Professor. Dr. Nur Hayati binti Abd Rahman**

**Deputy Rector (Research & Industrial Linkages), Universiti Teknologi MARA (UiTM)  
Cawangan Melaka**

With much passion and privilege, let me warmly welcome all of you to the Melaka International Innovation Exhibition (MIIEX), UiTM Cawangan Melaka's flagship event. I firmly believe that events such as these demonstrate the gradual evolution of this platform in terms of its significance and its governing principles within the sphere of learning and the broader scholarly society.

The theme for this year, "Empowering Special Needs Through Invention and Innovation," strongly connects to our mission of using research and technology to make a positive impact on the world we live in. Besides enforcing the message of diversity, this theme also reaffirms our focus on creating products to improve the lives of people with disabilities (PWDs). Such innovations are vital as only through focused constructive changes can society become more sensitive to the needs of all members.

MIIEX allows researchers, students, and industry professionals to come together, share their innovative research, and develop viable research partnerships. It has been great to see the enthusiasm of the participants and the efforts they put into their projects, which can offer various social and economic benefits. This is why one can state that MIIEX is a great

opportunity for creating connections between the academic environment and industry, facilitating the implementation of innovative and promising projects.

Finally, I would like to express my sincere appreciation to all the members and supporters of the organizing committee, all the participants, sponsors, and everyone involved in preparing this event. I want to express my gratitude for your commitment and involvement, as the success of MIIEX and the development of an active culture of innovation in our university and beyond is partly owed to your support.

Thank you



## **FOREWORD BY THE PROJECT DIRECTOR**



**Dr Zulkefli bin Muhamad Hanapiyah**

**Senior Lecturer**

Assalamualaikum and Warmest Greetings,

It gives me a great pleasure, on behalf of the organizing committee, to welcome all participants and speakers to the Melaka International Intellectual Exposition 2024 (MIIEX '24) with the theme "Empowering Special Needs Through Invention and Innovation." We are honoured and pleased to welcome all participants to this biennial event.

MIIEX '24 is a platform that gathers experts from local and international industries, academia, scientists, researchers, and the community to contribute to the advancement of scientific and technological knowledge. This knowledge helps develop disruptive innovation products that improve daily activities for businesses and the community, especially those with special needs.

MIIEX '24 provides an atmosphere for inventors of all levels to gain new exposure and collaborate. Indirectly, this promotes a collaborative and innovative culture that focuses on cutting-edge technologies and new standards in technology and creativity.

MIIEX '24 is anticipated to serve as an arena for participants to acquire and disseminate revolutionary information on ideas and innovation. It is intended that the competition will expose the contestants' minds to the latest technologies and designs, aligning with the government's goal of encouraging innovation in Malaysia.

Finally, I want to compliment my fellow committee members on their amazing efforts, which were vital to the event's success. In addition, I want to thank our co-organizers, event sponsors, and participants. Optimistically, we hope that all new knowledge discovered, invented, or innovated will lead us toward future sustainability.

Thank you.

**FOREWORD BY MELAKA STATE EXCO OF SCIENCE, TECHNOLOGY,  
INNOVATION AND DIGITAL COMMUNICATIONS**



**YB Datuk Fairul Nizam bin Roslan**

**Melaka State Exco of Science, Technology, Innovation and Digital Communications**

Welcome to the Melaka International Intellectual Exposition 2024 (MIIEX '24). It is an honor for me, on behalf of UiTM Cawangan Melaka, to thank all of you for joining MIIEX '24. We are proud to inform you that this is the 13th consecutive year that UiTM Cawangan Melaka is organizing this exposition. Since 2009, UiTM Cawangan Melaka has successfully hosted this innovation exposition. Not only have we succeeded in organizing the exposition, but we have also successfully embarked on commercialized products.

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This exposition would never happen without dedication, teamwork, and commitment. A round of applause should be given to the committee teams, who are the backbone of this exposition. Their hard work, effort, and time made this exposition possible.

Finally, I would like to conclude this brief remark by thanking all the participants and stakeholders for joining the exposition. We hope that this collaboration never ends here.

Thank you.

## MIIEX'24 ORGANISING COMMITTEE

COMMITTEE	NAME
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	RIDZUAN ADLI BIN AZIDIN
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JURY SELECTION AND MANAGEMENT	EN NORAZLAN ANUAL
	PN AFZAN NOR BINTI TALIB
	PN NUR HIDAYAH ZAINI
	CIK FARIHA AIZA BINTI RAMLY
	PN NURUL AIN BINTI MUSTAKIM
	PN NOORZALYLA MOKHTAR
	PN ZATUL HIMMAH BINTI ABDUL KARIM
	CIK MUNA KAMEELAH BINTI SAUID
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	PN NURHAFIZAH MOHD ZOLKAPLI
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	SITI RAMIZAH JAMA
	SITI NURSYAHIRA ZAINUDIN
	BUSHRA ABDUL HALIM
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	MUHAMMAD FURQAN BIN AZHAR
	KHAIRUL AZHAR BIN LOCHMAN



## **ABOUT MIIEX'24**

MIIEX'24 is an innovation competition annually organised by UiTM Melaka with the intention to bring together ideas and inspiration that could fit in for commercialization needs.

This event creates a platform for researchers to establish networking, partnership and opportunities to collaborate with industries.

## **OBJECTIVES**

1. Encourage and instil passion towards inventing and innovating among UiTM Cawangan Melaka staff, students and academicians of local and international higher education institutions;
2. Highlight distinguished talents of skilful inventors and exhibit intellectual products, inventions and innovations among local and private tertiary institutions, government and private agencies, including international participants;
3. Become an effective Business Matching platform for participating research products, matching industries and partnering government agencies;
4. Recognise, inspire and promote invention and innovation products to be patented and commercialized;
5. Increase passion towards inventing and innovating through research and boost interests of government and non-government agencies to obtain consultancy services from a line up experts of higher education institutions and UiTM Cawangan Melaka.

## **THEME**

**'EMPOWERMENT OF SPECIAL NEEDS THROUGH INVENTION AND INNOVATION'**

<b>INNOVATION, INVENTION, AND DESIGN</b>	
<b>MIIEX'24 ORGANISING COMMITTEE</b>	<b>9</b>
<b>ORAL HISTORY SYSTEM FOR MEMORY MANAGEMENT (OHS3M)</b>	<b>27</b>
<b>ALIMS – ASSETS LOAN AND INVENTORY MANAGEMENT SYSTEM WITH SMS NOTIFICATION</b>	<b>31</b>
<b>“SOCKET LOCK-IT”: TOOTH EXTRACTION SOCKET COMPRESSION DEVICE FOR SPECIAL NEEDS PATIENTS</b>	<b>36</b>
<b>F.O.S MEMBERSHIP SYSTEM ENHANCEMENT USING GEOLOCATION, CHATBOT WITH USER PREFERENCES</b>	<b>40</b>
<b>CDL-CQI TEMPLATE</b>	<b>44</b>
<b>AIDQR FINANCIAL BRIDGE FOR SPECIAL NEEDS</b>	<b>49</b>
<b>SMART RAKE ROLLER</b>	<b>53</b>
<b>INSUREQUEST: THE INSURANCE ADVENTURE</b>	<b>56</b>
<b>MONEYEASE APP</b>	<b>60</b>
<b>FLEXIWHEEL</b>	<b>64</b>
<b>VIRTUAL REALITY TOOL FOR TEACHING AND LEARNING HUMAN ANATOMY IN SECONDARY SCHOOL</b>	<b>68</b>
<b>ENHANCING CHEMISTRY LEARNING FOR SECONDARY SCHOOLS STUDENTS USING VIRTUAL REALITY</b>	<b>73</b>

<b>THE SUPPORT BOARD: TREATMENT WITHOUT TRANSFER</b>	<b>78</b>
<b>BLIND BANKER APPS</b>	<b>81</b>
<b>GEST2TALK (G2T) APPLICATION</b>	<b>84</b>
<b>ARTHRIEASE KIT</b>	<b>90</b>
<b>REVERZ PRINTER</b>	<b>94</b>
<b>EMPOWERING YOUR FINANCIAL WITH ULTIMATE FINANCIAL COMPANION</b>	<b>98</b>
<b>MY INNER VOICE: AN INNOVATION OF SELF-EXPRESSION</b>	<b>103</b>
<b>WITH THE COMMUNICATION BOOK</b>	<b>103</b>
<b>MIND MAP: INTERROGATIVE WORDS IN MANDARIN</b>	<b>107</b>
<b>AROMAZEN HANDKERCHIEF FOR INDIVIDUALS WITH AUTISM</b>	<b>111</b>
<b>AUTIEASE KIT ULTIMATE COMFORT AND CONVENIENCE SOLUTION</b>	<b>115</b>
<b>MONTESSORI SENSORY SOFTBOOK: ENGAGING EDUCATION FOR CHILDREN WITH AUTISM</b>	<b>119</b>
<b>BRAILLEBIND</b>	<b>122</b>
<b>HEAR TO SEE GLASSES</b>	<b>125</b>
<b>SMART BLIND-PEDESTRIAN TRAFFIC LIGHT AND SMART CANE WITH EARPIECE</b>	<b>128</b>
<b>MONEY BRAILLE STAMPING</b>	<b>130</b>

<b>EMPOWER SHOP INNOVATION</b>	<b>134</b>
<b>SENSORYSERENITY BOTTLE</b>	<b>138</b>
<b>SMART UMBRELLA</b>	<b>147</b>
<b>TAXQUEST</b>	<b>149</b>
<b>SMART MUG</b>	<b>153</b>
<b>FINDR</b>	<b>156</b>
<b>IFROST SMART REFRIGERATOR</b>	<b>159</b>
<b>A SMART CANE INTEGRATED WITH ARTIFICIAL INTELLIGENCE (AI) CAPABILITIES</b>	<b>164</b>
<b>ATTACHABLE ROOF FOR WHEELCHAIR</b>	<b>166</b>
<b>3 IN 1 UTENSILS</b>	<b>170</b>
<b>STUDYMATE: UITM STUDENT TIME MANAGEMENT SYSTEM USING WEB-SCRAPING AND TELEGRAM BOT API WITH AUTOMATIC NOTIFICATION REMINDER</b>	<b>173</b>
<b>EMPOWERING AUTISTIC TALENTS</b>	<b>182</b>
<b>DISABANK IMOBILE</b>	<b>187</b>
<b>COMFORTSTEP DIABETIC FOOTWEAR</b>	<b>192</b>
<b>SNUGGLETRON: A COMPANION ROBOT</b>	<b>194</b>
<b>BUDGETBUDDY: SAVE EASILY, SPEND WISELY</b>	<b>198</b>

<b>EZTOTE BAG</b>	<b>201</b>
<b>BUDGET BUDDY</b>	<b>205</b>
<b>SIGHTLESS SHOP</b>	<b>208</b>
<b>FINWEAR TRANSACTION BRACELET</b>	<b>214</b>
<b>FINWEAR TRANSACTION BRACELET</b>	<b>216</b>
<b>MONEY BUDDY</b>	<b>221</b>
<b>UNIVERSAL GAME CARDS (INVESTMENT EDITION)</b>	<b>225</b>
<b>SMART PEN FOR INTELLECTUAL DISABILITIES</b>	<b>229</b>
<b>GLITZGLAM MAKEUP BRUSH</b>	<b>231</b>
<b>INVENTNIC (INVESTMENT APPLICATION FOR VISUAL IMPAIRMENT)</b>	<b>234</b>
<b>THE SMART BLIND CANE STICK</b>	<b>237</b>
<b>TECHNOLOGICAL INNOVATION:</b>	<b>240</b>
<b>THE FUTURE AND CHALLENGES IN MALAYSIA CONTEXT</b>	<b>240</b>
<b>CHROMATONE</b>	<b>245</b>
<b>SMART MEDICINE DISPENSER</b>	<b>246</b>
<b>HELPHUB</b>	<b>250</b>

<b>CREATING BRIDGES FOR OPPORTUNITIES: DEVELOPING A UNIQUEHIRE.COM FOR PEOPLE WITH DISABILITIES</b>	<b>254</b>
<b>EMPOWER ABILITY APPLICATION</b>	<b>258</b>
<b>3D FLEXY LEG” SILICONE-BASED PROSTHETIC LEG</b>	<b>259</b>
<b>SMART TECH</b>	<b>263</b>
<b>IHEADEASE: INNOVATIVE HEAD IMMOBILISATION DEVICE FOR SPECIAL CARE PATIENTS DURING DENTAL PROCEDURES</b>	<b>266</b>
<b>CHILLI ROW COLLECTOR</b>	<b>270</b>
<b>TRI-WHEEL NAVIGATOR: INNOVATIVE LUGGAGE WITH TRIANGULAR WHEELS</b>	<b>273</b>
<b>PHINESTIC LEARNING</b>	<b>276</b>
<b>SMART ASSISTIVE WATCH FOR THE VISUALLY IMPAIRED</b>	<b>280</b>
<b>OPTICFIN: BANKING SOFTWARE FOR VISUALLY IMPAIRED PEOPLE</b>	<b>283</b>
<b>TWIST N’ TASTE 2-IN-1 BOTTLE</b>	<b>286</b>
<b>THE JIGGLE PILLOW</b>	<b>290</b>
<b>VISIONARY VAULT: REVOLUTIONIZING SOLUTION FOR DISABLE COMMUNITY</b>	<b>292</b>
<b>SAFETY BUBBLY JACKET</b>	<b>300</b>
<b>ADJUSTMENT ON EC METER FOR DISABLE PEOPLE</b>	<b>303</b>

<b>EARBUD TECHNOLOGY FOR THE BLIND</b>	<b>306</b>
<b>LEMMEGUIDE</b>	<b>310</b>
<b>SIGNSYNC</b>	<b>313</b>
<b>ICHAIR - THE NEXT GENERATION IN INTELLIGENT WHEELCHAIR MOBILITY</b>	<b>316</b>
<b>PORTABLE ARMCHAIR CANE</b>	<b>320</b>
<b>SMART INTELLIBOARD</b>	<b>324</b>
<b>MASSAGER WHEELCHAIR</b>	<b>327</b>
<b>VOXTECH: EMPOWERING FINTECH ACCESSIBILITY FOR VISUALLY IMPAIRED</b>	<b>331</b>
<b>TRANSFORMING CORN COBS INTO RENEWABLE COAL: A SUSTAINABLE ALTERNATIVE TO FOSSIL FUELS</b>	<b>336</b>
<b>MULTIPURPOSE KITCHEN TOOL</b>	<b>342</b>
<b>DIGITAL CHOPBOARD</b>	<b>347</b>
<b>GRABBYBITEZ</b>	<b>351</b>
<b>SEEINGSOR SYSTEM DETECTION</b>	<b>354</b>
<b>SAVVY COINS: PERSONAL FORCED SAVINGS TRACKER MOBILE APPLICATIONS</b>	<b>356</b>
<b>CAREMALL</b>	<b>360</b>
<b>TALK TO ME (TTM) ASSISTIVE MACHINE</b>	<b>364</b>

<b>EARSENSE: ENHANCING COMMUNICATION FOR THE DEAF THROUGH REAL-TIME TRANSLATION</b>	<b>367</b>
<b>REACHER GRABBER TOOL</b>	<b>371</b>
<b>FAIRY LIGHT COLOR</b>	<b>372</b>
<b>MYRELIEFF</b>	<b>376</b>
<b>FIN-ACCESS</b>	<b>377</b>
<b>SMART PILL BOX ORGANIZER</b>	<b>380</b>
<b>INNOVATION IN MAKEUP APPLICATOR FOR HAND DISABILITY PEOPLE</b>	<b>385</b>
<b>APEX SOLAR FAN</b>	<b>389</b>
<b>TALKBACK BALANCE CHECKER</b>	<b>394</b>
<b>THE SOSECURE BLIND-FOLD CANE</b>	<b>396</b>
<b>SIGNAVERSE</b>	<b>402</b>
<b>DISABILITY PEOPLE: SILANG TRANSLATOR</b>	<b>405</b>
<b>KINDLELIT: ADVANCING DYSLEXIA ACCESSIBILITY ON AMAZON KINDLE</b>	<b>408</b>
<b>SHOEDRY</b>	<b>411</b>
<b>BUDGETBUDDY BASED</b>	<b>416</b>
<b>BLYNUS VISION</b>	<b>420</b>



<b>VOICEEASE FOR PEOPLE WITH VISION IMPAIRMENT DISABILITIES</b>	<b>423</b>
<b>CAREABILITY</b>	<b>426</b>
<b>INNOVATIVE PITCHER PLANT TEA SET: A VERSATILE TABLE DECORATION WITH MULTIPLE COMPARTMENTS</b>	<b>430</b>
<b>HELPOK: HELP THOSE WHO NEED</b>	<b>433</b>
<b>REVOLUTIONIZING ADHD CARE: INTRODUCING FOCUS FLOW SMARTWATCH FOR ENHANCED DISABILITY SUPPORT</b>	<b>436</b>
<b>ZENSPHERE</b>	<b>441</b>
<b>CLOTHES BUTTON MAGNETIC</b>	<b>443</b>
<b>ADAPT TO EWHEEL SMART WHEELCHAIR</b>	<b>446</b>
<b>DISABILITY PEOPLE: ABILITYFIN</b>	<b>447</b>
<b>CAPABLEINVEST</b>	<b>450</b>
<b>MULTIFUNCTIONAL HEARING AIDS (AIDEWAY)</b>	<b>454</b>
<b>VTIFY APPLICATION</b>	<b>455</b>
<b>ONE STOP MAINTENANCE APP</b>	<b>458</b>
<b>BLIND STICK TECH (BST)</b>	<b>462</b>
<b>NAVICANE</b>	<b>466</b>

<b>THE ASSIST TOILET WHEELCHAIR</b>	<b>470</b>
<b>SOUND SENTRY</b>	<b>474</b>
<b>JAYJAY COFFEE</b>	<b>476</b>
<b>*BLOW WAVE PRO</b>	<b>480</b>
<b>BRIDGING THE GAP: TECHNOLOGICAL INNOVATIONS AND SUSTAINABILITY TOWARDS TRANSFORMING DISABILITY PRODUCTS</b>	<b>483</b>
<b>LAUNDRY SERVICES FOR PEOPLE WITH DISABILITIES</b>	<b>488</b>
<b>BUDGETBEE</b>	<b>491</b>
<b>VOICESTICK</b>	<b>494</b>
<b>SUPPER SOLE</b>	<b>495</b>
<b>EDUWISE PEN RECORDER</b>	<b>498</b>
<b>BHELP: THE 2-IN-1 BED AND WHEELCHAIR PROJECT</b>	<b>502</b>
<b>I-M-A-N APPROACH:</b>	<b>507</b>
<b>A CREATIVE METHOD TO TEACH AUTISTIC CHILDREN VERBAL COMMUNICATION</b>	<b>507</b>
<b>MF UMBRELLA</b>	<b>511</b>
<b>TEDDY GUARDIAN</b>	<b>514</b>
<b>SKIPPERS</b>	<b>519</b>

<b>PROSAFE: GUARDIAN GLOVE</b>	<b>523</b>
<b>ABLE APP</b>	<b>528</b>
<b>MONEY MASTER CALCULATOR: FINANCIAL CALCULATOR FOR BLIND OR VISION-IMPAIRED USERS</b>	<b>529</b>
<b>BANTU OKU APPLICATIONS</b>	<b>532</b>
<b>BOOKARMOR: A SUSTAINABLE SOLUTION FOR TEXTBOOKS LONGEVITY AND SUSTAINABILITY</b>	<b>535</b>
<b>MAGIC LIGHTERS</b>	<b>540</b>
<b>SKYSHIELD UMBRELLA</b>	<b>544</b>
<b>GLAMMIX</b>	<b>547</b>
<b>PAWTRACK HEALTH-GUARD</b>	<b>550</b>
<b>MONEYMINGLE: BRIDGING FINANCIAL LITERACY AND EXPERIENCE THROUGH INTERACTIVE LOAN EDUCATION APP</b>	<b>555</b>
<b>HOUSEHOLD LIFESTYLE : QUARTERCUT</b>	<b>562</b>
<b>WHEELCHAIR FOLDABLE TABLE</b>	<b>565</b>
<b>NAVIGATOR CANE</b>	<b>567</b>
<b>SILENT SPEAK CONNECT: YOUR BRIDGE IN BETTER HEARING</b>	<b>571</b>
<b>FINANCE BOARD GAME: CRITICAL THINKING FOR THE BLIND</b>	<b>575</b>

<b>ADVANCE SPEECH RECOGNITION</b>	<b>579</b>
<b>SENSORY KIT BOX</b>	<b>582</b>
<b>BRAILLE TABLET</b>	<b>585</b>
<b>BRAILLEFRESH: A BATHING INNOVATION ACCESSIBLE TO ALL</b>	<b>589</b>
<b>AIR UP FLAVOURED WATER BOTTLE</b>	<b>592</b>
<b>MYRELIEFF</b>	<b>597</b>
<b>ADAPTOWHEEL SMART WHEELCHAIR</b>	<b>598</b>
<b>MULTIFUNCTIONAL HEARING AIDS (AIDEWAY)</b>	<b>599</b>
<b>VOICESTICK</b>	<b>600</b>
<b>ABLE APP</b>	<b>601</b>
<b>GRABBYBITEZ</b>	<b>602</b>
<b>OKU SMART PARKING ASSISTANT</b>	<b>608</b>
<b>OBSTACLESENSE</b>	<b>612</b>
<b>VOLUNTEER FINDER APPLICATION</b>	<b>615</b>
<b>BAID: SMART HEARING AID WRISTBAND</b>	<b>618</b>
<b>MAKEUP BRUSH DRYER</b>	<b>622</b>

<b>UNIVERSE RING: EMPOWERING READING ACCESSIBILITY FOR PEOPLE WITH DISABILITIES</b>	<b>626</b>
<b>NEW PRODUCT DEVELOPMENT</b>	<b>630</b>
<b>SMART BRACELET (I-FIT)</b>	<b>631</b>
<b>COZYWRAP: TO SECURE AND PROTECT PATIENTS IN A COMFORTING WAY</b>	<b>634</b>
<b>COZEES, THE SELF-HEATING BLANKET</b>	<b>638</b>
<b>DYSCARD - DYSLEXIA-FRIENDLY CARD GAME</b>	<b>641</b>
<b>THE SPECTACLE SENSOR</b>	<b>644</b>
<b>LEXY LENSE</b>	<b>647</b>
<b>SNEAKSENSE SENSORY SHOE</b>	<b>650</b>
<b>CHROMAKIDS: KIDS COLOR BLINDNESS SPECTACLES</b>	<b>654</b>
<b>THE INTERACTIVE WEIGHTED LAP PAD WITH EMOTIONAL FEEDBACK</b>	<b>660</b>
<b>AI SMART RECITING BRAILLE QURAN PEN</b>	<b>662</b>
<b>QURANIC PILLOW</b>	<b>666</b>
<b>VISION VESSEL SMART BOTTLE</b>	<b>669</b>
<b>LAUNDRY BUTLER BY TIDYTOOLS</b>	<b>673</b>
<b>SMART WHEELCHAIR</b>	<b>676</b>

<b>DEAF PERSON GLASSES: MOUTH MOVEMENT TO SIGN LANGUAGE TRANSLATION</b>	<b>681</b>
<b>IDRINK COMPANY</b>	<b>683</b>
<b>SMART LASER FOR BLIND PEOPLE</b>	<b>686</b>
<b>INDIGO: SHADE OF DESIGN</b>	<b>688</b>
<b>SMART WHEELCHAIR</b>	<b>692</b>
<b>PORTABLE BLIND CANE</b>	<b>693</b>
<b>CARING-BASED EDUCATION PROGRAM MODULE FOR CRITICAL CARE NURSES</b>	<b>694</b>
<b>SPICES RACK WITH BRAILLE</b>	<b>697</b>
<b>MULTIFUNCTIONAL CLEANING STICK</b>	<b>702</b>
<b>COLOR-READING GLASSES</b>	<b>705</b>
<b>WHEELY BLISS</b>	<b>708</b>
<b>THE TALKING BUTTON</b>	<b>711</b>
<b>SINGGEST-EMPOWERING THE DEAF AND BLIND COMMUNITY THROUGH GESTURE-CONTROLLED ACCESSIBILITY</b>	<b>714</b>
<b>FAIT: FINANCIAL AUTISM INSIGHT TOOL</b>	<b>718</b>
<b>BRAILLE SMART GLOVE</b>	<b>722</b>
<b>SEAT AND TRACK CART</b>	<b>726</b>

<b>INTELLICANE (SMARTCANE)</b>	<b>729</b>
<b>CYBERWHEEL PRO BY INTELLIGUIDE COMPANY</b>	<b>733</b>
<b>BRAILLET TOUCH PRICEMARKERS</b>	<b>736</b>
<b>IMPROVISING FOGGING MACHINE DESIGN KEY CHARACTERISTIC THROUGH FUNDAMENTAL PERFORMANCES</b>	<b>741</b>
<b>BORNEAN CUISINE RESTAURANT</b>	<b>747</b>
<b>VOICE B</b>	<b>751</b>
<b>THE MULTIFUNCTIONAL BUZZER WATCH: A SOLUTION FOR DEAF PEOPLE</b>	<b>756</b>
<b>SEGRE-BAG: REVOLUTIONIZING WASTE MANAGEMENT THROUGH INNOVATIVE SEGREGATION</b>	<b>760</b>
<b>ACTIVRAY ADVANCE SKELETON</b>	<b>764</b>
<b>TECHNOLOGY INNOVATION SMART JEWELRY, LUMIÉRE ARMILLA</b>	<b>767</b>
<b>SANDAL MOP</b>	<b>770</b>
<b>BLINDGUIDE: MULTIPURPOSE PORTABLE STICK</b>	<b>774</b>
<b>SENSE SPEND: AI-ENHANCED FINANCIAL APPS FOR INDIVIDUALS WITH VISUAL IMPAIRMENTS</b>	<b>777</b>
<b>AUTO-UPDATE CONTAINER LIDS SCANNER WITH EXPIRATION DATE DISPLAY</b>	<b>786</b>

<b>SPREADING THE KNOWLEDGE: APPROACHING THE OBLIVIOUS ABOUT HIGH SENSORY INPUTS</b>	<b>791</b>
<b>EZPASAR</b>	<b>795</b>
<b>TOUCHSENSE GLOVE</b>	<b>798</b>
<b>CARE WATCH</b>	<b>800</b>
<b>EZPLANABILITY</b>	<b>802</b>
<b>COZY CUP 312 CAFE</b>	<b>806</b>
<b>AUTISM SPECIALIZED BAND</b>	<b>809</b>
<b>MULTIPURPOSE UTENSIL</b>	<b>814</b>
<b>COMMUNITY AWARENESS TOWARDS DISABLED PERSON: OVERVIEW AT MALAYSIA CHAPTER</b>	<b>816</b>
<b>RESQALERT</b>	<b>820</b>
<b>U&amp;I</b>	<b>824</b>
<b>TRANSVISION: YOUR GLOBAL LENS</b>	<b>825</b>
<b>NOUR TRAVEL &amp; TOURS</b>	<b>829</b>
<b>SMARTREACH</b>	<b>833</b>
<b>PMAS CARE : PARENTAL MONITORING AND SUPERVISION CARE</b>	<b>837</b>



<b>BODY N' MIND SPA</b>	<b>841</b>
<b>HUGGING CHAIR FOR AUTISM</b>	<b>845</b>
<b>OLA KINO - AN EMOTIONAL ASSISTANT APPLICATION</b>	<b>848</b>
<b>MASTER BRACELET</b>	<b>851</b>
<b>SIGNSENSE</b>	<b>853</b>
<b>SMATTRESS</b>	<b>855</b>
<b>MATH MIND MASTERKIT: REVOLUTIONIZING FINANCIAL EDUCATION FOR YOUNG MINDS THROUGH GAMIFIED LEARNING</b>	<b>859</b>
<b>CAMPUSHARE</b>	<b>864</b>
<b>ADAPTAWEAR CO.</b>	<b>867</b>
<b>EQUALEASE FINANCIAL SERVICES</b>	<b>871</b>
<b>DUMPSTERDOT.CO - BEYOND TOUCH: MOTION SENSOR TRASH CANS PWD-FRIENDLY WASTE MANAGEMENT INNOVATIONS</b>	<b>874</b>
<b>BUZZALERT</b>	<b>877</b>
<b>DIGITAL EYES SMART GLASSES TECHNOLOGY</b>	<b>880</b>
<b>CHILDREN EDUCATION CENTER</b>	<b>884</b>
<b>LEXIPLAY DYSLEXIA LEARNING ADVENTURES</b>	<b>887</b>

<b>SIGN TECH PRO</b>	<b>891</b>
<b>CLEANING SERVICES FOR PEOPLE WITH DISABILITIES</b>	<b>894</b>
<b>CAREWHEEL</b>	<b>897</b>
<b>EASYMOTION</b>	<b>901</b>
<b>NOURISHVITAL</b>	<b>904</b>
<b>BLINDCARE .JR</b>	<b>908</b>
<b>CARING CLEAN</b>	<b>911</b>
<b>COOKIESTER</b>	<b>914</b>
<b>SMARTCHEF PRO STOVE</b>	<b>918</b>
<b>VERSASTEADY WAND</b>	<b>921</b>
<b>ADHD FRIENDLY TOYS BY CALMMIND CREATION.CO</b>	<b>924</b>
<b>BRILLE WATCH</b>	<b>928</b>
<b>JUNGLE MATCH</b>	<b>930</b>
<b>JÆPPY: THE MULTIPURPOSE JACKET</b>	<b>934</b>
<b>SMART DESK LAMP</b>	<b>938</b>
<b>ROAD CITY EXPRESS</b>	<b>941</b>
<b>PRIMEXWHEELS</b>	<b>945</b>

<b>SMART FRIDGE</b>	<b>948</b>
<b>PORTABLE THERMOS WATER HEATER</b>	<b>952</b>
<b>AUTOMATIC BABY AND PET FENCE</b>	<b>956</b>
<b>NEW TECHNOLOGY WHITE STICK</b>	<b>960</b>
<b>MOBILITY SHOWER SOLUTION FOR PEOPLE WITH DISABILITIES</b>	<b>963</b>
<b>ANGEL WHEELS</b>	<b>968</b>
<b>ACCESSIBLE WEALTH: PERSONALIZED FINANCE FOR EVERY ABILITY</b>	<b>972</b>
<b>EMO PET (PERSONALIZED VIRTUAL ASSISTANTS WITH EMOTIONAL INTELLIGENCE)</b>	<b>975</b>
<b>COOLFLOW SHIRT</b>	<b>979</b>
<b>MAYFAA TOTE BAG</b>	<b>982</b>
<b>SOLARSPRINT POWER BANK</b>	<b>986</b>
<b>HISTORIA INDONESIA WITH RPG GAME</b>	<b>990</b>
<b>FINEASE</b>	<b>994</b>
<b>EZCOMB</b>	<b>998</b>
<b>THE SENSESTICK GLOVES</b>	<b>1002</b>
<b>MAGIC WAND</b>	<b>1004</b>
<b>“VTOKU”</b>	<b>1007</b>

<b>HIGH-TECH HEXAGON FRIDGE</b>	<b>1012</b>
<b>MEMORA FRAME: REIMAGINE YOUR WALLS WITH A TOUCH OF TECHNOLOGY</b>	<b>1016</b>
<b>CAMOCULAR</b>	<b>1020</b>
<b>MATHSLEXIA</b>	<b>1024</b>
<b>“WHEELY: ADVANCE TECHNOLOGY ON TRADITIONAL WHEELCHAIR”</b>	<b>1028</b>
<b>SENSA STRAP: ENHANCING SAFETY FOR VISUALLY IMPAIRED</b>	<b>1032</b>
<b>DYXTAB: TRANSFORMING LEARNING FOR DYSLEXIC CHILDREN</b>	<b>1035</b>
<b>EZ PRINT (PRINTING VENDING MACHINE)</b>	<b>1039</b>
<b>PREP PANTRY</b>	<b>1043</b>
<b>WHEELCHAIR SECUREMENT SYSTEMS</b>	<b>1047</b>
<b>GOBRELLA</b>	<b>1050</b>
<b>SIPPY PRESS - LIFESTYLE</b>	<b>1054</b>
<b>NAVIGATE AID STICK</b>	<b>1058</b>
<b>LUMINA FAN</b>	<b>1062</b>
<b>BRISK-WALK TROLLEY ASSISTANCE: AN INNOVATIVE APPROACH FOR OBESITY RECOVERY</b>	<b>1070</b>
<b>PORTABLE MEDKIT</b>	<b>1074</b>

<b>TIDYKIT</b>	<b>1077</b>
<b>BRAINWAVE: WHERE MAGIC MEETS NOTES - THE SMART NOTEBOOK WONDER</b>	<b>1081</b>
<b>TOURISM PLANNER APPLICATION</b>	<b>1084</b>
<b>SLEEPING HEADBAND</b>	<b>1088</b>
<b>TACTIBANCA: AUTOMATED TELLER MACHINE (ATM) FOR VISUALLY IMPAIRED INDIVIDUALS</b>	<b>1092</b>
<b>GINGER SURVIVOR</b>	<b>1096</b>
<b>BRAILLEPHABET PUZZLE BOOK</b>	<b>1098</b>
<b>HELMET WITH INTEGRATED AUGMENTED REALITY DISPLAY</b>	<b>1103</b>
<b>AUDIO VIEW</b>	<b>1106</b>
<b>BLUSCENT AIR CONDITIONER</b>	<b>1110</b>
<b>MULTIPURPOSE IRON BOARD</b>	<b>1114</b>
<b>LEAD</b>	<b>1117</b>
<b>MOMMY MAGIC</b>	<b>1121</b>
<b>ECHO CLASP</b>	<b>1125</b>
<b>BOTTOMUPZ: STUDENT-FRIENDLY SMART BOTTLE WITH TEMPERATURE DISPLAY</b>	<b>1128</b>
<b>FOLDABLE STICK WITH TUMBLER HOLDER</b>	<b>1131</b>

<b>SHOE CABINET WITH AUTOMATIC ODOR CONTROL</b>	<b>1134</b>
<b>AAIM SMART PILLOW</b>	<b>1138</b>
<b>BALBAT BEAUTY.CO 7IN1 MAKEUP PEN.</b>	<b>1141</b>
<b>VISION TECH</b>	<b>1145</b>
<b>SMART PORTABLE WARDROBE</b>	<b>1148</b>
<b>MOBILE EASE ONE</b>	<b>1150</b>
<b>BRAILLE MENU</b>	<b>1153</b>
<b>I-DETECTOR</b>	<b>1157</b>
<b>PENDIVE</b>	<b>1161</b>
<b>SMART SHOE FOR BLIND PERSON</b>	<b>1166</b>
<b>BRAILLE CHECKERS: AN INNOVATIVE BOARD GAME DESIGNED FOR THE VISUALLY IMPAIRED, ENSURING FUN AND ACCESSIBILITY</b>	<b>1169</b>
<b>RAIN KIT</b>	<b>1172</b>
<b>MINDMINGLE: AN AI STUDY APP</b>	<b>1175</b>
<b>“WRITING MOUSE”</b>	<b>1178</b>
<b>MASSAGE CHAIR FOR PUBLIC USERS AND PERSONS WITH DISABILITIES</b>	<b>1181</b>
<b>SMART SPECTACLES</b>	<b>1185</b>

<b>POCKET IRON</b>	<b>1188</b>
<b>SMART ASSISTIVE WATCH</b>	<b>1192</b>
<b>ZEMAI'S ADJUSTABLE UMRAH CLOTHES</b>	<b>1195</b>
<b>SILENTVUE: ENHANCING THE WORLD FOR THE DEAF</b>	<b>1198</b>
<b>MAGNETOP</b>	<b>1203</b>
<b>JUTAWAN EXPRESS</b>	<b>1206</b>
<b>COSETTE BEAUTY &amp; WELLNESS KIT *</b>	<b>1211</b>
<b>HIBISCUS INTELLIGENT AGING MASKER</b>	<b>1214</b>
<b>HIGH +</b>	<b>1216</b>
<b>SMART WINDOW</b>	<b>1219</b>
<b>APPLICATION FOR VISUALLY IMPAIRED</b>	<b>1223</b>
<b>SMART DISPENSER DUSTBIN</b>	<b>1226</b>
<b>EMERGENCY 2-IN-1 CLOTH_HIJAB SCAFT ZIPPER</b>	<b>1229</b>
<b>EMPOWERING AUTISTIC READERS: HARNESSING THE POWER OF VISUALS IN BOOKS</b>	<b>1234</b>
<b>CLOTHMATE SOLAR SPINNER</b>	<b>1237</b>
<b>FROZSCAN</b>	<b>1240</b>

<b>TEH TARIK MAHMUDI: MAXIMIZING COGNITIVE BENEFITS OF MORINGA OLEIFERA, PLUKENETIA VOLUBILIS, AND ANDROGRAPHIS PANICULATA VIA CO-ENCAPSULATION TECHNIQUE.</b>	<b>1245</b>
<b>KOPI ALA KAZIM: <i>MOMORDICA CHARANTIA'S</i> EXTRACTION OPTIMIZATION</b>	<b>1251</b>
<b>TEENYMOUTH: AN AT-HOME MOUTH PROP TO AID IN ORAL HYGIENE CARE FOR PERSONS WITH SPECIAL NEEDS</b>	<b>1256</b>
<b>FROSTBITE : A CHILLING TREAT</b>	<b>1260</b>
<b>DYSGRAPHIA SEVERITY CLASSIFICATION USING SUPPORT VECTOR MACHINE (SVM) BASED ON AUTOMATED HANDWRITING IMAGE FEATURE EXTRACTION</b>	<b>1263</b>
<b>CELESTIAL (SUN CHARGER SLING BAG)</b>	<b>1268</b>
<b>THE LEVEL OF AWARENESS ON MENTAL HEALTH AND ITS IMPACT ON TIKTOK USERS</b>	<b>1272</b>
<b>AUTOMATIC DUO FOOD STIRRER</b>	<b>1275</b>
<b>WATER FILTER IMPLEMENTATION CAGE: MODULE OF CLEAN WATER AND AWARENESS FOR INDIGENOUS PEOPLE (ABL MODULE)</b>	<b>1278</b>
<b>GARDBOT : OUTDOOR VACUUM</b>	<b>1281</b>
<b>SENSORY STICK FOR VISUALLY IMPAIRED</b>	<b>1283</b>
<b>BUSINESS MODEL INNOVATION: STATIONERY VENDING MACHINE (SVM)</b>	<b>1286</b>
<b>SPECIALIST BABER</b>	<b>1289</b>



<b>THE LEVEL OF OF HEALTHCARE EDUCATION EFFECTIVENESS ON TIKTOK</b>	<b>1293</b>
<b>THE ACCEPTANCE OF TIKTOK AS A NEW LEARNING PLATFORM</b>	<b>1301</b>
<b>SMARTSNACK</b>	<b>1304</b>
<b>GARDENING HEDGE SHEARS</b>	<b>1307</b>
<b>WHEEL HOES</b>	<b>1311</b>
<b>TASBIH BRAILLE</b>	<b>1316</b>
<b>MYUTQH</b>	<b>1321</b>
<b>THE USAGE OF CHATGPT AS AN ALTERNATIVE WAY OF LEARNING</b>	<b>1325</b>
<b>THE LEVEL OF AWARENESS TOWARDS POSTPARTUM DISEASE IN MALAYSIA</b>	<b>1328</b>
<b>DEEP LEARNING BASED TRANSLATOR SYSTEM OF DYNAMIC SIGN LANGUAGE PATTERN</b>	<b>1331</b>
<b>AGUSTAN SYAMSUDDIN, RIDWANG, MAHARIDA, AHMAD RIJAL</b>	<b>1331</b>
<b>VOCABULARY VERSUS SOCIOCULTURAL KNOWLEDGE IN EFL READING COMPREHENSION</b>	<b>1332</b>
<b>SMARTMED BOX</b>	<b>1333</b>
<b>THE EFFECTIVENESS OF CONTENT CREATORS IN SPREADING POSITIVE INFLUENCE TOWARDS TIKTOK USERS</b>	<b>1338</b>
<b>ICAR4</b>	<b>1341</b>

<b>AUTOMATIC WATERING SYSTEM USING AC DRAIN WATER</b>	<b>1347</b>
<b>STELLAR THE EXPLORER: YOUR HELPFUL COMPANION FOR SMOOTH INTERNATIONAL TRAVEL</b>	<b>1350</b>
<b>JS-TRACKER APP</b>	<b>1353</b>
<b>COUNTBUDDY</b>	<b>1362</b>
<b>STAIR ASSIST CANE LEVEL 5</b>	<b>1367</b>
<b>ITADS: INSTRUCTIONAL DESIGN FRAMEWORK FOR MALAYSIAN HEARING-IMPAIRED STUDENTS' INTERACTIVE MULTIMEDIA TEACHING AIDS</b>	<b>1371</b>
<b>PELAN FATWA: INOVASI WAKAF PAMPASAN KEMATIAN TAKAFUL DI FWD TAKAFUL BERHAD</b>	<b>1381</b>
<b>C.A.R.E</b>	<b>1386</b>
<b>FEELMART</b>	<b>1389</b>
<b>GESTURE-CONTROLLED PROSTHETICS</b>	<b>1392</b>
<b>AQUASTRIDER</b>	<b>1396</b>
<b>PROTOTYPE APPLICATION OF SIGN LANGUAGE HADITH FOR HEARING IMPAIRED: FIVE HADITHS FROM ARBAIN NAWAWIYAH'S BOOK</b>	<b>1401</b>
<b>SPECIAL EDUCATION CONTINUOUS TRAINING UNIVERSAL MODULE (SPECTRUM) TOWARDS AN INCLUSIVE SOCIETY</b>	<b>1404</b>

<b>THE INNOVATION OF 8 NEW BRAILLE CODES FOR MASHAF AL-QURAN BRAILLE MALAYSIA (MQBM)</b>	<b>1407</b>
<b>IN SIGHT ROLL</b>	<b>1411</b>
<b>FONT KOD TANGAN QURAN ( KTQ)</b>	<b>1415</b>
<b><i>QURAN HAND CODE FONT</i></b>	<b>1415</b>
<b>INCLUSIVE DESIGN WORKSHOPS: EMPOWERING DESIGNERS AND DEVELOPERS TO CREATE ACCESSIBLE PRODUCTS</b>	<b>1418</b>
<b>OUR BATIK ESTETIKA ISTIMEWA (OBAETIBOX)</b>	<b>1422</b>
<b>PERANTI IQRABRAILLE - KURNIAAN DARIMU</b>	<b>1424</b>
<b>UTILIZATION OF VIDEO ASSETS IN PROMOTING TOURIST DESTINATIONS AND PROCESSED TYPICAL TABAGSEL</b>	<b>1428</b>
<b>SALACHOLESTA (OBAT HERBAL KOLESTROL DARI KULIT SALAK) SEBAGAI UPAYA MENINGKATKAN KESEHATAN DAN PEREKONOMIAN DI KOTA PADANGSIDIMPUAN</b>	<b>1429</b>

## **Bhelp: The 2-In-1 Bed and Wheelchair Project**

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### **Abstract**

This project addresses the challenges faced by individuals with restricted mobility due to illness, injury, or other factors by introducing a groundbreaking 2-in-1 Bed and Wheelchair system named Bedridden Helper (BHelp) integrated with an advanced AI assistant named Intelligent System (INSYS). The traditional dichotomy between beds and wheelchairs presents limitations in mobility and independence for bedridden individuals. The innovative integration of these two essential components offers a transformative solution which will be providing seamless transition between bed and wheelchair modes. INSYS, which is the AI assistant will be enhancing user's experience through intuitive communication, personalized assistance and adaptive learning capabilities which will be setting a new standard for assistive technology in healthcare. The objectives of this project include prioritizing user comfort, safety, and accessibility while promoting autonomy and engagement. The novelty lies in the comprehensive integration of AI technology into the core functionality of the system and revolutionizing conventional approaches to bedridden care and mobility solutions. The societal benefits include improved quality of life, enhanced independence and greater inclusion for individuals who are facing mobility challenges and ultimately fostering a more empowered and resilient community.

**Keywords:** Bed, wheelchair, AI, accessibility, and mobility

## 1. INTRODUCTION

The 2-in-1 Bed and Wheelchair Project: BHelp represents a groundbreaking innovation in healthcare and mobility solutions and artificial intelligence (AI) are designed to provide comfort, functionality and independence for bedridden individuals. This innovative concept aims to address the challenges faced by individuals who spend a significant amount of time in bed due to mobility limitations, illness or injury.

The heart of this transformative project is the incorporation of an advanced AI system, which is named INSYS, designed to enhance user experience and communication. Drawing inspiration from popular AI assistants like Alexa or Siri, INSYS serves as a personalized companion who can understand and respond to user commands and inquiries. Whether adjusting bed positions, providing entertainment options or helping with daily tasks, INSYS' intuitive interface and conversational capabilities elevate the overall functionality and accessibility of the 2-in-1 bed and wheelchair system.

Through a combination of meticulous design considerations, engineering expertise and AI integration, the project prioritizes user comfort, safety, and convenience. The seamless interaction between the user and INSYS is facilitated by state-of-the-art voice recognition technology and adaptive learning algorithms which ensure a responsive and intuitive experience tailored to individual needs.

The goal of BHelp is to promote user comfort, safety and accessibility through meticulous design considerations and engineering competence. An easy-to-use mechanics and ergonomic features enable a seamless transition between bed and wheelchair modes which will be providing a hassle-free experience for users and caregivers alike.

By integrating AI capabilities into the core functionality of the system, the project aims to empower users with greater autonomy, engagement and quality of life and ultimately enabling them to lead more fulfilling and independent lives with confidence and ease.

In conclusion, BHelp represents a transformative approach to healthcare and mobility solutions which also redefines traditional ideas of bedridden care and accessibility. It provides a revolutionary approach to healthcare and mobility solutions. This project intends to improve the

quality of life and general well-being of people with mobility issues by integrating the functions of a wheelchair and bed into a single integrated solution. This will enable the people to live more independently and participate actively in their surroundings without the need to count on others.

## **2. OBJECTIVE**

The objective of this 2-in-1 Bed and Wheelchair Project is to create a wheelchair and bed that ease, ensuring the users comfort and the safety and convenience of cares. By expanding their mobility options and encouraging independence, the aim is to reduce user effort in controlling the wheelchair and ensure the safety during any movement (Amit Ranjan Trivedi, 2013). Another objective here are to develop a 2-in-1 bed and wheelchair system with advanced adjustability and support features, catering to the spesific needs in bedridden individuals with varying mobility levels, while prioritising user safety, comfort and ease.

Key objectives include priopritizing safety and stability in both bed and wheelchair configuration which integrating the INSYS AI system to automate adjustment and provide health monitoring capabilities, designing a user-friendly interface for seamless control the AI system and ensuring customization and adaptability to accommodate diverse user needs. By addressing these objectives, the project aims to provide a holistic solution that enhances the quality of life for both cares and bedridden patients by meeting these objectives.

## **3. NOVELTY & INVENTIVENESS**

The project introduces a novel approach by developing a unique design with a smart sensor that allowed for an easier customization and adaptation. The design conception is validated through the consolation with the medical staff as well as from the literature survey. Not only that, by employing advanced materials and manufacturing techniques, the system achieves a lightweight yet durable construction, offering portability. Additionally, the inclusion of customizable features such as adjustable holder and changing the bed into a wheelchair in an instant showcases a fresh approach to addressing the diverse needs of bedridden individuals and sets a new standard for adaptive assistive devices in the healthcare industry. (*Manao Bunkum, Parkbhum Reanaree, Nutthanan Wanluk, Sarinporn Visitsattapongse, 2018*)

#### **4. PRACTICALITY & USEFULNESS**

Our new innovative product is specially made for those bedridden patients who need extra care and attention. It is a must have as it is an improved bed from the typical bed at home. Patient, caretakers or nursing staff jobs are now easy (Andhare, A. B., & Onkar, A. M. 2021); they have no need to manually move or raise the patient's body as the bed can transform from the bed position to the chair position or any angle that they want by selecting the choices on the remote provided. The chair also made for the patient to move and turn around without worries by controlling it using its controller. Mobilized form of chair. With the power of the Red Pole Energy battery that provides a robust and reliable power supply for our electronic wheelchair. With its 5.12 kWh capacity, patient will have ample energy to keep our wheelchair running smoothly throughout the day We also included our own smart virtual assistant that functions as artificial intelligence (AI) named intelligent system INSYS, so that the patient can communicate and give instructions with it like it is a human being. The patient's safety and convenience are our priority. We included strong protection that will ensure the safety of the patient without falling out of bed as bed rails are attached to help prevent falls and provide support in getting in or out of the bed. We tested our product by taking surveys from people and taking the results as our improvement. It guarantees risk free and comfortable for all body weight as we are using a hi-fi bed frame and mattress.

#### **5. CONCLUSION**

In conclusion, this product will help disable people especially paralyzed people to move and rest at the same time. Plus, BHelp will give freedom of movement that can significantly enhance their ability to engage in daily life. With InSys (Intelegent System) in this product, it will help the user to be independent in doing things in daily life without needing help from others all the time.

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