

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
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Melaka Bandaraya Bersejarah
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MiiEX'2024

MELAKA INTERNATIONAL INTELLECTUAL EXPOSITION 2024

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

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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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Thank you.

MIIEX'24 ORGANISING COMMITTEE

COMMITTEE	NAME
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	DR NORASHIKIN ADAM
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	AFZAN SAHILLA BINTI MOHD AMIR HAMZAH
	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'

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The Spectacle Sensor

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Abstract

To enhance accessibility and independence for the visually impaired, our group is developing a spec sensor—a revolutionary device designed to provide real-time environmental information and sensory feedback. The spec sensor goes beyond traditional aids by offering a comprehensive suite of features tailored to the daily needs of the blind community. This device aims to identify and announce nearby objects, from furniture to specific items on grocery shelves, enabling users to navigate and interact with their surroundings more confidently. Additionally, the sensor offers color recognition capabilities, describing the colors of clothing or natural elements like flowers, thereby enriching the user's sensory experience. Moreover, the spec sensor enhances environmental awareness by alerting users to potential hazards such as uneven surfaces or changes in lighting conditions.

Keywords: Accessibility, Independence, Spec sensor , Environmental information , Sensory feedback , Nearby objects

1. INTRODUCTION

The Spec Sensor is a wearable assistive device designed to enhance the spatial awareness of blind and visually impaired individuals. It utilizes a combination of ultrasonic and infrared sensors to create a three-dimensional map of the user's surroundings. Next, The Spec Sensor employs both ultrasonic and infrared sensors. Ultrasonic sensors emit high-frequency sound waves that bounce off objects, like bat echolocation. Infrared sensors detect heat signatures, helping differentiate between objects and empty space. Thus, the sensor data is processed in realtime to build a mental picture of the environment. This data is then translated into audible cues or haptic feedback. Other than that, users can choose between audio alerts or gentle vibrations to receive information about their surroundings. Audio cues might describe nearby objects and their distance, while vibrations could indicate the presence of obstacles on different sides of the body. Finally, while existing assistive devices like canes provide basic obstacle detection, they lack the ability to create a

comprehensive picture of the surroundings. The Spec Sensor aims to bridge this gap by offering Improved spatial awareness by providing a broader sense of the environment. The Spec Sensor empowers users to navigate more confidently and independently. Early detection of obstacles like overhanging objects or uneven surfaces can help prevent accidents. The Spec Sensor can foster a sense of freedom and exploration for visually impaired individuals.

2. OBJECTIVE

Objective spectacle sensor for blind people involves focusing on functionality, reliability, and user experience to meet their specific needs. Recognizing faces Provide verbal signals regarding an individual's identity based on user input or saved profiles to assist blind persons in identifying people they come across. For those who are blind, personal safety features serve as the objective spectacle sensor. Incorporate functions like position tracking, emergency contact notifications, and fall detection to improve the personal safety of blind people and offer support in an emergency. The aim of our project is to ensure that the spectacle sensor is lightweight, comfortable to wear for extended periods of time, and compatible with a variety of head shapes and sizes. An objective spectacle sensor that incorporates these features and concerns can help blind individuals improve their mobility, independence, and quality of life in a variety of daily situations.

3. NOVELTY & INVENTIVENESS

Our device is unique in that it prioritizes accessibility for the blind while also improving accessibility for them. To guarantee that users can engage successfully without depending on visual clues, they include features like voice aid , haptic interfaces, and audio feedback. As an example, the requirements include sound , so those who are blind can be made aware of what is going on around them. This product considered as new and potentially revolutionary product in that niche market if it included innovative technologies like artificial intelligence for enhance d functionality from the specs with sensor features that improve accessibility and usability for the blind.

4. PRACTICALITY & USEFULNESS.

For blind individuals, a spectacle sensor could be particularly transformative, offering a range of practical and useful functions to enhance their daily lives. A spectacle sensor is used for obstacle detection and navigation. Spectacle sensors equipped with depth-sensing cameras or LiDAR technology could detect obstacles in the user's path and provide real-time audio or haptic feedback to help navigate safely through environments Facial recognition in spectacle sensors could recognize faces and provide audio cues to help blind individuals identify people they encounter,

enhancing social interactions and enabling them to recognize friends, family, or acquaintances. This spectacle sensor also practically uses for navigation assistance by integrating with GPS technology and mapping services, spectacle sensors could provide turn-by-turn navigation instructions, helping blind individuals navigate unfamiliar outdoor environments or public spaces more confidently.

5. CONCLUSION

In summary, our group is developing a navigation tool in the form of glasses with an alarm system to assist blind individuals in navigating their surroundings. This technology aims to enhance mobility by guiding users to their destinations and alerting them to obstacles. Our goal is to empower the visually impaired community and advance accessibility through innovative solutions, promoting greater independence and inclusivity. According to University of Illinois, The Technology Related Assistance to Individuals with Disabilities Act of 1988 described an assistive technology device as "any item, piece of equipment, or product system, whether acquired commercially off the shelf, modified, or customized, that is used to increase, maintain, or improve functional capabilities of individuals with disabilities." The first step that we take to promote this device is to identify the target audience which understands the demographics and specific needs of the visually impaired community. This includes factors such as age groups, lifestyles, and preferences.

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