Research

UMPSA student aspires to make university pioneer user-friendly and inclusive indoor navigation system

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PEKAN, 16 October 2025 – Realising the challenges faced by students and visitors in locating lecture rooms and laboratories at the Faculty of Computing (FK), Universiti Malaysia Pahang Al-Sultan Abdullah (UMPSA), FK student, Ahmad Haziq Mohamad, 21, introduced an innovation named UMPSA Smart Navi: Real-Time Digital Navigation System for Campus Wayfinding.

The research idea began when he found that many students, including new students, students from other faculties, lecturers, and external visitors, faced difficulties locating rooms based on room codes such as BZ-01-100.

The large building structure, divided into three main sections, often confused users and caused significant time loss in finding the correct destination.

According to him, questionnaire forms distributed via Google Form showed many faculty members faced the same problem.

“Seeing this need, I took the initiative to introduce an innovative solution that enables users to find locations quickly and accurately within a few seconds, in line with current technological developments.

“UMPSA Smart Navi is a web-based navigation system specifically designed for FK to assist students in locating lecture rooms, laboratories, and other key spaces within the faculty building that has a complex structure.

“This system features point-to-point navigation that enables users to identify the best route from one location to another in a short time, similar to navigation systems in modern shopping malls and airports,” he said.

This research was conducted under the supervision of the FK Lecturer, Ts. Dr Kohbalan Moorthy, beginning during Final Year Project 1 in Semester I of the Academic Session 2023/2024, with a focus on problem analysis and basic system design, before being fully completed in Final Year Project 2 the following semester.


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UMPSA Smart Navi

He added that among the unique features of this system is the interactive 3D display that shows routes and room positions based on the room name, code, or room owner.

“In addition, it provides a Floor Directory Page as supplementary guidance should the main navigation fail, with directional maps arranged according to building levels to help users identify routes to each lecture room and laboratory.

“The main objective of developing UMPSA Smart Navi is to simplify location searching with accurate directions, save time for students, staff, and visitors, replace the need for printed maps and physical signboards, and contribute to clean and sustainable energy use.

“This project also received positive feedback after being tested directly among students and staff,” he said.

He also plans to expand this system to all faculties and buildings at UMPSA under a single, more comprehensive interface.

“Future enhancements include multilingual support such as Malay, English, Arabic, and Mandarin, real-time location detection using WiFi or Bluetooth beacon technology, and voice instructions to assist visually impaired students and enable hands-free usage.

“This initiative also received support from the Centre for Artificial Intelligence and Data Science (CAIDaS) in efforts to expand system implementation throughout the campus as part of UMPSA’s smart campus initiative,” he said.

UMPSA Smart Navi has received various recognitions, including Gold Medal (Undergraduate Category) at the 15th Creation, Innovation, Technology & Research Exposition (CITREX) 2025, CAIDaS Spark Award for innovative idea, Silver Medal (Undergraduate Category) at iCE-Cinno 2024, Gold Medal (Diploma Final Year Project Category) at FYPro-Com Exhibition, as well as being an invited exhibitor at MydigitalMaker Fair 2024 organised by MDEC at Suria KLCC, Kuala Lumpur.

With an estimated development cost of about RM6,420 covering website development, WordPress subscription, Elementor, cPanel, and domain, this project demonstrates the potential of student innovation in delivering practical and sustainable technological solutions.

Ahmad Haziq hopes the university can provide space and support to continue expanding this system to all academic and administrative buildings across the campus.

He also aspires to make UMPSA a pioneering university in implementing an indoor navigation system that is user-friendly and inclusive, thereby becoming a reference model for other educational institutions in Malaysia and abroad.

He added that UMPSA Smart Navi serves as a stepping stone for him to explore more digital solutions in user experience design (UX/UI), smart campus systems, and user-friendly system development that benefit the university community.

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