ITE STUDENT ACHIEVERS' AWARDS 2025

Lee Kuan Yew Technology Award

JUST IN TIME

A Helping Hand

Ensuring patient safety in hospitals and care facilities is an ongoing challenge. Many bedridden patients, whether eager to regain independence or hesitant to call for help, attempt to get up on their own, increasing their risk of falls and serious injuries. At the same time, caregivers must manually check catheter bags, a repetitive and time-consuming task that, if overlooked, can lead to bladder overexpansion, infections, and severe medical complications.

To tackle these issues, the team developed Just in Time, a smart caregiver bed system with automated real-time monitoring capabilities. Equipped with motion and water level sensors, the system detects patient movement and catheter bag fill levels, instantly alerting caregivers via mobile notifications. This ensures timely intervention, enhancing both patient safety and caregiver efficiency.

Innovators' Inspiration

"A loved one of mine developed severe discomfort and blood in the urine due to a delayed catheter bag change, resulting in an extended hospital stay and higher medical costs. This incident left a deep impact on me. When our team later found out that our teacher had experienced the same issue, we realised that these are not isolated incidents. This inspired us to create 'Just in Time' – an automated system designed to prevent falls and ensure timely catheter monitoring. We hope to make a meaningful difference in healthcare by easing the workload of caregivers and improving patient safety."

~ Gwendolyn Neo Su Ping

What's So Special

- By integrating fall prevention and catheter monitoring into a single system, Just in Time offers a smart and proactive approach to patient care. Its bed exit alert function uses multiple sensors to detect when a patient attempts to sit up or move toward the edge of the bed, triggering immediate alerts for timely intervention.
- A water level sensor continuously tracks the catheter bag's fill level, sending notifications when it reaches a set threshold to prevent overexpansion and related complications.
- Powered by an ESP32 microcontroller with Wi-Fi capabilities, the system enables real-time alerts via Telegram or hospital monitoring networks, ensuring that caregivers can respond even when not in close proximity. Additionally, its multiple GPIO (General Purpose Input/Output) pins allow seamless integration of additional sensors to support different healthcare settings.
- Designed for affordability and easy deployment, Just in Time makes advanced patient care solutions accessible to hospitals and care facilities.

Members:
Law Heng Siang
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Course & College:

Higher Nitec in Security System Integration
ITE College East