

Robotics &amp; UAVs

Medical &amp; healthcare

## Wearable robotic device detects and prevents falls

News | ⌚ 2 min read

A wearable robotic device that detects and prevents falls has been developed by researchers at NTU Singapore and Tan Tock Seng Hospital (TTSH).



Developed by NTU Singapore and TTSH, MRBA is a wearable assistive robot that can detect and prevent a fall before it happens, reducing the user's risk of sustaining injuries - *NTU Singapore*

Dubbed the Mobile Robotic Balance Assistant (MRBA), the robot uses its inbuilt sensors to instantaneously detect a loss of balance and catches the user with its attached safety harness which is worn around the user's hips.

According to [NTU Singapore](https://www.ntu.edu.sg), the device would also help users who have difficulty in walking and balancing to stand up from a seated position, and to sit down from a standing position. It also uses a depth-sensing camera to observe the user's

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movements, while its machine-learning algorithms estimate the user's balance in real time to better predict future falls.

The human ability to balance degenerates with age and is exacerbated by neurological diseases and injuries, musculoskeletal problems and vertigo. This loss of balance control often results in falls, particularly among the elderly.

MRBA can help people to live with conditions and has been designed for use with minimal caregiver assistance. MRBA was co-developed by a team of researchers, engineers, and data specialists at the [Rehabilitation Research Institute of Singapore](#) (RRIS) at NTU, alongside clinicians and researchers at [TTSH](#).

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In clinical trials involving 29 participants, including patients who suffered from stroke, traumatic brain injuries, and spinal cord injuries, the researchers found that MRBA was successful in aiding them with sitting, standing, and walking, as well as assisting in tasks like fetching water. No falls were recorded in the trials, which spanned three days per participant.

In a statement, Associate Professor Ang Wei Tech, executive director of RRIS, who supervised the project's development, said: "MRBA could prove to be an invaluable resource for older adult users, and help promote independent living and aging. The development of the robot was a result of a fruitful collaboration with TTSH, blending

our expertise in engineering and machine learning with their strengths in rehabilitation and medicine.”

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MRBA’s success in the clinical setting has resulted in interest from Ninkatec and Home Instead, two Singapore home-care providers. The research team has also filed four patents for the technology with NTUitive, NTU’s innovation and enterprise company.

MRBA comes in three models with the first catering to users that weigh up to 80kg, while the second assists those who weigh up to 120kg. The third version, the Agile model, supports more dextrous movements.

In addition to assisting users in daily living, the robot can also support physiotherapy consultations by assisting those recovering from injuries to carry out rehabilitation exercises, such as side stepping, balancing on a rocker board, and standing on one leg. The research team hopes to expand the study and recruit 71 more participants from day rehabilitation centres to further build the use case for the robot in home and community settings.

The RRIS team is also working with industry partners to commercialise the MRBA within the next year.

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12 Sep 2022

