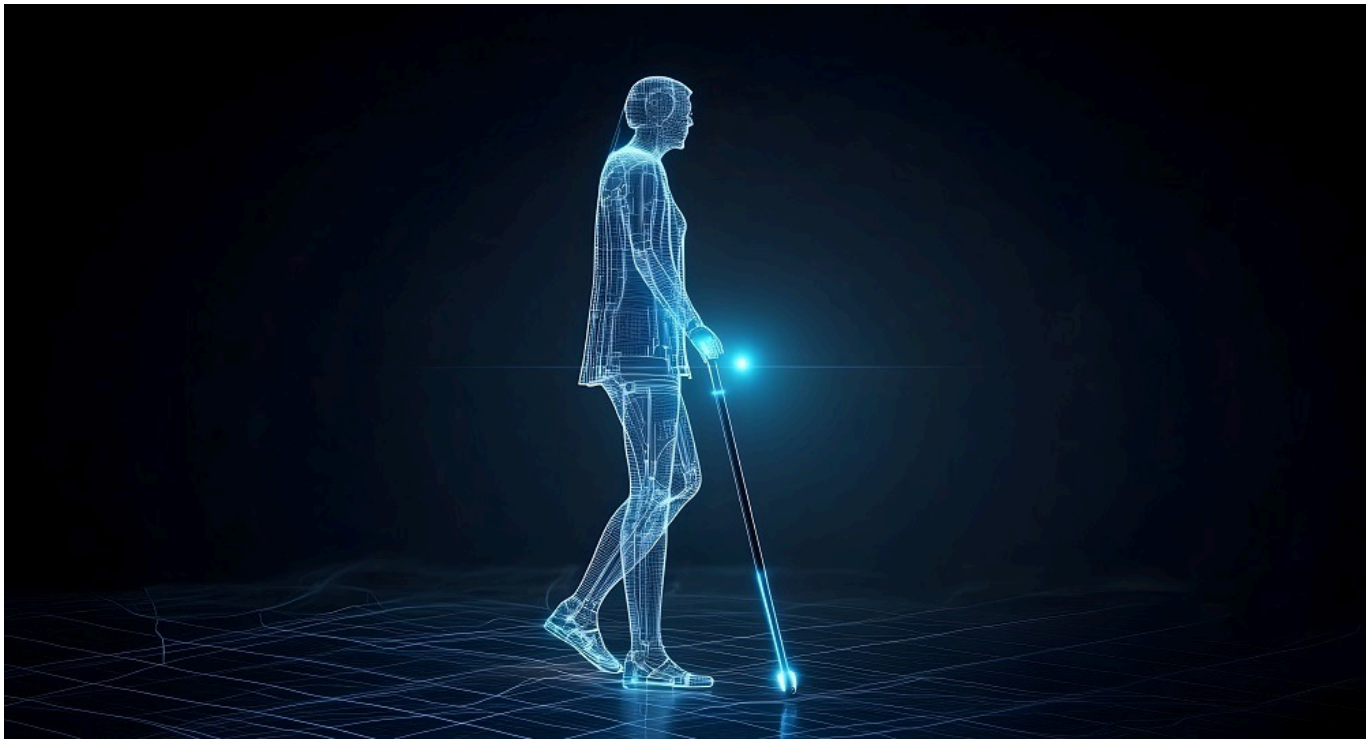
TECH OFFER

AI-Assisted Walking Cane for the Elderly and Mobility-Impaired Users



KEY INFORMATION

TECHNOLOGY CATEGORY:
Electronics - Sensors & Instrumentation
Healthcare - Medical Devices

TECHNOLOGY READINESS LEVEL (TRL): TRL6
COUNTRY: SINGAPORE
ID NUMBER: TO175453

OVERVIEW

Falls are a leading cause of injury and hospitalization among the elderly, often resulting in loss of independence and increased healthcare costs. Traditional walking aids provide basic support but lack the capability to proactively detect and prevent falls. This AI-Assisted Walking Cane is an innovative mobility aid developed to improve the safety and independence of elderly users and individuals with mobility challenges. By enabling real-time monitoring and intervention, it effectively bridges a critical gap in traditional walking aids and helps reduce the risk of falls. The primary target users are elderly individuals, patients undergoing physical rehabilitation, and people with neurological or musculoskeletal conditions that impact mobility.

The technology owner seeks collaboration with partners across the healthcare, technology, and manufacturing sectors to support the product's development, testing, and commercialization. Ideal partners include medical institutions and rehabilitation centres to provide clinical validation, user trials, and professional feedback; deep-tech companies with AI and data analytics expertise to develop and optimize algorithms for gait analysis and fall detection; assistive device manufacturers for prototyping, large-scale production, and quality assurance; institutes of higher learning for joint research in biomechanics, sensor technologies, and future

applications; and eldercare service providers or community health organizations to facilitate pilot testing and deployment in real-world care settings.

TECHNOLOGY FEATURES & SPECIFICATIONS

The AI-Assisted Walking Cane combines advanced hardware and software components, integrating sensors and artificial intelligence to monitor the user's gait, detect abnormal walking patterns, and provide intelligent mobility support with proactive fall risk detection.

Advanced Hardware Integration - The device features an embedded microcontroller, tilt sensor, accelerometer, gyroscope, and vibration motors that work together to continuously monitor the user's gait, posture, and cane tilt during movement.

Intelligent Fall Detection and Alerts - The device integrates an advanced algorithm that continuously analyses the user's gait patterns and posture in real time. By detecting abnormal movements or signs of instability that may indicate a potential fall, the device provides immediate alerts through vibration or audio signals to prompt corrective action or notify caregivers.

Connectivity and Data Insights - The device transmits collected data via Bluetooth or Wi-Fi to a companion mobile application, allowing users, caregivers, and healthcare professionals to track mobility trends and monitor progress.

User-Centric Design - The device is powered by a rechargeable, energy-efficient battery that supports extended use, and its lightweight, ergonomic design ensures comfort and ease of use for everyday mobility support.

POTENTIAL APPLICATIONS

The AI-Assisted Walking Cane has broad potential across healthcare, rehabilitation, and assistive technology sectors, with applications in both clinical settings and home-based care to enhance mobility, safety, and independence for individuals with gait or balance challenges.

Primary applications include real-time fall detection and prevention, gait monitoring to track rehabilitation progress, and early identification of mobility decline in elderly users or individuals with neurological or musculoskeletal conditions. The data collected also supports healthcare professionals in developing personalized therapy plans and targeted intervention strategies.

This technology can serve as a foundation for a range of marketable products beyond the walking cane, including AI-enabled crutches, walkers, and wearable gait monitors. It also supports the development of companion mobile apps and cloud-based platforms for remote monitoring, caregiver alerts, and long-term mobility data analysis.

UNIQUE VALUE PROPOSITION

This technology addresses the growing demand for intelligent assistive devices that enhance quality of life and reduce caregiver burden, offering a practical, scalable solution for improving mobility and safety in eldercare and rehabilitation settings.

Unlike traditional walking canes that provide only basic physical support, the AI-Assisted Walking Cane **incorporates sensors and AI algorithms** to continuously analyse gait and detect instability in real time, offering proactive alerts and enhanced safety for users.

Unlike existing smart canes that focus mainly on location tracking or emergency alerts, this technology emphasizes **preventive**

care through real-time gait analysis and **predictive fall detection**, setting it apart from current state-of-the-art solutions. It also provides **personalized alerts** for users, promoting independence while ensuring safety.

Furthermore, the system's integration with mobile applications and healthcare platforms **enables remote monitoring** and **data-driven decision-making**—features not commonly found in basic mobility aids. Its affordability, ergonomic design, and low maintenance further enhance its market appeal.