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DEPARTMENT OF HEALTH AND HUMAN SERVICES

National Institutes of Health

Government Owned Inventions Available for License: Gait Assistance Systems and Methods of Control Thereof

AGENCY: National Institutes of Health, HHS.

ACTION: Notice.

SUMMARY: The Clinical Center (CC), an institute/center of the National Institutes of Health (NIH), Department of Health and Human Services (HHS), is giving notice of the license opportunity for the invention listed below, which is owned by an agency of the U.S. Government and is available to achieve expeditious commercialization of results of federally-funded research and development.

FOR FURTHER INFORMATION CONTACT: Inquiries related to this license opportunity should be directed to: Tedd Fenn, J.D., M.S., Technology Transfer Manager, NCI, Technology Transfer Center, Email: *Edward.Fenn@nih.gov* or Phone: 240-276-6833.

SUPPLEMENTARY INFORMATION: Human movement disorders such as those arising from cerebral palsy cause diminished coordination, impaired motor control, and often long-term abnormal walking patterns in children and adults. There is a need for more effective interventions which can preserve and/or augment mobility and strength on a continuous basis for those with such movement disorders, especially in pediatrics. Robotic exoskeleton devices and powered orthoses are specifically designed for treatment of gait pathologies but better methods of controlling such devices/systems to better personalize and adapt them to a patient and provide assistive torque, are needed.

Researchers at the National Institutes of Health Clinical Center have developed an adaptive, machine-learning–based method and associated computing system for generating personalized

assistive torque in powered gait assistance systems (e.g., exoskeletons and orthotic devices). The method employs a multilayer perceptron (MLP) trained on sensor data collected from multiple individuals using powered gait assistance systems, including data that may be pre-processed through attention mechanisms and recurrent neural networks. Once trained, the model processes real-time sensor inputs from a new user to generate predicted torque values tailored to that individual's gait dynamics, or alternatively, to generate a predicted gait cycle for the user in which a specific torque profile is applied. These predicted torque values are applied directly to a motor in the powered gait assistance system, enabling adaptive assistive torque between mechanical arms or joints. The approach allows rapid personalization without extensive manual tuning or user-specific recalibration. The technology uses sensor data and a trained neural network to predict and apply individualized torque profiles, enabling more natural, efficient, and responsive gait assistance across users with varying biomechanics.

This Notice is in accordance with 35 U.S.C. 209 and 37 CFR Part 404 and the intellectual property rights have been assigned to the Government of the United States of America.

NIH Reference Number: E-121-2013.

Product Type: Powered gait assistance systems for robotic orthotic devices, powered orthoses, and exoskeleton devices and methods of control.

Therapeutic Area(s): Gait assistance systems.

Potential Commercial Applications:

- Lower-limb exoskeletons for mobility assistance.
- Rehabilitation robotics for neurological or orthopedic conditions.
- Assistive devices for aging or mobility-impaired populations.
- Wearable robotic devices for load-bearing assistance in military or industrial applications.

Competitive Advantages:

- Personalized assistance without lengthy calibration.
- Improved gait naturalness and user comfort.

- Scalable across users and device platforms.
- Compatible with real-time sensor data streams.

Patent Status: A PCT application was filed on September 20, 2024.

Development Stage: Prototype

Collaboration Opportunity: Researchers at the CC seek licensees for powered gait assistance systems and associated computing environments and methods of control in certain fields of use.

Dated: February 10, 2026.

Richard U. Rodriguez,

Associate Director,

Technology Transfer Center,

National Cancer Institute.

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