TECHNOLOGY

Noninvasive Neural Decoding of Human Bipedal Locomotion

OVERVIEW

In the past two decades, significant advancements have been made in the development of wearable robots or “exoskeletons” for medical rehabilitation training (restoration of walking and running after spinal cord injury, for example), and for motor performance enhancement applications in which the exoskeleton is not permanently integrated with the body (e.g. “super soldiers”). However, while the evolution of exoskeleton hardware has proceeded at a rapid pace, controlling these devices has lagged significantly behind.

Researchers at the University of Maryland have proposed a novel method for noninvasive decoding of human bipedal locomotion from scalp electroencephalography (EEG) signals that can achieve brain-machine confluence. By continuously extracting and decoding signals, the new method gives a user greater functionality of exoskeleton movement. This improved functionality has benefits for disabled users, allowing paralyzed individuals to walk, move sideways, and go up and down stairs, and for users looking for motor performance enhancement capabilities.

Advantages
- Allows for a continuous exchange of neural signals, achieving brain-machine confluence
- Improves functionality of wearable exoskeletons
- Decreases training time needed for BMI-based exoskeletons

Applications
- May be used in patients with severe neurological or muscular damage to regain or improve bipedal locomotion
- May be used for motor performance enhancement (e.g. “super soldiers”)
- May be used to remotely control walking robots in space or on Earth

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Additional Information

INSTITUTION

University of Maryland, College Park

PATENT STATUS

Patent(s) pending

LICENSE STATUS

Available for exclusive or non-exclusive license

CATEGORIES

- Microelectronics
- Robotics

EXTERNAL RESOURCES

- US Patent 9,468,541

PS-2010-072