

An Implantable Electrocorticogram (Ecog)-Brain-Computer Interface System For Restoring Lower Extremity Movement And Sensation

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BRIEF DESCRIPTION

A fully implantable brain-computer interface (BCI) system that enables direct brain control of lower extremity prostheses to restore walking after neural injury.

FULL DESCRIPTION

This technology presents a fully implantable electrocorticogram (ECoG)-based brain-computer interface (BCI) system designed to restore motor function and sensation in individuals with lower extremity paralysis, such as those caused by spinal cord injury. The system acquires and analyzes brain signals directly from the brain's surface to generate real-time control commands for prosthetic devices like robotic gait exoskeletons or functional electrical stimulation systems. The implantable design eliminates bulky external components and reduces reliance on non-invasive systems, offering a practical and power-efficient solution that maximizes patient independence and quality of life.

SUGGESTED USES

- » Neuroprosthetics for restoring lower limb movement and sensation.
- » Robotic gait exoskeleton control for individuals with spinal cord injury or paralysis.
- » Functional electrical stimulation (FES) systems for rehabilitation and mobility.
- » Medical devices aimed at improving quality of life and independence for paraplegic patients.
- » Advanced implantable neurotechnology for brain-controlled assistive devices.

ADVANTAGES

- » Fully implantable and miniaturized design for long-term use without external bulky hardware.
- » Ultra-low power consumption with low heat dissipation.
- » High channel count enabling rich, high-resolution brain signal acquisition.
- » Real-time internal signal processing for intuitive brain control of prosthetic devices.
- » Wireless transmission of control commands while minimizing exposure to harmful radio frequencies.
- » Subcutaneous coupling of electrodes and processor to protect brain and tissue from external interference.
- » Improves reliability and usability compared to non-invasive BCI systems.

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OTHER INFORMATION

KEYWORDS

Brain-Computer Interface (BCI), Electrocorticogram (ECoG), Ultra-Low Power (ULP), Amplifier Array, Integrated Circuits, Electroencephalography, Voltage Measurement

CATEGORIZED AS

- » **Biotechnology**
 - » Health
- » **Medical**
 - » Devices
 - » Disease: Central Nervous System
 - » Rehabilitation
- » **Sensors & Instrumentation**

PATENT STATUS

Country	Type	Number	Dated	Case
United States Of America	Issued Patent	11,278,226	03/22/2022	2016-344
Patent Cooperation Treaty	Published Application	WO 2018/068013	04/12/2018	2016-344

RELATED CASES

2016-344-0

RELATED MATERIALS

» Mahajan, A., et al. Heydari, P. (2015). A 64-channel ultra-low power bioelectric signal acquisition system for brain- computer interface. IEEE BioCAS. - 10/22/2015

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