Brain Imaging and Stimulation Devices for Rehabilitating Damaged Peripheral Nervous System

Published date: May 16, 2019

Technology description

Interface Couples Brain Imaging and Stimulation to Aid in Upper Limb Function in Stroke Patients

This Brain Computer Interface (BCI) system uses brain imaging and stimulation devices to rehabilitate the peripheral nervous system. In the United States alone, over 600,000 people a year suffer from non-fatal strokes. Strokes are the leading worldwide cause of long-term disabilities, and the number of affected people increases each year. Upper extremity complications are common following strokes and their healing often proves more difficult than that of lower extremity complications. No established method exists that restores upper limb function to normal following a stroke. University of Florida researchers have developed a brain imaging device and a stimulation device to aid in neuro-rehabilitation by training stroke survivors to enhance the self-regulation of certain neural circuits.

Technology

This closed-loop Brain Computer Interface comprises both functional Near Infrared Spectroscopy (fNIRS) for brain imaging and a Functional Electrical Stimulation (FES) device to generate artificial body movements. fNIRS is preferred to traditional brain imaging machinery, such as an EEG or MRI due to its greater speed, portability, and affordability. The fNIRS device monitors specific brain activity and allows the training of stroke patients to enhance the self-regulation of these neural circuits and evaluate the effects of this intervention to brain function and structural connectivity. The FES device then stimulates the muscles corresponding to brain activity in the targeted brain areas. This creates a closed-loop feedback system that includes the brain, the fNIRS, the FES device, and afferent nerves.

Application area

Brain Computer Interface uses brain imaging and stimulation devices to aid in upper limb rehabilitation for stroke survivors

Advantages

Uses functional Near Infrared Spectroscopy, increasing portability and affordability
Is compact and portable, increasing productivity

Institution

University of Florida

Inventors

Ranganatha Sitaram
Assistant Professor
Laboratory for Brain-Machine Interfaces and Neuromodulation
Aniruddh Ravindran
OPS Employee
BIOMEDICAL ENGINEERING
Janis Daly
Full Professor
NEUROLOGY
Mohit Rana
Post-Doctoral Associate

叶先生

电 话：021-65679356

手 机：13414935137

邮 箱：yeyingsheng@zf-ym.com