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A system for unattended delivery of cognitive neuromodulation therapy

Non-invasive interactive system with specialized equipment and customizable stimulation unit to deliver unattended cognitive neuromodulation therapy. The system supports training of prescribers and clinical staff leading to certification

IP Status: PCT Application Filed

Applications

- Cognitive neuromodulation treatments for compulsive behavior disorders such as depression and drug addiction

Key Benefits & Differentiators

- **Unattended treatment delivery:** the system is connected to the internet to support real-time treatment monitoring and adjustments. Computer vision techniques and facial recognition algorithms are used to verify a patient's identify, proper placement of electrodes, continuous presence of the patient and their attention to provided tasks
- **Customizable treatment:** specialized equipment and stimulation unit connects to a server, which delivers treatment with prescribed parameters such as frequency and length
- **Certification for prescribers and clinical staff:** through online interactive training and testing of the platform, which leads to certification
- **Easy progress monitoring and evaluation of continuity of care:** A summary of each treatment session is maintained on the server, where it can be shared with the prescriber/clinical staff as medical records via electronic transfer

Technology Overview

Compulsive behavior disorders such as thoughts, urges, or behaviors that persist despite negatively affecting health, job, or relationships are considered complex brain disorders. Examples of such conditions include drug addiction, alcohol abuse and depression. Despite the prevalence of these psychiatric conditions in the modern world, current treatments mostly involve pharmaceutical interventions, which is not always beneficial to the patient. Recently, two new therapy treatments have received significant attention, electrical brain stimulation and cognitive treatments, which involve passing an electrical current over a user's head and requiring the person to repeatedly practice a cognitive training task such as a memory game, respectively. For enhanced results, these two approaches can be combined into one treatment, often defined as cognitive neuromodulation therapy. Unfortunately, the delivery of these two treatments combined is currently limited because patients are not able to administer these treatments unattended.

To address this problem, researchers at the University of Minnesota have developed a system to deliver unattended cognitive neuromodulation therapy. This system includes basic equipment such as computer, camera, microphone, keyboard, and a screen as well as a customized neuromodulation stimulation unit and electrode cap. The appliances communicate wirelessly with the stimulation unit,controlling the timing and intensity of the stimulation

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Category
Engineering & Physical Sciences/Design Specifications
Life Sciences/Human Health
Life Sciences/Medical Devices
Life Sciences/Therapeutics

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delivered, synchronizing with the training tasks, and monitoring the current delivered. This novel system is connected to a server, which stores and delivers the prescribed treatment parameters such as frequency or length. A camera is used in conjunction with computer vision techniques and facial recognition algorithms to verify a patient's identity, ensure proper placement of the electrode cap, and assess patients presence and engagement throughout each treatment session. A summary of each treatment session is stored on the server and can be shared with the prescriber/clinical staff as medical records. This novel system also supports online training of healthcare professionals leading to a certification. All together, this novel system constitutes an effective, simple, user-friendly option to deliver at-home cognitive neuromodulation therapy treatments for patients suffering from compulsive psychiatric disorders.

Phase of Development

TRL: 4-6

A prototype has been developed.

Desired Partnerships

This technology is now available for:

- License
- Sponsored research
- Co-development

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Researchers

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