PURDUE INNOVATES | Office of Technology Commercialization

High-Resolution, Selective and Self-Optimizing Haptic and Electrotactile Display and Methods of Use

A scalable, high-resolution, self-optimizing haptic and electrotactile display offers personalized, reproducible sensory feedback for applications across medical, military, and consumer electronics sectors.

In the age of touch screens and attempting to make sensory information more useful, there are technologies that are designing realistic, usable haptic and electrotactile displays. However, these technologies have issues, such as lack of day-to-day reproducibility, an inability to reproduce multicomponent sensory stimuli and making it more realistic, and the inability to scale the technology.

To solve these problems, Purdue University researchers have developed a scalable, high-resolution, self-optimizing haptic and electrotactile display that provides sensory information to users. This is done through electrical stimulation of mechanoreceptors and proprioceptors, in isolation or combination, through the skin or an implantable interface, using electrodes with modules commonly used in haptic and digital displays.

Compared to currently available technologies, this innovation has a more personalized interface that improves its performance daily; it works with external or implantable haptic, electrotactile, or combination interfaces; it is scalable with cost, type, intensity, and resolution of sensation; it can predict sensory feedback by using stimulus parameters and physiologic responses; and it connects subjective experience with the hardware/software. These features allow potential use of this technology in the medical field through sensory restoration, remote surgery, sensory substitution, exposure therapy, rehabilitation therapy, cognitive behavioral therapy, physical therapy, and virtual reality. It can be used in the armed forces during aviation, navigation, combat, stealth communication, and virtual reality. In addition, it can be used for consumer electronics, marketing, apparel, navigation, and virtual reality.

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Artificial Intelligence & Machine Learning/Reinforcement & Federated Learning

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Advantages:

-High sensory feedback

-Uses both external and implantable interface

-Personalized interface

Potential Applications:

-Medical/Health

-Remote surgery

-Therapy

-Virtual reality

TRL: 6

Intellectual Property:

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