MetroHealth Medical Center

RESEARCH DAY 2023
Abstract Submission Form

Poster Title: **An Operator-centric Design of an Avatar System using Digital Nerve Stimulation**

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Location of Laboratory: **MetroHealth OBC**

Category: **Physical Medicine and Rehabilitation**

The Human Fusions Institute (HFI) team participated in the 2021 All Nippon Airways (ANA) Avatar XPRIZE Semifinals as a collaboration between Case Western Reserve University, Cleveland State University, and the University of California, Los Angeles. The primary aim of the HFI team was to provide an immersive, multimodal, seamless teleoperation experience to the operator of a remote robotic system. The robotic system consisted of a Stretch RE1 mobile manipulator with a TASKA prosthetic hand outfitted with tactile sensors. The operator was presented with a low latency, binocular video stream displayed through a VR headset, bidirectional audio capabilities, an electrical stimulation-based haptic feedback glove, and intuitive controls based on motion tracking of the operator's hand and body. The goal of the Human Fusions Institute (HFI) team was to create an immersive avatar-like, teleoperation system that would enable an operator to seamlessly embody a robot through intuitive full-body controls and multimodal feedback in telehealth mock scenarios like wound dressing. This poster describes the system architecture, human interface, and lessons learned from implementing a novel, electrical stimulation-based telerobotic system designed for an operator's natural phenomenological experience.