Student Research Short: Wearable Computing for Physical Rehabilitation
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According to the National Library of Medicine, more than 50% of the US population is affected by musculoskeletal impairments, making it the nation's leading cause of disability. During Physical Rehabilitation, a patient undergoes treatment including instructions to perform exercises at home; however, patients often forget to or incorrectly perform the exercises thereby hindering recovery.

The proposed research seeks to use wearable computing technology to create a system that detects exercise performance, sends collected data to the physician, and provides immediate feedback to the patient. The team is exploring how they can provide effective client feedback to increase patient performance and self efficiency. Currently, the team is exploring light and haptic feedback which have shown high success rates in similar settings. Considering haptic feedback, the team has implemented vibration motors to send "push" signals that mimic the guidance of a physical therapist pushing patient motions into correct positioning. Considering visual feedback, the team implemented a circular arrangement of lights that guide the patient in the direction associated with where on the circle the light is illuminated.

To test ideas, we have conducted pilot studies where users performed simple predetermined exercises while receiving visual or haptic feedback from prototypes. Next, we plan to conduct a study where we can test a prototype combining visual and haptic feedback. Ultimately, a final product would consist of a wearable device that can read a patient's data to provide immediate feedback to the patient and summarized feedback to the physician.