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An Integrated Robotic and Virtual Mirror Therapy System for Stroke Rehabilitation

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Abstract

Stroke affects approximately 2% of the population, and with advances in modern technology, more patients are surviving the event and requiring rehabilitation, placing further demand on already stretched medical systems. Because of this, an emergent area of research has arisen, investigating the use of robotics as a means to aid in the rehabilitation of patients affected by stroke. Projects such as the MIT Manus have provided evidence of the efficacy of robotic rehabilitation for stroke patients, but further research is required to provide ongoing improvements to this approach.

Further to this, mirror therapy, a treatment initially found to be useful in the treatment of phantom pain syndrome in amputees, has also shown promise in the rehabilitation of stroke, though further research into the mechanisms behind mirror therapy need further investigation.

A novel prototype robotic rehabilitation system was developed to investigate the integration of these two emergent approaches to stroke rehabilitation as a more comprehensive approach to stroke rehabilitation. This system was developed around a small industrial robot, utilising motion capture and force feedback for control of the robot with a virtual mirror therapy system to provide visual stimulation for the patient.

The operation of the prototype was verified, however further development is required to produce a system suitable for patient trials. Areas that require further investigation include the virtual mirror therapy system, and an improved approach to achieving real time operation of the system.

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Related Publications

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