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## An Overview of Rehabilitation Robotic Technologies

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### **ABSTRACT OF THE TALK**

The demand for rehabilitation services is growing apace with the graying of the population. According to the World Health Organization (WHO), senior citizens at least 65 years of age will increase in number by 88% in the coming years. By 2050 the US's contingent of seniors is expected to double from 40 to 80 million. With these increases comes increased incidence of age-related diagnoses including cerebral vascular accident (stroke). Some respite from stroke may result if pharmacological agents are successfully developed to preserve vessel patency, to protect neurons and to stimulate neosynaptogenesis. However, if that should happen, an increase in stroke survival rates may well increase the number of stroke victims in need of rehabilitation services. The need is even more pressing if we consider the many neurological injuries other than stroke. This situation creates both a need and an opportunity to deploy technologies such as robotics to assist recovery.

Robotics can revolutionize rehabilitation medicine by harnessing technologies to assist, enhance, and quantify recovery. Unlike prior work which used robotics as an assistive technology for the disabled (conceptually, a "smart" crutch), therapeutic robotics uses the technology to support and enhance clinicians' productivity as they try to facilitate a disabled individual's recovery. Therapy robots are a new class of



interactive clinical tools for evaluating patients and delivering meaningful therapy (e.g., via engaging “video games.”) Robotic and information technologies enable an overdue transformation of rehabilitation clinics from pre-industrial manual operations to technology-rich activities.

Applications of robots to therapy are fairly recent. A MEDLINE search prior to 1990 will show no papers on robotic therapy (as defined above). In the last five years, the field of robotic therapy has seen sustained rapid growth particularly in recent years.