Physical Rehabilitation Assessment based on Smart Training Equipment and Mobile APPs

Abstract:

Several studies demonstrated the limited access to patient-related information during decision-making, and limited or no information provided by training equipment during the rehabilitation process, which can be used by the physiotherapists for objective evaluation of the rehabilitation. The paper will focus on the state-of-the-art of smart training equipment for physical therapy and will include also a set of developed solutions for motor activity monitoring architectures that combines sensors embedded in standard training equipment and APPs for mobile devices. The implemented APPs provide appropriate information for physiotherapist about the patient health record, training outputs through computed metrics associated with the interaction between patient and the multi-sensory equipment during rehabilitation sessions. The developed multi-sensory systems combine different sensing technologies expressed by piezoresistive and ferroelectret film force sensors, MEMS inertial sensors and microwave Doppler radar sensors are used to sense the equipment training equipment may permit to perform comparisons between different training sessions through the rehabilitation outcome measures. Elements regarding the signal processing associated with measurement channels, and systems' GUI APPs for as part of electronic health record for physiotherapy is also included in the paper.