UW CENTER FOR
PATTERN ANALYSIS AND MACHINE INTELLIGENCE

GRADUATE SEMINAR SERIES

Automated Rehabilitation Exercise Motion Tracking

Speaker: Jonathan Feng-Shun

Date: March 13, 2013

Time: 4:30 pm – 5:00 pm

Place: E5 (5128) Refreshments will be served

Abstract :

Current physiotherapy relies on visual observation of the patient for diagnosis and assessment. The assessment process can potentially be automated to improve accuracy and reliability. This work proposes a method to recover patient joint angles utilizing small and lightweight body-worn sensors via the extended Kalman filter (EKF). The forward kinematics of the body is utilized as the measurement model. The state and measurement models are used to estimate the position, velocity and acceleration of each joint, updated based on the sensor inputs. A feature-guided hidden Markov model (HMM) based algorithm is developed for performing the segmentation. Motion segment candidates are found by scanning the observed data for velocity-based features, such as peaks and crossings, which match the pre-determined motion templates. These segment potentials are passed into the HMM for template matching. The proposed algorithms were verified experimentally on a dataset consisting of 20 healthy subjects performing rehabilitation exercises.

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