MISSOURI S&T
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Distinguished Seminar Computer Science

Proactive Health Management Using In-Home Sensing and Recognition Technology

Dr. Marjorie Skubic, UM-Columbia

Feb 25th Tuesday, 12:30 to 1:20pm

Computer Science 209

Abstract - Dr. Skubic will describe ongoing interdisciplinary research in the Center for Eldercare and Rehabilitation Technology, investigating the use of in-home sensing and machine learning to detect early signs of illness and functional decline, as a strategy towards proactively managing chronic health conditions. The sensor network includes a variety of sensors such as passive infrared motion sensors and a new hydraulic bed sensor that captures quantitative pulse, respiration, and restlessness while positioned under the mattress. In addition, fall detection and gait analysis systems are being developed using vision, radar, acoustic arrays, and the Microsoft Kinect depth camera. Sensor networks were installed in senior housing in Cedar Falls, Iowa, and will also be installed in 70 mid-Missouri senior homes as part of a new NIH study. Automated health change alerts are generated and sent to the clinical staff, based on recognized changes in the sensor data patterns. Systems will be installed in Kansas City homes this year through a new NSF project that will leverage the Google fiber network and GENI architecture.

The talk will focus on challenges in signal processing and machine learning for two sensing systems: (1) the hydraulic bed sensor system and (2) the Microsoft Kinect as used for capturing falls and gait parameters from depth images and tracking fall risk. Case studies will be shown from several senior apartments.

Brief Bio - Marjorie Skubic received her Ph.D. in Computer Science from Texas A&M University, where she specialized in distributed telerobotics and robot programming by demonstration. She is currently a Professor in the Electrical and Computer Engineering Department at the University of Missouri-Columbia with a joint appointment in Computer Science. In addition to her academic experience, she has spent 14 years working in industry on real-time applications such as data acquisition and automation. Her current research interests include sensory perception, computational intelligence, spatial referencing interfaces, human-robot interaction, and sensor networks for eldercare.