



Spring 2011 Colloquium

Temple University

Computer and Information Sciences

Activity Recognition and 3D Lower Limb Tracking with an Instrumented Walker

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Wednesday 1/26, 11am, Wachman Hall 447

Abstract

Wheeled walkers are popular mobility aids used by older adults to improve balance control. There is a need to automatically recognize the activities performed by walker users to better understand activity patterns, walking abilities and the context in which falls are more likely to happen. In the first part of this talk, I will describe feature extraction, supervised and unsupervised techniques for hidden Markov models (HMMs) and conditional random fields (CRFs) to recognize walker related activities. In the second part of this talk, I will describe a particle filtering approach that implicitly recovers depth information to estimate 3D poses of the lower limbs without doing explicit stereo matching. Finally, a comprehensive evaluation with control subjects and walker users from a retirement community will be presented. This work is done in collaboration with a multidisciplinary research team at the University of Waterloo, the Toronto Rehabilitation Institute and UW-Schlegel Research Institute for Aging.

Bio

Pascal Poupart is an Associate Professor in the David R. Cheriton School of Computer Science at the University of Waterloo, Waterloo (Canada). He received the B.Sc. in Mathematics and Computer Science at McGill University, Montreal (Canada) in 1998, the M.Sc. in Computer Science at the University of British Columbia, Vancouver (Canada) in 2000 and the Ph.D. in Computer Science at the University of Toronto, Toronto (Canada) in 2005. His research focuses on the development of algorithms for reasoning under uncertainty and machine learning with application to Assistive Technologies, Natural Language Processing and Information Retrieval. He is most well known for his contributions to the development of approximate scalable algorithms for partially observable Markov decision processes (POMDPs) and their applications in real-world problems, including automated prompting for people with dementia for the task of handwashing and spoken dialog management. Other notable projects that his research team are currently working on include a smart walker to assist older people and a wearable sensor system to assess and monitor the symptoms of Alzheimer's disease.

Pascal Poupart received the Early Researcher Award, a competitive honor for top Ontario researchers, awarded by the Ontario Ministry of Research and Innovation in 2008. He was also a co-recipient of the Best Paper Award Runner Up at the 2008 Conference on Uncertainty in Artificial Intelligence (UAI) and the IAPR Best Paper Award at the 2007 International Conference on Computer Vision Systems (ICVS). He is a member of the editorial board of the Journal of Artificial Intelligence Research (JAIR) and the Journal of Machine Learning Research (JMLR). His research partners include Google, Intel, the Alzheimer's Association, the UW-Schlegel Research Institute for Aging, Sunnybrook Health Science Centre and the Toronto Rehabilitation Institute.

