Colloquium

Department of Computer Science

Dr. Banafsheh Rekabdar

Banafsheh Rekabdar is a PhD candidate at the computer science and engineering department at the University of Nevada, Reno since August 2013. Her research interests are artificial intelligence, machine learning, and Data mining. Due to her excellence in her distinguished academic accomplishments and leadership abilities in University of Nevada, Reno she won the outstanding computer science and engineering thesis of the year award of 2016, the first place winner of graduate student association research paper competition of 2016, the outstanding computer science and engineering graduate student of the year award of 2015, outstanding international graduate student award of 2014, 2015, and 2016, differential fee fellowship of Engineering department of 2015 and Nevada Women's Fund Scholarship of 2014. Her research outcomes have been published in premiere venues (more than 18 publications in 4 years). Banafsheh Rekabdar is also actively serving the research community. She has served as a session chair of IJCAI conference, and as reviewer for different journals and conferences, including AAMAS, IJCAI, IROS, IJARS, and IJCARS. She is also a member of IEEE, ACM, SWE, WISCE, AAAS, and the honor society of Phi Kappa Phi.

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11:00 AM
Guyon Auditorium, Morris Library

Spike Timing Neural Network meets Learning, Recognizing and Early Classification of Spatio-Temporal Patterns

Abstract

Learning and recognizing spatio-temporal patterns is an important problem for all biological systems. Gestures, movements, activities, all encompass both spatial and temporal information that is critical for implicit communication and learning. In this talk I will focus on Spike timing neural networks, a biologically inspired machine learning technique that has attracted great attention in both academia and industry due to its great potential in many domains, such as speech, vision, and language understanding. I will demonstrate a novel, unsupervised approach for learning, recognizing and early classifying spatio-temporal patterns using spiking neural networks for human-robotic domains. The proposed spiking approach has five variations which have been validated on images of handwritten digits and human hand gestures and motions. The main contributions of this work are as follows: i) it requires a very small number of training examples, ii) it enables early recognition from only partial information of the pattern, iii) it learns patterns in an unsupervised manner, iv) it accepts variable sized input patterns, v) it is invariant to scale and translation, vi) it can recognize patterns in real-time and, vii) it is suitable for human-robot interaction applications and has been successfully tested on a PR2 robot.