INVITED SPEAKER SEMINAR

AT THE CONCORDIA INSTITUTE FOR INFORMATION SYSTEMS ENGINEERING

Friday, November 17, 2017 at 11:00 am
Room EV011.119

"In-Bed Pose Estimation: Deep Learning with Shallow Dataset"

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ABSTRACT

Deep learning approaches have been rapidly adopted across a wide range of fields because of their accuracy and flexibility. They provide highly scalable solutions for problems in object detection and recognition, machine translation, text-to-speech, and recommendation systems, all of which require large amounts of labeled data. This presents a fundamental problem for applications with limited, expensive, or private data (i.e. small data), such as healthcare. One example of these applications with the small data challenges is human in-bed pose estimation. In-bed poses provide information about the health state of the person and accurate recognition of these poses can lead to better diagnosis and predictive care. In this talk, I present the idea of using a small (limited in size and different in perspective and color) dataset collected from in-bed poses to retrain a convolutional neural network (CNN), which was pre-trained on general human poses. We showed that classical fine-tuning principle is not always effective and the network architecture matters. For the specific human pose estimation CNN, our proposed fine-tuning model demonstrated clear improvement over the classical ones when applied on sleeping poses.

BIOGRAPHY

Sarah Ostadabbas is an assistant professor at the Electrical and Computer Engineering Department of Northeastern University (NEU). Sarah joined NEU from Georgia Tech, where she was a post-doctoral researcher following completion of her PhD at the University of Texas at Dallas in 2014. At NEU, Sarah has recently formed the Augmented Cognition Laboratory (ACLab) with the goal of enhancing human information-processing capabilities through the design of adaptive interfaces via physical, physiological, and cognitive state estimation. These interfaces are based on rigorous models adaptively parameterized using machine learning and computer vision algorithms. Sarah has over five years of experience developing human-machine interaction technologies successfully bridging artificial intelligence (AI) and human intelligent amplification (IA) fields. With the support of an NSF SBIR grant in 2013, as the PI, she was involved in the commercialization of a decision-support software/interface to prevent pressure ulcers in bed-bound patients by suggesting a resource-efficient posture changing schedule. Professor Ostadabbas is the co-author of more than 40 peer-reviewed journal and conference articles, and is an inventor on two US patent applications. She is a member of IEEE, IEEE Women in Engineering, IEEE Signal Processing Society, IEEE EMBS, IEEE Young Professionals, and ACM SIGCHI.

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