Representation Learning and Image Synthesis for Deep Face Recognition

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When: August 6th, 2018 10:00 AM
Where: EB 3105

Abstract:

Face recognition has been advanced a lot in recent years thanks to the development of deep neural networks. The large intra-class variations in pose, illumination, and expression (PIE) are the long-standing challenges. Learning a discriminative representation that is robust to these intra-class variations is the key for deep face recognition. In the scenarios of extreme profile pose, or long-tail training dataset, data augmentation is needed either in image-level or feature-level. In this dissertation, we will present three different methods to handle these challenges. First, we explore multi-task Convolutional Neural Network (CNN) for face recognition that aims to leverage side tasks to learn discriminative features. Second, we propose a Face Frontalization-Generative Adversarial Network (FF-GAN) that can generate a frontal-view face image from an input image with arbitrary pose even up to 90°. Third, a feature transfer learning method is demonstrated for deep face recognition with long-tail data.