香港浸會大學理學院
HKBU Faculty of Science

DEPARTMENT OF COMPUTER SCIENCE

PhD Degree Oral Presentation

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Time:	19 January 2012 (Thursday) 2:30 pm – 4:30 pm (35 mins presentation and 15 mins Q & A)
Venue:	FSC1111, Fong Shu Chuen Library, HSH Campus

"Face Recognition from Video"

Abstract

With the increasing installation of camera devices in many areas, there is an increasing demand on the applications of Face Recognition from Video (FRfV) and more and more attention has been paid to FRfV. Comparing to the existing still image based recognition technique, FRfV encounters new challenges when the videos are used as input. The face region from the video is often small, in view of the fact that the face is not close to the camera when the video is captured. Some of the research issues, such as illumination / pose variations, become more challenging when the face region is small. In this thesis, three key research issues are discussed and addressed.

First, a feature, namely the Gradient Logarithmic Field (GLF) feature, has been proposed for tracking face in low resolution videos with illumination changes. The proposed feature is global dense feature and does not require fitting a face model, so it is effective in low resolution videos. And it reduces the illumination variance and mainly depends on the intrinsic characteristic of the face, so it is insensitive to lighting changes. Integrating GLF feature on particle filter framework, the GLF tracker is proposed to address the face tracking problem on low-resolution video with illumination changes. Second, the very low resolution (VLR) face recognition problem – that is the face to be recognized is less than 16x16 pixels – is discussed and addressed by the proposed relationship learning based super-resolution approach. In this approach, a linearity clustering algorithm is proposed to reduce the relationship learning complexity. After linear clustering, a regression relationship learning algorithm is developed for super-resolution. Based on the relationship learning framework, the new data constraint and the discriminative constraint are designed for good visual application and face recognition application, respectively. It is noted that the proposed method is the first super-resolution algorithm which utilizes the class label information to improve the recognition performance. Third, comparing to single still image based face recognition, multiple images from the videos are available. How to utilize the multiple images is a key research issue. Two new face image measurements, namely discriminability index (DI) for reference images and reliability index (RI) for testing images, is proposed to measure the matching quality of the face image to improve the multi-image based face recognition. DI and RI are developed by using not only the information from one single image, but also the whole distribution of the data. This helps to better utilize multiple images from recognition perspective.

Our experimental results are shown that, our proposed approaches can effectively solve the mentioned problems and out-perform the-state-of-the-art approaches.

***** ALL INTERESTED ARE WELCOME *****