香港浸會大學理學院
HKBU Faculty of Science

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DEPARTMENT OF COMPUTER SCIENCE

PhD Degree Oral Presentation

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Time:	22 June 2016 (Wednesday) 10:30 am – 12:30 pm (35 mins presentation and 15 mins Q & A)
Venue:	RRS732, Sir Run Run Building, HSH Campus

"Multi-Cue Visual Tracking: Feature Learning and Fusion"

Abstract

Visual tracking is an important and active research topic in computer vision community because of its wide range of applications, e.g., intelligent video surveillance, human computer interaction and robotics. Although it has been extensively studied in the last two decades, it still remains to be a challenging problem due to many appearance variations caused by occlusion, pose, illumination and so on. Different visual cues (features) are able to account for different variations and the use of multiple features could compensate the limitations of each feature and provide better performance. Therefore, to tackle these challenges from appearance variations, a promising direction is to properly use multiple visual cues in appearance modeling. Along this direction, we propose appearance models for multi-cue visual tracking and address several related issues in feature learning and fusion.

In order to extract uncontaminated discriminative features from multiple visual cues, this thesis proposes a robust joint discriminative feature learning framework for multi-cue appearance modeling. The proposed feature learning model is capable of removing corrupted/contaminated features, imposing discriminability into the learned features and exploiting the consistent and feature-specific discriminative information from multiple visual cues, which is a joint optimal framework to take advantages of both generative and discriminative tracking approaches.

To dynamically select and fuse appropriate features for more robust appearance modeling, considering that fusion on feature level contains more information than that in score level, this thesis proposes a novel feature-level fusion model based on joint sparse representation for multi-cue visual tracking in which feature selection, fusion and representation are performed jointly so that unreliable features which do not share the same sparsity pattern as reliable features are removed and reliable features are fused for representation.

To obtain a more accurate fused representation of multiple features, this thesis proposes a novel multiple-sparse-representation model which explicitly models the commonality and diversity in the representations of multiple visual cues for feature fusion, which lead to more informative representations with multiple features. To facilitate the close matching between the tracked target and the template, a novel online metric learning algorithm is proposed to adaptively incorporate the proximity constraint, which further enhance the tracking accuracy.

The experimental results demonstrate the effectiveness of the proposed methods.

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