香港浸會大學理學院
HKBU Faculty of Science

DEPARTMENT OF COMPUTER SCIENCE

PhD Degree Oral Presentation

PhD Candidate:	Ms Baoyao YANG
Date	29 August 2018 (Wednesday)
Time:	10:30 am - 12:30 pm (35 mins presentation and 15 mins Q & A)
Venue:	RRS732, Sir Run Run Shaw Building, HSH Campus

"Distribution Alignment for Unsupervised Domain Adaptation: Cross-domain Feature Learning and Synthesis"

Abstract

In recent years, many machine learning algorithms have been developed and widely applied in various applications. However, most of them have considered the data distributions of the training and test datasets to be similar. This thesis concerns on the decrease of generalization ability in a test dataset when the data distribution is diff t from that of the training dataset. As labels may be unavailable in the test dataset in practical applications, we follow the effective approach of unsupervised domain adaptation and propose distribution alignment methods to improve the generalization ability of models learned from the training dataset in the test dataset.

To solve the problem of joint distribution alignment without target labels, we propose a new criterion of domain-shared group sparsity that is an equivalent condition for equal conditional distribution. A domain-shared group-sparse dictionary learning model is built with the proposed criterion, and a cross-domain label propagation method is developed to learn a target-domain classifier using the domain-shared group-sparse representations and the target-specific information from the target data. Experimental results show that the proposed method achieves good performance on cross-domain face and object recognition.

Moreover, most distribution alignment methods have not considered the diff in distribution structures, which results in insufficient alignment across domains. Therefore, a novel graph alignment method is proposed, which aligns both data representations and distribution structural information across the source and target domains. An adversarial network is developed for graph alignment by mapping both source and target data to a feature space where the data are distributed with unified structure criteria. Promising results have been obtained in the experiments on cross-dataset digit and object recognition.

Problem of dataset bias also exists in human pose estimation across datasets with diff ent image qualities. Thus, this thesis proposes to synthesize target body parts for cross-domain distribution alignment, to address the problem of cross-quality pose estimation. A translative dictionary is learned to associate the source and target domains, and a cross-quality adaptation model is developed to refine the source pose estimator using the synthesized tar- get body parts. We perform cross-quality experiments on three datasets with diff t image quality using two state-of-the-art pose estimators, and compare the proposed method with fi e unsupervised domain adaptation methods. Our experimental results show that the pro- posed method outperforms not only the source pose estimators, but also other unsupervised domain adaptation methods.

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