GUODONG DING

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RESEARCH INTEREST

My current research interest is **video understanding** with deep networks, *i.e.,* Temporal Action Segmentation. I am also interested in learning with weak forms of supervisions, which includes fully-/semi-/un-supervised approaches.

EMPLOYMENT

School of Computing, National University of Singapore   October 2020 - Present
Research Fellow   *Adviser: Prof. Angela Yao*

· I started working on video understanding related topics, primiarily on temproal action segmentation with weak or semi-supervision.

Computer Vision Team, QCT, Qualcomm   June 2019 - September 2019
Intern   *Adviser: Xuan Zou*

· On-site internship in Qualcomm Shanghai, working on a intern project which focuses on improving the eatimator by incorporating human body articulation constraints. Proposed a Spatial Refinement Structure which sets constraint on both heatmap prediction and the offset between them.

EDUCATION

Nanjing University of Science and Technology (NJUST)

School of Computer Science and Engineering (CSE)

- Doctor of Philosophy (Ph.D.)   *September 2013 - January 2020*
  • Supervisor: Prof. Zhenmin Tang, Guangyi Bai
  • Research areas: Person Re-identification, Image Retrieval
  • Theis: Research on Deep Learning based Person Re-identification Methods under Different Supervisions
- Bachelor of Engineering (B. Eng.)   *September 2009 - June 2013*
  • Supervisor: Prof. Zhenmin Tang
  • Cumulative GPA: 3.64 / 4.0
  • Thesis: Content based Commodity Image Retrieval

PROJECTS

- Spatial Refinement Structure for Human Pose Estimation

Existing human pose estimator mainly adopt the heatmap prediction scheme, however, such scheme ignores the strong articulations of human parts. A spatial refinement structure is proposed to play a refinement role to improve the accuracy of the estimator. The refinement structure takes as input the heatmap predictions and applies softargmax to obtain maximum location (forming better predictions) and calculates the offset between them (considering the articualtion). This structure enables an end-to-end learnable framework.

- Re-ID Dataset Building

We design to build a brand-new person re-identification dataset, which is the largest-scale as far as we know. This dataset is challenging as its largest number of identities (5774) and cameras (26), number of images per identity (avg. 39) as well as time span.

- Validity Guided Clustering with a Dispersion Criterion

Clustering can be used to perform unsupervised person re-ID, but requires some adaptation. This project is aimed at finding a new criterion which matches the inherent characteristics of data. A dispersion based clustering approach is proposed to consider both inter- and intra-cluster variances for a valid cluster merging. Experiments demonstrate its effectiveness and stability.

- Modal Regularization with Pseudo-labeled GAN Images

The project aims at adopting GAN generated unlabeled data for a better and robust representation learning. Using the feature affinity between unlabeled sample and labeled clusters in the feature space to assign pseudo-labels on-the-fly for training. Other than that, a unified framework for two possible encodings is proposed.

- Complementary Representation Digging with Feature Selection

A Siamese-like network architecture together with a connecting mask network is proposed. Mask network takes one branch as guidance and force the other to learn a complementary representation with a pairwise ranking loss imposed. Attention visualization shows complementary property of learned representations.

RESEARCH EXPERIENCE

Australian National University   February 2017 - November 2017
Visiting Scholar   *Adviser: Prof. Fatih Porikli*

· On-site researching under the supervision of Prof. Fatih Porikli. Initiated my study on deep learning. Learned and implemented various basic models and approaches in the field of person re-identification.

The Hong Kong Polytechnic University   November 2015 - February 2017
Research Assistant   *Adviser: Prof. Calvin Wong*

· Worked for a joint research project of POLYU and HKRITA aiming at performing real-time fabric defect detection. Took part in designing the hardware framework and defect detection algorithm implementation.

PUBLICATIONS

Preprints

- **Temporal Action Segmentation: An Analysis of Modern Technique,**
  Guodong Ding, Fadime Sener, and Angela Yao
- **Towards better Validity: Dispersion based Clustering for Unsupervised Person Re-identification,**
  Guodong Ding, Salman Khan, Zhenmin Tang, Jian Zhang and Fatih Porikli

Journal Articles

- **Temporal Action Segmentation with High-level Complex Activity Labels,**
  Guodong Ding and Angela Yao
  *IEEE Transactions on Multimedia (**T-MM**)*, 2022. [PDF]
- **Feature Mask Network for Person Re-identification**,
  Guodong Ding, Salman Khan, Zhenmin Tang, and Fatih Porikli
  *Elsevier Journal of Pattern Recognition Letters (**PRL**)*, 2020. [PDF]
- **Feature Affinity based Pseudo Labeling for Semi-supervised Person Re-identification**,
  Guodong Ding, Shanshan Zhang, Salman Khan, Zhenmin Tang, Jian Zhang, and Fatih Porikli
  *IEEE Transactions on Multimedia (**T-MM**)*, 2019. [PDF]

Conference Papers

- **Leveraging Action Affinity and Continuity for Semi-supervised Temporal Action Segmentation,**

Guodong Ding and Angela Yao
*European Conference on Computer Vision (**ECCV**)*, 2022. [PDF]

- **Dispersion based Clustering for Unsupervised Person Re-identification,**
  Guodong Ding, Salman Khan, and Zhenmin Tang
  *British Machine Vision Conference (**BMVC**)*, 2019. [PDF]
- **Center based Pseudo-Labeling for Semi-supervised Person Re-identification,**
  Guodong Ding, Shanshan Zhang, Salman Khan, and Zhenmin Tang
  *Multimodal Biometrics Learning Workshop, IEEE International Conference on Multimedia and Expo (**ICME**), San Diego, USA*, 2018. [PDF]