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SUMMARY

Weihong Li is currently a research associate (postdoc) within the VICO Group led by Dr. Hakan Bilen in the School of Informatics at the University of Edinburgh. His research interests are in computer vision and machine learning, with a focus on multi-task/domain learning and learning visual models from limited human supervision. Before Edinburgh, he has completed his master and bachelor at Sun Yat-sen University, working with Prof. Wei-Shi Zheng. During the master program, he has visited Queen Mary University of London to work with Prof. Shaogang Gong.

EDUCATION

UNIVERSITY OF EDINBURGH *2022.08 - present*

RESEARCH ASSOCIATE IN SCHOOL OF INFORMATICS, WORKING WITH HAKAN BILEN

UNIVERSITY OF EDINBURGH *2018.09 - 2022.08*

PHD STUDENT WORKING ON COMPUTER VISION AND MACHINE LEARNING IN SCHOOL OF INFORMATICS

- ***Supervisor***: Hakan Bilen, Timothy Hospedales
- ***Research Interests***: Multi-task Learning, Semi-supervised Learning, Meta-learning

QUEEN MARY UNIVERSITY OF LONDON *2017.10 - 2018.04*

VISITING MASTER STUDENT WORKING ON VIDEO SEARCH

- ***Supervisor***: Shaogang Gong, Wei-Shi Zheng

SUN YAT-SEN UNIVERSITY *2011.09 - 2018.07*

B.Sc & M.Sc

- ***Supervisor***: Wei-Shi Zheng *GPA*: 3.8/4.0
- ***Research Interests***: Important People Detection, Object Tracking, Person Re-ID, Machine Learning

PROJECTS

CROSS-TASK/DOMAIN LEARNING *2018.09 - present*

- In this project, we look at the problem of learning a single set of universal representation for multiple tasks/domains (Li *et al*., Preprint 2022), *i.e*. a single model that tackles multiple tasks or is used for multiple domains. We propose to distill the knowledge from single-task networks to the multi-task network with the help of the proposed task-specific adapters (Li *et al*., ECCVW 2020). We then introduce to use CKA similarity as the knowledge distillation function to distill the knowledge from diverse domain-specific models to a multi-domain model such that the multi-domain learning model performs well on all domains (Li *et al*., ICCV 2021).

LEARNING FROM LIMITED LABELS *2018.09 - present*

- In this project, we aim at developing algorithms to enable deep models to learn from limited labeled data. We first propose a meta-learning method for semi-supervised learning where we learn a image classfication model from limited labeled and a large amount of unlabeled data by learning the model to impute labels for unlabeled data such that a model learned on such imputed labels achieves good performance on a hold-out set (Li *et al*., Preprint 2019). We then focus on learning multiple dense prediction tasks on partially annotated data by leveraging relations between task pairs (Li *et al*., CVPR 2022a). Unlike the above work that includes unlabeled data for learning, we consider a more practical setting where only limited labels are available, *i.e*. cross-domain few-shot learning, and we propose to attach light-weight adapters to the pretrained model residually to efficiently adapt the model to previously unseen tasks by learning the attached adapters on very few labeled samples (Li *et al*., CVPR 2022b).

IMPORTANT PEOPLE DETECTION & VIDEO HIGHLIGHT DETECTION *2016.04 - 2020.05*

- In this project, we focus on developing models to automatically detect important people from images and detect important clips from videos, *i.e*. Video Highlight Detection. We first introduce a graphical model, *i.e*. PersonRank, to construct graphs to model relations among people and rank the importance of people from the graphs (Li *et al*., FG 2018). We then develop a deep model that automatically learns relations among people to detect important people, *i.e*. namely POINT (Li *et al*., CVPR 2019) and we further introduce a semi-supervised learning approach to enable POINT to learn from partially annotated data (Hong *et al*., CVPR 2020). Apart from important people detection, we also propose a multiple instance learning approach to learn the video highlight detection model from web (unlabeled) data (Hong *et al*., ECCV 2020).

Person Re-identification (Person Re-id) *2015.09 - 2018.07*

• In the person re-id project, our goal is to develop algorithms that can efficiently learn from large scale data and can be efficiently applied to real-world system. We proposed a matrix sketch based method that enables person re-id models to learn on streaming data (Li *et al*., PR 2019). We proposed a correlation filter framework for one-step person search (Li *et al*., ICIG 2017, Best Paper Award).

SELECTED PUBLICATIONS

- **Wei-Hong Li**, Xialei Liu, Hakan Bilen, "Universal Representations: A Unified Look at Multiple Task and Domain Learning", Preprint, 2022.
- Yu-Kun Qiu, Fa-Ting Hong, **Wei-Hong Li**, Wei-Shi Zheng, "Learning Relation Models to Detect Important People in Still Images", Transactions on Multimedia (TMM), 2022.
- **Wei-Hong Li**, Xialei Liu, Hakan Bilen, "Learning Multiple Dense Prediction Tasks from Partially Annotated Data", Proceedings of International Conference on Computer Vision and Pattern Recognition (CVPR), 2022. **Best Paper Finalist** (33/8161)
- **Wei-Hong Li**, Xialei Liu, Hakan Bilen, "Cross-domain Few-shot Learning with Task-specific Adapters", Proceedings of International Conference on Computer Vision and Pattern Recognition (CVPR), 2022.
- **Wei-Hong Li**, Xialei Liu, Hakan Bilen, "Universal Representation Learning from Multiple Domains for Few-shot Classification", Proceedings of International Conference on Computer Vision (ICCV), 2021.
- **Wei-Hong Li**, Chuan-Sheng Foo, Hakan Bilen, "Learning to Impute: A General Framework for Semi-supervised Learning". (Preprint)
- **Wei-Hong Li**, Hakan Bilen, "Knowledge Distillation for Multi-task Learning", Proceedings of European Conference on Computer Vision Workshop on Imbalance Problems in Computer Vision (ECCVW), 2020.
- Fa-Ting Hong, Xuanteng Huang, **Wei-Hong Li**, Wei-Shi Zheng, "MINI-Net: Multiple Instance Ranking Network for Video Highlight Detection", Proceedings of European Conference on Computer Vision (ECCV), 2020.
- Fa-Ting Hong*, **Wei-Hong Li***, Wei-Shi Zheng, "Learning to Detect Important People in Unlabelled Images for Semi-supervised Important People Detection", Proceedings of International Conference on Computer Vision and Pattern Recognition (CVPR), 2020.
- **Wei-Hong Li***, Fa-Ting Hong*, Wei-Shi Zheng, "Learning to Learn Relation for Important People Detection in Still Images", Proceedings of International Conference on Computer Vision and Pattern Recognition (CVPR), 2019.
- **Wei-Hong Li**, Zhuowei Zhong, Wei-Shi Zheng, "One-pass Person Re-identification by Sketched Online Discriminant Analysis", Pattern Recognition, 2019.
- **Wei-Hong Li**, Benchao Li, Wei-Shi Zheng, "PersonRank: Detecting Important People in Images", Proceedings of International Conference on Automatic Face and Gesture Recognition (oral), 2018.
- **Wei-Hong Li**, Yafang Mao, Ancong Wu, Wei-Shi Zheng, "Correlation based Identity Filter: An Efficient Framework For Person Search", Proceedings of International Conference on Image and Graphics (oral, Best Paper Award), 2017.
- Yuting Mai, **Wei-Hong Li**, Yongyi Tang, Xixi Bi, Wei-Shi Zheng, "Sketch metric learning", Proceedings of International Joint Conference on Neural Networks, 2016.
- Zhaoyu Lu and Ziqi Luo and Huicheng Zheng and Jikai Chen and **Wei-Hong Li**, "A Delaunay-Based Temporal Coding Model for Micro-expression Recognition", Proceedings of Asian Conference on Computer Vision, 2014.

Awards

- CVPR 2022 Best Paper Finalist (33/8161)
- IGS PhD scholarship at University of Edinburgh
- Academic Excellence Award at Sun Yat-Sen University (2011-2018)
- Student Fellowship from the Royal Society Advanced Newton Fellowship Program and the Natural Science Foundation of China
- Best Paper Award at ICIG 2017
- First and Second Prize at Chinese RoboCup Competition (2013-2014)

Workshop/Conference Organization, and Service

- Reviewer at ICCV'21, CVPR'22, ECCV'22, Neurips'22, WIMF workshop, TMM.
- Universal Representations for Computer Vision (URCV) Workshop at BMVC 2022.

Academic Activities

- International Conference on Computer Vision (ICCV), 2021
- European Conference on Computer Vision (ECCV), 2020
- International Conference on Computer Vision and Pattern Recognition (CVPR), USA, 2019, 2021, 2022
- Informatics Workshop (Meta-Learning), UK, 2020
- Amazon Research Day, UK, 2019
- International Conference on Automatic Face and Gesture Recognition (FG), China, 2018

Teaching

- Image and Vision Computing (IVC), 2018-19
- Machine Learning Practical (MLP), 2018-19, 2019-20, 2020-21

Skills & Others

Programming Languages Python | Matlab | C++
Deep Learning Framework Pytorch | MatConvNet
Languages Mandarin | Teochew Dialect | English
Hobbies Workout | Badminton | Gongfu Tea | Reading