Kai Tian

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EDUCATION

Fudan University, Ph.D. (2014.9 – Present)
- Computer Science: Deep Learning, Cooperation and competition in Neural Ensemble Learning
- Advisor: *Shuigeng Zhou*

East China University of Science and Technology, B.A. (2010.9 – 2014.6)
- Information and Computing Science: GPA: 3.85
- Selected coursework: Numerical optimization · convex optimization

OVERVIEW

I am a final year CS Ph.D. student at Fudan University. My research focus has primarily been on unsupervised learning and semi-supervised learning. I am also interested in exploring the cooperation and competition among neural network ensembles.

EXPERIENCE

University of North Carolina at Charlotte, North Carolina USA
Visiting Scholar, supervised by *Jianping Fan* (2017.9 – 2018.9)
Mainly focus on how to boost the performance of ensemble models for image classification and how to enlarge the model capacity to adapt more classes with a small cost. Our solution for the first problem is to specialize these models and incorporates GAN into each model to deal with the overconfident issue of out-of-distribution samples.

MANUSCRIPTS

Kai Tian, Shuigeng Zhou. Training Hierarchical Multi-head Multiple Choice Ensemble with Deep Networks. (Work in Progress)

Kai Tian, Yi Xu, Shuigeng Zhou. Network as Regularization: A General Approach for Incorporating Semantic Uncertainty to Labels. (Submitted to NeurIPS 2019)

PUBLICATIONS

Yi Xu, **Kai Tian**, Longwen Gao, Shuigeng Zhou. Non-local ConvLSTM for Video Compression Artifact Reduction. In *Proceedings of the IEEE Conference on Computer Vision*. (ICCV 2019).

Kai Tian, Yi Xu, Jihong Guan, Shuigeng Zhou. Versatile Multiple Choice Learning and Its Application to Vision Computing. In *Proceedings of the IEEE Conference on Computer Vision and Pattern Recognition*. (CVPR 2019).

Kai Tian, Shuigeng Zhou, Jianping Fan, Jihong Guan. Learning Competitive and Discriminative Reconstructions for Anomaly Detection. In *Thirty-Third AAAI Conference on Artificial Intelligence* (AAAI 2019). Spotlight.

Fan Wu, **Kai Tian**, Shuigeng Zhou. Global Semantic Consistency for Zero-Shot Learning. arXiv preprint arXiv:1806.08503

Kai Tian, Shuigeng Zhou, and Jihong Guan. DeepCluster: A General Clustering Framework Based on Deep Learning. In *Joint European Conference on Machine Learning and Knowledge Discovery in Databases*. Springer, Cham, 2017: 809-825.

Xiaoxiong Zheng, Yang Wang, **Kai Tian**, Jihong Guan, Shuigeng Zhou. Fusing multiple protein-protein similarity networks to effectively predict lncRNA-protein interactions. *BMC bioinformatics* 18.12 (2017): 420

Kai Tian, Mingyu Shao, Jihong Guan, Shuigeng Zhou. Boosting compound-protein interaction prediction by deep learning. In *IEEE International Conference on Bioinformatics and Biomedicine* (BIBM 2015).

PROJECTS

Few-shot Object Detection This project is cooperated with military research institute. We aim to provide state-of-the-art few-shot (one-shot) object detection system for real-world applications.

One-Class-Learning Provided implementations of state-of-the-art one-class learning algorithms in Python. Including traditional PCA-based methods, Auto-encoder methods, deep energy models and our work on semi-supervised one-class learning.

GAN-Clustering Explored some GAN-based clustering methods, including CatGAN, AAE-based clustering as well as our investigations of GANs on clustering tasks.

Collaborative-Learning Showed that each model in the ensembles can simultaneously learn from each other through an additional distillation loss (Cross-Entropy, KL-Divergence, etc.) during the training process. It is different from classical knowledge distillation that a pre-trained teacher model is needed. This learning scheme improves the generalization ability of individual members as well as the ensembles.

Deep-Structured-Classifier Provided some implementations of structured classifiers on deep neural networks. Including deep neural decision forest and hierarchical softmax.

Document-Layout-Analysis: Document layout analysis system for reading materials pictures such as test papers taken by the cameras. Based on traditional DLA algorithms, we used deep object detection models such as YOLO to extract specific regions that are useful for users.

TEACHING

Fudan University
Teaching Assistant: Data Structure and Algorithm Design, 2017

Fudan University
Teaching Assistant: C Language Programming, 2016

HONORS AND AWARDS

Outstanding Ph.D. Students	(2016)
First-class Academic Scholarship	(2015 - 2017)
Second Place of Car Plate Deblur Competition	(2016)
Outstanding Graduates	(2014)
First-class Scholarship	(2013,2014)
National Scholarship	(2012)
National Encouragement Scholarship	(2011)

PROGRAMMING SKILLS

Deep learning softwares: Pytorch (Proficient), Torch
Languages: Python, C, Java, MATLAB