

Yongcheng Liu | Ph.D. candidate

Computer Vision

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National Laboratory of Pattern Recognition, Institute of Automation, Chinese Academy of Sciences

Education

Ph.D. candidate in Artificial Intelligence

School of Artificial Intelligence, University of Chinese Academy of Sciences, Beijing, China 2015–2020

B.E. in Control Technology and Instrument

School of Automation, Huazhong University of Science and Technology, Wuhan, China 2011–2015

Research Interests

3D point cloud processing, image segmentation, multi-label image recognition and object detection driven by deep learning.

Experience

Sensetime - Research Intern in Computer Vision 2017.11–2018.06

Project 1: Real-time Scene Recognition

- Highlights: core accomplisher (90%), ten millions level of data, thousands of labels, weakly-supervised detection
- Summary: Plain classification model has difficulty in locating multiple objects thus is less effective. Weakly-supervised detection can locate informative regions while not requiring laborious object-level annotations. A practical cross-task knowledge distillation framework is proposed to distill the unique knowledge from a weakly-supervised detection model into the classification model, such that the latter is improved significantly.

Project 2: Model Compression

- Highlights: core accomplisher (90%), network slimming, channel pruning, MobileNet v2
- Summary: Compressing deep model for real-time scene recognition. MobileNet v2 (56ms on Qualcomm Snapdragon 845) is pruned by 50% (reaching 24ms) in channels with performance only dropping 1 percent, by applying network slimming technique.

Competition

2017.05: ISPRS 2D Semantic Labeling Challenge

Double Champion

- Highlights: independent achievement, international, image segmentation, remote sensing
- Summary: Segmenting remote sensing images in five classes, including diverse roofs, small cars and threadlike vegetations, etc. A novel self-cascaded CNN is proposed to coherently segment the size-varied objects from global to local, while precisely segment the fine-structured objects from coarse to fine, reaching 91.1% in overall accuracy and winning 1st places in two sub-contests.

2018.11: Princeton ModelNet40 Benchmark

1st Place

- Highlights: independent achievement, international, 3D point cloud, shape classification
- Summary: Classifying 3D CAD models into 40 classes with point cloud data. A novel relation-shape CNN is proposed by forcing the convolution kernel to learn from geometric relation among points, resulting in much shape awareness as well as good robustness, and winning 1st place in point cloud-based methods.

2017.07: The 1st Eye Cup Challenge

2nd Place

- Highlights: captain, core accomplisher (80%), Chinese, object detection, remote sensing

- Summary: Detecting five kinds of targets from remote sensing images, including various harbors, small storages and dense boats, etc. The Single Shot Detector (SSD) is improved by multi-context learning to robustly recognize the style-varied harbors, while accurately detect small and dense targets, winning 2nd place in the challenge.

2017.10: Chinese Conference on Computer Vision (CCCV): Remote Target Extraction Challenge **4th Place**

- Highlights: captain, core accomplisher (80%), Chinese, object detection, remote sensing
- Summary: Detecting small planes and dense ships obscured by clouds from remote sensing images. The Single Shot Detector (SSD) is redesigned by introducing low-level details to detect the unrecognizable targets, winning 4th place in the challenge.

Publications

CONFERENCES

[C-1]: Yongcheng Liu, Bin Fan, Shiming Xiang, and Chunhong Pan. Relation-Shape Convolutional Neural Network for Point Cloud Analysis. In *IEEE Conference on Computer Vision and Pattern Recognition (CVPR, CCF A)*, **Best Paper Finalist**, pages 8895-8904, 2019.

[C-2]: Yongcheng Liu, Lu Sheng, Jing Shao, Junjie Yan, Shiming Xiang, and Chunhong Pan. Multi-Label Image Classification via Knowledge Distillation from Weakly-Supervised Detection. In *ACM International Conference on Multimedia (ACM MM, CCF A)*, pages 700-708, 2018.

[C-3]: Yongcheng Liu, Bin Fan, Lingfeng Wang, Jun Bai, Shiming Xiang, and Chunhong Pan. Context-Aware Cascade Network for Semantic Labeling in VHR image. In *IEEE International Conference on Image Processing (ICIP, CCF C)*, **Oral Presentation**, pages 575-579, 2017.

JOURNALS

[J-1]: Yongcheng Liu, Bin Fan, Lingfeng Wang, Jun Bai, Shiming Xiang, and Chunhong Pan. Semantic Labeling in Very High Resolution Images via A Self-Cascaded Convolutional Neural Network. *ISPRS Journal of Photogrammetry and Remote Sensing*. (IF = 6.942, SCI Top), vol.145, pp.78-95, Nov. 2018.

Awards

National Scholarship, 2014

National Scholarship for Encouragement, 2013

842 Alumni Scholarship, 2012

CASIA Climbing Scholarship, 2018

Technical Skills

- Computer Languages: MATLAB, Python, C/C++, L^AT_EX
- Deep Learning Platforms: PyTorch, Caffe, MXNet
- Operating Systems: Linux/Unix, Windows
- Productivity Tools: MATLAB, PyCharm, Microsoft Visual Studio, Vim