# 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 - Intern of Computer Vision Researcher**.........................................................................

**Project 1**: Real-time Scene Recognition

- Highlights: core accomplisher, 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, 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 accomplishment, 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 $1^{st}$ places in two sub-contests.

**2018.11**: Princeton ModelNet40 Benchmark          **$1^{st}$ Place**

- Highlights: independent accomplishment, 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 $1^{st}$ place in point cloud-based methods.

**2017.07**: The $1^{st}$ Eye Cup Challenge          **$2^{nd}$ Place**

- Highlights: captain, core accomplisher, 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 2$^{nd}$ place in the challenge.

**2017.10**: Chinese Conference on Computer Vision (CCCV): Remote Target Extraction Challenge **4$^{th}$ Place**
- Highlights: captain, core accomplisher, 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 4$^{th}$ 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**), **Oral** Presentation, pages 1-10, 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 = 5.994, SCI Top**), vol.145, pp.78-95, Nov. 2018.

## Technical Skills

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