Yuan Liu

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Date of Birth	27th Nov. 1993	**Homepage**	liuyuan-pal.github.io

Education/Work

2018-Now **RA in State Key Lab of CAD&CG, Zhejiang University**
Advisor: Prof. Xiaowei Zhou

2015-2018 **M.Sc. in Photogrammetry and Remote Sensing, LIESMARS, Wuhan University**
Advisor: Prof. Bisheng Yang

2011-2015 **B.Eng. in Geodesy and Geomatics Engineering, School of Geodesy and Geomatics, Wuhan University**
Grades during undergraduate study: GPA: 3.80/4.0 Rank: 2/406

Research Experience

Jan. 2019 – Now **Research on group invariant local descriptor**
Project Leader
- Extend normal convolution to group convolution.
- Use group CNN and bilinear pooling to extract group invariant feature

Dec. 2018 – Now **Research on registration of extreme object scan**
Project Member
- Register two scans without overlap using shape priors
- Use a CNN on spherical map to inpaint a partial scan
- Solve rotation via SO3 cost volume

Jun. 2018 – Jan. 2019 **Research on 6D object pose estimation by direction field.**
Project Leader
- Propose a direction field based representation for keypoints localization.
- Outperform state-of-the-art on LINEMOD and YCB dataset.

Sep. 2017 - May. 2018 **Research on semantic segmentation of point cloud based on GCN**
Master dissertation
- Design convolution and pooling operator for point cloud.
- Propose a network called PCSNet.
- Achieve 1st on S3DIS benchmark and 2nd on Semantic3D benchmark

Mar. 2016 - Nov. 2016 **Research on a novel local binary feature for road information extraction in MLS**
Project Leader
- Design a robust Binary Kernel Descriptor (BKD) using kernel weighting.
- Use BKD to detect road marking and road curb from MLS data.

Sep. 2015 - Mar. 2016 **Research on multi-level features for road facilities recognition in MLS.**
Project Member

- Extract and aggregate different multiple level features of point cloud
- Use features for recognition of road aside facilities and road surface

Feb. 2015 - Sep. 2015 **Research on automatic registration of multi-sites TLS data.**
Project Member
- Extraction of semantic feature for correspondence estimation
- Match two sets of triangles under the constraint of congruent triangles
- Global optimization via minimum spanning trees

Work/Competition

Apr. 2017 – Aug. 2017 **Internship in Microsoft XiaoIce team, image Sense Group.**
- Train a CNN to recognize human facial expression.
- Writing a program for face swapping between emoji and selfie image.
- Research on GANs for face editing.

Nov. 2016 – Apr. 2017 **Kaggle competition, national conservancy fisheries monitoring.**
Final Grade: Rank: 27/2293 (top 2%)
- Fish detection using a Single Shot Multi-box Detector (SSD).
- Fish categories classification by a deep model (GoogLeNet).

May. 2015 – Jun. 2018 **Development and Maintenance of Point2Model.**
Project Member
- A software for automatic and semi-automatic map production from point clouds..
- Incorporated with all algorithms proposed in our ISPRS papers

Publications/Proceedings

- GIFT: Learning transformation-invariant dense visual descriptors via group CNNs.
  Yuan Liu, Zehong Shen, Zhixuan Lin, Sida Peng, Hujun Bao, Xiaowei Zhou.
  Under Review 2019.

- Registration of Object Scans via Spherical CNNs.
  Jiahui Lei, **Yuan Liu**, Srinath Sridhar, Hujun Bao, Xiaowei Zhou
  Under Review 2019.

- PVNet: Pixel-wise Voting Network for 6DoF Pose Estimation.
  Sida Peng*, **Yuan Liu***, Qixing Huang, Hujun Bao, Xiaowei Zhou.
  CVPR, 2019 (oral presentation). (equal contribution)*

- 3D local feature BKD to extract road information from mobile laser scanning point clouds
  Bisheng Yang, **Yuan Liu**, Zhen Dong, Fuxun Liang, Bijun Li, Xiangyang Peng.
  ISPRS Journal of Photogrammetry and Remote Sensing 2017.

- A novel binary shape context for 3D local surface description.
  Zhen Dong, Bisheng Yang, **Yuan Liu**, Fuxun Liang, Bijun Li, Yufu Zang.
  ISPRS Journal of Photogrammetry and Remote Sensing 2017.

- Computing multiple aggregation levels and contextual features for road facilities recognition using

mobile laser scanning data.
Zhen Dong, Bisheng Yang, **Yuan Liu,** Fuxun Liang, Yongjun Wang.
ISPRS Journal of Photogrammetry and Remote Sensing 2017.

- Using mobile laser scanning data for features extraction of high accuracy driving maps.
  Bisheng Yang, **Yuan Liu**, Fuxun Liang, Zhen Dong.
  ISPRS Annals 2016

- Automatic registration of large-scale urban scene point clouds based on semantic feature points.
  Bisheng Yang, Zhen Dong, Fuxun Liang, **Yuan Liu.**
  ISPRS Journal of Photogrammetry and Remote Sensing 2016.

Rewards

- National Postgraduate Scholarship in 2017 (for top 5% students)
- National Undergraduate Scholarship in 2013 (for top 5% students)

Skills

Programming Languages/Frameworks

- C/C++, C#, Python, MATLAB
- TensorFlow, Pytorch, CUDA

Relative Basics

- Machine Learning/Deep Learning
- Computer Vision (Multi-view Geometry)