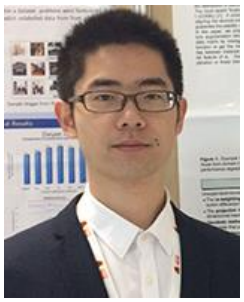
Xiaohu Lu



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Research Interests

My research interests lie in the areas of computer vision. I have done some work on: (1) image feature extraction, matching and reconstruction; (2) image stitching and panorama processing; (3) point cloud segmentation; (4) data clustering. In particular, I am now interested in machine learning and working on text detection as my Master Thesis.

Education

2014/9–Present **M. Eng.** in School of Remote Sensing and Information Engineering, Wuhan University
GPA: uncertain.

2010/9–2014/7 **B. Eng.** in School of Remote Sensing and Information Engineering, Wuhan University
GPA: 3.56/4.0.

Publications

In Progress

[1] Xiaohu Lu, Jian Yao, Li Li, Yahui Liu, and Wei Zhang. "PLinkage: Density Ascending Clustering via Pairwise Linkage", Submitted to **Pattern Recognition**, September 2016. (Under review)

Conferences

[2] Xiaohu Lu, Jian Yao, Xiaofeng Zhang, Haoang Li and Yahui Liu. "2-Line Exhaustive Searching for Real-Time Vanishing Point Estimation in Manhattan World", *IEEE Winter Conference on Applications of Computer Vision* (**WACV**), 2017.

[3] Xiaohu Lu, Jian Yao, Xiaofeng Zhang, Li Li and Yahui Liu. "MSEdge: A Multi-Scale Edge Chain Detector", Submitted to *Computational Visual Media Conference*(**CVM**), 2016.

[4] Xiaohu Lu, Jian Yao, Li Li, Yahui Liu, and Wei Zhang. "Edge Chain Detection by Applying Helmholtz Principle on Gradient Magnitude Map", *IAPR International Conference on Pattern Recognition* (**ICPR**),2016.

[5] Xiaohu Lu, Jian Yao, Jingge Tu and Kai Li. "Pairwise Linkage for Point Cloud Segmentation". *International Society for Photogrammetry and Remote Sensing* (**ISPRS**) Congress, 2016.

[6] Xiaohu Lu, Jian Yao, Kai Li, and Li Li. "CannyLines: A Parameter-Free Line Segment Detector", *IEEE International Conference on Image Processing* (**ICIP**), 2015.

[7] Xiaohu Lu, Jian Yao, Kai Li, Jinge Tu, Li Li and Kao Zhang. "NETLines: Recovering Line-Networks via Gradient -Based Line Segments Refinement", *IEEE International Conference on Information and Automation* (**ICIA**), 2015.

[8] Binbin Xiang, Jian Yao, Xiaohu Lu, Li Li, and Renping Xie. "Segmentation-Based Classification for 3D Urban Point Clouds", *IEEE International Conference on Information and Automation* (**ICIA**), 2016.

[9] Yahui Liu, Jian Yao, Kang Liu, Xiaohu Lu and Menghan Xia. "Optimal Image Stitching for Concrete Bridge Bottom Surfaces Aided by 3D Structure Lines", *International Society for Photogrammetry and Remote Sensing* (**ISPRS**) Congress, 2016.

[10] Li Li, Jian Yao, Xiaohu Lu, and Yong Ding. "A Robust System of Building Facades Extraction from Mobile LiDAR Data at Street Level", *The 9th International Symposium on Mobile Mapping Technology* (**MMT**), 2015.

[11] Kai Li, Jian Yao, and Xiaohu Lu. "Robust Line Matching Based on Ray-Point-Ray Structure Descriptor", *Asian*

Conference on Computer Vision Workshop on Robust Local Descriptors for Computer Vision (**ACCV-W**), 2014.

Journals

[12] Li Li, Jian Yao, Xiaohu Lu, Jinge Tu, and Jie Shan. "Optimal Seamline Detection for Multiple Image Mosaicking via Graph Cuts", **ISPRS Journal of Photogrammetry and Remote Sensing**, Volume:, Issue:, Page(s):, 2016. (Impact Factor: 3.132)

[13] Kai Li, Jian Yao, and Xiaohu Lu. "Hierarchical Line Matching Based on Line-Junction-Line Structure Descriptor and Local Homography Estimation", **Neurocomputing**, Volume:, Issue:, Page(s):, 2015. (Impact factor: 2.083)

Patents

Invention Patents

[1] Jian Yao, Xiaohu Lu and JingeTu. "A Point Cloud Segmentation System Based on Clustering Analysis", Application Number: CN201610269680.6 , 2016. (Under review)

[2] Jian Yao, Xiaohu Lu, Mengyi Chen and Li Li. "Street Building Facade Optimization Algorithm Based on Panorama Image", Application Number: CN201410751953.1, 2014. (Under review)

[3] Jian Yao, Shiyao Han, Ruiqian Zhang, Xiaohu Lu, Li Li and Yinxuan Li. "Ship Detection System based on Line Segment Frame", Application Number: CN201510332404.5 , 2015. (Under review)

Utility Patents

[4] Jian Yao, Renping Xie, Zhi Wan, Qifei Zeng and Xiaohu Lu. "Automatic Location System for Video Collection", Authorization Number: ZL201520299343.2 , 2015.

Research Experience

Text detection. 12/2016-present.

✧ Working on 4K video streams stitching via stitching line extraction.

✧ Proposed a self-calibration algorithm for fisheye lens.

Proposed a fast stitching line extraction algorithm based on super-pixel, edge saliency and the Dijkstra algorithm.

Panoramic video stitching. 6/2016-12/2016.

✧ Working on 4K video streams stitching via stitching line extraction.

✧ Proposed a self-calibration algorithm for fisheye lens.

✧ Proposed a fast stitching line extraction algorithm based on super-pixel, edge saliency and the Dijkstra algorithm.

Edge and multiscale edge detection. 3/2016-6/2016.

✧ Contribute a new definition to the Helmholtz Principle on edge detection.

✧ Proposed a unified frame to detect and validate both edge chain and line segment on the gradient map.

Proposed a fast multi-scale edge chain detector which can be applied on large size images.

Point cloud processing. 11/2015-3/2016.

✧ Proposed a point cloud segmentation via clustering analysis.

✧ Investigated algorithms for RGBD registration.

Bridge crack detection project. 5/2015-11/2015.

✧ Investigated algorithms for location and navigation via MEMS IMU.

✧ Investigated algorithms for POS-supported image matching.

✧ Investigated algorithms for virtual display via OSG.

Data clustering analysis. 3/2015-5/2015.

✧ Proposed a density ascending data clustering algorithm by a certain change.

Line segment detection. 10/2014-3/2015.

✧ Proposed a line segment detector based on the Canny detector and the Helmholtz Principle.

Street building facades extraction from LiDAR. 6/2014-10/2014.

✧ Proposed a street building facade optimization algorithm based on panorama image and LiDAR data.

- ✧ Proposed an algorithm for the translation from panorama to perspective image.

Line segment rebuilding. 3/2014-6/2014.

- ✧ Investigated algorithms for line segments rebuilding from images.
- ✧ Investigated algorithms for vanishing points detection under the Manhattan assumption.
- ✧ Accomplish the bachelor's degree thesis on line segment rebuilding based on vanishing point and line-networks.

Line-networks recovering on image. 10/2013-3/2014.

- ✧ Proposed a line-networks recovering algorithm via line extending, splitting, linking and merging.

Forest smokes and fires detection based on videos. 11/2012-6/2013.

- ✧ Developed an algorithm for automatically detecting forest smokes and fires from videos. The algorithm exploits intensity and color information of smokes and fires, and use background subtraction strategy to detect forest smokes and fires from videos.

Selected Awards

- ✧ **National Scholarship for Graduated Students,** Wuhan University, 2016.
- ✧ **China Aviation Aero Remote Sensing Scholarship**, Wuhan University, 2015.
- ✧ **Excellent Graduate Freshman Scholarship of Wuhan University**, 2014.
- ✧ **Outstanding Undergraduate Thesis**, Hubei Province, 2014 (ratio: 3/240+).
- ✧ **Excellent Undergraduate Students**, Wuhan University, 2012-2013.
- ✧ **Excellent Undergraduate Students**, Wuhan University, 2011-2012
- ✧ **Excellent Undergraduate Students**, Wuhan University, 2010-2011

Invited Talks

- ✧ “Edge Chain Detection by Applying Helmholtz Principle on Gradient Magnitude Map”, ICPR 2016, Cancun, 12/2016.
- ✧ “Pairwise Linkage for Point Cloud Segmentation”, XXIII ISPRS Congress 2016, Prague, 07/2016.
- ✧ “Edge & Multiscale Edge & Deep Edge”, Wuhan, 6/2016.
- ✧ “Point Cloud Segmentation”, Wuhan, 4/2016.
- ✧ “Clustering Analysis”, Wuhan, 1/2016.
- ✧ “On Edge and Line Segment Detection”, Wuhan, 7/2015.
- ✧ “Edge Detection”, Wuhan, 3/2015.
- ✧ “Line Segments in CV”, Wuhan, 10/2014.

Programming Skills

Languages: C++, C, Matlab, SQL, HTML.
Libraries: OpenCV, Qt, MFC, OSG, OpenGL, PCL

Language Proficiency

TOEFL (IBT): Reading 25, Listening 23, Speaking 17, Writing 21, Total 86