Rui Li

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- Date of Birth: 1994.02.03

EDUCATION

Northwestern Polytechnical University Xi'an, China
Phd candidate in Computer Science and Technology. Advisor: Prof. Yanning Zhang *2019.3-Present*
GPA: 93.5

Northwestern Polytechnical University Xi'an, China
M.S. in Computer Science and Technology. Advisor: Prof. Yanning Zhang *2016.9-2019.3*
GPA: 88.4 (2nd among 182 students)

Northwestern Polytechnical University Xi'an, China
B.S in Computer Science and Technology *2012.9-2016.6*
GPA: 83.9 (4th among 30 students)

RESEARCH EXPERIENCE

Self-supervised Learning for Single View Depth Estimation *2019.06 - 2020.02*
- Proposed novel gradient-based photometric loss to restrain the false supervisory signals caused by variant brightness under highly dynamic scenes.
- Proposed a novel combined selective mask leveraging both intra-loss and gradient-loss information, to filter out unreliable areas violating the motion assumption, such as moving objects like vehicles and pedestrians.
- Proposed a cycle-consistency constraint on ego-motion network using cross-frame relations, providing more robust supervision for more accurate estimation.

3D Reconstruction Software on Highly Blurred and Noisy Images *2018.06 - 2019.04*
- Designed an algorithm pipeline including image restoration, image enhancement and MVS algorithms specifically for 3D reconstruction and measuring on highly blurred and noisy images.
- Act as the only developer for designing and coding of the software. The software is written using C++, its visualization and measuring modules are realized by OpenGL and Qt 5.11.1.

Robust and Accurate Hybrid Structure-from-Motion *2018.1 – 2018.07*
- Proposed a novel Hybrid SfM pipeline integrating the strength of both conventional incremental and global SfM, to achieve better robustness, accuracy and efficiency.
- Proposed a novel robust subgraph construction algorithm for global SfM estimation using edge expansion strategy and loop consistency check.
- Proposed a community-based incremental SfM paradigm over the globally estimated result, which improves the accuracy and scalability toward state-of-the-art method.

3D Reconstruction and Pose Estimation on Highly Degraded Images *2016.12 - 2018.01*
- Served as the project leader to be responsible for the project application, development and conclusion. The project is supported by the *Seed Foundation of Innovation and Creation for Graduate Students of NWPU*.
- Designed the algorithm pipeline to recover the 3D structure and pose of target objects from highly blurred and low contrast images
- Developed the sparse and dense 3D reconstruction algorithms, and integrated different processing modules to construct a complete end-to-end software system.

Efficient and Robust Model Estimation Method *2017.03 - 2017.11*
- Proposed a novel sample consensus algorithm for outlier removal applications, which iteratively update the ranking of feature points for non-uniform sampling, in order to achieve faster convergence and higher model estimation accuracy.
- Proposed to constrain the algorithm to sample a wider range of points, to avoid possible degeneration in geometry estimation problems.

PUBLICATIONS

- **Rui Li**, Xiantuo He, Jinqiu Sun, Yu Zhu, Yanning Zhang. Enhancing Self-supervised Monocular Depth Estimation via Incorporating Robust Constraints. (*Will be available on ArXiv before May 20, 2020.*)
- **Rui Li**, Dong Gong, Jinqiu Sun, Ziwei Wei, Yu Zhu, Yanning Zhang. Robust and Accurate Hybrid Structure-from-Motion. *2019 IEEE International Conference on Image Processing* (*ICIP 2019*).
- **Rui Li**, Jinqiu Sun, Dong Gong, Yu Zhu, Haisen Li, Yanning Zhang. ARSAC: Efficient Model Estimation via Adaptively Ranked Sample Consensus. *Neurocomputing 2019*.
- Dong Gong, **Rui Li**, Yu Zhu, Haisen Li, Jinqiu Sun, Yanning Zhang. Blind Image Deblurring by Promoting Group Sparsity. *Neurocomputing 2018*.
- **Rui Li**, Jinqiu Sun, Yu Zhu, Haisen Li, Yanning Zhang. ARSAC: Robust Model Estimation via Adaptively Ranked Sample Consensus. *CCF Chinese Conference on Computer Vision 2017*.

PATENTS

- A 3D Reconstruction Method Based on Space Debris Images.
  Chinese Patent Application No. 201718003570.0
- A Fast Model Estimation Method Based on Adaptively Ranked Sampling.
  Chinese Patent Application No. 201710747495.8
- A 3D Reconstruction Method via Integrating Incremental and Global Estimation.
  Chinese Patent Application No. 201810902069.1

AWARDS AND ACHIEVEMENTS

- Excellent Master Graduate of Northwestern Polytechnical University (NWPU), 2019.
- Excellent Master's Thesis of Northwestern Polytechnical University (NWPU), 2019.
- Excellent report of The 16th Chinese Stereology and Image Analysis Conference, 2019.
- First Class Scholarship of NWPU in the academic year of 2015, 2016, 2017, 2018, 2019.
- First Class Social Activity Scholarship of NWPU in the academic year of 2017.
- Wu Yajun Scholarship of NWPU in the academic year of 2018.
- First Prize in Programming Contest of NWPU in 2015.
- Second Prize in NWPU Mathematical Contest in Modeling in 2015.
- Second Prize in Chinese "Star of Outlook" National English Talent Competition in 2013.
- Second Prize in National English Public Writing Contest in 2013.

PROFESSIONAL ACTIVITIES

- 2019.10.18   Give a talk at the Youth Forum of The 16th Chinese Stereology and Image Analysis Conference, Haikou, China.
- 2017.12.14   Give a talk at The International Doctoral Forum, Xi'an, China.
- 2017.10.13   Give a spotlight talk at CCF Chinese Conference on Computer Vision, Tianjin, China.
- Technical paper reviewer: IEEE Access, 2019 International Conference on Intelligent Science and Big Data Engineering.

KEY SKILLS

Programming Languages	C++, Python, Matlab, C
Software & Libraries	PyTorch, OpenCV, OpenGL, Qt, Latex, wxWidgets, Github, SVN
Language	TOFEL iBT 106 (Reading 29, Listening 29, Speaking 24, Writing 24)