Rui Li

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EDUCATION

Northwestern Polytechnical University **Xi'an, China**
Phd candidate in Computer Science and Technology. Advisor: Prof. Yanning Zhang *2019.3-Present*
Co-advised [*Romote*] *by Prof. Jianbo Shi* (*University of Pennsylvania*) *2020.5-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)

SELECTED PROJECTS

Semantic-guided Self-supervised Depth Estimation *2020.05 - 2020.11*
Two papers are under review for top CV conferences/journals. [*Project Page*]
This project explores how the semantics can be used for self-supervised depth estimation. A semantic branch is proposed providing extra contextual information to improve depth estimation.
- A semantic-guided representation enhancement method is proposed by enhancing the depth features with semantic contextual information in the global-to-local manner (https://arxiv.org/abs/2012.08048).
- A self-supervised depth estimation method is proposed which leverages both implicit and explicit semantics to improve category-level estimation accuracy and produce sharp depth borders.

Robust Self-supervised Monocular Depth Estimation *2019.06 - 2020.03*
One Paper Accepted by ACM Multimedia 2020 [*Project Page*]
- This project improves the robustness of self-supervised depth estimation via proposing a set of constraints unified in the final loss function, which enables the network to be robust against illumination change, moving objects as well as better utilizing sequential motion information.
- The proposed method achieved state-of-the-art performance across several depth estimation benchmarks. (https://dl.acm.org/doi/abs/10.1145/3394171.3413706)

Efficient and Robust Structure-from-Motion *2017.06 – 2019.01*
Two Papers Accepted by ICIP 2019 and Neurocomputing 2019 [*Project Page*]
This project focus on the accurate and efficient estimation of 3D structure of the scene. Progresses have been made in the topic of robust estimation and new SfM pipeline.
- A novel variant of RANSAC method is proposed to efficiently conduct robust estimation by adaptively ranked sample consensus strategy. (*Paper Link*)
- A new hybrid SfM pipeline is proposed which combines the advantages of both global and incremental SfM to conduct robust and accurate estimation. (*Paper Link*)

3D Reconstruction and Pose Estimation on Highly Degraded Images *2017.1 - 2018.01*
Served as project leader of Seed Foundation of Innovation and Creation for Graduate Students of NWPU. The project has been applied to industrial products.
This project aims to recover the 3D shape and 6-DoF pose from the highly degraded images (blurry, noisy and low resolution images). Both algorithm pipeline and software system are created for real-world application.
- Designed a 3D processing pipeline involving multiple algorithm modules to alleviate the impact of high image quality degradations during 3D reconstruction and pose estimation.
- Implement both sparse and dense 3D reconstruction algorithms for degraded images, and integrated different processing modules to construct an applicable software system (Created by Qt platform with C++).

PUBLICATIONS

- **Rui Li**, Xiantuo He, Danna Xue, Shaolin Su, Qing Mao, Yu Zhu, Jinqiu Sun, Yanning Zhang. Learning Depth via Leveraging Semantics: Self-supervised Monocular Depth Estimation with Both Implicit and Explicit Semantic Guidance. *arXiv preprint 2021.*
- **Rui Li**, Qing Mao, Pei Wang, Xiantuo He, Yu Zhu, Jinqiu Sun, Yanning Zhang. Semantic-Guided Representation Enhancement for Self-supervised Monocular Trained Depth Estimation. *arXiv preprint: 2012.08048, 2020.*
- **Rui Li**, Xiantuo He, Jinqiu Sun, Yu Zhu, Yanning Zhang. Enhancing Self-supervised Monocular Depth Estimation via Incorporating Robust Constraints. *ACM International Conference on Multimedia 2020.*
- Pei Wang, Wei Sun, Qingsen Yan, Axi Niu, **Rui Li**, Yu Zhu, Jinqiu Sun, Yanning Zhang. Non-uniform Motion Deblurring with Blurry Component Divided Guidance. *Submitted to Pattern Recognition.*
- **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 Robust Self-supervised Monocular Depth Estimation Method. (No. 2020110573490)
- A 3D Reconstruction Method Based on Space Debris Images. (No. 2017180035700)
- A Fast Model Estimation Method Based on Adaptively Ranked Sampling. (No. 2017107474958)
- A 3D Reconstruction Method via Integrating Incremental and Global Estimation. (No. 2018109020691)

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)