






Yu Chen

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EDUCATION

♥ **Research Master.** Department of Computer Science and Technology, Peking University. 2017.09-now(graduate in 2020.07 as expected)

- ▶ Major: Computer Software and Theory
- ▶ I joined the 3D reconstruction group of [Graphics and Interactive Laboratory](#) since Sep 2017 in Peking University, and collaborate with [Shuhan Shen](#). I'm supervised by [Yisong Chen](#) currently.
- ▶ Relevant Coursework: 3D Reconstruction Based on Images and Videos (A+), Computer Vision Theory, Models and Methods (B+), Graphic Computation (A+).

♥ **Bachelor.** Software College, Beihang University. 2013.09-2017.06

- ▶ Major: Software Engineering.
- ▶ Relevant Coursework: Advanced Mathematics (97/100), Linear Algebra (87/100), Software Engineering (91/100).

INTERNSHIP EXPERIENCE

[TuSimple Co., Ltd.](#) Research Intern, Localization and Mapping Group 2019.04 - 2019.07

- ▶ I took part in the research of globally optimal optimization approaches (currently on globally optimal rotation averaging). I'm supervised by [Ji Zhao](#).
- ▶ I improved global rotation averaging approach by x100 times in efficiency, without precision loss compared with state-of-the-art in large scale datasets.
- ▶ I make the global rotation averaging optimization approach practicable in SLAM backend.

[Beijing Megvii Co., Ltd.](#) 3D Vision Algorithm Intern, SLAM Group 2018.09 - 2018.12

- ▶ I implemented a mobile-based real-time 3D reconstruction framework utilizing the raw images and depth images as input.
- ▶ I applied depth fusion-based approach for front-end reconstruction, multi-view based approach for backend texture mapping.

RESEARCH EXPERIENCE & PUBLICATIONS

★ Yu Chen, Shuhan Shen, Yisong Chen, Guoping Wang. [Graph-Based Parallel Large Scale Structure from Motion](#). (In submission to Pattern Recognition 2020)

- ▶ My work as first author in improving the efficiency and robustness of large scale Structure from Motion, where SfM can be executed in parallel mode or distributed mode. The efficiency of our algorithm (named GraphSfM) is one magnitude faster than state-of-the art SfM approaches in sequential mode and can be further improved with more servers.
- ▶ I designed and implemented the images clustering algorithm ahead of large scale Structure from Motion, both traditional-based and machine-learning-based graph clustering algorithms are applied and tested.
- ▶ I designed the sub-scene merging algorithm for fusing the camera poses and sparse point clouds of multiple local reconstructions. A minimum spanning tree is utilized for accurate similarity transformations. A minimum height tree is adopted for finding a proper anchor node as the global reference frame, which can avoid accumulated errors.
- ▶ The algorithm is open-sourced at [Github](#), it has obtained more than 160 stars.

★ Yu Chen, Ji Zhao. **Robust and Efficient Global Rotation Averaging by Burer-Monteiro Method.** (In submission to ECCV 2020)

- ▶ My internship work as first author in TuSimple Co., Ltd. to improve the efficiency and robustness of globally optimal rotation averaging approaches.
- ▶ Previous globally optimal rotation averaging approaches are inefficient in optimization and sensitive to outliers. I accelerated the optimization approach of globally optimal rotation averaging via low-rank decomposition, the robustness to outliers is enhanced via local optimizer.

Yu Chen, Yisong Chen, Guoping Wang. **Bundle Adjustment Revisited.** arXiv: 1912.03858, 2019

- ▶ A literature review of bundle adjustment. 3D reconstruction algorithms, such as Structure from Motion and SLAM, relies heavily on bundle adjustment to optimize camera poses and 3D points. This work provides an overview and algorithm details to recent development of bundle adjustment, which can be used as a handbook of bundle adjustment algorithms.

PROFESSIONAL SKILLS

- ▶ Languages: IELTS (Listening 6.5, Reading 7, Writing 6, Speaking 5.5, Overall 6.5), English (CET-6), Chinese (native).
- ▶ Programming Languages: C++, C, LaTeX, MATLAB, C#, JAVA, JavaScript, HTML+CSS.

AWARDS AND SCHOLARSHIPS

- ▶ Nov. 2019. Second prize in 3D Reconstruction Group, The Second Virtual Reality and Application Innovation Competition.
- ▶ 2017-2019. Academic Scholarship of Peking University.
- ▶ 2018. Second place in 3v3 basketball game of Peking University.
- ▶ Oct. 2015. Software Copyright of MaterAnalys System.
- ▶ Oct. 2014. Certificate of The Tour of Code.
- ▶ 2012-2013. Top 10 Anchor of the Communist Youth League System of Beihang University.
- ▶ 2013. First prize in speech contest of Beihang University.