Yongcong Zhang

Xianning City, Hubei Province, China

Tel: (+86) 19974855071   Email: yongcongzhang@hnu.edu.cn   Homepage

EDUCATION

College of Computer Science and Electronic Engineering, Hunan University   **Hunan, China**
Master of Computer Science and Technology (GPA: 3.51/4.00)   *Sep. 2022 - Present*

College of Mathematics, Hunan University   **Hunan, China**
Bachelor of Information and Computational Science (GPA: 3.26/4.00)   *Sep. 2018 - Jun. 2022*

PUBLICATIONS

▷ **[ECCV'24]** RSL-BA: Rolling Shutter Line Bundle Adjustment
Yongcong Zhang* , Bangyan Liao*, Yifei xue, Chen Lu ,Peidong Liu , and Yizhen Lao(* equal contribution)
European Conference on Computer Vision. 2024 **[accepted][PDF]**

▷ **[TIV'24]** Ego-motion Estimation for Vehicles with a Rolling Shutter Camera
Yongcong Zhang, Bangyan Liao, Delin Qu, Junde Wu, Xinyu Lu, Wanting Li, Yifei Xue, and Yizhen Lao
IEEE Transactions on Intelligent Vehicles. 2024 **[accepted]**

▷ **[ICME'23]** DFR: Depth from Rotation by Uncalibrated Image Rectification with Latitudinal Motion Assumption
Yongcong Zhang* , Yifei Xue*, Ming Liao, Huiqing Zhang, Yizhen Lao(* equal contribution)
IEEE International Conference on Multimedia and Expo. 2023 **[accepted][PDF]**

RESEARCH EXPERIENCE

RSL-BA: Rolling Shutter Line Bundle Adjustment
Advised by Prof. Yizhen Lao at Hunan University
- **Research content:** Proposed the first rolling shutter line-based bundle adjustment solution, *RSL-BA*. Specifically, we initially establish the rolling shutter camera line projection theory utilizing Plücker line parameterization. Subsequently, we derive a series of reprojection error formulations which are stable and efficient. Finally, we theoretically and experimentally demonstrate that our method can prevent three common degeneracies, one of which is first discovered in this paper. Extensive synthetic and real data experiments demonstrate that our method achieves efficiency and accuracy comparable to existing point-based rolling shutter bundle adjustment solutions. (**accpted by ECCV 2024**)

Ego-motion Estimation for Vehicles with a Rolling Shutter Camera
Advised by Prof. Yizhen Lao at Hunan University
- **Research content:** Proposed a novel and efficient method for estimating the relative pose of vehicles, along with an efficient correction for feature point distortions. based on the vehicle motion model, we introduce an algorithm that requires only three pairs of feature points to solve for the relative pose and motion parameters of a rolling shutter camera. To enhance the efficiency and robustness of the algorithm, we further simplify the model to a continuous frame model, achieving a minimal solver for rolling shutter camera relative pose estimation that requires only one or two pairs of feature points. Extensive experiments validate the effectiveness and efficiency of the proposed relative pose solver, surpassing the state-of-the-art methods.(**accpted by TIV 2024**)

DFR: Depth from Rotation by Uncalibrated Image Rectification with Latitudinal Motion Assumption
Advised by Prof. Yizhen Lao at Hunan University
- **Research content:** Proposed a stereo image rectification algorithm based on a rotating camera, which is a novel image rectification solution that analytically rectifies two images with two-point correspondences and serves for further depth estimation. we model the motion of a rotating camera as the camera rotates on a sphere with fixed latitude and the camera's optical axis lies perpendicular to the sphere's surface. Then we derive a 2-point analytical solver from directly computing the rectified transformations on the two images. We also present a self-adaptive strategy to reduce the geometric distortion after rectification.

Extensive synthetic and real data experiments demonstrate that the proposed method outperforms existing works in effectiveness and efficiency by a significant margin. (**accpted by ICME 2023**)

COMPETITION EXPERIENCE

Third "Malanshan Cup" International Audio and Video Algorithm Competition (Free-Viewpoint Track)
- **Competition Task**: Given 92 camera parameters and randomly selected images of $n(n \in [23,46])$ angles, the contestant needs to generate another 92-n images.
- **My Contribution**: Responsible for designing and optimizing the algorithm section, mainly including: designing algorithm flow, optimizing camera poses, optimizing camera parameters, etc.
- **Competition Result**: Received the fourth place in the Excellence Award(4/301).

INTERNSHIP EXPERIENCE

DAHE.AI   Jul. 2023 – Sep. 2023
Research intern   *Changsha, China*
- Assisted in developing algorithms to calculate the position of virtual ad spaces relative to the camera in TV shows and other media.
- Optimized ad projection algorithms to ensure seamless integration and realism of virtual advertisements during post-production.

Mango TV   Jul. 2022 – Sep. 2022
Research intern   *Changsha, China*
- Assisted in designing algorithms to conceal unwanted elements, such as accidentally captured logos, in variety shows.
- Organized and managed data to support the development and implementation of these algorithms.

Lenovo   Jul. 2021 – Sep. 2021
Artificial Intelligence for IT Operations (AIOps) Researcher   *Beijing, China*
- Designed algorithms to utilize Python for fully automatic reading and processing of data from MySQL, InfluxDB, and other databases.
- Designed algorithmic processes and implement them using Python to monitor abnormal data within the company, and perform automated remediation and alerts.

TEACHING EXPERIENCE

Teaching assistant for "Digital Image Processing" course   2023 – 2024
    Assisted the professor in grading assignments and exam papers, organizing course materials, and explaining key exercises.

Teaching assistant for "Data Structures" course   2022 – 2023
    Assisted the professor in explaining practice exercises, revising student assignments and exams, and creating practice exercises for students.

AWARDS

▷ First-class Master's Academic Scholarship   2022 – 2024, for two consecutive years
▷ Third "Malanshan Cup" International Audio and Video Algorithm Competition (Free-Viewpoint Track) Fourth Place in Excellence Award   2022
▷ Renewal Scholarship   2018 – 2020, for two consecutive years

SKILLS AND INTERESTS

Digital Skills: Python, MATLAB, C, SQL, Colmap, Metashape, CloudCompare
Interests: Karate, Go