

Jiaming Zhang

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GitHub Profile

EDUCATION

• Beijing Forestry University, Beijing, China

M.S. in Forestry Equipment and Information Technology

Advisor: Prof. Jiangming Kan (kanjm@bjfu.edu.cn)

09/2021 - 06/2024 (expected)

GPA: 92.8/100 (Rank: 1/127)

• China University of Mining and Technology, Beijing, China

B.S. in Information and Computing Science

08/2016 - 06/2020

GPA: 3.0/4.0

PEER-REVIEWED PUBLICATIONS

1. "Numerical simulation based on the CIR model and positive comparative analysis of set-up participation", Shilei Gao; Anqi Li; Jialu He; Heng Yuan; Jiaming Zhang.
Accepted in Science and Technology Innovation Herald, 2020 [Paper]
2. "Impact of Weather Insurance on Household Production and Savings", Dr. Xiaoling Zhang; Jiaming Zhang.
Proceedings of the 2022 7th International Conference on Financial Innovation and Economic Development (ICFIED 2022) [Paper]
3. "Tea Bud and Picking Point Detection Based on Deep Learning", Junquan Meng; Prof. Yaxiong Wang; Jiaming Zhang; et al.
Accepted in Forests, 2023 [Paper]

Work In Progress

1. "A Novel Forestry Information-collecting Mobile System", Prof. Shun Yao†, Jiaming Zhang†, Prof. Jiangming Kan*; et al.
Under review in Computers and Electronics in Agriculture, 2023
2. "Defocus blur detection based on Transformer and complementary residual learning", Shuyao Chai; Prof. Xixuan Zhao; Jiaming Zhang, Prof. Jiangming Kan*; et al.
Under review in Multimedia Tools and Applications, 2023
3. "Location of pruning points in tall spindle apple trees with RGB-D based on SOLOv2", Dr. Siyuan Tong†; Jiaming Zhang†; et al.
Revise and resubmit in Biosystems Engineering, 2023
4. "KAN-Forestry: A Kinematic, Automated, and Network-Driven System for Real-time Tree Diameter Estimation using RGB-D Camera", Jiaming Zhang, Dr. Siyuan Tong, Prof. Jiangming Kan*; et al.
Submitted in Remote sensing, 2023 [Code]

(† indicates equal contribution.)

INVITED TALKS

1. "Efficient forestry information-collecting system based on multi-modal mobile robot and its application"
Invited speaker at the 8th China Forestry Academic Conference, 08/2023
Northeast Forestry University, Harbin
Jiaming Zhang, Prof. Shun Yao.

EXPERIENCE

• Backend Server Development for Multi-user Platform

03/2020 - 04/2021

Duolaima Information Technology Co., Ltd., Wuhan, China

System Software Engineer

- Designed and implemented a robust server backend using I/O multiplexing and thread pooling models to support multiple user logins simultaneously.
- Developed a socket-based networking module with features like "Broken-point Continuingly-transferring" and incorporated Reactor architecture for efficient request handling.
- Integrated MySQL database for user data storage and retrieval, ensuring data integrity and security.
- Led the development of a command-line interface for system components, enhancing user interaction and system control.
- Collaborated closely with task delegates for system co-tuning, ensuring optimal performance and timely business maintenance.

• **Dunhuang Gobi Wind-Sand Jumping Study Based on 3D Gravel Morphology** 09/2021 - 06/2022

Collaboration project with the Key Laboratory of Desert and Desertification (Chinese Academy of Sciences)

This research was funded by the National Natural Science Foundation of China (Grant No. 42071014)

- Engineered a bespoke photogrammetric apparatus specifically for intricate three-dimensional analysis of gravelly terrains, facilitating accurate digital modeling and extraction of their morphological characteristics.
- Introduced a point cloud segmentation methodology tailored for gravel, enabling the extraction of gravel point clouds across varied scales from irregular terrains and densely packed scenarios.
- Upon extracting a high-resolution three-dimensional model of gravel surfaces, I conducted comprehensive analyses on its granular morphological features, including shape, roundness, and sphericity. This analysis was pivotal in determining the gravel's fractal dimension and computing the Hurst coefficient.

• **Intelligent Defect Detection Based on Computer Vision** 05/2022 - 07/2022

Bohr Intelligent Manufacturing Co., Ltd., Shenzhen, China

Research Intern

- By analyzing the frequency domain features of the image to be tested, an image preprocessing algorithm is added to filter out stray light in order to improve the detection rate of the detection algorithm.
- Through the lens of the pinhole camera model, the imaging quality is optimized prior to inspection, resulting in improved image performance in all other commonly used metrics such as NIQE and information entropy.

• **Deep Learning & RGB-D in Apple Tree Pruning** 10/2021 - Present

Key Lab of State Forestry and Grassland Administration for Forestry Equipment and Automation, Beijing

This research was financially supported by the NingXia key research and development program (Grant No. 2019BBF02009).

- Devised a robust algorithm, integrating deep learning with RGB-D, to pinpoint pruning locations on dormant tall spindle apple trees. Specifically, the Cascade Mask R-CNN SW-T was employed for precise segmentation tasks.
- After segmentation, devised an image post-processing method to determine junction points, potential pruning points, and branch diameter endpoints. Achieved good accuracy for branch diameter and distance gauging.
- Combining actual pruning rules from orchardists with the operational characteristics of robotic arms, I designed an optimized pruning strategy for robotic arms, laying a solid foundation for future automated pruning tasks.

• **Automatic Measurement of Tree Diameter at Breast Height based on Computer Vision.** 06/2022 - Present

Key Laboratory of State Forestry Administration on Forestry Equipment and Automation, Beijing

This work was supported by the National Natural Science Foundation of China under Grant No. 32071680.

- Developed and validated an efficient method for measuring tree diameter at breast height (DBH) using Structure from Motion (SfM) photogrammetry.
- Designed and implemented a comprehensive software suite for SfM-based reconstruction, facilitating automated DBH estimation.
- Engineered a multi-modal robotic platform tailored for enhanced precision in forest resource data acquisition, effectively circumventing the limitations of conventional methodologies.
- Instituted a real-time forest metric capture system, harnessing the capabilities of an RGB-D camera, amalgamated with onboard computational processes and wireless transmission, ensuring cost-efficient and high-fidelity tree data aggregation.

HONORS AND AWARDS

Excellent Freshman Scholarship, China University of Mining and Technology (Beijing)	2016
Merit Postgraduate Scholarship, Beijing Forestry University	2021
Merit Postgraduate Scholarship, Beijing Forestry University	2022

TECHNICAL SKILLS

Language: English(fluent), Chinese(native), Russian/Deutsch(very basic)

Programming: C/C++, Python, Java, Rust, Matlab, R [[Certification](#)], bash-script, L^AT_EX

Libraries : C++ STL, OpenCV(C++/Python), PointCloud Library, Open3d, Eigen, Qt 5.x, ...

Dev Tools: Vim, gcc/gdb, bash, Git, ...

Frameworks: PyTorch, TensorRT, ROS, ...

Databases: Relational Database(mysql)

Relevant Coursework: Data Structures & Algorithms, Operating Systems, Object Oriented Programming, Database Management System, Computer Network, Computer Vision, Data Visualization, ...

TEACHING EXPERIENCE

• **Teaching Assistant** | Digital Electronics - (For undergraduates) - Prof. Xixuan Zhao Fall/Spring 2021

- Reviewed and analyzed class homework after each lesson, highlighting main errors to the teacher.
- Addressed student queries post-class and provided feedback on key issues to the teacher.

• **Teaching Assistant** | Machine Vision - (For MS / PhD) - Prof. Jiangming Kan Fall 2022

- As a high-performing student who has taken the course, I was invited to share my learning with students by organizing workshops.
- Assist the instructor in guiding the environment setup, code debugging, algorithm design and other issues.