

Mengdi JIA

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👤 <https://mengdijia.github.io/>

EDUCATION

Anhui Agricultural University

Master of Engineering in Agricultural Engineering

2020.09 - 2023.06

- **GPA:** 3.54 / 4.0 (Top 10%)

College of Modern Science And Technology Hebei Agricultural University

Bachelor of Engineering in Mechanical Design, Manufacturing & Automation

2014.09 - 2018.06

- **GPA:** 3.52 / 4.0 (Top 3%)
- **Honors:** First-Class scholarship (annually); **Outstanding** Graduation Project; **Champion**, World Robot Olympiad (China)

RESEARCH EXPERIENCES

OmniSpatial: Towards Comprehensive Spatial Reasoning Benchmark for Vision-Language Models

Mengdi Jia^{1}, Zekun Qi^{14*}, Shaochen Zhang², Wenyao Zhang³⁴, Xinqiang Yu⁴, Jiawei He⁴, He Wang⁴⁵, Li Yi^{16†}* *ICLR, 2026*

- <https://arxiv.org/abs/2506.03135>
- **Benchmark:** Proposed **OmniSpatial**, a novel and comprehensive spatial reasoning benchmark addressing limitations of existing vision-language evaluations predominantly focused on high level spatial tasks.
- **Categorization Framework:** Established a structured categorization comprising four dimensions—dynamic reasoning, complex spatial logic, spatial interaction, and perspective-taking—to enhance evaluation complexity and breadth.
- **Dataset Construction:** Constructed the OmniSpatial dataset by crawling and curating diverse visual data from global sources, spanning various scenes, resolutions, illumination conditions, and weather scenarios, ensuring realistic and comprehensive evaluation contexts.
- **Model Evaluation and Insights:** Performed thorough evaluations of state-of-the-art vision-language models (e.g., ChatGPT O3, Gemini-2.5-Pro), identifying notable deficiencies in advanced spatial reasoning and providing actionable insights for future research.
- **Reasoning Enhancement:** Enhanced spatial reasoning capabilities of VLMs through integrating auxiliary models using a chain-of-thought approach, demonstrating effective strategies for complex multimodal reasoning.

Experimental Investigation on the Crack Propagation Principle of Pecan under Heating State

Mengdi Jia¹ *Master's Thesis, 2023*

- DOI: [10.26919/d.cnki.gannu.2023.000742](https://doi.org/10.26919/d.cnki.gannu.2023.000742)
- Developed a real-time weight and temperature monitoring system using LabVIEW
- Implemented a crack detection algorithm with YOLOv8, and constructed a moisture prediction model using near-infrared spectroscopy and BP neural network.
- Constructed a moisture prediction model using near-infrared spectroscopy and BP neural network.

Biophotonics Lab, Dept. of Electronics, Tsinghua University

Intern

2019/12 - 2020/09

- Developed biomedical device components using OpenCV, C++, Qt and SolidWorks for photoacoustic imaging systems.

SKILLS

English Proficiency: Fluent

Programming & Tools: Python, C++, C, MATLAB, LaTeX, PyTorch, NumPy, Pandas, OpenCV, Linux, Jetson, STM32

WORK EXPERIENCES

Noetix Robotics Co., Ltd.

Mechatronics Engineer (Mechanical Design Lead)

Jul. 2025 – Present

- Led the system-level mechanical design of wheel-legged biped robots for consumer companionship and industrial inspection, covering leg architecture, joint layout, foot-end structures, and actuator integration. Redesigned the knee shaft system for improved impact resistance by replacing graphite bronze bushings with PEEK, and developed a bidirectionally symmetric folding knee mechanism to avoid parallelogram dead points and improve force transmission.

- Developed whole-robot dynamics models to support system architecture design, requirement allocation, actuator sizing, and morphology optimization, enabling the derivation of an optimal robot configuration under performance and engineering constraints. Evaluated joint torque and speed requirements under high-dynamic loads to define customized actuator module specifications.
- Designed waist-and-leg structures and sensing layouts for humanoid and character-style robots, including sensor placement and extrinsic calibration. Exported URDF models and conducted simulation-based training and validation.
- Implemented Adversarial Motion Priors (AMP) using stylized expert motion data, enabling a single reinforcement-learning policy to execute walking, running, turning, and jumping with smooth transitions between locomotion behaviors.
- Coordinated product definition, PRD development, system requirements, and technical solution alignment across mechanical, electrical, control, and software teams.

Beijing Donghong Zhiyuan Medical Technology Co., LTD

Mechatronics Engineer (Project Leader)

2024/05 - 2025/06

- Leading electromechanical design and lifecycle management of surgical instruments and endoscopes.

Beijing Precision Medical Technology Co., LTD

Project Engineer

2023/07 - 2024/04

- Developed robotic end-effectors and calibration methods for MR-guided surgical systems.

Solidreamer Co., LTD

Co-founder

2014/12-2017/06

- Provided robotics and STEM training for teenagers, organized workshops, designed educational programs.

PUBLICATIONS AND PATENTS

OmniSpatial: Towards Comprehensive Spatial Reasoning Benchmark for Vision-Language Models

Mengdi Jia^{1*}, Zekun Qi^{14*}, Shaochen Zhang², Wenyao Zhang³⁴, Xinqiang Yu⁴, Jiawei He⁴, He Wang⁴⁵, Li Yi^{16†}

ICLR, 2026

- <https://arxiv.org/abs/2506.03135>

Control Method, Control Device, and Wheel-Legged Robot

Jiang Zheyuan, Zhang Shipu, **Jia Mengdi**

Mar. 2026

- Patent Publication No.: CN 121756299 A

Experimental Research on Cotton Seed Depth Detection System Based on Magnetic Field

Jia Kang, Nan Wang, Haiyong Jiang, Pengyun Xu, **Mengdi Jia**, Limin Shao

Graduation Project, Mar. 2021

- Published in *Journal of Agricultural University of Hebei*, Vol. 44 No. 2.
- DOI:10.13320/j.cnki.jauh.2021.0033.
- Built a parallel-arm robot capable of detecting seed depth in soil while driving through farmland.

A device and method for light emission protection of photoacoustic probes based on transparent capacitive films

Wu Zhen, Wang Xiaojun, Song Hongfei, **Jia Mengdi**, Fang Chenyu

Nov. 2023

- Patent No.: CN 113827183 B

Monitoring devices and methods for visible and invisible light energy of lasers

Song Hongfei, Wang Xiaojun, Wu Zhen, Fang Chenyu, **Jia Mengdi**, Wei Shengyi

Jan. 2022

- Patent No.: CN 113970371 A

A differential analog transmission system for the acquisition of photoacoustic signals

Song Hongfei, Wang Xiaojun, Wu Zhen, Fang Chenyu, **Jia Mengdi**, Wei Shengyi

Jan. 2022

- Patent No.: CN 113966996 A

A laser emission protection method applicable to photoacoustic imaging systems

Wu Zhen, Wang Xiaojun, Song Hongfei, **Jia Mengdi**, Fang Chenyu

Dec. 2021

- Patent No.: CN 113827184 A

A differential analog transmission device for photoacoustic signal acquisition

Song Hongfei, Wang Xiaojun, Wu Zhen, Fang Chenyu, **Jia Mengdi**, Wei Shengyi

Jan. 2021

- Patent No.: CN 212326383 U

Monitoring devices for visible and invisible light energy of lasers

Song Hongfei, Wang Xiaojun, Wu Zhen, Fang Chenyu, **Jia Mengdi**, Wei Shengyi

Jan. 2021

- Patent No.: CN 212340426 U

A seed depth detection system based on magnetic field

Jia Mengdi, Feng Yongfei, Jiang Haiyong, Zhou Yongjie, Wang Nan

Apr. 2019

- Patent No.: CN 208736340 U

An Extrusion Device for Additive Manufacturing of Flexible Materials Using Hard Materials

Jia Mengdi

Apr. 2018

- Patent No.: CN 207273878 U

A Peach Flower Stamen Cutting Mechanism

Du Yujie, Jia Mengdi

Mar. 2018

- Patent No.: CN 207054379 U