Mengdi JIA

mengdi__jia@163.com 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 Zhang*[2], *Wenyao Zhang*[34], *Xinqiang Yu*[4], *Jiawei He*[4], *He Wang*[45], *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 Jia[1] *Master's Thesis, 2023*

- DOI: 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 (Project Leader) *2025/07 - Present*

- To C Scenario - Small Bipedal Robot for Companionship:

  a. Optimized dual-leg folding scheme by designing limb positions and leg folding angles.

  b. Calculated and evaluated torque and speed demands of each joint module under high-dynamic load conditions to support customized joint module development.

  c. Served as a Project Manager, developed product definition and product requirement documents, ensured information consistency among technical team members, and led technical solution analysis.

- To B Scenario - Large Bipedal Robot for Inspection:
  a. Optimized shaft system design to address intermittent high-intensity impacts on knee joints; replaced graphite copper sleeves with PEEK.
  b. Proposed a novel bidirectional symmetric folding knee joint structure, resolving parallelogram dead-point issues and improving linkage force transmission efficiency.
  c. Designed foot-end structures for the robotic foot.
- Humanoid Robot:
  a. Structural Design for Radar-Camera Sensing scheme,Arranged sensor positions and generated extrinsic parameters.
  b. Exported URDF and traing robot.

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 Zhang*[2], *Wenyao Zhang*[34], *Xinqiang Yu*[4], *Jiawei He*[4], *He Wang*[45], *Li Yi*[16†] *ICLR, 2026*

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

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