Jinjia Guo

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EDUCATION

University of Michigan-Ann Arbor **Aug./2024 - Now**
M.S. Robotics(4.0/4.0) Ann Arbor, Michigan
Core course: ROB 501(A) ROB 550(A) ROB 422(A)
University of Cincinnati **Sep./2019 - Apr./2024**
B.S. Mechanical Engineering, Cincinnati, Ohio
Chongqing University **Sep./2019 - Jun./2023**
B.E. Mechanical Design and Manufacturing and Automation Chongqing, China

PROJECTS

In-Hand Screwdriver Rotation Based on Linear Programming and Diffusion Strategy (Project Page)
ARM Lab, University of Michigan *Feb. 2025 - Apr.2025*

- Estimated the initial pose of the screwdriver by registering point cloud data using iterative closest point (ICP), achieving a 1.2% average error compared to ground truth.
- Configured force-torque sensing and constructed SDF-based local contact frames to monitor and control contact forces during manipulation, enabling real-time force-closure constraint checking.
- Proposed an LP-based online replanning strategy that corrects diffusion-sampled trajectories to maintain force-closure, achieving an average rotational improvement of 0.3 radians over baseline diffusion-only methods across 30 randomized trials.

Learning Multi-Body Dynamics via Residual Augmented Simulation (SAIN) (Project Page)
University of Michigan *ROB599 project*

- Combined PyBullet predictions with residual Interaction Networks (SAIN) to model two-body push-plate dynamics.
- Coupled SAIN with MPPI control, reaching 100% target-placement success (<5 cm error) in 40 randomized scenes.
- Exhibited zero-shot transfer to goal shifts and shape swaps, confirming model generalization.

Vision-Guided Palletizing with ReactorX-200 (Project Page)
University of Michigan *ROB550 Armlab*

- Built an autonomy stack—FK/IK, HSV object detection, state-machine planner—on a 5-DOF arm.
- Achieved 95 % color–size accuracy via surface segmentation + data augmentation across 6 block classes.
- Realized click-to-grasp and auto-stacking to 12-layer towers using calibrated world frames and analytical IK.

Reinforcement Learning for Robotic Capture of Free-Floating Objects in Space (Report)
UC Center for Robotics Research, University of Cincinnati *October 2023 - April 2024*

- Developed a vision-guided (YOLOv8) SAC-based control system for a robotic arm to autonomously capture free-floating objects in 3D space.
- Integrated motion planning and control on KUKA iiwa14 within ROS2, validated the system with a 91.2% success rate in real-world experiments.

PUBLICATION

- Zhang X, **J. Guo**, Mu N, Jing J. *"A Multi-Distance Feature Dissimilarity-Guided Encoder-Decoder Network for Polyp Segmentation"* 2023 IEEE International Conference on Systems, Man, and Cybernetics
- Mu N, **J. Guo**, Tang J. *Learning How to Detect Salient Objects in Nighttime Scenes.* Journal of Scientific & Industrial Research, 2023, 82(02): 192-201
- X. Xiao, **J. Guo**, X. Cao, X. Zhang, and S. Pang, *"An industrial mineral raw material classification method based on image segmentation,"* 2022 International Conference on Manufacturing, Industrial Automation and Electronics (ICMIAE), Rimini, Italy, 2022, pp. 135-142, doi: 10.1109/ICMIAE57032.2022. 00033

EXPERIENCE

Fitten Technology Co., Ltd. **Beijing, China**
LLM Research Assistant
May/2024 - August/2024

- Applied RAG in JittorLLM, a large language code completion model based on the self-developed framework: Jittor. Latency ↓ 70 % / accuracy ↑ 20 % vs Copilot.
- Shipped Fitten Code extensions (VS Code + JetBrains), over 271 k installs.

University of Cincinnati **Cincinnati, Ohio**
Teaching Assistant
August/2023 - April/2024

- Graded & mentored 103 students, got a 5.0/5.0 review.

Michigan Technological University **Houghton, Michigan**
Research Assistant
August/2022 - December/2022, April/2023 - August/2023

- Developed a dataset of saliency targets from over 1,000 nighttime images for object detection in low-light conditions.
- Designed and implemented a new salient object detection network tailored for medical imaging, utilizing multi-scale fusion in neural networks to achieve a performance improvement of over 10%.

CISDI INFORMATION Technology Co., Ltd. **Chongqing, China**
Computer Vision Algorithm Assistant
May/2021 - August/2021, January/2022 - April/2022

- Built and deployed a TensorRT-optimized U-Net++ segmentation pipeline on edge servers, creating a raw-material classification dataset for belt-machine inspection.
- Designed and maintained five SSD MobileNet v2 object-detection models for the "Shuanggaobang" production line, ensuring robust material sorting in real-time.

Skills

- **Coding Languages**: Python (PyTorch, NumPy), C++17, MATLAB
- **Robotics Stack**: ROS 1/2, Point Cloud (ICP, PointNet++)
- **Sim & Physics**: PyBullet, Isaac Sim, MuJoCo
- **ML & Optimization**: Diffusion Models, RL (SAC/PPO), MPPI
- **Tools**: Git, Docker, Linux, LaTeX