

Hui Li

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EDUCATION

The University of Alabama

Ph.D. in Computer Science, GPA 3.67/4.00

Aug. 2025 (Expected)

Tuscaloosa, AL

Thesis – Context-Aware Task-Oriented Grasping by a Dexterous Anthropomorphic Robotic Hand

Hebei University of Science and Technology

B.S. in Electrical Engineering, GPA 3.6/4.00

Aug. 2004 – June 2008

Hebei, China

PROFESSIONAL EXPERIENCE

UA Autonomous Robotic Lab – Research Assistant

June 2023 – Current

Topic: Task-Oriented Dexterous Grasping via Contextual Reward Machine

- Developed **DexMobile**, a bimanual mobile manipulator with dual UR5e arms, Schunk SVH, PSYONIC Ability Hand, and Husky UGV, integrated sensors, and force feedback, including Zivid One, RealSense D435, and ErgoGLOVE.
- Designed a ROS2-based control system and digital twin in PyBullet for policy training and sim-to-real transfer.
- Implemented and trained a CRM-based reinforcement learning (CRL) model for task-oriented grasping, improving success rate by 33.8% and reducing task time by 68.9% in simulation.
- Transferred the CRL model to the DexMobile platform using domain randomization, achieving an 83.3% success rate.

Topic: Knowledge Augmentation and Task Planning in Large Language Models (LLM)

- Developed an LLM-driven grasping system to infer object features and plan grasps from incomplete sensory data.
- Built prompt-based feature complementation, achieving up to 95% accuracy in predicting object texture, rigidity, etc.
- Built a PyTorch-based grasp selection model with 100% match to human-preferred strategies in real-world evaluations.
- Implemented a control library to execute LLM-generated grasp plans as robot commands, achieving 80% success rate.

WSU Robot Intelligence Lab – Research Assistant

Aug. 2018 – June 2023

Topic: Learning Task-Oriented Dexterous Grasping from Human Knowledge

- Developed a multi-class, multi-label neural network in PyTorch to learn grasp poses from human demonstrations, achieving a 100% hit rate and a 98.6% top-3 match rate.
- Built a task-object grasp dataset from human experience covering 74 tasks, 15 grasp types, and 157 3D objects.
- Designed a PyBullet simulation environment and trained a PPO-based reinforcement learning agent using Stable Baselines3, achieving 85.6% success over 2,700 grasping trials.

Topic: MagicHand: Context-Aware Dexterous Grasping System

- Developed the **MagicHand** platform, a context-aware dexterous grasping system combining Sawyer robot, AR10 hand, Intel RealSense D435, and SCiO near-infrared sensor.
- Designed a ROS-based control system and digital twin in PyBullet for policy training and sim-to-real transfer.
- Created a Near-Infrared (NIR) dataset with 16,000 spectra from 54 daily-use objects across six materials.
- Implemented a multi-layer perceptron (MLP) neural network using Keras and Scikit-Learn to classify material types from NIR spectra, achieving 99.64% accuracy.
- Conducted real-robot grasping experiments with the **MagicHand** platform, achieving an 80% grasp success rate.

SELECTED PUBLICATIONS

- [Task-Oriented Grasping Using Reinforcement Learning with a Contextual Reward Machine](#) – **Hui Li**, Akhlak Uz Zaman, Fujian Yan and Hongsheng He. (**Submitted to IEEE Transactions on SMC: Systems**)
- [Towards Neurorobotic Interface for Finger Joint Angle Estimation: A Multi-Stage CNN-LSTM Network with Transfer Learning](#) – Yun Chen, Xinyu Zhang, **Hui Li**, Hongsheng He, Qiang Zhang. (**Published at ICRA 2025**)
- [Learning Task-Oriented Dexterous Grasping from Human Knowledge](#) – **Hui Li**, Yinlong Zhang, Yanan Li, and Hongsheng He. (**Published at ICRA 2021**)
- [MagicHand: Context-Aware Dexterous Grasping Using an Anthropomorphic Robotic Hand](#) – **Hui Li**, Jindong Tan and Hongsheng He. (**Published at ICRA 2020**)

SKILLS

- **Robotics and Simulation:** ROS/ROS2, MoveIt2, ROS2 Control, PyBullet, Rviz, Gazebo/Ignition, URDF/SDF
- **ML and Vision Tools:** PyTorch, TensorFlow, Keras, Scikit-Learn, Pandas, Stable Baselines3, Gym, CV2, Open3D
- **Robots and Sensors:** UR5e, Sawyer Robot, AR10 Hand, Schunk SVH, Psyonic Hand, Husky UGV, NAO Robot, Realsense D435, Zivid One, SCiO, ErgoGLOVE
- **Programming Languages and Systems:** Python, C++, Ubuntu, Raspberry Pi4
- **Other:** Blender, Git, ThinkerCAD, Form4 3D Printer, ELEGOO Saturn 3D Printer

AWARDS

NSF I-Corps Grant, Ph.D. Excellence Award, Shocker Innovation Award, Outstanding Research Output