

Agentic Robotics for Long-Horizon Real-World Manipulation

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Autonomous robots that operate in real environments need more than a single learned policy: they need perception, memory, planning, safety checks, and the ability to coordinate multiple skills over long horizons. This project explores agentic robotics systems for manipulation, with an emphasis on modular robot intelligence, sim-to-real transfer, and physically grounded decision-making.

Students will contribute to research on embodied agents that can reason about tasks, interact with the physical world, and adapt across platforms. Possible directions include agentic robot architectures, wire and cable manipulation, task planning, skill execution, and sim-to-real evaluation. Students may work with the Trossen Stationary AI Robot, UR5 robot, and other real robotic platforms, in addition to simulation environments.

Preferred Foundation / Experience

- Strong programming skills in Python
- Background in AI/ML, robotics, or autonomous systems
- Familiarity with robot learning, planning, or control
- Experience with simulation tools such as IsaacSim, IsaacLab, MuJoCo, or similar
- Interest in embodied agents, long-horizon autonomy, and real-robot deployment
- Prior experience with ROS, PyTorch, or robotics hardware is a strong plus

Why this project?

You'll work on a fast-moving research area where large-scale AI systems meet real-world robotics, gaining hands-on experience with robot platforms, simulation, and agentic autonomy. The project is ideal for students interested in industry R&D, robotics startups, or future graduate research in embodied AI.

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