Kaedin Kurtz

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EDUCATION
Bachelor of Science in Mechanical Engineering
Concentration in Robotics and Autonomous Systems
Boston University 2025

PROJECTS

3D Tactile SLAM Project, Summer 2024 - Present
- Designed and implemented a 3D tactile SLAM algorithm in ROS2 using custom 6-axis robotic arm with a skin sensor for surface mapping.
- Generated point clouds from sensor data, implementing a decaying gradient approach to estimate surface topology.
- Developed path planning algorithms to explore surfaces based on density gradients, guiding the arm to low-density regions for further exploration.
- Utilized CoppeliaSim for simulation and PyVista for visualization, managing real-time sensor data processing.

Inverse Kinematics & Motion Planning, Fall 2024 - Present
- Designed an inverse kinematics algorithm for an exploration program that navigates environments using projected density gradients from point clouds.
- Developed collision-avoidance trajectory planning, dynamically adjusting paths in response to dense object clusters.
- Integrated optimized control theories to improve the arm's performance in real-world simulations.

Proprietary Robotic Linear Actuator Design, Summer 2024 – Fall 2024
- Engineered a high-performance, compact, coaxial actuator with non-backdrivable worm gear mechanisms and optimized torque output.
- Designed prototypes for testing, focusing on achieving efficient motion within space-constrained environments.

Multi-Environment Simulations, Fall 2024 - Present
- Transitioned robotic simulations from Gazebo to CoppeliaSim to enhance system interaction and simulation accuracy.
- Worked with URDF and XACRO files for robot descriptions and developed algorithms for real-time joint control and collision avoidance.
- Trained a 6-DoF robotic arm to learn primitive dynamic interaction using Isaac Lab Simulation.

RELEVANT COURSES

Robotics	Medical Robotics	Heat Transfer
Electric Circuits	Material Science	Instrumentation

SKILLS
Programming Languages: Python, C++, MATLAB, C#
Robotics Frameworks: ROS1 (Noetic), ROS2 (Rolling)
Simulation & Modeling: CoppeliaSim (V-REP), Gazebo, PyVista, Isaac Sim, Rviz
CAD & Design Software: Autodesk Fusion 360, SolidWorks, Blender, Autodesk Inventor, Autodesk CFD, Onshape
Hardware & Prototyping: CAN Bus Systems, 3D Printing, CNC Machining, Actuator Design, DFM
Technical Competencies: SLAM Mapping, Inverse Kinematics, Motion Planning, Collision Avoidance, Point Cloud Analysis, Optimized Control Theory, Tactile SLAM, Exploration Algorithms

PROFESSIONAL EXPERIENCE
RASTIC Lab Researcher| July 2024 – Present
- Assisted students and faculty with engineering projects, providing guidance on design and fabrication.
- Maintained and operated equipment including 3D printers, CNC machines, and laser cutters.

Lead STEM Educator | May 2023 – August 2023
- Created and taught a variety of STEM instructional content, ranging from elementary to advanced concepts.
- Facilitated 32 students' robotics-centric projects, mentoring project management and successful execution.