

Sarthak Dayal

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EDUCATION

University of Texas at Austin

Aug 2023 - May 2026

B.S. Computer Science, Minor: Robotics (GPA: 3.9706)

Coursework: Honors Operating Systems, Computer Architecture, Data Structures, Discrete Math, Gateway to Robotics, Differential Equations and Linear Algebra, Probability.

WORK EXPERIENCE

MIDI Lab (Dr. Amy Zhang), Research Assistant - Austin, TX

May 2024 - Present

- Designed simulated environments, a physical computer vision system, and an easy-to-use YAML configuration pipeline that enabled faster and customizable training of Reinforcement Learning policies for dynamic manipulation tasks in air hockey.
- Developed PPO and SAC benchmarks for use by other researchers in the RL community, which achieved tasks 99% of the time with a high sample efficiency, validating our setup and paving way for future researchers to evaluate their results.
- Formulated a novel representation learning approach to leverage repeated structure in state spaces for reduced training time and samples in the hierarchical setting, which is currently being used to learn control tasks in simulation from raw pixels.
- **Technologies:** PyTorch, Numpy, Matplotlib, OpenCV, Tianshou, Box2D, Mujoco, Gymnasium, Weights & Biases, Slurm.

Paradigm Robotics, Product Lead, Radar/Acoustics, Part time - Austin, TX

Nov 2023 - Aug 2024

- Researched over 15 types of radar technologies and many sensor-fusion solutions, culminating in the development of a localization and mapping system that worked in smoke-filled rooms where traditional LiDAR-based methods fail.
- Conducted product interviews with radar vendors, informing a cost-benefit analysis that guided purchasing decisions.
- Engineered a sound detection platform that accurately classified more than 10 distinct sound types, enabling proactive firefighter alerts to potential hazards and identifying nearby individuals.
- **Technologies:** C++, C, Python, ROS, Gazebo, MoveIt, Cochl AI, TI radar toolbox.

PROJECTS

E1000 Network Driver (Honors Operating Systems) | C, x86-32 Assembly, QEMU

Dec 2024

- Built an emulated E1000 network card driver and integrated it into a custom UNIX-based operating system that allowed us to send packets between computers over wifi, culminating in running a networked Doom game on our custom OS.

Text to Object Mapping for Library Bookshelves | Python, SAM, CLIP, Google Cloud Vision

Apr 2024 - May 2024

- Pioneered a novel technique that segmented a bookshelf image from text descriptions of books given an image of a bookshelf, reducing total processing time for camera-assisted robots by tens of seconds compared to OCR-based methods.

Counter A&M Turret (Won HackTX among 747 teams from 52 universities) | Python, C++, OpenCV

Oct 2023

- Created a vision and controls pipeline and constructed the physical body for a C-RAM-like Texas A&M logo-targeting water bead turret in a 4-person team during a 24-hour hackathon.

Reflexion Buddy (Winner, IBM Watson AI challenge, HackMIT) | Python, Streamlit, Watson, GPT-3

Sep 2023

- Designed and implemented a product to help mental health professionals track patient health and improve patient outcomes by providing an interactive multimodal (audio, text, image) journaling interface with sentiment analysis and mood tracking.

ACTIVITIES

CS 309: Essentials of AI for Life and Society with Dr. Peter Stone | Teaching Assistant

Aug 2024 - Present

- Supported curriculum development and improved student learning outcomes by writing new course material, providing verbal feedback to students, and supporting course logistics, guiding course design for a class offered for the first time ever.

Directed Reading Program (DiRP) | Reinforcement Learning Mentor and Admin

Mar 2024 – Present

- Organized a new reading group with 5 students interested in Reinforcement Learning, leading group discussions to teach fundamental concepts and guiding the development of projects including Q networks and PPO for toy environments.

Technical Skills: Python (PyTorch, ROS, Streamlit, OpenCV), C, C++ (ROS, OpenCV), ARM/x86 Assembly, Gymnasium, Tianshou, Mujoco, Gazebo, Arduino, Weights & Biases, Git, Cochl AI, SAM, CLIP, QEMU, Slurm.

Publications: Co-authored with a focus on task creation and benchmarking, “Robot Air Hockey: A Manipulation Testbed for Robot Learning with Reinforcement Learning,” accepted at ICRA 2024 Manipulation Skills Workshop.