PARHAM SHARAFOLESLAMI

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Education

MEng Mechanical Engineering (Control & Robotics), University of California, Berkeley May 2026
GPA: 3.77

BS Electrical Engineering & Computer Science, University of California, Berkeley Dec 2024
GPA: 3.73 HKN EECS Honor Society

Relevant Coursework: Robotics, Advanced Control Systems, Multi-Agent Systems, Optimization Models, Probability & Random Processes, Data Structures, Algorithms, Machine Learning, Deep Learning, Computer Vision.

Skills

Languages C/C++, Python, Rust, Go, Java, MATLAB, SQL, Bash, RISC-V Assembly
Robotics ROS2, Gazebo, RViz2, Foxglove, MoveIt, SLAM, PyTorch, OpenCV, JAX
Systems Linux, Docker, CUDA, Git, AWS (EC2), AzureML, Kubernetes, Jenkins, Spark

Experience

Machine Learning Engineer (Computer Vision) Jan 2025 – Mar 2026
IntuigenceAI *San Francisco, CA*

- Converted P&ID schematics into knowledge graphs representing industrial process topology.
- Developed graph algorithms to detect faulty components and infer valid configurations under changing valve states.
- Implemented reachability and subsystem-isolation queries to validate plant topology and generate digital twin models.
- Built GPU training and inference pipelines on Azure for scalable vision model development.

Student Research Assistant — Autonomous Race Car Jun 2023 – Dec 2024
University of California, Berkeley *Berkeley, CA*

- Developed and evaluated a progress-based Model Predictive Controller using CasADi and ACADOS.
- Built an offline simulation pipeline for trajectory optimization, constraint evaluation, and solver tuning.
- Trained a transformer policy via DAgger to imitate MPC-generated trajectories for faster inference.

Research Assistant — Berkeley AI Research (BAIR) Lab Jan 2023 – Dec 2024
University of California, Berkeley *Berkeley, CA*

- Developed a JAX-based autonomous driving simulator modeling vehicle dynamics and multi-agent traffic.
- Trained PPO policies for lane-keeping and trajectory stabilization using custom reward functions.

Projects

- **Decentralized Fleet Coordination for Airport Ground Operations** (Python, JAX, Flax, CVXPY)
  - Designed a decentralized coordination system for autonomous ground vehicles servicing aircraft at gates.
  - Implemented Buffered Voronoi Cell collision avoidance with per-vehicle convex QP safety projections.
  - Trained a multi-agent RL policy (MAPPO) for anticipatory positioning with a safety filter.
- **Constrained Manipulation with Model Predictive Control** (UR7e Robot Arm)
  - Built a perception-driven pipeline: RGB-D detection → IK goal → joint-space MPC trajectory generation.
  - Formulated nonlinear MPC enforcing joint limits, bounded increments, obstacle avoidance, and table clearance.
  - Demonstrated replanning in MuJoCo simulation and UR7e hardware tests (N=30, t=0.08 s, 11.7 ms solve time).
- **Probabilistic Mapping for a Mobile Robot**
  - Built a 2D occupancy grid map from LiDAR using a log-odds Bayesian update model.
  - Maintained a consistent world-frame map during robot motion under noisy measurements.
  - Analyzed mapping error from odometry drift and grid resolution tradeoffs.
- **Vision-Guided Navigation and Feedback Control**
  - Estimated target position from monocular images using projective geometry and camera calibration.
  - Generated smooth reference trajectories using cubic Bézier paths.
  - Implemented a PID waypoint controller achieving stable heading and distance convergence.