Shahid Shah Tasbih

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EDUCATION

Massachusetts Institute of Technology **Expected Graduation: May 2029**
- Candidate for B.S. in Aerospace Engineering. *Cambridge, MA*
- Relevant Coursework: Introduction to Autonomy, Differential Equations
- Advanced Learning (Audit): Deep Learning (Graduate Level), Advances in Computer Vision (Graduate Level)

EXPERIENCE

Anduril - AI Grand Prix (Autonomous Drone Racing Competition) **May 2026 – August 2026**
Autonomy Software Developer, Solo Entry *Cambridge, MA*
- Engineered a vision-only autonomous drone-racing stack in Python for the Anduril AI Grand Prix simulator, flying with no GPS and no gate coordinates via a Mahony AHRS on MAVLink IMU and an OpenCV ring detector.
- Rebuilt a 303-patch legacy codebase into a tested reactive control stack and traced a hidden mid-race respawn bug, lifting the later-cycle first-gate pass rate from 34% to 96% and yielding 9x more gate attempts per flight.

MIT - Nuclear Reactor Laboratory **June 2026 – August 2026**
Research Assistant *Cambridge, MA*
- Engineered a reinforcement learning model to autonomously align multi-axis motors on a high-resolution diffractometer, streamlining complex spatial searches.
- Programmed adaptive scan routines using the Bluesky framework to process real-time environment feedback, replacing slow manual grid scans with dynamic, policy-driven positioning.

MIT - Department of Aeronautics and Astronautics **January 2026 – May 2026**
Research Assistant *Cambridge, MA*
- Utilized the F Prime framework to compile and execute flight software on the RP2350 chip for satellite applications.
- Conducted a comparative analysis between Convolutional Neural Networks (CNNs) vs. algorithmic methods on NVIDIA Jetson Nano to optimize orbital event detection under strict power and memory constraints.

PROJECTS

Whole-Body QP Locomotion Control for a Simulated Hexapod
- Built a 24-DOF, 18-joint, 9.30 kg hexapod in MuJoCo with a 100 Hz control stack chaining closed-form analytic leg IK into a 42-variable OSQP whole-body inverse-dynamics QP at 94 us median solve.
- Tracked commanded speed within 1.2% over a 0.03-0.22 m/s forward sweep on flat ground, holding trunk height under 0.3 mm standard deviation across 16 seeds per speed rung.
- Caught three measurement routines inflating results via adversarial review, then characterized blind locomotion along a difficulty axis: correlated obstacles like ridges defeat the controller 10x sooner than random roughness.

Deep Q-Network (DQN) for Autonomous Lunar Landing
- Engineered a PyTorch D3QN agent to solve a 2D landing environment with >95% success, later extending the architecture into a custom 3D rigid-body MuJoCo simulation modeling accurate 1.62 m/s² lunar gravity dynamics.
- Upgraded to a Deep Deterministic Policy Gradient (DDPG) to navigate a 13-dimensional continuous state space, utilizing a hybrid PD-RL attitude controller to map high-level 3D continuous actions across 5 thrusters.
- Accelerated convergence using Prioritized Experience Replay (PER), soft target updates, and gradient clipping, alongside a shaped reward optimizing for fuel efficiency, slow terminal descent, and upright stability.

SKILLS

Simulation & Control: MuJoCo, MJCF, PD / whole-body QP control, inverse kinematics, ArduPilot SITL
Machine Learning & AI: PyTorch, RL (DQN, DDPG, PER), Computer Vision (OpenCV, YOLO), Kalman Filters
Software & Embedded: Python, C++, MATLAB, Bash, Linux, F Prime, cFS, MAVLink, RP2350, SolidWorks