Ali BaniAsad

Tehran, Iran
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Education

Sharif University of Technology **Sep. 2022 – Apr. 2025**
Master of Science in Aerospace Engineering *Tehran, Iran*

Sharif University of Technology **Sep. 2017 – May 2022**
Bachelor of Science in Aerospace Engineering *Tehran, Iran*

Research Interests

- Reinforcement Learning
- Deep Learning
- Automatic Control
- Optimal Control
- Robotics
- Game Theory

Publications

- 2025 [J] Sharifi, A., **BaniAsad, A.** *et al.* "Applied an In-Motion Transfer Alignment Approach During Global Positioning System Outages Utilizing a Recurrent Neural Network Algorithm." *Eng. Appl. AI* — minor review.
- 2025 [C] **BaniAsad, A.**, Nobahari, H. "Robust DDPG Reinforcement Learning Differential Game Guidance in Low-Thrust, Multi-Body Dynamical Environments." *23rd Int. Conf. of Iranian Aerospace Society* — Accepted.
- 2025 [C] Amirpour, M., **BaniAsad, A.**, Nobahari, H. "Reinforcement Learning-Based Controller Design for a Suspended Ball Plant." *23rd Int. Conf. of Iranian Aerospace Society* — Accepted.
- 2024 [J] **BaniAsad, A.** *et al.* "Attitude Control of a 3-DoF Quadrotor Platform Using a Linear Quadratic Integral Differential Game Approach." *ISA Trans.* — Elsevier DOI.
- 2022 [C] Nobahari, H., **BaniAsad, A.** *et al.* "Linear Quadratic Integral Differential Game Applied to the Real-Time Control of a Quadrotor Experimental Setup." *ICRoM* — IEEE DOI.

Research Experience & Projects

Embedded RL Control for Robots on Resource-Constrained Hardwares **Aug. 2022 – Apr. 2025**
Master's Thesis, Sharif University of Technology *Tehran, Iran*

- Outperformed classical MPC, cutting trajectory-tracking error by 22 % within strict on-board CPU/memory limits.
- Designed zero-sum, disturbance-augmented training that kept policies stable under 10× worst-case perturbations.
- Engineered 15 k-LOC RL control stack (DDPG, TD3, SAC, PPO) in PyTorch/TensorFlow+Gym for embedded robots.
- Validated robustness on Gymnasium locomotion tasks—Ant, Humanoid, HalfCheetah, Walker2d.
- Ported the system to a C++/Python ROS 2 hardware-in-the-loop node for on-board testing.

Researcher at CNAV Lab **May 2020 – Feb. 2025**
Head of Lab (Current), Researcher (Former) *Tehran, Iran*

- Led projects on **Embedded AI** in C, **Reinforcement Learning (RL)**, and **ROS** for robotic control systems.
- Robust in-motion Transfer Alignment method based on the multilayer Neural Network.
  - Proposed **LSTM–MLP** that performs in-motion using only IMU + SINS data when GPS is unavailable.
  - Cuts navigation drift to $< 0.1\%$ of the Kalman-INS error during 100 s GPS outages.
  - Generalises across ship, ROV, and car datasets, outperforming conventional methods out of domain.

Game Theory-Based Control for Three Degrees of Freedom Platform **Feb. 2021 – Sep. 2023**
Bachelor's Thesis, Sharif University of Technology *Tehran, Iran*

- Modelled a 3-DoF setup in Simulink and identified dynamics for parameter estimation.
- Designed a robust controller via **Differential Game** theory and **Nash Equilibrium**.
- Implemented the controller through a MATLAB/Simulink–to–C pipeline for real-time hardware tests.
- Benchmarked against **ADRC** and **DOBC**, achieving superior disturbance rejection and robustness.

Awards and Honors

- Best B.Sc. Thesis Award, Iranian Aerospace Society (2023)
- Ranked 23rd nationally, Iran M.Sc. Aerospace Exam (2022)
- Top 0.5% of 150 000, Iran B.Sc. Entrance Exam (2017)
- NODET exceptional-talent scholar. (2010–2017)

Technical Skills

Programming Languages: C/C++, Embedded C, MATLAB, Python
Tools & Platforms: Git, Linux, ROS, Simulink, Terminal, LaTeX
Libraries/Frameworks: Matplotlib, NumPy, Pandas, PyTorch, TensorFlow