

Ali BaniAsad

Curriculum Vitae

Contact Information

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EDUCATION

M.S. Aerospace Engineering
Sharif University of Technology

September 2022 – November 2024 (Expected)

B.S. Aerospace Engineering
Sharif University of Technology

September 2017 – May 2022

RESEARCH INTERESTS

- Robotics
- Multi-Agent Systems
- Game Theory
- Reinforcement Learning
- Automatic Control
- Embedded ML

PUBLICATIONS

Journal Papers

- **Ali BaniAsad**, Alireza Sharifi, Reza Pordal, Hadi Nobahhari. "Attitude Control of a 3-DoF Quadrotor Platform Using a Linear Quadratic Integral Differential Game Approach." *ISA Transactions*, [Elsevier](#), 2024.
- Alireza Sharifi, **Ali BaniAsad**. "Robust In-Motion Transfer Alignment of Low-Grade Inertial Navigation Systems with Recurrent Neural Networks in the Event of Reference Malfunction." *IEEE*, 2024 (Active)
- **Ali BaniAsad**, Hadi Nobahhari. "Robust Differential Game Reinforcement Learning with Soft Actor-Critic for Guidance in Low-Thrust Multi-Body Environments." *AIAA*, 2024 (Active)
- **Ali BaniAsad**, Alireza Sharifi. "Enhancing AHRS Results with Deep Learning LSTM Networks for Real-Time Attitude Estimation in GNSS-Denied Environments." *Engineering Applications of Artificial Intelligence*, 2024 (Active)

Conference Papers

- Hadi Nobahhari, **Ali BaniAsad**, Alireza Sharifi. "Linear Quadratic Integral Differential Game Applied to the Real-time Control of a Quadrotor Experimental Setup." *ICRoM*, [IEEE](#), 2022.

RESEARCH EXPERIENCE

Researcher at [CNAV Lab](#) [in](#) [GitHub](#) [YouTube](#)

May 2020 – Ongoing

Head of Lab (Current), Researcher (Former)

Tehran, Iran

Supervisors: Hadi Nobahari, PhD and Alireza Sharifi, PhD

- Integrated **embedded AI** with C programming to enhance **robotic control** system efficiency.
- Developed AI-driven navigation systems ([INS-AI](#), [AHRs-AI](#)) to enhance **precision**, **safety**.
- Employed **ROS** for inter-robot networking and swarm flight in **multi-agent** [Crazyflie](#) drones.

Robust Reinforcement Learning Guidance [GitHub](#)

August 2022 – November 2024 (Expected)

Master's Thesis in Sharif University of Technology

Tehran, Iran

Supervisors: Hadi Nobahari, PhD

- Investigated **Deep Reinforcement Learning** methods, comparing their performance with classical strategies, such as **MPC**, to identify strengths and weaknesses.
- Integrated **ROS** to test and validate robotic **Embedded RL** in **real-world** scenarios.
- Utilized **game theory** to develop **robust** and **safe multi-agent** RL algorithms.

Game Theory-Based Control for a UAV [GitHub](#) [YouTube](#)

February 2021 – September 2023

Bachelor's Thesis in Sharif University of Technology

Tehran, Iran

Supervisors: Hadi Nobahari, PhD

Awarded the Best Undergraduate Thesis [🏆](#)

- Developed a robust **quadrotor** control system using **differential game theory**.
- Employed **optimization** for **system identification**, enhancing control **reliability**.
- Tested the control strategy on a [3DoF setup](#), demonstrating the **game-theoretic** approach.

Optimized Flocking of Autonomous Drones [GitHub](#)

July 2023

Project in Sharif University of Technology

Tehran, Iran

Supervisors: Hadi Nobahari, PhD

- Optimized a swarm model for **communication delays** and **obstacle avoidance**.
- Implemented and validated the model with **Simulink** simulations and **HIL** testing using **embedded C** on a **microcontroller**, ensuring robustness and reliability.

Multi-Objective Heuristic Optimization [GitHub](#)

February 2023

Project in Sharif University of Technology

Tehran, Iran

Supervisors: Hadi Nobahari, PhD

- Implemented the [REMARK](#) algorithm for **multi-objective optimization** with **conflicting** objectives, allowing for the effective evaluation of trade-offs.

Advanced Aircraft Trim Stability Analysis with DATCOM [GitHub](#)

March 2022

Project in Sharif University of Technology

Tehran, Iran

Supervisors: Afshin Banazadeh, PhD

- Developed an advanced **UI** for DATCOM software, enhancing aircraft **stability analysis**.
- **Real-Time** visualization and **interactive** adjustments for aircraft performance **evaluation**.

AIAA Regional Jet Design Competition [GitHub](#)

June 2021

Project in Sharif University of Technology [[Poster of the Aircraft](#)]

Tehran, Iran

Supervisors: Afshin Banazadeh, PhD

- Led regional jet design, integrating disciplines for performance and **industry standards**.
- Developed a project [report](#) and presentation, highlighting **design choices** and simulation results, leading to a successful team presentation.

TEACHING EXPERIENCE



Teaching Assistant

- **Automatic Control** September 2021 – Present
Department of Aerospace Engineering, Sharif University of Technology
Instructors: [Hadi Nobahari](#), PhD and [Alireza Sharifi](#), PhD
- **Control Lab** September 2021 – Present
Department of Aerospace Engineering, Sharif University of Technology
Instructors: [Hadi Nobahari](#), PhD and [Alireza Sharifi](#), PhD
- **Dynamics** September 2021 – December 2023
Department of Aerospace Engineering, Sharif University of Technology
Instructors: [Alireza Sharifi](#), PhD
- **Introduction to Aerospace Engineering** September 2021 – December 2023
Department of Aerospace Engineering, Sharif University of Technology
Instructors: [Alireza Sharifi](#), PhD
- **Aircraft Design II** September 2021 – December 2021
Department of Aerospace Engineering, Sharif University of Technology
Instructors: [Afshin Banazadeh](#) PhD
- **Fundamentals of Programming (C/C++)** September 2018 – December 2018
Department of Computer Engineering, Sharif University of Technology
Instructor: [Ms. Marjan Nikbin](#)

SELECTED AWARDS AND HONORS

- Ranked 23** 2017
Ranked 23 among more than thousands participants in the Nationwide University Entrance Exam for Aerospace Engineering.
- Iranian Aerospace Society's Best Undergraduate Thesis Award** 2022
Awarded for the exceptional undergraduate thesis titled "Control of a 3DOF Quadrotor Stand using a Linear-Quadratic-Integral Controller based on Differential Game Theory".
- Ranked Top 0.5%** 2017
Ranked Top 0.5% among 150,000 participants of Iran's Undergraduate University Entrance Exam

TECHNICAL SKILLS

- **Programming Languages**
 - C/C++
 - Embedded C
 - MATLAB
 - Python 🐍
- **Tools and Platforms**
 - Git 
 - ROS
 - Terminal >_
 - Linux 
 - Simulink
 - L^AT_EX
- **Libraries/Frameworks:**
 - **Machine Learning Libraries:**
PyTorch, TensorFlow, Keras, Scikit-learn, OpenAI Gym, JAX
 - **Data Analysis and Visualization Libraries:**
Matplotlib, NumPy, Pandas, OpenCV
 - **Simulation Tools:** Gazebo, MuJoCo
- **Languages:** Farsi (Native), English (Full Professional Proficiency)
The TOEFL iBT score is 96 (Reading: 26, Listening: 27, Speaking: 22, Writing: 21)

NOTABLE COURSES

University Courses

2017 – 2024

Sharif University of Technology, Tehran, Iran

- **Programming and Computational Methods:**
 - Basic Programming of C (20)
 - Numerical Calculations (20)
- **Mathematics and Statistics:**
 - Engineering Mathematics (19.8)
 - Probability and Statistics (20)
- **Control Systems:**
 - Automatic Control (18.1)
 - Optimal Control (17.5)
 - Control Lab (18.5)
- **Aerospace Engineering:**
 - Aircraft Design II (18.3)
 - Flight Dynamics II (18.3)
- **Research and Projects:**
 - Bachelor Thesis (20)

- **Robotics:** [verify certificate](#)
Provided by University of Pennsylvania, Coursera
 - Aerial Robotics
 - Computational Motion Planning
 - Mobility
 - Perception
 - Estimation and Learning
 - Capstone
- **Reinforcement Learning:** [verify certificate](#)
Provided by University of Alberta, Coursera
 - Fundamentals of Reinforcement Learning
 - Sample-based Learning Methods
 - Prediction and Control with Function Approximation
 - A Complete Reinforcement Learning System
- **IBM AI Engineering:**
Provided by IBM, Coursera
 - Machine Learning with Python
 - Introduction to Deep Learning and Neural Networks with Keras
 - Building Deep Learning Models with TensorFlow
 - Introduction to Neural Networks and PyTorch
 - Introduction to Computer Vision and Image Processing
 - AI Capstone Project with Deep Learning
- **Neural Networks and Deep Learning:** [verify certificate](#)
Provided by deeplearning.ai, Coursera
- **Python Data Structures:** [verify certificate](#)
Provided by University of Michigan, Coursera
- **Introduction to Embedded Machine Learning:** [verify certificate](#)
Provided by Edge Impulse, Coursera
- **Game Theory:** [verify certificate](#)
Provided by Stanford University, Coursera

HOBBIES

- | | | |
|---------------------|--------------|-----------------|
| • Violin 🎵 | • Coding 🖥️ | • Traveling ✈️ |
| • Classical Music 🎧 | • Swimming 🏊 | • Photography 📷 |
| • Reading 📖 | • Hiking 🏔️ | • Chess ♟️ |

REFERENCES

- **Sharifi, Alireza, PhD**


Assistant Professor of Aerospace Engineering, Sharif University of Technology

Dr. Sharifi Supervised my work in the [CNAV Lab](#) for over three years, during which we collaborated on multiple projects. I served as both a researcher and a teaching assistant during this time.

–  [Faculty Page at Sharif University](#)

–  ar.sharifi@sharif.edu

–  [Google Scholar Profile](#)

–  (+98)-21-6616-8115

- **Nobahari, Hadi, PhD**


Professor of Aerospace Engineering, Sharif University of Technology

I have worked with Dr. Nobahari for over four years, including on both my master's and bachelor's theses.

–  [Faculty Page at Sharif University](#)

–  nobahari@sharif.edu

–  [Google Scholar Profile](#)

–  (+98)-21-6616-4040

- **Banazadeh, Afshin, PhD**


Professor of Aerospace Engineering, Sharif University of Technology

I have taken several courses with Dr. Banazadeh, achieving excellent results. I developed a fully designed regional jet and created a GUI to facilitate and automate the design process. Additionally, I served as a teaching assistant for the "Airplane Design II" course for one year.

–  [Faculty Page at Sharif University](#)

–  banazadeh@sharif.edu

–  [Google Scholar Profile](#)

–  (+98)-21-6616-8108