Niyousha Rahimi

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Education

University of Washington — Seattle, WA
PhD in Aeronautics and Astronautics Engineering — *2018 – present*

University of Washington — Seattle, WA
M.Sc. in Mechanical Engineering — *2016 – 2018*

Sharif University of Technology — Tehran, IRAN
B.Sc. in Mechanical Engineering — *2011 – 2016*

Area of Interest

- Vision-based Navigation and Control
- Stochastic planning
- Data-driven Optimal control
- Multi-agent Systems

Technical Skills

- **Languages**: Python, C#/C++, MATLAB
- **Packages and Platforms**: Pytorch, TensorFlow, AirSim, Unreal Engine
- **Software**: CVX, ROS, Simulink, Git, LaTex

Experience

Internship at Amazon, Project Kuiper
Los Angeles, California — *June-Sept 2022*

Internship at NASA Jet Propulsion Laboratory (JPL)
Section 347N (Maritime and Multi-Agent Autonomy), California Institute of Technology — *Jan-Mar 2022*

- **Robust Controller Synthesis for Vision-based Spacecraft Guidance and Control**
  I developing a method for Robust Controller synthesis for Vision-based Spacecraft guidance and control. The method was build around the use of a photo-realistic simulator (Unreal Engine), where a camera is deployed on a tracking spacecraft (Ego) to observe an uncontrolled vehicle (Target) in a Low Earth Orbit (LEO).
  Under the supervision of Amir Rahmani

Robotics, Aerospace, Information, and Networks (RAIN) Lab
University of Washington — *Aug 2019 – present*

- **Online regulation of partially unknown (and possibly unstable) linear systems.**
  We proposed the Data-Guided Regulator(DGR) synthesis that regulates the underlying states of an unknown linear model through generating informative data.

Scale-independent Multi-modal Automated Real Time Systems (SMARTS) Lab
University of Washington — *Sept 2017 – Aug 2018*

- **Multi-Agent Consensus Optimization in Large-Scale Supply Networks**
  Multi-agent systems are characterized by (semi)-autonomous agents with decentralized decision-making capabilities. In this work, we bring the notion of multi-agent systems to clustered supply-demand networks such that each supplier acts as an independent agent. Consequently, consensus-based auction bidding methods were adapted to optimize the assignment of demands to the suppliers with known communication pathways and resource constraints.

Internship at Umbra Cuscinetti, Inc.
Everett, Washington — *June 2017 – Sept 2017*

- Collaborated with a team of 5 Engineers on OCSO project for Boeing. Specific tasks: Design of control logic, as well as participating in the design of the overall system mechanism

Publication

- **N. Rahimi**, S.Talebi, A.Deole, M.Mesbahi, S.Bandyopadhyay, A.Rahmani **Robust Controller Synthesis for Vision-based Spacecraft Guidance and Control**, AIAA SciTech Forum and Exposition , 2022.
- J. Becktor, W. Seto, A.Deole, S.Bandyopadhyay, **N. Rahimi**, S.Talebi, M.Mesbahi, A.Rahmani **Robust Vision-based Multi-spacecraft Guidance Navigation Control using CNN-based Pose Estimation**, IEEE Aerospace Conference , 2022.
- S.Talebi, S.Alemzadeh, **N. Rahimi**, M.Mesbahi, **On Regularizability and its Application to Online Control of Unstable LTI Systems**, IEEE Transactions on Automatic Control, 2022 December issue.
- S.Talebi, S.Alemzadeh, **N. Rahimi**, M.Mesbahi, **Online Regulation of Unstable LTI Systems from a Single Trajectory**, IEEE Conference on Decision and Control, 2020.
- **N. Rahimi**, J. Liu, A. Shishkarev, I. Buzytsky, A. Banerjee, **Auction Bidding Methods for Multi-Agent Consensus Optimization in Supply-Demand Networks**, IEEE Robotics and Automation Letters, 2018.

Honors & Awards

- **Ruth C. Hertzberg Endowed Fellowship**, William E. Boeing Department of Aeronautics & Astronautics Engineering, 2018
- **Ranked 81st** among more than 300,000 participants in nationwide university entrance exam for BS degree, 2011.

Selected Course Projects

Deep Learning Oct 2019 – Dec 2019

- **DDPG for UAV Autonomous Landing on a Moving Platform:** In this work, I implemented the Deep Deterministic Policy Gradients (DDPG) algorithm for UAV Autonomous Landing on a Moving Platform.

Advanced Robotics Oct 2017 – Dec 2017

- **MDP and Collision avoidance for Multi Robots:** In this work I implemented the Markov Decision Processes (MDP) algorithm for two homogeneous robots in an indoor environment, the goal of which was to take two victims out of a corrupted building, autonomously, without collision to obstacles or to one another.

Selected Courses

Learning and Robotics
- Deep Learning
- State Estimation
- Advance Robotics
- Robotics Algorithms & Application

Control Systems
- Linear Systems Theory
- Multivariable Control
- Nonlinear Control
- Robust Control

Mathematics
- Real Analysis
- Convex Optimization
- Numerical Optimization
- Advanced Stochastic Process

Teaching Experience

University of Washington Sept 2018 – June 2019

- Teaching Assistant: Classical Control Theory
- Teaching Assistant: Linear Systems Theory
- Teaching Assistant: Orbital and Space Flight Mechanics