

Shahab Nikkhoo

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INTEREST

- **Robotics** Space Robotics, learning-based control, Multi-Robot Systems
- **Machine Learning** Deep Reinforcement Learning, Adversarial Machine learning
- **Cyber-Physical systems** Real-time Embedded Systems

EDUCATION

- **University of California, Riverside** California, USA
M.S., *Electrical Engineering (Robotics, Reinforcement Learning)* Sep 2022 - Jan 2024
Selected Courses: Secure Autonomous System and CPS, Advanced OS, Theory of Computation, Advanced Robotics, Pattern Recognition, Introduction to DeepRL
- **University of Tehran** Tehran, Iran
B.S., *Electrical Engineering (Control, Robotics)* Sep 2016 - Jul 2021
Selected Courses: Advanced Robotics, Real-Time Embedded Systems, Mechatronics, Modern Control, Digital Control Systems, Industrial Control

PUBLICATIONS

- **PIMbot: Policy and Incentive Manipulation for Multi-Robot Reinforcement Learning in Social Dilemmas** (Accepted at IROS 2023)
Shahab Nikkhoo, Zexin Li, Aritra Samanta, Yufei Li, Cong Liu
- **MIMONet: Multi-Input Multi-Output On-Device Deep Learning** (arXiv)
Zexin Li, Xiaoxi He, Yufei Li, Shahab Nikkhoo, Wei Yang, Lothar Thiele, Cong Liu
- **An Intelligent Toy Car for Autism Screening using Multi-Modal Features** (MDPI Sustainability)
Bijan Mehralizadeh, Bahar Baradaran, Shahab Nikkhoo, Pegah Soleiman, Hadi Moradi
- **Pareto-Secure Machine Learning (PSML): Fingerprinting and Securing Inference Serving Systems** (arXiv)
Debopam Sanyal, Jui-Tse Hung, Manav Agrawal, Prahlad Jasti, Shahab Nikkhoo, Somesh Jha, Tianhao Wang, Sibin Mohan, Alexey Tumanov

SUMMER SCHOOL

- **Attendee**, Differential Privacy Summer School Boston, USA
Boston university 2022
- **Assistant**, Global Summer School Barcelona, Spain
Institute for advance architecture of Catalonia (Iaac) 2019

TEACHING EXPERIENCE

- **Advanced Robotics** Tehran, Iran
University of Tehran 2021
- **Mechatronics** Tehran, Iran
University of Tehran 2021
- **Real-Time Embedded Systems** Tehran, Iran
University of Tehran 2020

WORK EXPERIENCE

- **FarmSense:** Smart insect monitoring and pest management company California, USA
Software & Hardware Engineer Summer 2023
 - Developed software and hardware for nrf9160 with Zephyr OS
- **Persia 3D Printer:** 3D printer manufacturer Tehran, Iran
R&D Team Member 2016 - 2021
 - Embedded Designer
 - PCB Designer
 - C++ and Python Programmer
 - Research Fellow

PROJECTS

- **Learning How to Fly: Training Two Connected Quadcopters**
 - *Reinforcement Learning - Robotics*
 - Trained 9000 agents simultaneously in Nvidia Isaac Gym to learn how to fly
 - Developed a DDPG + HER algorithm to solve the control problem
- **Python Quadcopter Simulator**
 - *Robotics*
 - Designed a Python simulator to model quadcopter dynamics
 - Implemented an A* algorithm to find paths on a static map and followed them with a minimum jerk trajectory
- **Multi Agent Reinforcement Learning**
 - *Reinforcement Learning*
 - Implemented DQN, A2C, DDPG, SAC, and PPO algorithms to solve a multiplayer game and compared their performance
 - Developed a teacher-student framework to train a simpler model for the game based on a more complex model
- **WellOGraph**
 - *Digital Art - Robotics*
 - An Omni directional drawing machine that raises awareness on water crisis
 - ROS base robot with Visual Odometry for positioning and a drawing system for plotting points on a canvas
- **Autonomous Quadcopter**
 - *Robotics*
 - A ROS base autonomous Drone for doing automated task like auto takeoff - window detection
 - Designed the board, modified the control system for position holding, visualized the 2D map given by LIDAR
- **Mobile Robot Localization**
 - *Robotics*
 - Developed a particle filter algorithm in Python for localizing a mobile robot in gazebo
 - Creating the map with SLAM algorithm
- **Ball and Plate**
 - *Robotics*
 - A 4 DOF parallel robot to control the position of a ball
 - Developed a code to position a ball and estimate the velocity with image processing algorithms
 - Designed a PD controller on an arduino base board

HONORS AND AWARDS

- **Dean's Distinguished Fellowship,**
 - *University of California at Riverside, school of Electrical and Computer Engineering* 2022
- **Best undergraduate project,**
 - *University of Tehran, school of Electrical and Computer Engineering* 2021
- **1st Place RoboCup UAV – Indoor (autonomous UAV)**
 - *Iran Open International Robotic Competitions* 2018
- **2nd Place AUTCUP Fira Drone (autonomous UAV)**
 - *International Robotic Competitions* 2018

SKILLS

- **Languages** Python, C++, C#, Bash, Embedded C
- **Frameworks** PyTorch, TensorFlow, Isaac Gym
- **Platforms** Arduino, Raspberry, STM32, Zephyr
- **Software** 3D Printing Softwares, Altium Designer, Solid Works

LANGUAGE

English(Fluent), Farsi(Native)

NON-ACADEMICAL ACTIVITIES

Agriculture, Camping, Hiking, Tennis

REFERENCES

- **Sibin Mohan**, Associate Professor at George Washington University, School of SEAS advisor
 - *Email: sibin.mohan@gwu.edu* 2022
- **Hadi Moradi**, Associate Professor at University of Tehran, School of ECE B.S. advisor
 - *Email: moradih@ut.ac.ir* 2018 - 2021