Aliasghar Arab

Curriculum Vitae

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⌨ *RU-Racer* **in** *Linkedin*   *Scholar*

Brief Bio

As the Entrepreneurial Lead at Agile Safe Autonomy, I lead a team of experts in developing software solutions for autonomous robotic systems, focusing on safety enhancements. My academic background in Robotics and multi disciplinary industrial experience fuel my passion for robot and autonomous vehicle safety. Specializing in control systems, my work centers on sustainable high-performance, safe operation of autonomous vehicles and robots in different operational domains. I am committed to advancing any aspect of these technologies as an individual contributor or team lead and excited about its potential to transform everyday life.

Education

2016–2021 **Doctorate of Philosophy, Mechanical & Aerospace Engineering**, *Rutgers University*, NJ, USA.
Thesis: Safe Motion Control and Planning for Autonomous Racing Vehicles

2011–2013 **Master of Science, Electrical Engineering**, *Shahrood University of Technology*.
Thesis: Robust Tracking Control of a Mobile Robot Using Voltage Control Strategy

2007–2011 **Bachelor of Science, Computer & Robotics Engineering**, *Shahrood University of Technology*.

Professional Experiences

Agile Safe Autonomy

May, 2023 –Present ***AI Safety Research Lead***, *New York*, NY.
- Currently leading an NSF-funded project focused on AI safety, aiming to advance research and implementation of robust safety measures in artificial intelligence systems.

Nuro AI

Mar, 2023 Nov, 2023 ***Autonomous Vehicle Researcher***, *Remote*, NY.
- Leading the design, implementation and verification of an ODD-aware fault response method for autonomous vehicles.

Nokia Bell Labs

Mar, 2020 Mar, 2023 ***Robotics Research Scientist***, *Murray Hill*, NJ.
- Led the development of a secure path planning method for connected robotic vehicle. (Bell Labs Award)
- Developed functional safety analysis methods for autonomous industrial mobile robots.
- Designed and led implementation of safe predictive controller for industrial mobile robots with independent steer and drive wheels for factory robots.

Verizon

Mar, 2016 –Mar, 2020 ***System Architecture (PMTS)***, *Basking Ridge*, NJ.
- Led a device technology team to design an Edge computing and 5G-LTE architecture for connected vehicles, autonomous robots, and smart cities.
- Managed an automation project to develop a robotic process automation (RPA) application for verification and validation.
- Developed an algorithm for low-power connection of IoT devices and sensor networks.

Rutgers University

Aug, 2015 *Research Assistant*, *Piscataway*, NJ.
– Mar, 2020 o Developed optimal motion planning and a robust motion controller for racing cars.
o Led an autonomous race-car project and built 2 different versions of scaled race cars and a race track for research.

Zoomi Inc.

Mar, 2014 *Algorithm Developer (ML)*, *Princeton*, NJ.
– Mar, 2015 o Developed algorithms for online course analytical dashboards and adaptive course contents using ML and AI techniques using Python.

TAM IranKhodro

Sep, 2011 *Machine Vision & Robotics Engineer*, *Tehran*, Iran.
– Feb, 2014 o Designed and built modular grippers for industrial Kuka robots in Catia with it's digital twin in Delmia.
o Led a machine vision and industrial robotic project to build and end-to-end robot controller with visual feedback using C#.

Teaching Experience

Fall, 2023	**Robotics**, *Adjunct lecturer*, New York University.
Summer,2020	**Dynamical Systems**, *Adjunct lecturer*, Rutgers University.
Fall, 2018	**Fluid Dynamics**, *Teaching Assistant*, Rutgers University.
Spring, 2017	**Linear Control**, *Teaching Assistant*, Rutgers University.
Fall, 2016	**Linear Control**, *Teaching Assistant*, Rutgers University.
Spring, 2014	**Control in biological systems**, *Adjunct lecturer*, Tehran University.
Fall, 2013	**Modern Control Systems**, *Teaching Assistant*, Shahrood University of Technology.
Spring, 2012	**Fuzzy Control Systems**, *Teaching Assistant*, Shahrood University of Technology.
Fall, 2011	**Machine Design**, *Teaching Assistant*, Shahrood University of Technology.
Spring, 2011	**Robotics Lab**, *Adjunct lecturer*, Shahrood University of Technology.

Memberships

2020-Present	**Underwriters Lab (UL)**, *Standard Technical Panel Member (STP)*.
2013-Present	**IEEE**, *Member*.
2013-Present	**AAAI**, *Member*.
2016-Present	**ASME**, *Member*.
2022-Present	**SAE**, *Member*.

Awards

Mar. 2023	Innovation Corps (I-Corps™) National Award by **National Science Foundation (NSF)**
Jun. 2022	Innovation Corps (I-Corps™) Northeast Regional Award by **National Science Foundation (NSF)**
Jun. 2021	Bell Labs Summer Research Award by **Nokia Bell Labs**
Jun. 2013	Elite Student Presidential Award by **Iran's Elite Organization**

Computer skills

Programming Python, C, C++, C#, Matlab

Software	Catia, Gazebo, Delmia, LabView, Visual Studio
Web	AWS, AMQP, Django
Tools	TensorFlow, Reinforcment Learning, ROS, Git, Docker, Kubernetes
General	Intrapreneurship, Management, Teamwork, Communication, Problem Solving, Leadership

Publications

Selected Journal Article

2023 **RDT-RRT: Real-time double-tree rapidly-exploring random tree path planning for autonomous vehicles**, *J. Yu, C. Chen, A. Arab, J. Yi, X. Pei, X. Guo, Expert Systems with Applications.*

2023 **Enhancing Autonomous Driving Safety Analysis with Generative AI: A Comparative Study on Automated Hazard and Risk Assessment**, *A. Abbaspour, A Arab, Y. Mousavi, A. Jelvani, Machines, Special Issue Safety and Security of AI in Autonomous Driving, Under Review.*

2023 **Hybrid Reinforcment Learning-based Gear Shift Control of Electric Vehicles**, *Y. Mousavi, A. Arab, IEEE Access, Under Review.*

2023 **Safe Iterative Feedback Linearization Control Design for Collaborative Robots**, *A Arab, IEEE Arxiv.*

2023 **Motion Planning and Control of Autonomous Aggressive Vehicle Maneuvers**, *A Arab, K Yu, J Yu, J Yi, IEEE Transactions on Automation Science and Engineering.*

2022 **Hierarchical Framework Integrating Rapidly-exploring Random Tree with Deep Reinforcement Learning for Autonomous Vehicle**, *J Yu, A Arab, J Yi, X Pei, X Guo, Applied Intelligence.*

2017 **Robust Impedance Control of Uncertain Mobile Manipulators Using Time-Delay Compensation**, *M Souzanchi-K, A Arab, MR Akbarzadeh-T., MM Fateh, IEEE Transactions on Control Systems Technology.*

2015 **An Uncertainty Compensator for Robust Control of Wheeled Mobile Robots**, *A Arab, MM Fateh, Advanced Robotics.*

2015 **An Adaptive Gradient Descent-based Local Search in Memetic Algorithm Applied to Optimal Controller Design**, *A Arab, A Alfi, Information Sciences.*

2015 **Robust Control of a Wheeled Mobile Robot by Voltage Control Strategy**, *A Arab, MM Fateh, Nonlinear Dynamics.*

2015 **Design and Implement of Fuzzy Control of a Robotic Camera for Target Tracking**, *A Arab, MM Fateh, Journal of Solid and Fluid Mechanic.*

Conference Articles

2021 **Instructed Reinforcement Learning Control of Safe Autonomous J-Turn Vehicle Maneuvers**, *A Arab, J Yi, IEEE/ASME International Conference on Advanced Intelligent Mechatronics (AIM).*

2021 **Safe Predictive Control of Four-Wheel Mobile Robot with Independent Steering and Drive**, *A Arab, J Yi, American Control Conference (ACC).*

2021 **Safety-Guaranteed Learning-Predictive Control for Aggressive Autonomous Vehicle Maneuvers**, *A Arab, J Yi, IEEE/ASME International Conference on Advanced Intelligent Mechatronics (AIM).*

2020 **Optimal Control of Wheeled Mobile Robots: From Simulation to Real World**, *A Arab, Y Mousavi, American Control Conference (ACC).*

2016 **Motion Planning for Aggressive Autonomous Vehicle Maneuvers**, *A Arab, K Yu, J Yi, D Song, IEEE International Conference on Automation Science and Engineering (CASE).*

2016 **Motion Control of Autonomous Aggressive Vehicle Maneuvers**, *A Arab, K Yu, J Yi, Y Liu, IEEE/ASME International Conference on Advanced Intelligent Mechatronics (AIM).*

2014 **Robust Control of a Low-Cost Mobile Robot Using a Neural Network Uncertainty Compensator**, *A Arab, J Yi, MM Fateh, S Arabshahi, IEEE/ASME International Conference on Advanced Intelligent Mechatronics (AIM).*

2011 **Camera-based Mobile Robot Global Localization using Min Box method**, *A Arab, MM Fateh, Int. Conf. of Mobile Robots and Assertive Technologies (CLAWAR).*

Patents

2023 **Systems and Methods for Semi-Supervised Automated Hazard Analysis of Safety-Critical Autonomous Systems Using Generative AI**, *A Arab, US Provisional Patent 63/589,021.*

2023 **Safe Agile Hazard Avoidance System for Autonomous Vehicles**, *A Arab, J. Yi, US Patent 63/356,979.*

2019 **Synchronization for battery-powered IoT networks**, *A Arab, J. Nacer, N. Qian, US Patent 10,433,270.*

2018 **Smart IoT Self-Healing Network**, *A Arab, J. Nacer, N. Qian, US Patent 20,180,332,846.*