ARAS HI-TECH ROBOTIC SOLUTIONS
ADVANCED ROBOTICS & AUTOMATED SYSTEMS

1928
Industrial Control Center of Excellence
K. N. Toosi University of Technology

Series of ARAS Public Webinars By ARAS Alumni

Safe and Resilient Autonomous Navigation in Highly Dynamic Environments

Invited Speaker

Dr. Golnaz Habibi, Ph.D.

Golnaz Habibi is currently a research scientist at the department of Aeronautics and Astronautics at MIT. Previously, she was a robotics engineer at Autel robotics leading the team responsible for motion planning of autonomous drones. Golnaz received her Bsc in electrical and control engineering from K.N.Toosi University of Technology, Advanced Robotics and Automated System (ARAS) , in 2005, her Msc. in control engineering from Tarbiat Modares University, Tehran, Iran, in 2007, and her PhD in computer science from Rice University, Houston, US, in 2015.
Golnaz's work lies at the intersection of robotics, control, machine learning, and multi agent systems. Her algorithmic solutions have been implemented on real robotics systems and they have been applied to real-world problems such as autonomous driving, multi-agent task allocation, and collective transport. Her current research focuses on visual autonomous navigation, reliable communication and improving the safety and reliability of autonomous agents.

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Abstract

Despite all recent advances in robotics and automation, building a **resilient**, safe, and practical **autonomous system** with the ability of interacting with the environment efficiently and overcoming the challenges of real-world scenarios is not trivial. This talk addresses three critical challenges in building a fully autonomous system including **safety**, **transferability**, and **intractability**. In particular, the first part of the talk focuses on challenges of **self-driving vehicles** navigating in highly dynamic environments. A transferable and scalable algorithm is introduced which incorporates the environment context for predicting the motion behaviors of pedestrians in environments with high level of uncertainty. The presented framework is also able to continually learn when the data is available incrementally, leading to a **real-time learning** and inference paradigm. Furthermore, the extension of the context-based perception pipeline to **multi-agent** learning such as fleet of autonomous vehicles (AV) or smart nodes (IX) will be described. The second part of the talk demonstrates an example of an end-to-end **distributed and scalable pipeline** for collective transport of an unknown object by a team of robots with limited sensing. At the end, ongoing and future direction in safety and robustness of visual autonomous navigation systems will be discussed.

Date & Time

Date: Monday, April. 19, 2021 (30 Farvardin 1400)
Time: 18:00-19:30 (+3:30 GMT Tehran local time)
9:30-11:30 (-5:00 GMT Canada Eastern Time Zone)

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