✉ eaasi@mit.edu
linkedin.com/in/erfan-aasi
https://erfanaasi.github.io/
h-index: 7, Citations: 214
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Erfan Aasi

Education

2024–Now **Postdoctoral Associate**, *MIT, Boston, USA*,
Distributed Robotics Lab (DRL), Advisor: Daniela Rus and Sertac Karaman.

2018–2023 **Master of Science and Ph.D.**, *Mechanical Engineering, Boston University, Boston, USA*,
Hybrid and Networked Systems (HyNeSs) Group, Advisor: Calin Belta.
GPA: *3.87/4.00*

2013–2018 **Bachelor of Science**, *Electrical Engineering, Sharif University of Technology, Tehran, Iran*,
Robotics and Machine Vision Laboratory, Advisor: Mehran Jahed.
GPA: *3.60/4.00*

Research Interests

- Safe Autonomy for dynamic systems
- Automated synthesis and inference
- Language models and deep learning
- Interpretable decision-making
- Time-series analysis and prediction

Research Experience

Jan. 2024–Now **Postdoc Researcher**, *MIT*,
Cambridge, MA, USA, Advisor: Daniela Rus, Sertac Karaman,
- Developing robust autonomous systems by integrating deep learning and language models..

Sept. 2022–Apr. 2023 **Machine Learning Intern**, *Symbotic*,
Wilmington, MA, USA, Advisor: Dan Burns,
- Developed anomaly detection methods using machine learning techniques, for time-series behavior analysis of warehouse robots.

2018–2023 **Research Assistant**, *Hybrid and Networked Systems (HyNeSs) Group, BU Robotics Lab*,
Boston University, Boston, USA, Advisor: Calin Belta,
- Designed motion planning and control algorithms for safe, efficient urban driving..

2016–2018 **Research Assistant**, *Robotic and Machine Vision Laboratory*,
Sharif University of Technology, Tehran, Iran, Advisor: Mehran Jahed,
- Designed a robotic platform for automated needle insertion in prostate cancer sampling.

Projects

Accepted (ICLR 2025) **ReGen: Generative Robot Simulation via Inverse Design**.
- Proposed a framework using LLMs to automatically generate simulation environments from agent behaviors.
- Enabled controllable, counterfactual scenarios for robust robot policy testing.

Accepted (ICRA 2025) **Generating Out-Of-Distribution Scenarios Using Language Models**.
- Developed a LLM-based framework to generate and simulate diverse Out Of Distribution (OOD) scenarios in autonomous driving.
- Assessed Vision-Language Models for interpreting and navigating the generated OOD scenarios.

Published (T-ITS 2023) **Two-Level Control Algorithm for Autonomous Driving in Urban Environments**.
- Developed a control method for self-driving cars in uncertain environments, subject to safety and traffic rules.
- Improved runtime performance and solution quality, compared to existing works.

On-going **Interpretable Generative Adversarial Imitation Learning**.
- Designed an imitation learning framework that combines interpretable inference and control synthesis.
- Trained GAN-inspired inference and policy networks for efficient adaptation and expert alignment.

Published (RA-L 2023) **Deep Reinforcement Learning for Continuous Control in Cluttered Environments**.
- Proposed a deep policy gradient control algorithm for robots navigating in cluttered environments.
- Designed a reward scheme, using sampling based methods, to overcome the exploration challenges.

Published (L4DC 2023) **Time-Incremental Learning from Data Using Temporal Logics**.
- Proposed a classification method for temporal properties of time-series data in an incremental manner.
- Leveraged decision trees and neural networks to minimize the misclassification rates.

Published (IROS 2022) **Classification of Time-Series Data using Boosted Decision Trees**.
- Developed a decision-tree based approach for data classification using temporal logic specifications.
- Improved runtime performance and misclassification rate over existing approaches.

Published (ACC 2021) **Control Architecture for Provably-Correct Autonomous Driving**.
- Proposed a predictive control method for autonomous driving in deterministic environments.
- Achieved substantial improvements in the sense of runtime performance over existing approaches.

Published (L4DC 2022) **Learning Spatio-Temporal Specifications for Dynamical Systems**.
- Developed a spatio-temporal logic based algorithm for generating desired patterns in dynamical systems.
- Maximized occurrence of desired patterns, using clustering, supervised learning and optimization methods.

Published (ACC 2021) **Robust Planning and Control Algorithm in Polygonal Environments**.
- Developed a robust navigation method in polygonal environments, based on linear programming methods.
- Provided stability and safety guarantees by enforcing Control Barrier Function (CBF) constraints.

Publications

- **E. Aasi**, P. Nguyen, S. Sreeram, G. Rosman, S. Karaman, and D. Rus, "Generating Out-Of-Distribution Scenarios Using Language Models", arXiv preprint arXiv:2411.16554, 2024, doi:10.48550/arXiv.2411.16554.
- **E. Aasi**, M. Cai, C. I. Vasile, and C. Belta, "A Two-Level Control Algorithm for Autonomous Driving in Urban Environments", IEEE Transactions on Intelligent Transportation Systems, 2024, doi:10.1109/TITS.2024.3486557.
- W. Liu, D. Li, **E. Aasi**, R. Tron, D. Rus, and C. Belta, "Interpretable Generative Adversarial Imitation Learning", arXiv preprint arXiv:2402.10310, 2024, doi:10.48550/arXiv.2402.10310.
- **E. Aasi**, M. Cai, C. I. Vasile, and C. Belta, "Time-incremental learning from data using temporal logics", 2023 Learning for Dynamics and Control conference (L4DC), 2023, pp. 547-559, PMLR 211:547-559, 2023.
- M. Cai, **E. Aasi**, C. Belta, and C. I. Vasile, "Overcoming Exploration: Deep Reinforcement Learning for Continuous Control in Cluttered Environments From Temporal Logic Specifications", IEEE Robotics and Automation Letters 8, no. 4 (2023): 2158-2165, doi:10.1109/LRA.2023.3246844.
- **E. Aasi**, C. I. Vasile, M. Bahreinian, and C. Belta, "Classification of Time-Series Data Using Boosted Decision Trees", 2022 IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS), pp. 1263-1268. IEEE, 2022, doi:10.1109/IROS47612.2022.9982105.
- S. Alsalehi, **E. Aasi**, R. Weiss, and C. Belta, "Learning Spatio-Temporal Specifications for Dynamical Systems", 2022 Learning for Dynamics and Control conference (L4DC) , 2022, pp. 968-980, PMLR 168:968-980.
- **E. Aasi**, C. I. Vasile, and C. Belta, "A Control Architecture for Provably-Correct Autonomous Driving", 2021 American Control Conference (ACC), 2021, pp. 2913-2918, doi:10.23919/ACC50511.2021.9482810.
- M. Bahreinian, **E. Aasi** and R. Tron, "Robust Path Planning and Control For Polygonal Environments via Linear Programming", 2021 American Control Conference (ACC), 2021, pp. 5035-5042, doi:10.23919/ACC50511.2021.9483196.

Community Service

Membership IEEE member

Service **Program Committee**
- International Symposium on Distributed Autonomous Robotics Systems (DARS 2022)

Reviewer *20 papers, Verified on Web of Science*
- ICLR (2025); ICRA (2024-2025); RSS (2024); IROS (2023); RA-L (2021-2023); ACC (2021, 2024); DARS(2022); EAAI (2022); TCST (2021); TAC (2020); CDC (2020)

Skills

Coding	Python (expert), Matlab (intermediate), C++ (beginner)
ML and AI	LLMs, Deep Neural Networks, Decision Trees, LSTM, CNN, GAN
Libraries	OpenAI, Anthropic, PyTorch, Pandas, Scipy, Matplotlib, Pyswarm
Tools	SQL, ROS, Git, Shell
Databases	Snowflake, Tableau, Azure Microsoft
Simulators	CARLA, AirSim, Gazebo, CoppeliaSim

Relevant Courses

Classroom	Deep Learning; Learning From Data; Introduction to Data Structures with Python; Stochastic Processes; Optimization Theory; Robot Motion Planning; Dynamic Systems Theory; Vision, Robotics and Planning; Nonlinear Systems and Control; Hybrid Systems; Signals and Systems; Biosensors; Principles of Biomedical Engineering; Applied Electronics in Bioengineering
Online	Generative AI with Large Language Models; Introduction to Machine Learning; Introduction to Self-Driving Cars; Motion Planning for Self-Driving Cars; Fundamentals of Reinforcement Learning

Teaching Experience

2020-2021	**Instrumentation Lab**, *Teaching Assistant, Boston University*.
2017-2018	**Artificial Intelligence and Biological Computations; Biosensors; Logic Circuits and Digital Systems; Modeling and Control of Neuromuscular Systems; Communication Systems; Computer and Microprocessor Architecture**, *Teaching Assistant, Sharif University of Technology*.

Languages

- English (Fluent); Persian (Native); Turkish (Fluent)

References

- Available upon request.