Batuhan Avcı

Doctoral researcher focusing on learning-based control, multi-agent systems, and scalable decision-making under uncertainty, with applications to autonomous systems and large-scale traffic networks.

Born in Türkiye, May 26^{th}, 2000

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Education

École Polytechnique Fédérale de Lausanne (EPFL) 09 2025 – Present
PhD in Robotics, Control, and Intelligent Systems *Lausanne, Switzerland*

Aalto University 09 2023 – 06 2025
MSc Electrical Engineering - ***GPA: 4.9/5*** *Espoo, Finland*

- Major in control and robotics with a minor in machine learning and artificial intelligence
- Master's thesis: *Safe and optimal control parameter tuning* (**Grade: 5/5**)

Istanbul Technical University (ITU) 08 2019 – 06 2023
BSc Control and Automation Engineering - ***GPA: 3.64/4*** *- Ranked* ***2nd*** *Istanbul, Türkiye*

- Graduation project: *Constructing prediction intervals with deep learning and fuzzy logic systems*

TEVITOL High School 09 2014 – 06 2019
Merit Based Scholarship for Gifted Children - ***GPA: 95.1/100*** *Istanbul, Türkiye*

Research

Urban Transport Systems Laboratory, EPFL 09 2025 – Present
Doctoral Researcher *Lausanne, Switzerland*

- Developing machine learning-based algorithms to coordinate autonomous drones for large-scale traffic monitoring and spatio-temporal data collection
- Focusing on scalable learning, adaptive control, and real-time decision-making under uncertainty

Computational Systems Biology Group, Aalto 06 2024 – 08 2024
Research Assistant *Helsinki, Finland*

- Researched continuous-time reinforcement learning methods

Artificial Intelligence and Intelligent Systems Laboratory, ITU 09 2020 – 06 2023
Research Assistant *Istanbul, Türkiye*

- Funded by the Turkish Academy of Sciences
- Focused on uncertainty quantification and its integration with deep learning and fuzzy systems
- Worked on convolutional neural networks (e.g., R-CNN, YOLO) for face recognition and tracking

Publications

1. **B. Avcı***, A. Beke, and T. Kumbasar, "Towards Reliable Uncertainty Quantification and High Precision with General Type-2 Fuzzy Systems," in *Proceedings of the IEEE International Conference on Fuzzy Systems*, Songdo Incheon, Korea, 2023.
2. H. E. Dursun, E. C. Güven, **B. Avcı***, and T. Kumbasar, "Recognizing and Tracking Person of Interest: A Real-Time Efficient Deep Learning Based Method for Quadcopters," in *10th International Conference on Recent Advances in Space Technologies (RAST)*, Istanbul, Turkey, 2023. **Code**

Teaching

EPFL — Department of Civil Engineering 09 2025 – Present
Teaching Assistant *Lausanne, Switzerland*

- Course: CIVIL-349 *Traffic Engineering* by Prof. Nikolas Geroliminis
- Responsibilities: assisting students during exercise sessions and grading

Aalto University — Department of Computer Science 08 2024 – 12 2024
Teaching Assistant *Helsinki, Finland*

- Course: CS-E4825 *Probabilistic Machine Learning* by Prof. Pekka Marttinen
- Responsibilities: assisting students during exercise sessions and grading

Aalto University — Department of Electrical Engineering 08 2024 – 12 2024
Teaching Assistant *Helsinki, Finland*

- Course: ELEC-E8101 *Digital and Optimal Control* by Prof. Dominik Baumann
- Responsibilities: handling exercise sessions, proposing exam and quiz questions, and grading

Industrial Experience

ASELSAN Inc. 07 2022 – 09 2022
Control Systems Design Intern *Ankara, Türkiye*

- Mainly dealt with the robotic manipulation and implementation of various controllers on embedded systems

BAYKAR Technologies 07 2021 – 09 2021
Artificial Intelligence Intern *Istanbul, Türkiye*

- Worked in a project named *Localization of Unmanned Aerial Vehicles in GPS Denied Environments*
- Implemented a particle filter based visual odometry framework
- Completed a time series prediction task on UAV sensor data

Technical Skills

Languages: Python, MATLAB, R, C++
Skills: TensorFlow 2, PyTorch, Linux, ROS2, OpenAI Gym, Git
Research interests: Gaussian processes, probabilistic machine learning, online control, multi-agent learning systems.

Projects

Machine Learning for Medical Diagnosis. Developed a disease classification model using logistic regression and random forest. Implemented feature engineering, model training, and evaluation for accuracy. **Code**

Decentralized Pricing Models for California Housing. Implemented a federated learning framework for predicting housing prices using distributed training. Applied regression models to train on decentralized data while preserving privacy. **Code**

Modelling and Control of Rotary Inverted Pendulum. Developed PID and LQR controllers for the Quanser QUBE Servo 2, implementing position control for the rotary disk and full-state feedback for inverted pendulum stabilization. **Code**

Microsoft Hackathon: Generative AI for RFP Automation. Developed an LLM-driven AI pipeline to automate B2B Request for Proposal (RFP) responses, streamlining proposal generation and approval. Implemented document parsing, structured data extraction, and product matching using vector search. **Code**

References

Prof. Dominik Baumann dominik.baumann@aalto.fi
Aalto University School of Electrical Engineering

Prof. Tufan Kumbasar kumbasart@itu.edu.tr
ITU Department of Control and Automation Engineering

Prof. Nikolas Geroliminis nikolas.geroliminis@epfl.ch
EPFL Department of Civil Engineering