Dilsad Er

Doctoral Researcher

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in/guner-dilsad-er Google Scholar

Profile

I am a Doctoral Researcher specializing in distributed learning systems. My research focuses on communication-efficient **distributed learning** techniques, federated learning and the use of **system-theoretical approaches for analysis**.

Professional Experience

Doctoral Researcher *Max Planck Institute for Intelligent Systems* **Tübingen, Germany** *10/2022 - present*

- Learning and Dynamical Systems Group under the supervision of Michael Mühlebach, Ph.D.. See **my Google Scholar Profile.**

Supervised Projects

Intenship Project, **Teaching Machine Learning with Lego**, By: *Viacheslav Sydora* 10/2024 - 04/2025

- Developing a machine learning tutorial for teenagers that can be implemented with Lego kits.
- The developed course took place at the KI Makerspace Tübingen.

Master Thesis, **FedBack: Controlling Communication in Federated Learning,** By: *Michael Cummins* 10/2023 - 04/2024

- Improved communication efficiency in federated learning by *FedBack* using a control theoretic approach.
- Awarded the Collen Prize for best master thesis by Trinity College Dublin. Publication is to be appeared at L4DC 2025

R&D Operations Assistant Specialist, *Turk Telekom Inc.* **Ankara, Turkey** *10/2019 - 09/2022*

- Participated as a Fellow Researcher in the 5G and Beyond Joint Graduate Support Programme coordinated by the Information and Communication Technologies Authority.

Undergraduate Student Assistant *METU* **Ankara, Turkey** *02/2019 - 05/2019*

- Assisted in teaching and research activities for the EE302 Feedback Systems course.

Intern Researcher, *DAI Labor, TU Berlin* **Berlin, Germany** *06/2018 - 09/2018*

- Implementation of the Bayesian Policy Reuse algorithm for Robot Decision-Making during their human collaboration and integration with ROS environment for an assembly line of a smart factory as a use-case in Industry 4.0 project; CHARIOT, under the supervision of Orhan Can Gorur, Ph.D.
- **Contributed to:** O. Can Gorur et al. "Anticipatory Bayesian Policy Selection for Online Adaptation of Collaborative Robots to Unknown Human Types." In: *AAMAS*. 2019, pp. 77–85.
- **Contributed to:** O. Can Gorur et al. FABRIC: A Framework for the Design and Evaluation of Collaborative Robots with Extended Human Adaptation. 2023. *J. Hum.-Robot Interact.* 12 (3) 38.

Intern Engineer, *ISSD Electronics, METU Technopolis* **Ankara, Turkey** *07 - 08/2015, 08 - 09/2017*

- Coordinated maintenance schedules and developed troubleshooting documentation for smart traffic solutions.
- Focused on Image Processing, Object and Shape Detection Algorithms, and Optical Character Recognition.

Leadership & Organization

Communications Chair *Tübingen Women in Machine Learning (TWiML)* **Tübingen, Germany** *01/2024 - present*

- Founding member responsible for managing event communications, correspondence, and visual materials.
- Organized three local workshops (March & October 2024, March 2025) with 300+ participants.

Communications Support *Soapbox Science Tübingen* **Tübingen, Germany** *01/2025 - present*

- Assisting with outreach and communication efforts to promote women in STEM through public engagement events.

Sponsorship Committee Member *METU Robotics Club* **Ankara, Turkey** *2016 - 2018*

- Organized METU Robotics Days, one of Turkey's largest student-led robotics events, with 5000+ participants.
- Chaired the Innovation category for two years, overseeing competition design and participant support.

Education

PhD Computer Science *University of Tübingen* **Tübingen, Germany** *10/2022 - Present*

Max Planck Institute for Intelligent Systems - Learning and Dynamical Systems Group

MSc Electrical and Electronics Engineering *METU* **Ankara, Turkey** *09/2019-06/2022*

Control Area (3.50/4.0) - Linear Systems Theory I-II, Optimization, Stability Theory of Dynamical Systems, Adaptive Control Systems, Robot Motion Planning and Control, Statistical Signal Processing and Modelling

MSc Thesis: *Stochastic Analysis and Adaptive Control Studies in Legged Systems*, **Publications:** [1][2][3][4]

BSc Computer Engineering *METU* **Ankara, Turkey** *09/2016-06/2019*

Information Systems Minor - Data Structures, Database Management and File Structures, Fundamentals of Image Processing, Software Engineering, Introduction to Robotics, Computer Vision

BSc Electrical and Electronics Engineering *METU* **Ankara, Turkey** *09/2014-06/2019*

Control Area (3.74/4.0) - Process Control, Control System Design and Simulation, Discrete Time Systems, Digital Signal Processing, Feedback Control Systems Laboratory, Computational Intelligence, Signals and Systems I-II

Teleoperated Hockey Player Robot Developed a teleoperated robot controlled via a 3G Cellular Data Network.

Languages

English [Advanced] - C1 (TOEFL: 108/120) **German** [Intermediate] - B1 (Humboldt Uni., Berlin) **Turkish** [Native]

Publications

M. Cummins, G. D. Er, and M. Muehlebach, **Controlling Participation in Federated Learning with Feedback**, (to be appeared in L4DC 2025)

G. D. Er, S. Trimpe and M. Muehlebach, **Distributed Event-Based Learning via ADMM**, Preprint

G. D. Er and M. Muehlebach, **Event-Based Federated Q-Learning**, ICML 2024 Workshop: Foundations of Reinforcement Learning and Control, Vienna, Austria

G. D. Er, S. Trimpe and M. Muehlebach, **A Systems-Theoretic Approach to Event-Based Distributed Learning**, Symposium on Systems Theory in Data and Optimization, Stuttgart, Germany

G. D. Er, and M. M. Ankarali, **Stochastic Stability Analysis of Legged Locomotion Using Unscented Transformation**, Bioinspiration & Biomimetics Journal

G. D. Er, **Stochastic Analysis and Adaptive Control Studies in Legged Systems** Master Thesis, 2022

G. D. Er and M. M. Ankarali, **Adaptive Control of Underactuated Planar Hexapod** conference paper: , extended version : , IEEE RAS/EMBS Int. Conf. for Biomedical Robotics and Biomechatronics (BioRob), 2022, Seoul, Korea

O. K. Karagoz, I. Sever, G. D. Er, U. Saranli and M. M. Ankarali, **Characterization of fixed points of spring-mass model with a body**, IEEE Signal Processing and Communications Applications Conf., 2020, Gaziantep, Turkey

Awards and Achievements

TUBITAK 2224-A 2022

- Support Program for Participation in Scientific Activities Abroad from Scientific and Technical Research Council of Turkey, Programme 2224-A.

TUBITAK 2210 Scholarship 2020-2021

- Scholarship from Scientific and Technical Research Council of Turkey, Programme 2210.

DAAD Scholarship 2017

- For international students and graduates, awarded by German Academic Exchange Service, Humboldt University - German Language Academy summer course in Berlin.

B.S. High Achievement Scholarship and "The First Hundred" Scholarship 2014-2019

- Awarded by the Middle East Technical University and Turkish Government Given to those who rank in the first 100 among 2 million students in the nationwide university entrance exam

Isbank Golden Youth Award 2014

- Granted for outstanding performance in the nationwide university entrance exam

Ranked 20th (first-stage, YGS) and 9th (second-stage, LYS) in the university entrance examinations 2014

- Among two million high school seniors in Turkey, 2014.

Technical Skills

MATLAB, Python - Proficient, used almost for all BSc/MSc courses listed above, also all my simulation environments related to my MSc studies

C, C++ - used in C Programming and Data Structures Courses

SQL - used in Database Management and File Structures course

ROS - used for Human Robot Interaction Project in DAI Labor together with Python

Arduino, Raspberry Pi - used in Teleoperated Hockey Player Robot project, Feedback Systems, Process Control and other small course projects during BSc.