

ERKAN BAYRAM

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EDUCATION

University of Illinois at Urbana-Champaign

Ph.D. Candidate in Electrical and Computer Engineering

Aug 2021 - Present

Urbana, IL

- Studying under co-advisory of Prof. Tamer Başar and Assoc. Prof. M. Ali Belabbas.

Bilkent University

B.S. in Electrical and Electronics Engineering (with Full Tuition Fee Scholarship)

Aug 2016 - June 2021

Ankara, Turkey

- Overall GPA: 3.94/4.00

Aston University

Exchange Mobility in Electrical and Electronics Engineering

January 2019 - May 2020

Birmingham, UK

PROFESSIONAL EXPERIENCE

Analog Devices Inc.

Upcoming ML/Data Science Intern

May 2024 - Aug 2024

Boston, MA

Neurocess, Co.

Signal Processing Focus Data Science Consultant

May 2021 - Dec 2023

Remote, London, UK

- Developed probabilistic ML models for performance analysis of soccer players via **TensorFlow** and **PyTorch**.
- Developed a novel denoising model providing a significant **17dB** SNR improvement for motion artifact denoising on **sEMG** data.
- Automated report generation for weekly monitoring of athletes using generative models and LLM.
- Utilized **AWS** for ML model deployment and cloud computing.

University of Illinois Urbana-Champaign

Teaching Assistant

Jan 2024 - Present

Urbana, IL

- Teaching Assistant for MATH595/ECE553 Optimum Control Systems: Holding office hours and Grading assignments.

Coordinated Science Lab (UIUC)

Research Assistant at Decision and Control Group

Aug 2021 - Present

Urbana, IL

- Proficient in advanced control theory, optimizing system performance.
- Specializing in **sensor fusion** techniques for data integration.
- Focused on distributed optimization algorithms for enhanced system efficiency.

Tübitak SAGE

Researcher (at Scientific and Technological Research Council of Turkey)

Jan 2021 - June 2021

Ankara, Turkey

- Worked at the Simulation and Mission Planning Software Division.
- Used **C++** and **.NET** to create the simulation environment for navigation algorithms for cruise missiles.

ASELSAN

Summer Intern in Systems Engineering

June - August 2020

Ankara, Turkey

- Worked on a nonlinear radar tracking problem and obtained % **5.2** increase in filtering performance.
- Compared the performance of iterative and non-iterative Kalman Filters (**EKF**, **UKF**, **PLF**) in MATLAB.

Tübitak SAGE

Summer Intern in Simulation Engineering (at Scientific and Technological Research Council of Turkey)

August - September 2019

Ankara, Turkey

- Modeled sound behavior for a flight simulator in **MATLAB**, including simulations of physical characteristics e.g **Doppler effect**.

PUBLICATIONS AND PREPRINTS

Bayram E., Liu S., Belabbas M.-A., Başar T., *Control Theoretic Approach to Fine-Tuning and Transfer Learning*. (Under review) View on ArXiv

Bayram E., Baştopçu M., Belabbas M.-A., Başar T., *Age of (k,n) -Threshold Signature Scheme on a Gossip Network*. (Under review)View on ArXiv

Bayram E., Belabbas M.-Ali, Başar T., *Vector-Valued Gossip over w -Holonomic Networks*. (Under review)View on ArXiv

Ergeneci M., **Bayram E.**, Carter D., Kosmas P., *A Novel Framework for Motion-Induced Artefact Cancellation in sEMG: Evaluation on EPL and Ninapro Datasets*. (Under review)

Ergeneci M., **Bayram E.**, Carter D., Kosmas P., *Attention-Enhanced Frequency-Split Convolution Block for sEMG Motion Classification: Experiments on Premier League and Ninapro Datasets*. IEEE Sensors Journal, 24(4), 4821-4830. View on IEEEExplore

Ergeneci M., **Bayram E.**, Carter D., Kosmas P., *sEMG Motion Classification Via Few-Shot Learning With Applications To Sports Science*. (prePrint)View on TechRxiv

PRESENTATIONS

Ergeneci M., **Bayram E.**, Carter D. *The Cooperation of Isometric Force Test and EMG for Hamstring Injury Prevention*. *Isokinetic Conference23*, London, 2023.

Bayram E., Belabbas M.-Ali. *Nontrivial Holonomy in Gossip Networks*. *CSL Student Conference*, Urbana, 2023.

PROJECTS

Detection and Denoising of Motion Artifact in sEMG: Experiments on Novel Artifact Model 2023 - 2024

- Developed a novel metric combining spectral and temporal evaluations for sEMG denoising.
- Introduced a motion artifact model providing a significant **17dB** SNR improvement for denoising.
- Compared state-of-the-art noise cancellation techniques with VISA (**Variable Input Size Attention**).

Meta Learning for Rare Lower Extremity Motions to Detect Injury 2021-2022

- Aimed to identify rare lower extremity motions using a novel feature extractor.
- Applied Metric-Based Meta-learning and Transfer Learning techniques.

Motion Classification with Temporal sEMG Signal 2021-2022

- Improved over the existing state-of-the-art motion classifications models with an accuracy of % **95** and % **98** on Ninapro DB2 and DB1, respectively. The work is accepted for publication.
- Introduced a novel approach, COZDAL net, within **CBAM** and **Multi-Head Attention**.

Image Captioning on COCO Set 2020

- Developed a NLP and computer vision model to caption images on the **COCO set**, providing **0.85 BLEU-2** score.
- Utilized transfer learning models such as **Inception v3** and **GloVe**.

Determination of Predominant Instrument 2020

- Implemented spectrogram analysis with **Random Forest on C4.5** from scratch and providing % **93** accuracy in classification.

Comparison of OFDM and FBMC in 5G Signal Processing 2020

UWB Based Multi-Robot CoordinationView project video 2020-2021

- Aimed to conduct swarm robotic operations in different formations for indoor applications via TDoA and AoA.
- Responsible for measurement noise filtering for **IMU** and **Tof Module**, the design of nonlinear controllers.

SERVICE

Technical Reviewer: IEEE ISIT, IEEE L-CSS, IEEE CDC.

HONORS & ACADEMIC ACHIEVEMENTS

- Academic Excellence Award, Bilkent University EEE Department. 2021
- Social Awareness and Activity Award, Bilkent University EEE Department. 2021
- Recipient of the Undergraduate Industrial Project Grant, 2209B Tübitak Grant for an R&D project. 2021
- National Merit Scholarships - Stipend for successful precollege students in Turkey. 2009-2016
- Ranked **252nd** among 2 million students in the National University Placement Exam (YGS-LYS) 2016