AYBERK YARKIN YILDIZ

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Education

Northeastern University, Boston, MA, USA *Fall 2023 – Spring 2028*
Doctor of Philosophy in Electrical and Computer Engineering *CGPA: 3.84/4.00*

- Courses: Advanced Machine Learning, Probabilistic System Modeling, Machine Learning with Small Data, Introduction to Machine Learning and Pattern Recognition, Data Visualization, Parallel Processing for Data Analytics, Applied Probability and Stochastic Processes, Fundamentals of Computer Engineering

Bilkent University, Ankara, Turkey *Fall 2018 – Spring 2023*
Bachelor of Science in Electrical and Electronics Engineering *CGPA: 3.38/4.00*

- Courses: Digital Signal Processing, Telecommunications, Neural Networks, Electronic Circuit Design, Feedback Control Systems, Microprocessors, Probability and Statistics, Engineering Electromagnetics, Signals and Systems, Analog Electronics, Engineering Mathematics I–II, Digital Design, Circuit Theory, Introduction to Programming in Python, Engineering Economic Analysis

Friedrich-Alexander-Universität, Erlangen, Germany *Spring 2022*
Erasmus Student in Elektrotechnik – Elektronik und Informationstechnik

- Courses: Deep Learning, Machine Learning for Engineers, Optimization for Engineers, Cognitive Neuroscience for AI Developers

Mehmet Emin Resulzade High School, Ankara, Turkey *Fall 2014 – Spring 2018*

- *CGPA: 98/100.* Attended Nesibe Aydın High School for the last year.

Skills

Programming: Python (PyTorch, Keras, PySpark), MATLAB, C/C++
Languages: English (Fluent – C1 level), Turkish (Native Fluency), German (Beginner – A2 level)

Research and Work Experience

Northeastern University *Boston, MA, USA*
Graduate Research Assistant *Fall 2023 – Spring 2028*

- Research Labs: DNAL, WIoT, SPIRAL

Neurocess Limited *London, England*
Data Science / Machine Learning Engineer (Remote) *Fall 2022 – Summer 2023*

- Analyzed data from active **sEMG** sensors designed for monitoring athletic and physiologic performance of football players using **Siamese networks** with **CNNs** and **Transformers** for multivariate time-series implemented in **PyTorch** and **Keras**.

KOCLAB, National Magnetic Resonance Research Center (UMRAM) *Ankara, Turkey*
Undergraduate Researcher *Fall 2021 – Fall 2022*

- Conducted deep learning research on implementation and technical extensions of time-series analysis and imputation using **RNNs** and **Transformer** models in **PyTorch**.

Bilkent University *Ankara, Turkey*
Teaching Assistant *Spring 2020 – Fall 2021*

- Tutored students and graded assignments for Calculus I, Calculus II for 60 students per semester.

TUBITAK SAGE *Ankara, Turkey*
Intern *Summer 2021*

- Used **Altium Designer** to implement and design the software and hardware simulations of nano-drones to improve agility and reduce visibility for military applications.

UMRAM *Ankara, Turkey*
Intern *Summer 2020*

- Implemented and tested the interfaces of the fundamental electronic devices such as a gaussmeter, an analog filter, and a DC power supply in **MATLAB** for the company's future research. Led to a publication in Medical Physics.

Projects

Communication-aware neural Mapping and Pruning Framework *Spring 2024 – Spring 2025*

- Performed efficient distributed inference over communication-aware mapped and pruned **CNNs** using **PyTorch**. Tested on real-life environments such as **Colosseum** wireless emulator in wired, wireless, and cellular scenarios, and **Raspberry**

Pi's. Observed up to a **26×** speedup over pruned models.

Markovian Experimental Design under Concept Drift *Spring 2024 – Spring 2025*

- Implemented a markovian experimental design framework under concept model drift scenarios via **Kalman filters** in **Python**.

Gradient Boosting Decision Trees on Medical Diagnosis View publication [1] *Fall 2024*

- Implemented an extensive analysis of **ensemble models** in medical diagnosis focusing on the superior performance over state-of-the-art deep learning models in **PyTorch**.

Wireless Radar Classification with Transformers View preprint *Fall 2023 – Spring 2024*

- Implemented **Transformer**-based classification models for wireless radar signals over out-of-distribution data with **LoRA** and **conformal prediction** in **PyTorch**.

Portable RF Signal Sensing System Using SDR View publication [2] *Fall 2023*

- Implemented an Electronic Support Measures (ESM) system with a **GPU** accelerated **SDR** that could detect, measure, and classify **RF** signals using signal processing algorithms in **GNU Radio** and **XGBoost**. Designed the system as compact and portable contrary to the current ESM products.

Genetic Algorithms for Feature Selection View preprint *Fall 2023*

- Major contribution in parallelization of several genetic algorithms for feature selection to enable concurrent training of ML models on diverse feature subsets in **PySpark** and **JobLib**.

sEMG Motion Classification and Anomaly Detection View preprint *Fall 2022 – Fall 2023*

- Implemented motion classification and anomaly detection models using **sEMG** signals via few-shot learning with a **Siamese network** in **Keras** and **PyTorch**.

Multivariate Time Series Imputation With Transformers View publication [3] *Fall 2022*

- Developed a **Transformer**-based **autoencoder** for missing value imputation that outperformed seven state-of-the-art imputation methods by $\mathbf{13.5 - 50.5\%}$ over benchmark datasets.

Publications

[1] **A. Y. Yıldız** and A. Kalayci, "Gradient boosting decision trees on medical diagnosis over tabular data." arXiv preprint arXiv:2410.03705 (2024). (accepted to IEEE International Conference on AI and Data Analytics, 2025)

[2] G. S. Yavuz, B. Sayğılı, Y Aydınlı, R. Dalkıran, İ. Eşin, M. Uluçay, B. Uykulu, S. S. Kıyma, O. Arikan, and **A. Y. Yıldız**, "Detection and classification architecture for sdr based radar electronic support measure systems." 2024 32nd Signal Processing and Communications Applications Conference (SIU). IEEE, 2024.

[3] **A. Y. Yıldız**, E. Koç, and A. Koç. "Multivariate time series imputation with transformers." IEEE Signal Processing Letters 29 (2022): 2517-2521.

Honors & Awards

- Invited Talks
  - IEEE Signal Processing Society Blog *2024*
  - IEEE International Conference on Image Processing *2023*
- Research Excellence Award at Bilkent University *2023*
- High Honor Student & Tuition Scholarship at Bilkent University *2018 – 2023*
- Ranked as 1914 out of 2.5 million students in university entrance exam *July 2018*

Extracurricular Activities & Memberships

- Amazon IET-MSI Program Participant *Fall 2024*
- Northeastern University SPIRAL Committee Member *Fall 2024*
  - Organized three seminars with participants from Northeastern University and Boston University, MA, USA; and École Polytechnique Fédérale de Lausanne, Switzerland.
- Bilkent Community Awareness Projects Active Member *Spring 2021*
- 8/8th grade practical and theoretical performance certificate for piano *February 2023*
  - Examiner: Associated Board of the Royal School of Music (ABRSM), London, UK
- Competitive basketball player, medaled in several local tournaments *2008 – 2017*