

Education

Master of Science - Electrical and Electronics Engineering (3.91/4.00) 2021-2024
 Bilkent University - Faculty of Engineering Ankara, Turkey
 Thesis: Novel Ensembling Approaches in Time Series Forecasting
 Advisor: Prof. Süleyman Serdar Kozat

Bachelor of Science - Electrical and Electronics Engineering (3.61/4.00) 2017-2021
 Middle East Technical University - Faculty of Engineering Ankara, Turkey

Research Interests

- Machine Learning (Tree-Based Models, Ensemble Models)
- Deep Learning (Neural Networks, Sequence Models, Transformers, Generative Networks)
- Optimization (Constrained/Unconstrained Optimization, Multi-Objective Optimization, Gradient Descent Variants)
- Online Learning (Fine-tuning, Transfer Learning, Online Convex Optimization)
- Time Series Analysis and Forecasting (Univariate & Multivariate Forecasting, State Space Models, Anomaly Detection)

Publications 🎓

Journal Papers

4. **A. Fazla**, M. E. Aydin, S. S. Kozat, “*Time-Aware and Context-Sensitive Ensemble Learning for Sequential Data*”, IEEE Transactions on Artificial Intelligence, 2023, **Accepted**.
 Available: <https://doi.org/10.1109/TAI.2023.3319308>
 Code: <https://github.com/ardafazla/context-time-aware-ensemble>
3. S. F. Tekin, **A. Fazla**, S. S. Kozat, “*Numerical Weather Forecasting using Convolutional-LSTM with Attention and Context Matcher Mechanisms*”, IEEE Transactions on Geoscience and Remote Sensing, 2023, **In Second-Stage Revision**.
 Available: <https://arxiv.org/abs/2102.00696>
 Code: <https://github.com/sftekin/spatio-temporal-weather-forecasting>
2. M. E. Aydin, **A. Fazla**, S. S. Kozat, “*Hybrid State Space-based Learning for Sequential Data Prediction with Joint Optimization*”, IEEE Transactions on Neural Networks and Learning Systems, 2023, **In Revision**.
 Available: <https://arxiv.org/abs/2309.10553>
 Code: <https://github.com/mustafaaydn/lstm-sx>
1. **A. Fazla**, M. E. Aydin, S. S. Kozat, “*Joint Optimization of Linear and Nonlinear Models for Sequential Regression*”, Digital Signal Processing, Elsevier, 2022, **Accepted**.
 Available: <https://doi.org/10.1016/j.dsp.2022.103802>
 Code: <https://github.com/ardafazla/jointoptimization>

Conference Papers

1. K. G. Ince, A. Köksal, **A. Fazla**, A. A. Alatan, “*Semi-Automatic Annotation for Object Detection*”, Proceedings of the IEEE/CVF International Conference on Computer Vision, 1233-1239, 2021, **Accepted**.
 Available: <https://doi.org/10.1109/ICCVW54120.2021.00143>

In Progress

2. **A. Fazla**, S. S. Kozat, “*Online Causal Inference for Modeling User Preferences: A State-Space Approach*”, to be submitted to IEEE Transactions on Neural Networks and Learning Systems, 2023.
1. **A. Fazla**, S. S. Kozat, “*Context-Aware ARIMA-Tree with Switching Regions for Nonstationary Environments*”, to be submitted to IEEE Transactions on Signal Processing, 2023.

Academic Duties

Tutoring and Grading

2021 - Present

- *Electrical and Electronics Engineering, Bilkent University*
- EEE321 Signals and Systems
- EEE202 Circuit Theory
- MATH255 Probability and Statistics

Relevant Coursework

- Neural Networks (4.0/4.0)
- Statistical Learning and Data Analytics (4.0/4.0)
- Random Processes (4.0/4.0)
- Deep Generative Networks (4.0/4.0)
- Introduction to Computer Intelligence (4.0/4.0)
- Data Structures (4.0/4.0)
- Digital Signal Processing (4.0/4.0)

Research Projects

Hourly Wind Energy Prediction

2023

- *Bilkent University*
- Predicted the hourly energy data of multiple wind turbines in Turkey and Europe, which show chaotic and nonstationary behaviour in multiple regions.
- Developed a large-scale ML framework, consisting of various deep-learning (NN, ConvLSTM), machine learning (LightGBM, RandomForest), statistical (SARIMAX) models and state-of-the-art ensembling techniques.

Natural Gas Demand Prediction

2022

- *Bilkent University*
- Predicted the daily data of international natural gas demand in Turkey, which contains nonstationary multivariate time series from multiple sources.
- Developed a large-scale ML framework, consisting of various machine learning (LightGBM, MLP, LSTM) and statistical (exponential smoothing, SARIMAX) models and state-of-the-art ensembling techniques.

Small-Target Detection & Tracking

2021

- *Middle East Technical University*
- Developed an application using Python for real-time small target tracking by leveraging temporal data derived from the output of object detectors.

Additional Projects

Multi-modal Photo Upsampling via Latent Space Exploration of StyleGAN

2023

- *Bilkent University, Deep Generative Networks Course Project*
- Adapted the PULSE algorithm for multi-modal image super-resolution by incorporating a variational autoencoder to enhance network diversity.

Image Captioning based on LSTM with Transfer Learning

2022

- *Bilkent University, Neural Network Course Project*
- Constructed a framework, which generates meaningful sentences describing a given image (Image Captioning).
- Employed state-of-the-art models such as ResNet, VGG-16 and InceptionV3, where LSTM is used as the main learning model for transfer learning.
- Used BERT transformers for word embedding.

Surveillance – Protective Measures

2021

- *Middle East Technical University*, Senior Year Project
 - Designed a product that detects whether a person is not wearing a mask and/or showing fever symptoms.
 - Our mask detection system uses the YOLOv4 algorithm for classification, trained on a self-constructed dataset with image augmentation.
- Available: <http://capstone.eee.metu.edu.tr/project-fair-2021/#BOMAS>

Semi-Automatic Video Annotation for Object Detection

2021

- *Middle East Technical University*, EEE STAR Program, Finalist
- The project mainly involves computer vision and image processing. It consists of two parts: first, a multi-hypothesis tracking algorithm is introduced and then an annotation tool employing this algorithm is given.

Software Skills

- **Python:** Professional research and industrial experience based on machine learning. High knowledge and experience on libraries such as *PyTorch*, *Tensorflow*, *Pandas*, *Numpy* and *Scikit-Learn*. I have experience with Docker and Git, via industrial projects.
- **MATLAB:** Professional research experience in signal processing and computer vision. Used for projects during my undergraduate courses, undergraduate research, and internships.
- **R:** Intermediate level experience, employed during research based on time-series forecasting using statistical models.
- **C/C++:** Intermediate experience in Arduino and various undergraduate projects.

Languages

Turkish: Native

English: Conversationally Fluent [TOEFL IBT 108/120 (Available Through: October 19, 2024)]