Oguzhan Karaahmetoglu
Resume

Department of Electrical and Electronics Engineering
Bilkent University, Ankara 06800, Turkey

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Research Interests

machine learning, deep learning, reinforcement learning, spatio-temporal prediction, online learning, distributed systems, point process modeling, information theory, computer vision, big data, detection and estimation theory and statistical signal processing.

Education

Bilkent University, Ankara, Turkey

M.S. in Electrical and Electronics Engineering, August 2019 – Present

Expected Graduation Date: June 2021
Supervisor: Suleyman Serdar Kozat

Middle East Technical University, Ankara, Turkey

B.S. in Electrical and Electronics Engineering, Sep 2015 – Jan. 2019

Ranked 10th among 268.

Rize Fatih High School, Rize, Turkey

High School Degree, Natural Sciences Field, Sep 2011 – June 2015

Graduated as the **1st** in class.

Awards and Honors

- **5 journal papers** submitted to highly respected Transactions, including **4 IEEE Transactions**.
- **2 conference papers** in high impact conference proceedings.
- **2 oral presentations** in respected international conferences.
- Graduated as High Honors student from Middle East Technical University
- Received the **23rd** rank among 2M high school graduates in National University Entrance Examinations.
- Full Scholarship from Bilkent University during Ms. Studies.
- Graduated as the **1st** in class from high school.

Journal Papers

1. **O. Karaahmetoglu**, S. S. Kozat "Spatio-temporal Sequence Prediction with Point Processes and Self-organizing Decision Trees" (Submitted to **IEEE Transactions on Neural Networks and Learning Systems**, https://arxiv.org/abs/2006.14426), June 2020.
2. F. Ilhan, **O. Karaahmetoglu**, I. Balaban, S. S. Kozat "Markovian RNN: An Adaptive Time Series Prediction Network with HMM-based Switching for Nonstationary Environments" (Submitted to **IEEE Transactions on Neural Networks and Learning Systems**, https://arxiv.org/abs/2006.10119), June 2020.
3. **O. Karaahmetoglu**, F. Ilhan, I. Balaban, S. S. Kozat "Unsupervised Online Anomaly Detection On Irregularly Sampled Or Missing Valued Time-Series Data Using LSTM Networks" (Submitted to **IEEE Transactions on Neural Networks and Learning Systems**, https://arxiv.org/abs/2005.12005), June 2020.
4. **O. Karaahmetoglu**, S. F. Tekin, S. S. Kozat "Distributed Online Multi-Target Tracking With Switching LSTM Networks" (Submitted to **IEEE Transactions on Neural Networks and Learning Systems**, July 2020.
5. **O. Karaahmetoglu**, S. S. Kozat "Nonstationary Time-Series Data Modeling With Switching Point Processes" (Submitted to **IEEE Transactions on Signal Processing**), July 2020.

Conference Papers

1. **O. Karaahmetoglu**, Fatih Irım and S. F. Tekin, "Interpretable Classification And Regression For Time Series Data," (submitted)**IEEE**, (17 January 2020).
2. **O. Karaahmetoglu**, and Bilgin Aksoy, "Time Series Prediction With Hierarchical Recurrent Models," (submitted)**IEEE**, (17 January 2020).

Presentations

1. "Online Anomaly Detection Under Markov Statistics with Controllable Type-I Error" Bilkent University, 2019.
2. "On Confidence Intervals Of Deep Neural Networks," Bilkent University, Ankara, 2019.

Industrial Experience

Data Scientist
Databoss Analytics, Ankara, Turkey — Sep 2018 – Now
- Using Machine learning and Statistical models to design spatio-temporal forecasting models for various real life applications.
- Developing software with the state of the art versioning and continuous integration tools.
- Developing mathematical models using the state of the art Python APIs such as PyTorch, TensorFlow.
- Working in a highly competitive yet collaborative environment to develop systems.
- Working in a research team to collaboratively share ideas and knowledge about various research topics and development tools.
- Developing purpose-built, distributable and scalable services such as prediction systems and exploratory data analysis tools.
- Agile software development.

Intern Engineer
Databoss Analytics, Ankara, Turkey *(Supervisor: S. Serdar Kozat)* — Jun 2018 – Sep 2018
- Design and implementation of an online anomaly detection system.
- Optimization of the implemented algorithm and adaptation to the real world settings.

Intern Engineer
Darkblue Telecommunications, Ankara, Turkey *(Supervisor: Alper Tosun)* — Jun 2017 – Sep 2017
- Designed a face recognition system based on deep neural architectures.
- Designed a local server to process customer requests.
- Designed an Android Mobile App to connect and send face images to the server.
- Worked in a software development team and used versioning and deployment tools such as Git and Docker.

Academic Experience

Research Assistant
Bilkent University, Ankara, Turkey — Sep 2019 – Present
- Efficient Spatiotemporal prediction
- Point Process Modeling
- Non-stationary time series prediction
- Non-stationary and online filtering
- Applied prediction and filtering on event and crime data
- Target tracking with event prediction and dynamic behavior modelling applications

Grader
Bilkent University, Ankara, Turkey — Sep 2019 – Present
- EEE 485 (Statistical Learning and Data Analytics) in Spring 2020
- EEE 391 (Basics of Signals and Systems) in Fall 2019

Undergraduate Researcher
Bilkent University, Ankara, Turkey — Sept 2017 – Aug 2019
- Online anomaly detection on non-stationary time series data

Skills

Programming:

- **Python** Professional work experience in a large-scale ML framework and follows PEP coding standards,

- **C/C++, C#** Experience with socket programming and parallel programming,
- **Matlab, R** Experience with various statistical libraries, signal processing tools and neural system toolboxes,
- **Verilog HDL, ARM Assembly** Learned during undergraduate studies as a part of the core Computer Engineering field courses,
- **JavaScript, Prolog, LaTeX**

Tools:

- **Pytorch** Main tool used in the industrial experience,
- **TensorFlow** Experience with deep learning applications,
- **GDAL and OpenWeather** Geospatial and weather feature extraction for ML applications,
- **PySpark and Flask**,
- **MySQL and PostgreSQL**,
- **Docker and Git**

PROJECTS

Spatio-temporal Crime Prediction with Adaptive Spatial Partitioning: Implementation of a crime prediction model based on joint optimization of deep learning algorithms and decision tree spatial partitioning mechanism. The algorithm is capable of modeling spatial behaviors in different regions with different models. Surpasses the standard approaches applied on the same problem.

Omen: Probabilistic time-series prediction and optimization framework. Model parameters and state vectors are jointly optimized via filtering approaches. Also incorporates the uncertainty from the hyperparameter selection via Bayesian Hyperparameter Optimization. The framework is capable of jointly updating statistical time series models with deep feature extraction models.

Capstone Project (Middle East Technical University): Design and implementation of a omni-directional tele-operated robot. The robot is controlled by a player to play hockey in a hexagonal playing field. Awarded by the faculty members.

FastCap: Design and implementation of a lightweight image captioning model. Both training and captioning of the designed model are significantly faster than the standard approaches. Model is based on multiple pretrained networks merged together.

SpectrogramUI: Design and implementation of a spectrogram application written in MATLAB. The project offers a user interface that allows user to record or load an audio signal and draw spectrograms with various different configurations.

Multi-Cycle Microprocessor Design: Design and implementation of a multi-cycle microprocessor. Written in Verilog HDL. This project offers a minimalist multi-cycle microprocessor that is able to perform simple load/store instructions, arithmetic instructions and i/o instructions.

Digital Signal Oscilloscope: Design and implementation of a digital signal oscilloscope. Written in Verilog HDL. This project offers a digital signal oscilloscope that has almost the same functionality as a standard DSO. Implemented the design on an Altera Cyclone V FPGA board. Projected the oscilloscope screen on a VGA monitor.

FMCW Distance Sensor: Designed a distance measurement sensor using frequency modulated continuous sound waves. The design is tested and implemented on a circuit board as a module.

Languages: Turkish (Native), English (Fluent)

HOBBIES

Baglama Player:

- I am a professional Baglama (traditional instrument) player. I have attended to a 5-year course and awarded with a certificate.

Reading:

- I like reading poems in my spare time. My favorite poet is Edgar Allan Poe.
- I also like to read novels, especially if they are related to historical events. However, I am also a good fan of fantasy novels. I personally admire the work of J. R. R. Tolkien.