Ege Ozkoc

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Background & Research Interests

I specialize in machine learning, signal processing, and biomedical engineering, with a BSc in Electrical and Electronics Engineering from METU and an MSc in Medical Engineering from FAU Erlangen-Nürnberg. I have experience in pattern recognition, deep learning, Edge AI, and biomedical signal/image analysis (ECG, EMG, MRI) using MATLAB, Python, and C/C++. I am passionate about AI-driven healthcare solutions and aim to leverage advanced computational methods to improve medical diagnostics and patient outcomes.

Education

Friedrich-Alexander-Universität Erlangen-Nürnberg Oct 2022 – Nov 2024
MSc in Medical Engineering, Medical Image and Data Processing *Erlangen, Bavaria*

- Grade: 1.4/1.0 (Sehr gut/Very good)
- Graduated with 150 ECTS instead of 120 ECTS which is required.
- Specialized in signal processing, pattern recognition, and artificial intelligence in biomedical signals and images.

Middle East Technical University Sep 2016 – Aug 2022
BSc in Electrical and Electronics Engineering *Ankara, Türkiye*

- Specialization: Biomedical Engineering, Communications Engineering
- Graduation project: A wearable device that warns the user when the user forgets to take COVID-19 precautions, such as avoiding touching the face and washing the hands regularly.
- Ranked 142nd in the Turkish Nationwide University Entrance Exam among 2.3 million students.

Research & Work Experience

Fraunhofer Institute for Integrated Circuits IIS Mar 2024 – Nov 2024
Medical Sensors and Analytics Group *Erlangen, Bavaria*

- Worked on a hand stabilizer glove project that can mitigate Parkinson's disease tremors as they start.
- Master's Thesis: Evaluation of Traditional and Machine Learning Algorithms for Real-time Parkinson's Tremor Detection
- Trained and evaluated various algorithms from traditional Fourier transform-based algorithms to deep learning algorithms to detect Parkinson's tremors in real-time. Selected algorithms are implemented on an embedded device through optimizations such as post-training quantization and pruning.

FAU Erlangen-Nürnberg Jun 2023 – Apr 2024
Machine Learning and Data Analytics Lab *Erlangen, Bavaria*

- Research internship on biomechanics: Predictive gait simulations of leg length inequality on MATLAB
- Supported the Python exercises of the "Biomedical Signal Analysis" course at FAU as a student assistant.

Universitätsklinikum Erlangen Feb 2023 – Oct 2023
Department of Radiology *Erlangen, Bavaria*

- Worked on a project on virtual contrast-enhanced breast MRI scans using neural networks.
- Preprocesses MRI images with SimpleITK, filtered and organized MRI data of patients with Pandas to be used as input to the neural networks.

Middle East Technical University Jul 2020 – Jul 2022
Heart Research Laboratory *Ankara, Türkiye*

- Worked on the "ClinECGI" project, evaluating the performance of noninvasive electrocardiographic imaging for localizing premature ventricular contractions.
- Applied registration and interpolation methods to transfer epicardial data between geometries in MATLAB.
- Solved the inverse problem of electrocardiography using Bayesian MAP estimation with simulated epicardial data.
- Explored Bayesian estimation methods for inverse electrocardiographic imaging, focusing on prior model

selection and noise reduction techniques.

ASELSAN   Nov 2021 – Jan 2022
Radar, Electronic Warfare, and Intelligence Systems Division   *Ankara, Türkiye*

- Worked as part-time candidate engineer in the RF laboratory.

ASELSAN   Jul 2021 – Aug 2021
Defense Systems Technologies Division   *Ankara, Türkiye*

- Developed an animation software on MATLAB that visualizes the trajectory and orientation of the missile by using its position and angle data obtained by experiments.

Publications

1. **Ege Ozkoc**, Elifnur Sunger, Kutay Ugurlu, Yesim Serinagaoglu Dogrusoz, "Prior Model Selection in Bayesian MAP Estimation- Based ECG Reconstruction", DOI: 10.23919/Measurement52780.2021.9446831
Presented at the 13th International Conference on Measurement, Smolenice Castle, Slovakia, 2021.

2. **Ege Ozkoc**, Yesim Serinagaoglu Dogrusoz, "Bayesian MAP solution of the Inverse ECG problem with Sinus Rhythm Data: Evaluation of Simulated Training Sets", DOI: 10.1109/SIU55565.2022.9864708
Presented at the 30th IEEE Conference on Signal Processing and Communications Applications Safranbolu, Türkiye, 2022.

Scholarships

Turkish Education Foundation   Dec 2017 - June 2021
Outstanding Merit Scholarship

- The Turkish Education Foundation (TEV) offers the "Outstanding Merit Scholarship" to support future leaders among Turkish university students. Initiated in 2007, this scholarship is awarded annually to approximately 60 to 70 new students.

TÜBİTAK (Scientific and Technological Research Council of Turkey)   Oct 2020 - Jul 2022
2205 Undergraduate Researcher Scholarship

- The Scientific and Technological Research Council of Turkey (TÜBİTAK) offers the 2205 - Undergraduate Scholarship Program through its Science Fellowships and Grant Programmes Directorate.

Class Projects

- **Deep Learning:** Implemented a neural network system from scratch in Python by first defining each forward and backward pass method, then using them to build various neural network systems such as fully connected, convolutional, and recurrent neural networks.
- **Movement Neuroscience:** Analyzed EMG signals, and applied blind source separation approaches to extract the motor unit firing patterns. Investigated the relationship between the motor unit firing patterns, the EMG signals, and the resulting movement. method, then using them to build various neural network systems such as fully connected, convolutional, and recurrent neural networks.
- **Introduction to Medical Imaging:** Implemented projection and filtered/unfiltered back-projection algorithms in MATLAB for computed tomography with various filters, adjustable beam numbers, and projection step size.
- **Biomedical Signals, Instrumentation, and Measurement:** Simulated the Hodgkin-Huxley membrane model and action potentials of which the input stimulus can be customized in MATLAB.
- **Digital Signal Processing:** Implemented a spectrogram algorithm with short-time Fourier transform and investigated the effects of window length, window type, and overlap percentage preferences in MATLAB.

Computer/Software Skills

MATLAB, Simulink, Python, C / C++, Git, Arduino, Raspberry Pi, Computer Aided Drawing Siemens NX, LTSpice, Intel Quartus, Verilog HDL, Keysight VEE, Microsoft Office (Excel, Word, PowerPoint), LaTeX

Languages

- English (IELTS: 7.5)
- German (B1)
- Turkish (Native)