

Irmak Sivgin

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EDUCATION

- **Bilkent University** Ankara, Turkey
Bachelor of Science in Electrical and Electronics Engineering; CGPA: 3.96/4.00 *Sep. 2019 – Ongoing*
 - **Relevant Coursework:** Electronic Circuit Design (EEE 313), Signals and Systems (EEE 321), Digital Signal Processing (EEE 424), Neural Networks (EEE 443), Medical Imaging (EEE 473)
- **METU Development Foundation High School** Ankara, Turkey
Sep. 2015 – June. 2019

EXPERIENCE

- **National Magnetic Resonance Research Center (UMRAM)** Ankara, Turkey
Research Volunteer *September 2021 - Present*
 - **Project:** Implementation of deep learning methods on fMRI datasets aiming to diagnose neurological diseases such as Autism or Parkinson's with functional connectivity analysis on brain regions.
- **National Magnetic Resonance Research Center (UMRAM)** Ankara, Turkey
Summer Internship *June 2022 - August 2022*
 - **Project:** Design and testing of graph neural network (GNN) layer for rest-fMRI scan analysis on 2 public datasets using different backbone models. Analysis of important brain regions for gender classification task.
- **InterLabs** Ankara, Turkey
Intern Project Engineer *August 2022 - Present*
 - **Project:** Rescue project based on Unmanned Air Vehicles (UAVs). I am designing algorithms to process sound signals collected by a microphone array mounted on UAV to detect lost people in forested environments through their shout.
- **METEKSAN Defence** Ankara, Turkey
Summer Internship *June 2021 - July 2021*
 - **Project:** Digital circuit design. Building a transmitter-receiver architecture on FPGA, designing a downconverter with FPGA through Xilinx, Vivado, VHDL.

ACHIEVEMENTS & AWARDS

- **The 30th IEEE Conference on Signal Processing and Communications Applications (SIU) Best Signal Processing Paper Award, Safranbolu 2022.**
- **Bilkent University High Honors Student (2019 Fall - ongoing)**
- **100% comprehensive success scholarship, Bilkent University, 2019 - 2023**
- **Currently ranking 4th in electrical and electronics engineering department in class of 2023**
- **Ranked 451st in national university entrance exam in Turkey, 2019**

PUBLICATIONS

- Bedel, H. A., **Sivgin, I.**, Dalmaz, O., Dar, S. U. H., & Çukur, T. (2022). BolT: Fused Window Transformers for fMRI Time Series Analysis. arXiv preprint arXiv:2205.11578.
- Bedel, H. A., **Sivgin, I.**, & Çukur, T. (2022, May). A Graphical Network Layer for Lagged Analysis of FMRI Data. In 2022 30th Signal Processing and Communications Applications Conference (SIU) (pp. 1-4). IEEE.

RESEARCH PROJECTS

- **Lagged functional connectivity analysis for gender classification:** Worked on the design of a graph neural network (GNN) layer to incorporate lagged correlation analysis of blood-oxygen-level-dependent (BOLD) signals to extract richer features to be used as inputs for a backbone classifier neural network model. Working towards a journal publication as a co-first author supervised by Assoc. Prof. Tolga Çukur. The preprint will appear in arxiv soon, you may access my work on my web page.
- **Utilizing transformer neural network architecture for fMRI signal analysis:** Optimization of hyperparameters for training to achieve blood-oxygen-level-dependent (BOLD) signal based gender, disease and task prediction. (supervised by Assoc. Prof. Tolga Çukur)
- **Graph Neural Network based functional connectivity analysis for Parkinson's disease (PD):** Worked with Parkinson's Progression Markers Initiative (PPMI) database to train graph neural networks to predict PD patients from fMRI scans. (supervised by Assoc. Prof. Tolga Çukur)
- **Design of a Wavelet Based Decomposition for a Hierarchical Representation of 3D Scalar Wave Fields Related to Diffraction:** Studying wavelet transform based optical signal processing. (supervised by Prof. Levent Onural)

RESEARCH INTERESTS

- **Magnetic resonance imaging (MRI)**
- **Digital signal processing**
- **Neural networks**
- **Signal processing and machine learning for neural data analysis (fMRI)**
- **Computational imaging**

SKILLS

- **Programming:** Python 3 (libraries such as NumPy, PyTorch, PyTorch geometric, Matplotlib), MATLAB, Mbed compiler (c++), Assembly Language
- **Design:** VHDL, LTspice
- **Languages:** Turkish (native), English (TOEFL iBT: 113), German (intermediate)