Ecem Bozkurt

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EDUCATION

University of Southern California, Los Angeles, CA   Aug. 2019 — present
Ph.D. in Electrical Engineering, CGPA: 3.63/4.00   Advisor: Prof. Dr. Antonio Ortega
Specialization: Signal Processing, Graphs, Machine Learning, Deep Learning

Bilkent University, Ankara, Turkey   Feb. 2015 — Jan. 2018
M.S. in Electrical and Electronics Engineering, CGPA: 3.52/4.00   Advisor: Assoc. Prof. Dr. Emine Ulku Saritas
Specialization: Signal Processing, Medical Imaging, MRI

Bilkent University, Ankara, Turkey   Sept. 2010 — Jun. 2014
B.S. in Electrical and Electronics Engineering, CGPA: 3.42/4.00

Case Western Reserve University, Cleveland, OH   Aug. 2012 — Jun. 2013
B.S. in Electrical Engineering, exchange program, CGPA: 3.912/4.000

RESEARCH EXPERIENCE

Signal and Image Processing Institute, USC   Jan. 2021 — present
Graduate Research Assistant at STAC Lab

- **Non-negative Kernel Graphs for Time-series Signals**
  Novel framework was proposed to represent sets of time-series signals using non-negative kernel (NNK) graph construction. The original NNK framework was extended to allow explicit delays as part of the graph construction. Proposed framework was applied on EEG signals.

- **Non-negative Kernel Graph Based Interpretation of Deep Neural Networks**
  NNK algorithm was applied on the penultimate layer feature space of a neural network and polytopes were formed around each feature. Polytopes have geometric properties that were shown to be predictive in the neural network's performance. Geometric properties are also informative for enhancing the manifold representation or designing the types of data augmentation.

National Magnetic Resonance Research Center, Bilkent University   Feb. 2015 — Jan. 2018
Graduate Research Assistant at Saritas Lab

- **Effects of Human Scanning Parameters of Magnetic Particle Imaging on Image Quality**
  Simulation and experimental analysis of how the safety limits on human subjects affect the image quality of MPI images, as the ultimate goal is to use MPI as a new medical imaging modality for human scanning. Hardware experiments were conducted with phantom objects and 1D MPI images were attained at different scanning parameters. New receiver coil was designed for the MPI system using Solidworks and Matlab, based on magnetic field simulations. Image reconstruction simulations were conducted in Matlab.

WORK EXPERIENCE

Huawei Research and Development Center, Istanbul, Turkey
Research Engineer, Deep Learning and Computer Vision Department, VisionLab   Feb. 2018 — Aug. 2019

- **Smart Ad Placement on Videos**
  The goal is to match ads with the contextually related scenes, and to place ads naturally to the background of the scenes, considering the surface geometry, scene change, saliency, occlusion problem and semantic similarity between the ads and the scenes. Deep learning, speech processing and computer vision techniques were used. Patent application in progress.

- **Automated Censoring Faces and the Licence Plates in Fish-Eye or 360° Images**
  The aim is to detect faces and license plates in fish-eye or 360° images and blur them to protect the privacy, using planar transformation, object detection and segmentation techniques.

Publications

Conference Publications

1. **Ecem Bozkurt**, Antonio Ortega. 'Neighbors Tell Who You Are: Non-Negative Kernel Graph Based Interpretation of Datasets for Deep Learning'. In progress.

2. **Ecem Bozkurt**, Antonio Ortega. 'Non-Negative Kernel Graphs for Time-Varying Signals Using Visibility Graphs', European Signal Processing Conference (EUSIPCO). Oral Presentation. August 2022. Belgrade, Serbia. *https://eurasip.org/Proceedings/Eusipco/Eusipco2022/pdfs/0001781.pdf*

3. **Ecem Bozkurt**, Mustafa Ütkür, Yavuz Muslu, Emine Ulku Saritas. 'Effects of Excitation Field Parameters on Image Quality in Magnetic Particle Imaging: A Relaxometer Study'. 21st National Biomedical Engineering Meeting (BIYOMUT). Oral Presentation. November 2017. Istanbul, Turkey

4. **Ecem Bozkurt**, Omer Burak Demirel, Damla Sarica, Yavuz Muslu, Emine Ulku Saritas, 'Effects of Safety Limits On Image in MPI'. Poster Presentation. International Workshop on Magnetic Particle Imaging (IWMPI). March 2016. Lübeck, Germany.

Printed Publications

1. **Ecem Bozkurt**, Antonio Ortega. ' Non-negative Kernel (NNK) Graphs for Multi-channel EEG Signals'. In progress.

2. **Ecem Bozkurt**, Emine Ulku Saritas. 'Signal-to-Noise Ratio Optimized Image Reconstruction Technique for Magnetic Particle Imaging'. J Fac Eng Archit Gaz, 32(3):999-1013, 2017.

Honors and Awards

- Fulbright Scholarship for Ph.D. studies in USA (2019-2021)
- 'Future Star Award' by Huawei Research and Development Center, Istanbul, Turkey. (2018)
- 'Best Paper and Presentation Award' with 'Effects of Excitation Field Parameters on Image Quality in Magnetic Particle Imaging: A Relaxometer Study' in 21st National Biomedical Engineering Meeting (BIYOMUT), Istanbul, Turkey. (2017)
- Ranked 104th in the nationwide University Entrance Exam among nearly 1.5 million candidates. (2010)
- 100 % Scholarship from Bilkent University for BS and MS studies (2010-2018)

Courses and Software Skills

- **Courses** Probability, Linear Algebra, Random Processes, Graph Signal Processing, Digital Signal Processing, Machine Learning, Pattern Recognition, A Computational Intro to Deep Learning, Advanced Signal Processing, Magnetic Resonance Imaging, Medical Image Processing, Linear Systems Theory, Advanced Biomedical Imaging, Physiological Signals and Data Analytics, Biomedical Signals and Instrumentation
- **Software** Python (tensorflow, pytorch, keras, scipy, opencv, numpy, matplotlib), Matlab, R

References

- Available upon request