OKYANUS ORAL

METU, Department of Electrical and Electronics Engineering, ARC-209, Ankara, Turkey
ookyanusmetu.edu.tr ♦ +90 553 910 9260 ♦ ookyanus.github.io

Education

Middle East Technical University (METU)

MSc in Electrical and Electronics Engineering **CGPA: 4.00**/4.00 *10.2021 - Present*

Thesis: Three-Dimensional Near-Field MIMO Array Radar Imaging using Physics-Based Deep Neural Networks *(Advisor: Figen S. Oktem)* .

BSc in Electrical and Electronics Engineering **CGPA: 3.80**/4.00 *11.2017 - 09.2021*

Completed all semesters with High Honors (Graduation Ranking: 10^{th} out of 350.)
Senior year specializations in Signal Processing & Control Areas

Research Interests

- Inverse Problems
- Computational Imaging
- Optimization
- Statistical Signal Processing
- Deep Learning
- Machine Learning

Relevant Coursework :

- Theory of Remote Image Formation
- Advanced Statistical Signal Processing
- Statistical Signal Processing and Modeling
- Vector Space Methods in Signal Processing
- Linear Systems Theory I
- Machine Vision
- Optimization
- Pattern Recognition
- Computational Intelligence
- Digital Signal Processing

Publications - Under Review / Submitted

1. **O. Oral** and F. S. Oktem, "Plug-and-Play Regularization on Magnitude with Deep Priors for 3D Near-Field MIMO Imaging" in *IEEE Transactions on Computational Imaging*, 2023 (Under Review).
2. I. Manisali, **O. Oral** and F. S. Oktem, "Efficient Physics-Based Learned Reconstruction Method for 3D Near-Field MIMO Radar Imaging" *Digital Signal Processing*, 2023 (Under Review).
3. **O. Oral**, M Kiran and BM Ozyildirim, "HPS-RL: A Library for Evolutionary Search for Hyper-parameter Search for Optimum Deep Reinforcement Applications" *Neural Networks*, 2022 (Under Review).

Publications - Accepted / Published

1. **O. Oral** and F. S. Oktem, "Plug-and-Play Reconstruction with 3D Deep Prior for Complex-Valued Near-Field MIMO Imaging." *2023 31th European Signal Processing Conference (EUSIPCO)*, Helsinki, Finland, 2023.
2. **O. Oral**, E. L. Oral, and M. S. Andaç, "Comparison of the Performance of K-Nearest Neighbours and Generalized Neural Network in Construction Crew Productivity Prediction," *Çukurova Üniversitesi Mühendislik Fakültesi Dergisi*, vol. 36, no. 1, pp. 131-140, 2021. doi: 10.21605/cukurovaumfd.933867.

Experience

Research & Teaching Assistant, *METU - Deptartment of EEE* *02.2022 - Present*

- Courses: Vector Space Methods in Signal Processing, Digital Signal Processing, Introduction to Logic Design, Summer Practice I & II.

Researcher, *Scientific & Technological Research Council of Turkey* *11.2021 - Present*

- Research on "Development of Deep Learning-based Approaches for Solving Inverse Problems in Imaging and Comparative Performance Evaluation" (Project: 120E505. PI: Assoc. Prof. Figen S. Oktem)

Intern, *ROKETSAN - Directorate of Space Systems* *08.2021 - 09.2021*

- Conducted spectral analysis on launch vehicle liftoff vibroacoustics for acoustic protection systems.
- Prepared a review report of inertial measurement units, onboard computers, and actuators for the Micro-Satelite launch vehicle system that was in development.

Voluntary Work, *Berkeley Lab Computing Sciences - ESnet* *04.2021 - 07.2021*

- Implemented Levenberg-Marquardt Algorithm with map-reduce for least squares problems and Vector Free Low Memory Broyden–Fletcher–Goldfarb–Shanno (VLBFGS) algorithm with map-reduce as a PyTorch-Optimizers.
- Implemented a scalable genetic algorithm working on multiple CPUs for hyperparameter search of reinforcement learning models (Contributed to HPS-RL library).

Intern, *HAVELSAN - R & D, Signal Processing Products Development Team* *08.2020 - 09.2020*

- Implemented MUSIC algorithm, conventional beam-forming method, and used CNNs for the direction of arrival estimation with 2×2 uniform rectangular arrays.

Skills

Programming Languages and Frameworks:

- Python (PyTorch, NumPy, SciPy, Matplotlib, scikit-learn, Tensorflow & Keras)
- MATLAB & Simulink (Signal Processing, Computer Vision, and Control System Toolboxes)
- C, C++ (LabVIEW, Arduino, ESP32), C# (Unity3D), Quartus-II, LTspice XVII, Siemens NX.

Languages:

English (TOEFL iBT, score 107/120), Turkish (Native), Norwegian (A1), German (A1), Russian (A1)

Awards, Certificates & Achievements

Bülent Kerim Altay Award for Spring 2019-2020 & Spring 2020-2021

BKA award is presented by the Department of Electrical and Electronics Engineering, METU, biannually based on academic performance.

Certifactes from Coursera:

- Convolutional Neural Networks — *by deeplearning.ai* — *08.2020*
- Structuring Machine Learning Projects — *by deeplearning.ai* — *10.2019*
- Improving Deep Neural Networks — *by deeplearning.ai* — *10.2019*
- Neural Networks and Deep Learning — *by deeplearning.ai* — *09.2019*
- Fundamentals of Digital Image and Video Processing — *by Northwestern University* — *08.2019*
- Machine Learning — *by Stanford University* — *08.2019*

IEEEXtreme 12.0 Programming Competition *10.2018*

Global Ranking: 563rd out of 9500 groups - Ranking in Turkey: 11th out of 73 groups.

Sample Term Projects

- Prediction of S&P500 index prices using nonlinear Bayesian estimation **(Adv. Stat. Signal Proc.)**
- Comparison of Meta-Optimizers on Optimization of Substitution Permutations for Integer Wavelet Transformation based Image Steganography **(Optimization)**
- Review of Self-Organizing Map Oversampling for Imbalanced Dataset Learning **(Pattern Recog.)**
- Self Monitoring COVID-19 Symptoms: as a member of the capstone team, designed and implemented the cough detection sub-system. **(Engineering Design I & II)**
- Range & Speed Estimation of a Constant Speed Vehicle **(Digital Signal Processing)**

Extra-Cirrucular

Worldbuilding: I have been working on my constructed language since 2019.

Sports: Running, Archery (I am a previous member of ONOK Archery Club, with a 40lb recurve bow).