OKYANUS ORAL

METU, Department of Electrical and Electronics Engineering, ARC-209, Ankara, Turkey

ookyanusmetu@gmail.com ♦ +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: 10th 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 (Minor Revision).

2. **O. Oral**, M Kiran and BM Ozyildirim, "HPS-RL: A Library for Evolutionary Search for Hyperparameter Search for Optimum Deep Reinforcement Applications" *Neural Networks*, 2022 (Under Review).

Publications - Accepted / Published

1. I. Manisali, **O. Oral**, and F. S. Oktem, "Efficient physics-based learned reconstruction methods for real-time 3D near-field MIMO radar imaging", *Digital Signal Processing*, vol. 144, p. 104274, 2024, doi: 10.1016/j.dsp.2023.104274 ☒.

2. **O. Oral** and F. S. Oktem, "Plug-and-Play Reconstruction with 3D Deep Prior for Complex-Valued Near-Field MIMO Imaging," *2023 31st European Signal Processing Conference (EUSIPCO)*, Helsinki, Finland, 2023, pp. 496-500, doi: 10.23919/EUSIPCO58844.2023.10290090 ☒.

3. **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," *Cukurova University Journal of the Faculty of Engineering*, 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.

Graduate 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-satellite 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 and Vector Free Low Memory Broyden–Fletcher–Goldfarb–Shanno (VLBFGS) algorithm with map-reduce as 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).