Özlem Yıldız

Contact Information

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ECE Department

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Summary

Ph.D. student in Electrical and Computer Engineering working at the intersection of machine learning, optimization, and wireless communications.

Research Interests

Wireless Communications, Deep Learning, Virtual Reality, Machine Learning, Information Theory, Digital Signal Processing

Professional Experience

- *Wireless Communications:* 5G Network simulation, mmWave Systems, Analog/Hybrid Beam Alignment, 3GPP Specifications, Low Density Parity Check Coding, MATLAB 5G NR Toolbox, RayTracing Toolbox
- *Optimization and Analytical Tools:* Information Theory, Group Testing, Heuristic Optimization, Artifical Intelligence, Reinforcement Learning, Machine Learning, Deep Neural Networks

Education

Ph.D. Candidate, Electrical and Computer Engineering, **GPA**: 3.923/4.0 2020 - present
NYU Tandon School of Engineering, New York, USA
Advisor: Prof. Elza Erkip
Courses: Heuristic Problem Solving, Image and Video Processing, Optimizational and Computational Linear Algebra, Foundations of Deep Learning, Digital Signal Processing Lab, Algorithmic Machine Learning and Data Science, Data Structures and Algorithms, Wireless Communications, Information Theory, Digital Signal Processing, Machine Learning, Deep Learning, Probability and Stochastic Processes

- School of Engineering Fellowship

B.Sc. Electrical and Electronics Engineering, **GPA**: 3.83/4.0 2015 - 2020
Bilkent University, Ankara, Turkey
Teaching: Algorithms and Programming 1, Microprocessors

- Fellowship student, the ranking: 215/2 million in university selection and placement exam
- **Study abroad**: University of Erlangen-Nuremberg, Erlangen, Germany between *March 2019 - August 2019* with Erasmus+ scholarship

Work Experiences

NYU Wireless, New York, USA August 2020 - Present, Research Assistant
Advisor: Prof. Elza Erkip

- Analog/Hybrid beam alignment by using group testing to detect multiple paths (with Prof. Elza Erkip)
- Joint source channel coding for task-based and semantic communication (with Prof. Elza Erkip and Prof. Yao Wang)
- Investigation of virtual reality over wireless channels (with Prof. Elza Erkip, Prof. Shivendra Panwar and Prof. Yao Wang)
- Alignment of neural cellular automata with pathfinding problems using hand-coded networks and learned models (with Prof. Julian Togelius and Prof. Chinmay Hegde)

Samsung Research America, Dallas, USA June - August 2023, Summer Internship

- Optimization of 3D frequency dependent beamforming by using true time delay elements and phase shifters (supervised by Dr. Jianhua Mo and Dr. Ahmad AlAmmouri)

Dell Technologies, New York, USA June - August 2022, Summer Internship

- Secrecy capacity optimization of intelligent reflective surfaces-assisted mmWave indoor wireless communication (supervised by Dr. Tejinder Singh)

NYU, New York, USA Fall 2021, and Spring 2022, Course Assistant

- Introduction to Probability and Stochastic Processes (with Prof. Elza Erkip)
- Machine Learning (with Prof. Christopher Musco)

Interdigital, New York, USA June - August 2021, Summer Internship

- Evaluation of non-linear waveform spectral performance for high frequencies and a waveform energy KPI (supervised by Dr. Ramon Khalona)

P.I. Works, Ankara, Turkey August 2019 - August 2020, Telecommunication Intern

- Network planning, management and optimization for the Turk Telekom network

Key Software, Ankara, Turkey October 2018 - February 2019, Part-Time Project Manager

- Real estate price prediction in R and Java

Polaran, Ankara, Turkey June - July 2018, Summer Internship

- LDPC Coding according to the 3GPP specifications (supervised by Prof. Erdal Arikan)

Roketsan, Ankara, Turkey July - August 2018, Summer Internship

- RF circuits and pulse shaping filter design

Koc University Arcelik Research Center, Istanbul, Turkey June - August 2017, Summer Internship

- Smart bottle design with both hardware and software components (supervised by Prof. Aykut Coskun)

Technical skills MATLAB, Simulink, Python, Pytorch, Tensorflow, Scipy, Machine learning, C/C++, Linux, Java, SQL, Android

Publication

O. Yildiz, Ahmad AlAmmouri, Jianhua Mo, Younghan Nam, Elza Erkip, and Jianzhong (Charlie) Zhang, "3D Beamforming Through Joint Phase-Time Arrays," submitted to IEEE International Conference on Communications (ICC) 2024.

O. Yildiz, M. Alavirad,and T. Singh, "Investigation and Optimization of Secrecy Capacity for Intelligent Reflective Surfaces-Assisted Secure mmWave Indoor Wireless Communication, " IEEE Radio and Wireless Symposium (RWS) 2023.

S. Earle, **O. Yildiz**, J. Togelius, C. Hegde, "Pathfinding Neural Cellular Automata," , arXiv preprint arXiv:2301.06820.

F. Wilhelmi, J. Hribar, S. F. Yilmaz, E. Ozfatura, K. Ozfatura, **O. Yildiz**, D. Gündüz, H. Chen, X. Ye, L. You, Y. Shao, P. Dini, and B. Bellalta, "Federated Spatial Reuse Optimization in Next-Generation Decentralized IEEE 802.11 WLANs," ITU Journal on Future and Evolving Technologies (ITU J-FET) 2022.

O. Yildiz, A. Khalili, and E. Erkip, "Hybrid Beam Alignment for Multi-path Channels: A Group Testing Viewpoint," IEEE Asilomar Conference on Signals, Systems, and Computers, 2022.

E. Erturk, **O. Yildiz**, S. Shahsavari and N. Akar, "Power Allocation and Temporal Fair User Group Scheduling for Downlink NOMA," Telecommun Syst 77, 753–766, 2021.

Patents **O. Yildiz**, Ahmad AlAmmouri, Jianhua Mo, and Younghan Nam, "3D Beamforming Through Joint Phase-Time Arrays," August 25, 2023, Patent pending.

O. Yildiz, M. Alavirad, and T. Singh, "Increasing Secrecy Capacity for Intelligent Reflective Surface-Assisted Wireless Communications, " September 128, 2023, Patent pending.

Selected Projects

- Investigation of Learned Image Compression for Feature Detection
  - Ballé 2018 image compressor
  - *Class*: Image and Video Processing, NYU, 2023 Spring
- Eat, Move, Learn
  - Reinforcement learning for a multiplayer snake game (Kaggle competition: "Hungry Geese")
  - *Class*: Deep Learning, NYU, 2021 Spring
- AI for Atomic Force Microscope (AFM) Image Acquisition
  - Automation of the AFM scanning system with machine learning, using gaussian process upper confidence bound and deep reinforcement learning algorithms
  - *Class:* Senior Industrial Design Project, Bilkent, 2019 Fall - 2020 Spring

Personal Traits

Self-confident, highly motivated to explore, analytical thinker, determined, self-disciplined, good at planning and organization, punctual.