Yılmaz Korkmaz

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Research Interests

- Medical Imaging
- Deep Learning
- Image Reconstruction & Processing
- Computer Vision
- Medical Image Analysis
- Magnetic Resonance Imaging

Education

Aug 2019 present	**Bilkent University**, *Ankara, Turkey* *M.Sc., Department of Electrical and Electronics Engineering* **Advisor:** *Prof. Tolga Çukur* **CGPA:** *3.74/4.00.*
Sep 2014 Jun 2019	**Bilkent University**, *Ankara, Turkey* *B.Sc., Department of Electrical and Electronics Engineering* **CGPA:** *3.60/4.00.*
January 2018 May 2018	**Nanyang Technological University**, *Singapore* *Exchange student in Electrical and Electronic Engineering.*

Honors and Awards

2019–present	**Bilkent University Graduate Scholarship**: Full tuition waiver and stipend during M.Sc.
2019–present	**Scientific-Technological Research Council of Turkey**: Monthly stipend during M.Sc. (Project No: 121N029).
2019	**Turkish Academic Personnel and Postgraduate Education Entrance Exam (ALES)**: Ranked in top 1800 students among more than 300,000 candidates.
2014–2019	**Bilkent University High Honor Students List**: Placed in Bilkent University's High Honor Students List for multiple times.
2014–2019	**Bilkent University Undergraduate Scholarship**: Full tuition waiver and stipend during B.Sc.
2014	**Turkish National University Entrance Exam (LYS)**: Ranked 202nd among more than 2 million candidates.

Publications

Articles

[1] **Y. Korkmaz**, S. U. H. Dar, M. Yurt, M. Ozbey, and T. Çukur, "Unsupervised MRI reconstruction via zero-shot learned adversarial transformers," *arXiv preprint arXiv:2105.08059, (under second round review at IEEE Transactions on Medical Imaging)*, 2021. [Online]. Available: https://arxiv.org/abs/2105.08059.

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Peer-Reviewed Conference Proceedings

[4] **Y. Korkmaz**, M. Yurt, S. U. H. Dar, M. Özbey, and T. Cukur, "Deep mri reconstruction with generative vision transformers," in *International Workshop on Machine Learning for Medical Image Reconstruction*, Springer, 2021, pp. 54–64.

[3] **Y. Korkmaz**, S. U. H. Dar, M. Yurt, M. Ozbey, and T. Çukur, "A zero-shot learning approach for accelerated MRI reconstruction," in *Proceedings of the 2021 Annual Meeting of ISMRM*, Virtual Conference, May 2021.

[2] S. U. H. Dar, **Y. Korkmaz**, and T. Çukur, "Mr image reconstruction via zero-shot learned generative adversarial transformers," in *Proceedings of the 2022 Annual Meeting of International Society for Magnetic Resonance Imaging (ISMRM)*, Virtual Conference, May 2022 (submitted).

[1] M. Yurt, S. U. H. Dar, B. Tinaz, M. Ozbey, **Y. Korkmaz**, and T. Çukur, "A semi-supervised learning framework for jointly accelerated multi-contrast mri synthesis without fully-sampled ground-truths," in *2021 annual meeting of International Society for Magnetic Resonance Imaging (ISMRM)*, Virtual Conference, May 2021.

Academic Experience

Graduate Researcher, UMRAM (National Magnetic Resonance Research Center), Bilkent University

2021-present — **Federated learning for robust MRI reconstruction**, *Developed a federated learning framework for MR image reconstruction to improve the model generalizability with collaborative training,* **(to be submitted to IEEE Transactions on Medical Imaging)**.

2021-present — **Unsupervised MRI synthesis using style-generative adversarial networks**, *Developing a novel unsupervised framework for robust MRI synthesis by efficiently inverting style-generative adversarial networks and manipulating inverted latent spaces to synthesize missing slices in the target contrast,* **(to be submitted to IEEE Transactions on Medical Imaging)**.

2019-2021 — **Unsupervised MRI reconstruction via zero-shot learned adversarial transformers**, *Introduced an unsupervised reconstruction model using adversarial vision transformers for the first time in literature for MRI reconstruction. Proposed model takes the advantage of transformers to capture long range spatial dependencies without computational burden,* **(Korkmaz et. al., proceedings of the 2021 Scientific Meeting of ISMRM), (Korkmaz et. al., proceedings of the MLMIR 2021 - MICCAI 2021 Satellite Event) (Korkmaz et. al., under review at IEEE Transactions on Medical Imaging, 2021)**.

Graduate Course Projects, Bilkent University

2020 — **EEE 573 Medical Imaging**, *Analyzed and simulated the effects of T2-decay during data acquisition in MRI using MATLAB, including the effect of magnetic field inhomogeneity as an additional nonideality.*

2020 — **MATH 565 Mathematical Foundations of Data Science**, *Investigated the effect of noise in backpropagation by mathematically examining and implementing recently proposed related papers.*

2020 — **EEE 575 Medical Image Reconstruction and Processing**, *Implemented convex optimization approaches ADMM and FISTA to solve linear system of equations involved in Magnetic Particle Imaging reconstruction and compared those methods with standard Kaczmarz method.*

2020 — **CS 550 Machine Learning**, *Implemented a music-genre classification framework using MLP and CNN-based models using Keras.*

2019 — **EEE 543 Neural Networks**, *A fused computer vision and natural language processing framework was implemented using Tensorflow for the task of producing meaningful captions for a given natural image. Proposed model includes CNN, LSTM and attention modules.*

Undergraduate Researcher, UNAM (National Nanotechnology Resarch Center), Bilkent University

2018-2019 — **Wireless Power Transfer System Design and Implementation**.
Wireless power and data transmission circuits are designed and implemented using only single inductive link under the supervision of Prof.Hilmi Volkan Demir as a part of EEE 492 Senior Project course.

Undergraduate Course Projects, Bilkent University

2019 **CS 464 Introduction to Machine Learning**, *A deep learning framework was implemented using Keras to classify skin lesions from dermoscopic images from public datasets in a group of 4 students.*

2019 **EEE 485 Statistical Learning and Data Analytics**, *A handwritten digit recognition framework was implemented from scratch using various machine learning methods with MATLAB.*

2018-2019 **EEE 493-94 Industrial Design Project**, *Designed and implemented a GPS spoofing framework for unmanned aircrafts in senior project group of 6 students and partnership with Aselsan company. .*

2017 **EEE 212 Microprocessors**, *A microprocessor framework was designed to calculate the angle between multiple objects and implemented in Assembly making use of the distances between objects.*

2016 **EEE 102 Introduction to Digital Circuit Design**, *Designed and implemented a tetris-like game using VGA and VHDL in an FPGA.*

2016 **EEE 211 Analog Electronics**, *Implemented an AM radio transceiver in laboratory sessions.*

2016 **CS 102 Algorithms and Programming II**, *An Android application was designed and implemented to ease orientation of freshmans to Bilkent University campus in a group of 5 students, using GPS and Android Studio.*

Academic Duties

Teaching Assistance

2019–present **Electrical and Electronics Engineering at Bilkent University**.
- EEE 443/543 Neural Networks (2021-present): Prepared homeworks and graded quizes.
- MATH 241 Engineering Mathematics (2021): Organized proctoring and graded quizes.
- EEE 211 Analog Electronics (2019-2020): Interviewed students in the laboratory sessions.

Work Experience

Internship

2018 **Aselsan Company, Ankara, Turkey**, *Worked on debugging in previously written dynamic libraries in C++ including their adaptation to MATLAB and Simulink environments. Designed some graphical user interfaces in C#.*

2017 **AB Micro Nano Company, Ankara, Turkey**, *Thermodynamic behaviour of GaN based transistors is analysed and implemented a simulation program to ease the analysis process in MATLAB.*

Social Activities

2014-2019 **Active Member of Bilkent IEEE Student Branch**.

2015-2019 **Active Member of Bilkent IEEE Robotics and Automation Society (RAS)**.

Programming Skills

Programming Python (professional), Matlab (professional), Java (intermediate), VHDL (intermediate), C++ (intermediate), Assembly (intermediate), Android (used in a few projects)

Frameworks TensorFlow (professional), Keras (professional), PyTorch (professional), NumPy (professional), Matplotlib (professional), Scikit-learn(intermediate)

Tools LaTeX(professional), Microsoft Visual Studio (professional), Spyder (professional), Inkscape (professional)

Relevant Links

- Personal Website
- Google Scholar