Mahmut Yurt

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Research Interests

- Medical Imaging
- Magnetic Resonance Imaging
- Computer Vision
- Image Analysis/Processing
- Healthcare
- Deep Learning

Education

Jul 2019 present **Master of Science**, *Bilkent University*, Ankara/Turkey, *Department of Electrical and Electronics Engineering.*
CGPA: 4.00/4.00
Advisor: Prof. Tolga Çukur
Thesis: Supervised and Semi-Supervised Deep Generative Models for Robust Multi-Contrast Accelerated MRI Synthesis and Reconstruction

Sep 2014 Jun 2019 **Bachelor of Science**, *Bilkent University*, Ankara/Turkey, *Department of Electrical and Electronics Engineering.*
CGPA: 3.88/4.00

Honors and Awards

2019–present Bilkent University Graduate Study Comprehensive Scholarship: full tuition waiver and stipend during the Master of Science program

2019–present Scientific and Technological Research Council of Turkey: monthly stipend during the Master of Science program (project no: 118E256)

2020 Scientific and Technological Research Council of Turkey: 1512 BIGG Grant Program, awarded to only 144 developers among 4000 competitors

2019 Ranked 22nd among 300,000 candidates in Turkish Academic Personnel and Postgraduate Education Entrance Exam (ALES)

2019 Graduation Research Excellence Award at Bilkent University

2014–2019 Bilkent University Undergraduate Study Comprehensive Scholarship: full tuition waiver and stipend during the Bachelor of Science program

2014–2019 Turkish Prime Ministry Fellowship: monthly stipend during the Bachelor of Science program, awarded to only 100 students in Turkey

2018 Best research paper award in Bilkent University Graduate Research Conference

2014 Ranked 27th among 2,200,000 candidates in Turkish National University Entrance exam (LYS)

Publications

Articles

[5] **M. Yurt**, S. U. H. Dar, A. Erdem, E. Erdem, K. K. Oğuz, and T. Çukur, "mustGAN: multi-stream generative adversarial networks for MR image synthesis," *Medical Image Analysis,* **accepted, in press**, 2020. [Online]. Available: `https://arxiv.org/abs/1909.11504`.

[4] **M. Yurt**, M. Ozbey, S. U. H. Dar, B. Tınaz, and T. Çukur, "Progressively volumetrized deep generative models for data-efficient contextual learning of MR image recovery," preprint, to be submitted to *Nature Machine Intelligence*, 2020. [Online]. Available: `https://arxiv.org/abs/2011.13913`.

[3] **M. Yurt**, S. U. H. Dar, B. Tınaz, M. Ozbey, and T. Çukur, "Semi-supervised learning of mutually accelerated multi-contrast MRI synthesis without fully-sampled ground-truths," preprint, to be submitted to *IEEE Transactions on Medical Imaging*, 2020. [Online]. Available: `https://arxiv.org/abs/2011.14347`.

[2] S. U. H. Dar, **M. Yurt**, M. Shahdloo, M. E. Ildız, B. Tınaz, and T. Çukur, "Prior-guided image reconstruction for accelerated multi-contrast MRI via generative adversarial networks," *IEEE Journal of Selected Topics in Signal Processing*, vol. 14, no. 6, pp. 1072–1087, 2020. [Online]. Available: `https://ieeexplore.ieee.org/document/9115255`.

[1] S. U. H. Dar, **M. Yurt**, L. Karacan, A. Erdem, E. Erdem, and T. Çukur, "Image synthesis in multi-contrast MRI with conditional generative adversarial networks," *IEEE Transactions on Medical Imaging*, vol. 38, no. 10, pp. 2375–2388, 2019. [Online]. Available: `https://ieeexplore.ieee.org/document/8653423`.

Book Chapters

[1] **M. Yurt**, S. U. H. Dar, T. Çukur, and J. C. Ye, "Image synthesis in multi-contrast MRI with generative adversarial networks," in *Deep Learning for Biomedical Image Reconstruction*, Cambridge: Cambridge University Press, 2021 (in progress).

Peer-Reviewed Conference Proceedings

[11] **M. Yurt**, B. Tinaz, S. U. H. Dar, M. Ozbey, and T. Çukur, "A semi-supervised learning framework for jointly accelerated multi-contrast MRI synthesis without fully-sampled ground-truths," in *29th annual meeting of International Society for Magnetic Resonance Imaging (ISMRM)*, Vancouver, May 2021 (submitted).

[10] **M. Yurt**, M. Ozbey, S. U. H. Dar, B. Tinaz, and T. Çukur, "Progressive volumetrization of cross-sectional image recovery tasks for data-efficient contextual learning in MRI," in *29th annual meeting of International Society for Magnetic Resonance Imaging (ISMRM)*, Vancouver, May 2021 (submitted).

[9] **M. Yurt**, B. Tınaz, M. Ozbey, S. U. H. Dar, and T. Çukur, "Semi-supervised learning of multi-contrast MR image synthesis without fully-sampled ground-truth acquisitions," in *Medical Imaging Meets NeurIPS*, Virtual Conference, Dec. 2020.

[8] **M. Yurt**, S. U. H. Dar, A. Erdem, E. Erkut, and T. Çukur, "A multi-stream GAN approach for multi-contrast MRI synthesis," in *28th annual meeting of International Society for Magnetic Resonance Imaging (ISMRM)*, Virtual Conference, Aug. 2020.

[7] S. U. H. Dar, **M. Yurt**, M. Ozbey, and T. Çukur, "Hybrid deep neural network architectures for multi-coil MR image reconstruction," in *28th annual meeting of International Society for Magnetic Resonance Imaging (ISMRM)*, Virtual Conference, Aug. 2020.

[6] **M. Yurt**, S. U. H. Dar, A. Erdem, E. Erdem, and T. Çukur, "Adaptive fusion via dual-branch GAN for multi-contrast MRI synthesis," in *IEEE 17th International Symposium on Biomedical Imaging (ISBI)*, Virtual Conference, Apr. 2020.

[5] M. Ozbey, **M. Yurt**, S. U. H. Dar, and T. Çukur, "Three-dimensional MR image synthesis with progressive generative adversarial networks," in *IEEE 17th International Symposium on Biomedical Imaging (ISBI)*, Virtual Conference, Apr. 2020.

[4] S. U. H. Dar, **M. Yurt**, M. Ozbey, and T. Çukur, "Hybrid deep neural networks for parallel MR image reconstruction," in *IEEE 17th International Symposium on Biomedical Imaging (ISBI)*, Virtual Conference, Apr. 2020.

[3] S. U. H. Dar, **M. Yurt**, L. Karacan, A. Erdem, E. Erdem, and T. Çukur, "Journal paper: Image synthesis in multi-contrast MRI with conditional generative adversarial networks," in *IEEE 17th International Symposium on Biomedical Imaging (ISBI)*, Virtual Conference, Apr. 2020.

[2] **M. Yurt** and T. Çukur, "Multi-image super resolution in multi-contrast MRI," in *IEEE 28th Signal Processing and Applications (SIU)*, Virtual Conference, Oct. 2020.

[1] S. U. H. Dar, **M. Yurt**, M. Shahdloo, M. E. Ildız, and T. Çukur, "Joint recovery of variably accelerated multi-contrast MRI acquisitions via generative adversarial networks," in *27th annual meeting of International Society for Magnetic Resonance Imaging (ISMRM)*, Montreal, May 2019.

Academic Experience

Undergraduate/Graduate Researcher, ICON Lab/UMRAM, Bilkent University

2020–present **Progressively volumetrized deep generative models for data-efficient learning of MR image recovery**.
Developed a novel generative model for data-efficient contextual learning of volumetric MR image recovery via progressively volumetrized implementation of cross-sectional tasks across individual rectilinear orientations. *(Yurt et. al., to be submitted to Nature Machine Intelligence)*

2020–present **Semi-supervised learning of MR image synthesis without fully-sampled training ground-truths**.
Introduced a novel semi-supervised MRI synthesis model that enables recovery of fully-sampled images of a target contrast without requiring fully-sampled ground-truths in the training set.*(Yurt et. al., to be submitted to IEEE Transactions on Medical Imaging)*

2019–present **Multi-stream generative adversarial networks for multi-contrast MRI synthesis**.
Develop a novel multi-stream generative adversarial network architecture for multi-contrast MRI synthesis that complementarily fuses information across multiple one-to-one streams and a single many-to-one stream. *(Yurt et. al., Medical Image Analysis, in press)*

2018–2020 **Prior-guided image reconstruction for accelerated multi-contrast MRI via generative adversarial networks**.
Performed synergistic reconstruction-synthesis of multi-contrast MRI by complementarily exploiting high-frequency, low-frequency, and perceptual priors available within lightly- and heavily-undersampled images of distinct contrasts. *(Dar et al, IEEE JSTSP, 2020)*

2017–2019 **Multi-contrast MRI synthesis with conditional generative adversarial networks**.
Devised conditional generative adversarial network models for MRI synthesis by using cycle-consistency for unpaired training data and pixel-wise consistency for paired training data. *(Dar et. al., IEEE TMI, 2019)*

Teaching Assistant

2019–present **Electrical and Electronics Engineering at Bilkent University**.
- EEE 443/543: Neural Networks
- EEE 321: Signals and Systems
- EEE 493: Industrial Design Project I
- EEE 494: Industrial Design Project II

Programming Skills

Programming Languages Python (professional), Matlab (professional), Java (professional), VHDL (professional), Verilog (intermediate), C++ (intermediate), Android (often used)

Frameworks PyTorch (professional), TensorFlow (professional), NumPy (professional), Matplotlib (professional), OpenCV (professional), Git (intermediate)

Software Tools LaTeX(professional), Spyder (professional), Inkscape (professional), Illustrator (professional), Photoshop (intermediate), AWR (intermediate), DICOM (intermediate), FSL (frequently used)

Relevant Links

- Personal Website
- Google Scholar

Last Update: November 30, 2020.