Mahmut Yurt

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Education

Jul 2019 – present **M.Sc.**, *Bilkent University*, Ankara/Turkey, *Department of Electrical and Electronics Engineering.*
Advisor: Prof. Tolga Çukur
CGPA: 4.00/4.00

Sep 2014 – Jun 2019 **B.Sc.**, *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 M. Sc. program

2019–present Scientific and Technological Research Council of Turkey: monthly stipend during the M. Sc. program

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

2019 Research excellence award in Graduation Awards at Bilkent University

2014–2019 Bilkent University Comprehensive Scholarship: full tuition waiver and stipend during the B. Sc. program

2014–2019 Turkish Prime Ministry: monthly stipend during the B. Sc. program, awarded to only 100 students in Turkey

2018 Best research paper award in Bilkent University Research Graduate Conference

2014 Ranked 27th among 2,000,000 participants 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, under second round revision*, 2020. [Online]. Available: `https://arxiv.org/abs/1909.11504`.

[4] 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`.

[3] S. U. 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`.

Work in Progress

[2] **M. Yurt**, B. Tınaz, M. Özbey, S. U. H. Dar, and T. Çukur, "Semi-supervised learning of multi-contrast MRI synthesis without fully-sampled ground truth data," 2020.

[1] **M. Yurt**, M. Özbey, S. U. H. Dar, B. Tınaz, and T. Çukur, "Progressively volumetrized deep generative models for data-efficient contextual learning of MR image recovery," 2020.

Peer-Reviewed Conference Proceedings

[10] **M. Yurt**, M. Özbey, B. Tınaz, S. U. H. Dar, and T. Çukur, "Progressively volumetrized deep generative nets for data-efficient contextual learning of MR image recovery," in *Medical Imaging Meets NeurIPS (to be submitted)*, 2020.

[9] **M. Yurt**, B. Tınaz, M. Özbey, S. U. H. Dar, and T. Çukur, "Semi-supervised learning of multi-contrast MRI synthesis without fully-sampled ground truth data," in *Medical Imaging Meets NeurIPS (to be submitted)*, 2020.

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

[7] **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)*, Paris, Aug. 2020.

[6] S. U. H. Dar, **M. Yurt**, M. Özbey, 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)*, Paris, Aug. 2020.

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

[4] 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)*, Iowa City, Apr. 2020.

[3] S. U. H. Dar, **M. Yurt**, M. Özbey, and T. Çukur, "Hybrid deep neural networks for parallel mr image reconstruction," in *IEEE 17th International Symposium on Biomedical Imaging (ISBI)*, Iowa City, Apr. 2020.

[2] 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)*, Iowa City, Apr. 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

2019–present **Teaching Assistant**, *Bilkent University*.

- Neural Networks
- Signals and Systems
- Industrial Design Project I
- Industrial Design Project II

2019–present **Graduate Researcher**, *ICON Lab/Bilkent University*.
Developing novel supervised and semi-supervised generative models for robust, volumetric multi-contrast MRI synthesis, reconstruction, and super-resolution as well as for fundamental computer vision problems including image-to-image translation and image inpainting under the supervision of Prof. Tolga Çukur.

2017–2019 **Undergraduate Researcher**, *ICON Lab/Bilkent University*.
Contributing to various research projects, with focus on deep learning-based accelerated MRI synthesis and reconstruction models under the supervision of Prof. Tolga Çukur.

Research Experience

Graduate Researcher, ICON Lab/UMRAM, Bilkent University

2020–present **Deep generative models for data-efficient learning of MR image recovery**.
We develop a novel deep generative model for volumetric MR image recovery. The proposed method enables data-efficient contextual learning by defining a series of cross-sectional recovery tasks defined across separate rectilinear orientations. Compared to traditional cross-sectional and volumetric models, the proposed method efficiently recovers global contextual information while enhancing the capture of fine-structural details within each orientation. *(Yurt et. al., to be submitted to Nature Machine Intelligence)*

2020–present **Semi-supervised learning of within-domain MR image synthesis without fully-sampled training ground-truths**.
We propose 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. The preliminary results suggest that the proposed method achieves a similar performance with the fully-supervised gold standard method. *(Yurt et. al., to be submitted to IEEE Transactions on Medical Imaging)*

2019–present **Multi-stream generative adversarial networks for multi-contrast MRI synthesis**.
We develop a novel multi-stream generative adversarial network (mustGAN) architecture for multi-contrast MRI synthesis. mustGAN recovers a target contrast image from multiple source contrast images by complementarily fusing information across multiple one-to-one streams and a single many-to-one stream. The one-to-one streams effectively capture unique, detailed features available within each individual source image, whereas the many-to-one stream manifests enhanced sensitivity to shared features available across all source images. *(Yurt et. al., under second-round review in Medical Image Analysis)*

2019–present **Prior-guided image reconstruction for accelerated multi-contrast MRI via generative adversarial networks**.
Using conditional generative adversarial networks, we performed synergistic reconstruction-synthesis of multi-contrast MRI. This method preserves high-frequency details of the target contrast by relying on the shared high-frequency priors available from the source contrast, and prevents feature leakage or loss by relying on the priors available from undersampled acquisitions of the target contrast. *(Dar et al, IEEE JSTSP, 2020)*

Undergraduate Researcher, ICON Lab/UMRAM, Bilkent University

2017–2019 **Multi-contrast MRI synthesis with conditional generative adversarial networks**.
We develop a cycle-consistent generative adversarial network model for MRI synthesis with unpaired training data and a pixel-wise generative adversarial network model for MRI synthesis with paired training data. Both models yield an enhanced capture for high frequency details compared to traditional random forest methods and deep convolutional networks. *(Dar et. al., IEEE TMI, 2019)*

Programming Skills

Programming Languages	Python (professional), Matlab (professional), Java (intermediate), VHDL (professional), Verilog (intermediate), C++ (intermediate), Android (often used)
Frameworks	PyTorch (professional), TensorFlow (professional), NumPy (professional), Matplotlib (professional), OpenCV (intermediate), Git (intermediate)
Software Tools	LaTeX(professional), Inkscape (professional), Illustrator (professional), Photoshop (intermediate), Spyder (professional), LTSpice (frequently used), FSL (frequently used), AWR (intermediate), DICOM (intermediate)