Nikola Janjušević

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Research Statement

I am interested in **medical-imaging inverse-problems** and **Deep Neural Networks (DNNs)**. My Ph.D. focused on the **interpretable-construction of DNNs**, leveraging this understanding to achieve robustness to inference-time changes in the signal observation and noise model. I believe DNN construction derived from optimization algorithms can yield superior performance and novel capabilities, with meaningful translation to clinical settings.

Work Experience

NYU Langone Radiology, Postdoc Fellow
Unsupervised training of DNNs for Low-Field MRI denoising and CS-MRI reconstruction.
Fall 2024 - Present, New York, NY

NYU Langone Radiology, NTV Intern
Summer 2023 - Summer 2024, New York, NY

Apple Video Engineering, Research Intern
"White-box" reference-guided image enhancement.
Summer 2022, Cupertino, CA

Teaching Experience

The Cooper Union, Adjunct Professor
ECE-150 Digital Logic Design.
Fall 2022, 2023, 2024 New York, NY

NYU Tandon, Teacher's Assistant
ECE-GY 6123 Image and Video Processing.
Spring 2022, Spring 2023, Brooklyn, NY

NYU Summer STEM, Senior Instructor
Introduction to Machine Learning.
Summer 2019, Brooklyn, NY

Awards and Honors

NYU Shiv Panwar Scholarship 2021-2023
Telephonics Research Fellowship 2020
NYU K-12 STEM Fellowship 2019
Radio Club of America Scholarship 2019
CU Half-Tuition Scholarship 2015-2019
CU Innovator's Merit Scholarship 2015-2019

Education

New York University
Ph.D. Electrical Engineering, GPA: 3.83/4.00
Advisor: Professor Yao Wang, NYU Video Lab
Fall 2019 - Summer 2024, Brooklyn, NY

The Cooper Union
Bachelors of Engineering, Electrical Engineering
Magna Cum Laude, Minor in Computer Science
Fall 2015 - Spring 2019, New York, NY

Selected Graduate Courses:
Math-GA 20(10,20) Numerical Methods I, II
Math-GA 2012 Non-smooth and Convex Optimization
Math-GA 2012 High Performance Computing
Math-GA 2022 Applied Stochastic Analysis

Selected Skills:
Julia (Lux, CUDA, MPI), Python (PyTorch),
C (OpenMP, MPI), Matlab, Bash, Linux,
LaTeX (PGFplots, TikZ), Manim

Publications

[1] N. Janjušević, A. Khalilian-Gourtani, A. Flinker, Li Feng, and Y. Wang, *GroupCDL: Interpretable Denoising and Compressed Sensing MRI via Learned Group-Sparsity and Circulant Attention*, IEEE TCI 2025. Julia code.

[2] N. Janjušević, A. Khalilian-Gourtani, Y. Wang, and Li Feng, *Learned Primal Dual Splitting for Self-Supervised Noise-Adaptive MRI Reconstruction*, IEEE ISBI 2025, accepted.

[3] B. Frost, N. Janjušević, C. Strimbu, C. Hendon, *Compressed Sensing on Displacement Signals Measured with Optical Coherence Tomography*, Biomed. Opt. Express 14, 2023.

[4] N. Janjušević, A. Khalilian-Gourtani and Y. Wang, *CDLNet: Noise-Adaptive Convolutional Dictionary Learning Network for Blind Denoising and Demosaicing*, IEEE OJSP 2022. PyTorch code.

[5] N. Janjušević, A. Khalilian-Gourtani and Y. Wang, *Gabor is Enough: Interpretable Deep Denoising with a Gabor Synthesis Dictionary Prior*, IEEE IVMSP 2022. PyTorch code.

Conferences, Seminars, Talks

27/05/24 L. Bojić and N. Janjušević, *Strategija Razvoja Veštačke Inteligencije Kod Nas / An Artificial Inteligence Strategy for Serbia*, Eduka Institute of Organizational Business, Belgrade, Serbia.

04/05/24 International Society for Magnetic Resonance in Medicine (ISMRM), May 4th - May 9th 2024, Suntec Singapore Convention & Exhibition Centre, Singapore.

- N. Janjušević et al., *Advanced Deep Learning Denoising for Accelerated 0.55T Prostate MRI*, Digital Poster + Power-Pitch Presentation.

- N. Janjušević et al., *Self-Supervised Noise-Adaptive Convolutional Dictionary Learning for Low-Field MRI Denoising*, Digital Poster.

21/02/24 N. Janjušević et al., *Learning Deep Denoisers for Low-Field MRI with Noisy Data*, Research Seminar, The Center for Biomedical Imaging (CBI) and Center for Advanced Imaging Innovation and Research (CAI^{2}R), Translational Research Building, NYU Langone Health, New York, NY, USA.

18/10/23 N. Janjušević et al., *Self-Supervised Low-Field MRI Denoising via Spatial Noise Adaptive CDLNet*, Power-Pitch Presentation, i2i Workshop, CAI^{2}R, October 18th - October 19th 2023, NYU Langone, NY, USA.

26/06/22 N. Janjušević et al., *Gabor is Enough: Interpretable Deep Denoising with a Gabor Synthesis Dictionary Prior*, Research Presentation, IEEE 14th Image, Video, and Multidimensional Signal Processing Workshop (IVMSP), June 26th - June 29th 2022, Nafplio, Greece.

Last updated: February 2025