Nikola Janjušević

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Research Statement

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

Work Experience

NYU Langone Dept. Radiology, NTV Intern
Unsupervised training of DNNs for Low-Field MRI denoising and CS-MRI reconstruction.
Summer 2023 - Present, New York, NY

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

Samsung Research America, Research Intern
Survey of fast novel-view synthesis methods for video involving with comparisons on in-house data.
Summer 2021, Plano, TX (remote)

Teaching Experience

The Cooper Union, Adjunct Professor
ECE-150 Digital Logic Design.
Fall 2022, Fall 2023 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 - Present, 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
DS-GA 3001 Bayesian Machine Learning
ECE-GY 6813 Medical Imaging

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, and Y. Wang, *Fast and Interpretable Nonlocal Neural Networks for Image Denoising via Group-Sparse Convolutional Dictionary Learning*, preprint 2023. Julia code.

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

[3] 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.

[4] 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.

Last updated: October 2023