

Paras Maharjan

Computer Vision Researcher

Kansas City, MO | paras.maharjan@mail.umkc.edu | 8166052910 | Google Scholar | LinkedIn | GitHub

Website

Skills

Languages: Python, MATLAB, C/C++

Framework: PyTorch, TensorFlow, Numpy, Scikit-Learn, OpenCV

Tools: FFmpeg, VVC VTM, VVenc/VVdec, Git, ~~TeX~~LaTeX, Unix/Linux, TMUX, Docker, ssh, VSCode

Technologies: Image/Video Processing, Image/Video Compression, Image analysis, Image Signal Processors(ISP), Computer Vision, Deep Learning, Machine Learning, Denoising, Deblurring, Deblocking, Data analysis, Foundational Model, Large Language Model, Generative AI Radar Imaging, Remote Sensing

Education

University of Missouri-Kansas City

Completed July 2025

Ph.D. in Electrical and Computer Engineering (GPA: 4.0/4.0)

Dissertation - *Complex-valued SAR Image Compression: An Approach for Amplitude, Phase, and Gradient Recovery*

University of Missouri-Kansas City

Completed Dec 2019

Master's Degree in Electrical and Electronics Engineering (GPA: 4.0/4.0)

Thesis - *Improving Extreme Low-Light Image Denoising via Residual Learning*

Experience

AI/ML Computer Vision Research Intern

Sept 2025 - Present

Sony Corporation of America – San Jose, CA

- Working on high-level computer vision tasks using deep learning-based vision and language foundational models for Image/Video Matting.

Intern Research Scientist

Feb 2024 – July 2025

Atombeam Technologies – Moraga, CA

- Architected an end-to-end **image compression** solution utilizing a machine learning approach for complex-valued SAR images, achieving a 28% reduction in inference time.
- Optimized channel context modeling through feature grouping based on latent energy, leading to a 26.5% BD-rate improvement over **VVC/H.266**-based SAR image compression.

Graduate Research Assistant

June 2018 – July 2025

Multimedia Computing and Communication Lab, UMKC – Kansas City, MO

- Designed a residual learning-based deep neural network for **extreme low-light denoising**, achieving a 29× speedup with improved reconstruction performance.
- Developed a camera pipeline for learning-based dark **image enhancement** with **white balance correction** and **color tuning**, applying denoising before ISP and separately learning low- and high-frequency components.

Video Processing Research Intern

May 2022 – Aug 2022

Dolby Labs – Sunnyvale, CA

- Formulated a local gamma correction algorithm for **adaptive face brightness adjustment** in video conferencing scenarios.
- Developed a machine learning-driven technique to determine the optimal tuning parameter for **automatic exposure correction**.

Research Intern of Image/Video Algorithms

Jun 2021 – Aug 2021

Kuaishou Technology – Palo Alto, CA

- Constructed a deep neural network for **image deblocking** and **deblurring**, leveraging DCT decomposition for enhanced transform-domain processing.
- Performed objective and subjective **image quality assessment** for generated output images, achieving a 3% improvement in PSNR with real-time performance.

Research Intern of Image/Video Algorithms

Sept 2020 – Jan 2021

Kuaishou Technology – Palo Alto, CA

- Implemented deep learning-based **image denoising** techniques for real-world noisy images.
- Proposed a dual-input-dual-output network with a dual loss function that processes noisy raw and ISP-processed noisy sRGB images to generate clean sRGB outputs.

Image Processing Engineering Intern

Jun 2020 – Sept 2020

Dolby Labs – Burbank, CA

- Accelerated real-time **video understanding** and **image segmentation** using deep neural networks, achieving a $3\times$ speedup for sports recognition and a 30% improvement in segmentation.

Camera Design Intern

May 2019 – Aug 2019

Poly Inc. (Previously Polycorn) – Austin, TX

- Prototyped **multi-camera image fusion** techniques to improve image quality in **real-time applications**.
- Developed an algorithm for multi-camera systems incorporating geometric calibration, **image registration** (SIFT), parallax correction, and alpha fusion-based blending for seamless video transitions.

Open-sourced Project

Deep Image Denoising:

- Developed a deep learning-based end-to-end **ISP** solution for **extremely low-light raw image denoising**, designing a residual learning network with self-attention and implementing it using PyTorch and Gradio.

Publications

Paras Maharjan, Zhu Li, Chris McGuiness, "Amplitude, Phase and Gradient Recovery from Compressed SAR Images", *2026 IEEE Transactions on Circuits and Systems for Video Technology (TCSVT)*.

Paras Maharjan, Zhu Li, "Distributed Polarimetric SAR Compression with Joint Deblocking Using Side Information", *2025 IEEE International Symposium on Circuits and Systems (ISCAS 2025)*.

Paras Maharjan, Corey Marrs and Zhu Li, "End-to-End Compression of Complex-Valued SAR Images", *2024 IEEE 26th International Workshop on Multimedia Signal Processing (MMSP 2024)*.

Chris Henry, **Paras Maharjan**, Zhu Li, George York, "E2SIFT: Neuromorphic SIFT via Direct Feature Pyramid Recovery from Events", *2024 IEEE International Conference on Image Processing (ICIP 2024)*

Paras Maharjan, Zhu Li, "Complex-valued SAR Image Compression: A Novel Approach for Amplitude and Phase Recovery", *2023 International Conference on Visual Communications and Image Processing (VCIP 2023)*

Paras Maharjan, Lyle Vanfossan, Zhu Li, Jerry Jialie Shen, "Fast LoG SIFT Keypoint Detector", *2023 IEEE 25th International Workshop on Multimedia Signal Processing (MMSP 2023)*.

Hongcheng Jiang, **Paras Maharjan**, Zhu Li, George York, "Dct-based residual network for nir image colorization", *2022 IEEE International Conference on Image Processing (ICIP 2022)*

Paras Maharjan, Zhu Li, Ning Xu, Xuan Xu, Yuyan Song, "DCTResNet: Transform Domain Image Deblocking for Motion Blur Images", *2021 International Conference on Visual Communications and Image Processing (VCIP 2021)*.

Paras Maharjan, Zhu Li, Ning Xu, Chongyang Ma, Li Li, Yue Li, "Improving Extreme Low-Light Image Denoising via Residual Learning", *2019 IEEE International Conference on Multimedia and Expo (ICME 2019)*.

Patents

Systems and methods for synthetic aperture radar image compression, *US Patent: 12392891*

System and method for federated two-stage compression with federated joint learning, *US Patent: 12373739*

Distributed system and method for adaptive neural network-based data compression, *US Patent: 12375101*

System and method for hyperspectral image generation with quality assurance, *US Patent: 12322070*

Upsampling of compressed financial time-series data using a jointly trained Vector Quantized Variational Autoencoder neural network, *US Patent: 12229679*

System and methods for upsampling of decompressed genomic data after lossy compression using a neural network, *US Patent: 12095484*

System and method for adaptive quality driven compression of genomic data using neural networks, *US Patent: 12443564*

Controllable lossy compression system using joint learning, *US Patent: 12199643*

Systems and methods for hyperspectral image generation, *US Patent: 12190573*

Upsampling of decompressed financial time—series data using a neural network, *US Patent: 12093972*

System and method for federated two-stage compression within a persistent cognitive machine, *US Patent: 12438554*

System and methods for upsampling of decompressed time-series data using a neural network, *US Patent: 12068761*

Systems and methods for neural network based data compression, *US Patent: 12224777*

Real time discrete cosine transform image and video processing with convolutional neural network architecture, *US Patent: 12198304*

Adaptive real time discrete cosine transform image and video processing with convolutional neural network architecture, *US Patent: 12437365*

System and method for learning-based lossless data compression, *US Patent: 12119848*

Methods and devices for joint sensor and pixel domain denoising, *US Patent: 11967047*