

EDUCATION

The University of Texas at Austin

Ph.D. in Electrical and Computer Engineering

CGPA: **4.00/4.00**

May 2024

The University of Texas at Austin

M.S. in Electrical and Computer Engineering

CGPA: **4.00/4.00**

Dec 2021

Indian Institute of Technology Hyderabad, India

B.Tech. in Electrical Engineering, Silver medalist

CGPA: **9.77/10.0**

May 2019

EXPERIENCE

Samsung Research America, Senior Research Engineer

Since May '24

- Designing next-generation **Camera ISP** algorithms.

Apple Inc., Software Engineering Intern

Summer '23

- Developed novel **motion models** to assess motion discomfort and visual quality for immersive videos.
- Demonstrated **10-30% improvement** in accuracy over existing methods across use cases.
- Developed tools using **MATLAB, Swift, Metal**, and an application using **SwiftUI**.

Meta Platforms Inc., ASIC Engineering Intern

Summer '22

- Worked on developing novel adaptations for **High Dynamic Range** content in the **AV1 video codec**.
- Modeled and optimized memory architectures for hardware-accelerated compression. Led to **20% reduction in memory footprint** with comparable performance.
- Made key contributions to Meta's **next-generation video infrastructure**.

Facebook Inc., ASIC Engineering Intern

Summer '21

- Worked on developing novel **super-resolution** methods for the **AV1 video codec**.
- Identified applications and demonstrated up to a **15% improvement in performance** over the baseline.
- Contributed to **MSVP, Meta's hardware video accelerator**.

LIVE, UT Austin, Graduate Research Assistant

Fall '19 - Spring '24

- Guided by Prof. Alan Bovik.
- Collaborate with Meta** to develop novel algorithms to improve the performance and efficiency of quality assessment models.
- Focus on developing efficient quality assessment models for **video-on-demand** and **HDR tone-mapping**.

Carnegie Mellon University, Research Intern

Summer '18



- Proposed a new **Reinforcement Learning** algorithm, based on a model of decision making in the brain.
- Demonstrated its advantages using **PyTorch** in a simulated risky environment, where patience can be a virtue.
- Submitted as a paper to AAAI 2018 - preprint available online.













Uurmi Systems C/o Mathworks Inc., India, Intern

Summer '17

- Used **CUDA** to develop an efficient implementation of **stereoscopic depth estimation** on the GPU.
- Used by the company in their Autonomous Vehicle, as an alternative to LASER range finders.
- Integrated to MATLAB's** Computer Vision system toolbox.

SELECT PROJECTS









- A Crowdsourced Database of User-Generated High Dynamic Range Videos:** Part of a team creating the first large-scale crowdsourced UGC HDR video dataset of over 2,000 videos.
- Disentangled Representation Learning for Joint Image Restoration and Quality Assessment:** Exploring disentangled representation learning of deep content and quality features that can be used for image restoration and quality assessment.
- Joint Deep Image Restoration and Unsupervised Quality Assessment:** Proposed a simple Residual Quality Attention Layer that can be added to an image restoration network that allows the learning of unsupervised quality metrics. We demonstrate that RQAttention is capable of learning quality-aware representations without significantly affecting restoration accuracy. 
- Assessing the Quality of Tone-Mapped and Compressed High Dynamic Range Videos:** Developed the first large-scale database of 15,000 tone-mapped and compressed HDR videos. Conducted a crowdsourced subjective study on Amazon Mechanical Turk and developed a state-of-the-art video quality model that outperforms comparable models by 25% and achieves SOTA accuracy. Manuscripts under preparation. 

- **One Transform To Compute Them All: Efficient Fusion-Based Full-Reference Video Quality Assessment:** Developed the FUNQUE+ suite of models, improving upon both FUNQUE and VMAF. Improved running time by 2x over FUNQUE and 11x over VMAF, coupled with robust accuracy improvements.  
- **FUNQUE: Fusion of Unified Quality Evaluators:** Developed FUNQUE - a fusion quality metric with explicit focus on computation sharing and perceptually relevant pre-processing, which is 10% more accurate than the state-of-the-art Visual Multimethod Assessment Fusion (VMAF) quality model, combined with over 8x speedup! Accepted at ICIP 2022.  
- **Assessing the Impact of Image Quality on Object-Detection Algorithms:** Created a database to assess the impact of image quality on the performance of deep object-detection algorithms. Proposed a no-reference image quality metric to predict the accuracy of such algorithms. Winning entry to NIST Enhancing Computer Vision for Public Safety Challenge and published at Electronic Imaging 2022.  
- **A Hitchhiker's Guide to Structural Similarity:** Conducted a comprehensive evaluation of design choices involved in deploying SSIM. Proposed Enhanced SSIM, which improved both performance and efficiency over the baseline SSIM. Created an open-source software release. Published in IEEE Access.   
- **Quality Modeling Under A Relaxed Natural Scene Statistics Model :** Analyzed the mathematical behavior of information-theoretic quality models when relaxing natural scene statistical constraints. Derived novel expressions for properties of Generalized Gaussian Distributions for use in quality modeling. 
- **Perceptually Driven Conditional GAN for Fourier Ptychography:** Proposed a perceptually driven Boundary Equilibrium Conditional GAN, with application to supervised magnitude and phase reconstruction in Fourier Ptychography. Accepted at Asilomar 2019.  





PROGRAMMING SKILLS

- **Languages:** C/C++, Python, MATLAB, \LaTeX , Swift, Metal, CUDA
- **Others:** Pandas, Scikit-Learn, Scikit-Image, Scikit-Video, OpenCV, PyTorch

SELECT PUBLICATIONS

- A. K. Venkataramanan, A. C. Bovik. **Quality Modeling Under A Relaxed Natural Scene Statistics Model.** IEEE SSIAP 2024. 
- H. E. Gedik, A. K. Venkataramanan, A. C. Bovik. **Joint Deep Image Restoration and Unsupervised Quality Assessment.** IEEE SSIAP 2024. 
- A. K. Venkataramanan, C. Stejerean, I. Katsavounidis, A. C. Bovik. **One Transform To Compute Them All: Efficient Fusion-Based Full-Reference Video Quality Assessment.** IEEE Transactions in Image Processing, vol. 33, 2023. 
- A. K. Venkataramanan, C. Stejerean, A. C. Bovik. **FUNQUE: Fusion of Unified Quality Evaluators.** IEEE ICIP 2022. 
- A. K. Venkataramanan, M. Facktor, A. C. Bovik. **Assessing the impact of image quality on object-detection algorithms.** Electronic Imaging 34, 2022. 
- A. K. Venkataramanan, C. Wu, A. C. Bovik, I. Katsavounidis, Z. Shahid. **A Hitchhiker's Guide to Structural Similarity.** IEEE Access, vol. 9, 2021. 
- A. K. Venkataramanan, C. Wu, A. C. Bovik. **Optimizing Video Quality Estimation Across Resolutions.** IEEE MMSP 2020. 
- A. K. Venkataramanan, S. Gupta, S. S. Channappayya. **Perceptually Driven Conditional GAN for Fourier Ptychography.** Asilomar SSC 2019. 

OPEN SOURCE PROJECTS

- **VideoLIB** - A library to simplify common image and video processing tasks. **Source - , ReadTheDocs - **
- **QualityLIB** - A library to simplify quality assessment research tasks. **Source - , ReadTheDocs - **

ACCOMPLISHMENTS

- **Second Place in both "No-Reference" and "Full-Reference" categories at WACV 2023 Grand Challenge** - 2023.
- **Joint winners of NIST Enhancing Computer Vision for Public Safety Challenge** - 2020.
- **Institute Silver Medal** 2019, for highest CGPA in the EE department.
- **SN Bose Scholar** - 2018.
- **All India Rank 1016** - JEE Advanced 2015 (top 1% of aspirants)
- **KVPY Fellow** - 2014.