Abhinau K Venkataraman

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EDUCATION

University of Texas at Austin CGPA: **4.00/4.00**
M.S. and Ph.D. in Electrical and Computer Engineering Expected: *Dec 2024*

Indian Institute of Technology Hyderabad, India CGPA: **9.77/10.0**
B.Tech. in Electrical Engineering, Silver medalist *May 2019*

EXPERIENCE

LIVE, UT Austin, *Graduate Research Assistant* Fall '19 - Present
- Guided by Prof. Alan Bovik.
- I work with Facebook to develop new algorithms to improve the performance and efficiency of quality assessment models.
- I am also involved in practical and theoretical work related to perceptual optimization.

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 in a simulated environment, using PyTorch, 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 the Semi Global Matching 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.

PROJECTS

- **A Hitchhiker's Guide to SSIM**: Conducted a comprehensive evaluation of design choices involved in deploying SSIM. Proposed a new version of SSIM based on our findings. To be submitted to IEEE Access

- **Analyzing Model Tradeoffs in Predicting Length of Stay (LOS) in eICU Patients**: Data Mining class project in which we analyzed the effect of using interpretable and Federated Learning models on performance. Used several data cleaning methods, statistical tests, Machine Learning models and Deep Neural Networks. </>

- **Quality Assessment of Low Framerate Videos**: Proposed a fusion metric to assess the decrease in video quality as a result of reduction in frame rate, using a fusion of DCT domain signal processing and statistical modelling of optical flow. To be submitted to ICIP 2021.

- **Generalization of VIF to Non-Pristine Sources**: Analyzed the mathematical behaviour of Visual Information Fidelity when relaxing statistical constraints on the source. Derived novel expressions for properties of Generalized Gaussian Distributions.

- **Video Integrity Testing Using Minimal Learning**: Proposed a method to detect near-static videos using transfer learning and demonstrated robustness to choices of pretrained models. This allows for computation sharing, leading to more efficient deployment at scale.

- **Optimizing Video Quality Estimation Across Resolutions**: Proposed an efficient method to estimate the quality of HD videos compressed at lower resolutions. This was achieved using Histogram Matching, Suport Vector Regressors, and Neural Networks. Accepted at IEEE MMSP 2020. </>

- **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. </>

- **Better Safe than Sorry: Evidence Accumulation Allows for Safe Reinforcement Learning**: Proposed a new architecture for a Reinforcement Learning agent based on a model of decision making in the brain and showed its advantages in environments where patience can be a virtue. Submitted to AAAI 2019.

- **Deep learning for Unsupervised Voice Activity Detection**: Developed an unsupervised deep learning model that can detect voice activity in a speech signal. This is useful in VoIP systems where the cost of transmitting silence can be cut, leading to lower data usage and better performance in low bandwidth networks.

- **No-Reference Quality Assessment of HDR Images**: Proposed a no-reference deep learning model to estimate the Mean Opinion Score of tone-mapped HDR Images. Due to the small size of dataset, this was achieved using transfer learning and dimensionality reduction. Accepted at QOMEX 2017. </>

PROGRAMMING SKILLS

- **Languages**: C/C++, CUDA, Python, MATLAB, R, LaTeX
- **Others**: PyTorch, Tensorflow, Scikit-Learn, Scikit-Image, Scikit-Video, OpenCV, Scipy

PUBLICATIONS

- 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.

- A. K. Venkataramanan, S. Gupta, S. S. Channappayya. **No-reference quality assessment of tone mapped High Dynamic Range (HDR) images using transfer learning**. QOMEX 2017.

ACCOMPLISHMENTS

- **Joint winners of Phase 1 of NIST Enhancing Computer Vision for Public Safety Challenge** - 2020.

- **Institute Silver Medal** 2019, for highest CGPA in the EE department.

- **Academic Excellence Award** in 2017 and 2019.

- **SN Bose Scholar** - 2018.

- **KVPY Fellow** - 2014.