

PAVAN C. MADHUSUDANARAO

Samsung Research America

CONTACT INFORMATION	Samsung Research America, Mobile Processor Innovation Lab, 6105 Tennyson Parkway, Plano, TX- 75024	<i>Email</i> : pavan.madhusudana@gmail.com <i>Phone</i> : +1 5129440149 https://pavancm.github.io
RESEARCH INTERESTS	Image and Video Processing, Computer Vision, Machine Learning, Computational Photography, Generative AI, Self-Supervised Learning	
EDUCATION	The University of Texas at Austin <i>Doctor of Philosophy in Electrical and Computer Engineering</i>	Aug 2018 - Aug 2022
	Indian Institute of Science, Bangalore <i>Master of Technology (Research) in Electrical Communication Engineering</i>	Aug 2016 - June 2018
	National Institute of Technology, Karnataka, Surathkal <i>Bachelor of Technology in Electronics and Communication Engineering</i>	July 2012 - May 2016
WORK EXPERIENCE	Samsung Research America, Plano, TX <i>Senior Research Engineer, Mobile Processor Innovation (MPI) Lab</i> Project Title : Image Enhancement Methods for Mobile Camera <ul style="list-style-type: none">• Designing image enhancement algorithms for Samsung Galaxy mobile cameras.	August 2022 - Present <i>Mentor : Dr. Hamid Sheikh</i>
	Samsung Research America, Plano, TX <i>Research Intern, Mobile Processor Innovation (MPI) Lab</i> Project Title : Low complexity generative models for computer vision applications <ul style="list-style-type: none">• Designed deep learning based models trained on synthetic data for image enhancement applications. Low complexity and scalability was the key component for the generative model.	May 2021 - August 2021 <i>Mentor : Dr. Seok-Jun Lee</i>
	Google, Mountain View, CA <i>Research Intern, Media Algorithms Team, YouTube</i> Project Title : Real time video denoising for YouTube videos <ul style="list-style-type: none">• Designed real-time video denoising algorithms for user-generated-content in YouTube.	May 2019 - August 2019 <i>Mentor : Dr. Mohammad Izadi</i>
RESEARCH EXPERIENCE	Label-free Image and Video Quality Assessment <i>Advisor: Prof Alan C. Bovik, Electrical and Computer Engineering, UT Austin</i> <ul style="list-style-type: none">• Developed self-supervised models for quantifying image and video quality.	June 2020 - August 2022
	Frame Rate Dependent Video Quality Assessment <i>Advisor: Prof Alan C Bovik, Electrical and Computer Engineering, UT Austin</i> <ul style="list-style-type: none">• Designed an entropic difference based model to capture quality variations due to changes in video frame rate.	Aug 2018 - May 2020
	Quality Assessment of Stitched Images <i>Advisor: Dr.Rajiv Soundararajan, Electrical Communication Engineering, IISc Bangalore</i>	Aug 2016 - June 2018

JOURNAL PUBLICATIONS

- Constructed a panoramic image database by employing popular stitching algorithms and a human study was conducted to obtain subjective ratings. Designed a natural image statistics based model which achieved high correlation with human scores.
- **FAVER: Blind Quality Prediction of Variable Frame Rate Videos.**
Q. Zheng, Z. Tu, **P. C. Madhusudana**, X. Zheng, A. C. Bovik, and Y. Fan. *Signal Processing: Image Communication*, March. 2024.
- **CONVIQT: Contrastive video quality estimator.**
P. C. Madhusudana, N. Birkbeck, Y. Wang, B. Adsumilli and A. C. Bovik. *IEEE Transactions on Image Processing*, Sept. 2023.
- **Image Quality Assessment using Contrastive Learning.**
P. C. Madhusudana, N. Birkbeck, Y. Wang, B. Adsumilli and A. C. Bovik. *IEEE Transactions on Image Processing*, June. 2022.
- **Making Video Quality Models Sensitive to Frame Rate Distortions.**
P. C. Madhusudana, N. Birkbeck, Y. Wang, B. Adsumilli and A. C. Bovik. *Signal Processing Letters*, March. 2022.
- **Revisiting Dead Leaves Model: Training with Synthetic Data.**
P. C. Madhusudana, S. Lee, and H. R. Sheikh. *IEEE Signal Processing Letters*, Dec. 2021.
- **ST-GREED: Space-Time Generalized Entropic Differences for Frame Rate Dependent Video Quality Prediction.**
P. C. Madhusudana, N. Birkbeck, Y. Wang, B. Adsumilli and A. C. Bovik. *IEEE Transactions on Image Processing*, August 2021.
- **Subjective and Objective Quality Assessment of High Frame Rate Videos.**
P. C. Madhusudana, X. Yu, N. Birkbeck, Y. Wang, B. Adsumilli and A. C. Bovik. *IEEE Access*, July 2021.
- **Capturing Video Frame Rate Variations via Entropic Differencing.**
P. C. Madhusudana, N. Birkbeck, Y. Wang, B. Adsumilli and A. C. Bovik. *IEEE Signal Processing Letters*, Oct. 2020.
- **Subjective and Objective Quality Assessment of Stitched Images for Virtual Reality.**
P. C. Madhusudana and R. Soundararajan. *IEEE Transactions on Image Processing*, Nov. 2019.
- **Multiple spectral peak tracking for heart rate monitoring from photoplethysmography signal during intensive physical exercise.**
P. C. Madhusudana, P. Suresha, V. Periyasamy, and P. K. Ghosh. *IEEE Signal Processing Letters*, Dec. 2015.

CONFERENCE PUBLICATIONS

- **Image Quality Assessment Using Synthetic Images.**
P. C. Madhusudana, N. Birkbeck, Y. Wang, B. Adsumilli and A. C. Bovik. *IEEE/CVF Winter Conference on Applications of Computer Vision (WACV)*, Jan. 2022.
- **High Frame Rate Video Quality Assessment using VMAF and Entropic Differences.**
P. C. Madhusudana, N. Birkbeck, Y. Wang, B. Adsumilli and A. C. Bovik. *Picture Coding Symposium (PCS)*, July 2021.

SKILLS

- Programming: C/C++, Python
- Scientific: MATLAB, PyTorch, Keras, Tensorflow, Halide, L^AT_EX

REVIEW EXPERIENCE

- IEEE Transactions in Image Processing (TIP), IEEE Transactions on Circuits and Systems for Video Technology (CSVT), International Conference on Computer Vision (ICCV), Springer Multimedia Systems.

ACHIEVEMENTS

- **Prof. F M Mowadawalla Medal** for best Master thesis 2018 awarded by Department of ECE, Indian Institute of Science (IISc) Bangalore.
- Finalist (selected amongst 54 teams across India) in **Qualcomm Innovation Fellowship, India 2017**
- Member of the team which secured 4th position globally in **Signal Processing Cup 2015** conducted by IEEE Signal Processing Society
- Selected in the **Regional Mathematics Olympiad (RMO)** from Karnataka state conducted by Indian Statistical Institute (ISI) Bangalore, during 2011 and 2012.
- Secured *All India rank of 785* (amongst 1,200,000 candidates) in All India Engineering Entrance Examination (AIEEE) 2012.
- Recipient of Ministry of Human Resources Development Scholarship for being ranked in top 0.1% of AIEEE (2012 - 2016)
- Secured 1st *position* in the Karnataka State Class X Secondary Examination (SSLC) in 2010.