# PAVAN CHENNAGIRI

The University of Texas at Austin

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**CONTACT INFORMATION**

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**RESEARCH INTERESTS**

Image and Video Processing, Computer Vision, Machine Learning

**EDUCATION**

**The University of Texas at Austin** **Aug 2018 - Present**
*Doctor of Philosophy in Electrical and Computer Engineering*

- **Advisor :** Professor Alan C. Bovik

**Indian Institute of Science, Bangalore** **Aug 2016 - June 2018**
*Master of Technology (Research) in Electrical Communication Engineering*
**Prof. F M Mowadawalla Medal** for best Master Thesis - 2018

- **Advisor :** Dr. Rajiv Soundarajan
- **Thesis : Quality Assessment of Stitched Images for Virtual Reality**

**National Institute of Technology, Karnataka, Surathkal** **July 2012 - May 2016**
*Bachelor of Technology in Electronics and Communication Engineering*

- **Advisor :** Dr. Deepu Vijayasenan
- **Thesis :** Video Magnification for non-intrusive heart monitoring

**WORK EXPERIENCE**

**Samsung Research America**, Mountain View, CA **May 2021 - August 2021**
*Research Intern, Mobile Processor Innovation (MPI) Lab* *Mentor : Dr. Hamid Sheikh*
**Project Title : Synthetic data for computer vision applications**

- Designed deep learning based models trained on synthetic data for image enhancement applications. Model for synthetic data generation had low complexity and was easily scalable.

**Google**, Mountain View, CA **May 2019 - August 2019**
*Research Intern, Media Algorithms Team, YouTube* *Mentor : Dr. Mohammad Izadi*
**Project Title : Real time video denoising for YouTube videos**

- Designed real-time video denoising algorithms for user uploaded videos in YouTube. The proposed method had superior processing speed than the existing denoiser
- The method was employed for processing YouTube TV and LIVE videos

**RESEARCH EXPERIENCE**

**Label-free Image and Video Quality Assessment** **June 2020 - Present**
*Advisor: Prof Alan C Bovik, Electrical and Computer Engineering, UT Austin*

- Developing self-supervised models for quantifying image and video quality without using any subjective quality annotations.
- Exploiting inductive bias present in deep Convolutional Neural Networks for quantifying image and video quality.

**Frame Rate Dependent Video Quality Assessment** **Aug 2018 - May 2020**
*Advisor: Prof Alan C Bovik, Electrical and Computer Engineering, UT Austin*

- Designed an entropic difference based quality model to capture quality variations due to changes in video frame rate.
- A dataset of 480 videos consisting 6 different frame rates and 5 compression levels was constructed. A subjective study was conducted to obtain subjective quality scores. The proposed model achieved *state-of-the-art* performance on this database.

**Quality Assessment of Stitched Images** **Aug 2016 - June 2018**

*Advisor: Dr.Rajiv Soundararajan, Electrical Communication Engineering, IISc Bangalore*

- Constructed a panoramic image database by employing popular stitching algorithms and a human study was conducted to obtain subjective ratings.
- An objective model using natural image statistics was proposed and achieved high correlation with human scores.

## PREPRINTS/ UNDER REVIEW

- **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*, under review.
- **FAVER: Blind Quality Prediction of Variable Frame Rate Videos.**
  Q. Zheng, Z. Tu, **P. C. Madhusudana**, X. Zheng, A. C. Bovik, and Y. Fan. *arXiv:2201.01492*, Jan. 2022.
- **Image Quality Assessment using Contrastive Learning.**
  **P. C. Madhusudana**, N. Birkbeck, Y. Wang, B. Adsumilli and A. C. Bovik. *arXiv:2110.13266*, Oct. 2021.

## JOURNAL PUBLICATIONS

- **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, LaTeX

**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 $4^{th}$ 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 $1^{st}$ *position* in the Karnataka State Class X Secondary Examination (SSLC) in 2010.