Aakanksha

Image Processing and Computer Vision Lab
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RESEARCH INTEREST

Image Processing, Computer Vision, Deep Learning, Multi-modal Learning for Vision Tasks, Robustness in Deep Learning.

EDUCATION

Indian Institute of Technology Madras, Chennai, India — July 2018 - Present
MS+PhD in Image Processing and Computer Vision
Research Advisor: Prof. A.N.Rajagopalan
CGPA: 8.03
(*On Medical Leave : Aug 2019 - Dec 2019*)

Indian Institute of Information Technology Guwahati, India — July 2014 - May 2018
B.Tech in Electronics and Communication Engineering
CGPA: 9.39

WORK EXPERIENCE

Video-based characterization of the bounce of a spinning ball, Centre of Sports Excellence-IITM — **May 2021 – Present**
(Advisors: Dr. A.N. Rajagopalan, Dr. M. Panchagnula)
Working on an approach to develop a low-cost Decision Review System (DRS) using consumer-grade video cameras. In particular, involved in the design and development of the imaging setup, and the development of an algorithm for a video-based robust estimation of the 3D spin of a ball.

Blurred Image Segmentation, IPCV Lab, IITM — **July 2022 – November 2022**
(Advisor: Dr. A.N. Rajagopalan)
Developed a class-centric augmentation strategy using segmentation annotations to simultaneously model dynamic scene and camera motion blur which gives state-of-the-art performance for segmentation of blurred images.

Weak Supervision for Monaural-to-Binaural audio conversion, IPCV Lab, IITM
(Advisor: Dr. A.N. Rajagopalan) — **September 2020 – March 2021**
Collaboratively developed an approach to leverage the location of a sound source as weak supervision to impart spatial binaural quality to monaural audio using a significantly lesser number of real monaural-binaural pairs.

Robustness in Super-Resolution, IPCV Lab, IITM — **June 2020 - August 2020**
(Advisor: Dr. A.N. Rajagopalan)
Collaboratively developed an approach to obtain robust and faithful super-resolved images for multiple low-resolution images corresponding to the same high-resolution image by extracting latent features similar to the clean low-resolution image.

Frequency Reconfigurable Patch-antenna Design, IIIT Guwahati — **July 2017-April 2018**
(Advisor: Dr. Bidisha Dasgupta)
Designed a novel frequency reconfigurable patch antenna for C-band using PIN diode as RF switch resulting in a publication.

Firewall for prevention of DDoS attacks, Hubble Connected Pvt. Ltd. (Bangalore)
Undergraduate Intern — **December 2016 - January 2017**
Designed and tested a firewall for prevention of DDoS attacks on smart home monitoring cameras used in IoT setup.

Watermark Detection in Frequency Domain, IIT Patna — **June 2016 – July 2016**
(Advisor: Dr. Rajib K. Jha)
Improved the detection of randomly generated, invisible watermarks in the frequency domain using Suprathreshold Stochastic Resonance leading to a publication.

TEACHING EXPERIENCE

Served as teaching assistant for Deep Learning, Image Signal Processing, Modern Computer Vision courses under Prof. A.N. Rajagopalan and Prof. Kaushik Mitra.

	Also served as teaching assistant for Image Signal Processing course offered by Prof. A.N. Rajagopalan on NPTEL.
AWARDS	- Was awarded the *Chairman's Medal* for Outstanding Performance in the Department of Electronics and Communication Engineering in 2018. - Was selected as the 2021 Malathi Veeraraghavan (MV) scholar.
PUBLICATIONS	[1] Aakanksha, and A. N. Rajagopalan. "Improving Robustness of Semantic Segmentation to Motion-Blur using Class-Centric Augmentation." , Proceedings of IEEE/CVF Conference on Computer Vision and Pattern Recognition. 2023. [2] Rachavarapu, Kranthi Kumar, Aakanksha, Vignesh Sundaresha, and A. N. Rajagopalan. "Localize-to-Binauralize: Audio Spatialization from Visual Sound Source Localization." Proceedings of the IEEE/CVF International Conference on Computer Vision. 2021. [3] Saurabh Goswami, Aakanksha and A. N. Rajagopalan, "Robust Super-Resolution of Real Faces using Smooth Features," Workshop on Adversarial Robustness in the Real World, European Conference on Computer Vision Workshops (ECCV W) 2020. [4] Aakanksha, Dasgupta B. (2019) A Simple Reconfigurable Printed Antenna for C-Band Applications. In: Ray K., Sharan S., Rawat S., Jain S., Srivastava S., Bandyopadhyay A. (eds) Engineering Vibration, Communication and Information Processing. Lecture Notes in Electrical Engineering, vol 478. Springer, Singapore. https://doi.org/10.1007/978-981-13-1642-5_40 [5] S. Kumar, R. K. Jha and Aakanksha, "Characterization of Supra-threshold Stochastic Resonance for Uniform Distributed Signal with Laplacian and Gaussian Noise," *2017 International Conference on Noise and Fluctuations (ICNF)*, Vilnius, 2017, pp. 1-4, doi: 10.1109/ICNF.2017.7986027
SKILLS	Programming: Python, MATLAB, C/C++ Libraries: PyTorch, Tensorflow, OpenCV
RECENT COURSEWORK	Image Signal Processing, Computational Photography, Geometry & Photometry-Based Computer Vision, Introduction to Machine Learning, Fundamentals of Deep Learning, Linear Algebra, Probability Foundations
WORKSHOPS ATTENDED	- Attended the workshop - *Summer School on Computer Vision* organized by CVIT, IIIT Hyderabad (2019). - Attended the first '*Perspective Series*' interdisciplinary workshop titled '*The Mind Matters: Language, Cognition and Other Correlations*' at IIIT Guwahati (2017).
EXTRA-CURRICULAR	- Invited to deliver a talk to first-year students at IIIT Guwahati as part of their Induction Programme 2022. - Participated in the E-Yantra Robotics competition sponsored by MHRD. - Volunteered as a member for the organizing committee of the Cultural Fest at IIIT Guwahati. Participated and won prizes in Short Story Writing and Group Dance. - Helped organize the first 'Perspective Series' interdisciplinary workshop titled 'The Mind Matters: Language, Cognition and Other Correlations' in 2017.

REFERENCES

Prof. A.N. Rajagopalan
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Department of Electrical Engineering
Indian Institute of Technology Madras

Prof. Mahesh Panchagnula
Professor, Dean (A&CR)
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