Ashish Verma

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Research Interests

Research interests cover signal and image processing for computer vision applications with deep learning techniques. Specifically, his works include human eye movement data analysis and he is focused on designing learning frameworks to model human visual scanpaths for dynamic analysis of still images. He is also interested in exploring the use of human or artificially generated visual scanpaths in learning algorithms for natural image action classification and medical image analysis. He has 6+ years of experience in working on deep learning models for image processing, sequential modeling of eye movement data and medical image analysis.

Education

PhD Indian Institute of Technology, Kharagpur — **July 2016 - Present**
Department of Electronics and Electrical Communication Engineering
PhD in Signal and Image Processing
Thesis: Generation of Human Visual Scanpaths for Dynamic Analysis of Still Images

MTech National Institute of Technology Patna — **June 2016**
Department of Electronics and Communication Engineering — **CGPA: 8.57**
Master of Technology in Communication Systems
Thesis: Electrocardiogram Denoising using Wavelet and Empirical Mode Decomposition

BE Shri Shankaracharya Engineering College, CSVTU Bhilai — **June 2013**
Department of Electronics and Telecommunication Engineering — **CGPA: 8.58**
Bachelor of Engineering in Electronics and Telecommunication Engineering

Experience

Research Internship

- Worked as Interim Engineering Intern at Qualcomm India Private Limited. **May 4 – July 3, 2020**

Teaching Assistant (TA)

- TA for Digital Signal Processing and Applications (EC 60085), Basic Electronics Theory (EC 21101), Neural Networks and Applications (EC 60013), Vision and Visualization (EC 61302), Computer Vision (EC 60002) courses at *IIT Kharagpur*.
- TA for Basic Electronics Laboratory (EC 29001) and Networks Laboratory (EC 29005) at *IIT Kharagpur* and TA for Basic Electronics Circuits Laboratory at *NIT Patna*.

Talks and Tutorials

- Taught deep learning tutorials for "Short Term Course on Machine Vision for Robot Applications in Manufacturing, 2022" (MVRAM '22) organized by Centre of Excellence in Advanced Manufacturing Technology (COEAMT), *IIT Kharagpur*. **May 2022**
- Delivered a hands on session in the "Workshop on Deep Learning and Optimization", organized by *Techno Main Salt Lake, Kolkata* Sponsored by *NIT Patna*. **January 2021**

- Delivered a hands on session in the QIP short term course on "Fundamentals of Digital Image and Video Processing with 30D Applications", organized by Dept. of Mining Engineering, *IIT Kharagpur*. **May 2018**

Technical Skills & Research Areas

Programming Languages and Tools/Framework*:* C, Python, PyTorch, Matlab

Research Areas: Signal and Image Processing, Computer Vision, Machine Learning, Deep Learning, Eye Movement Analysis

Awards & Accomplishments

- Received Qualcomm Innovation Fellowship (QIF) 2019 India.
- Received MHRD Government of India Fellowship for pursuing masters and doctoral degrees.
- Received the scholarship under the "Central Sector Scheme of Scholarships for College and University Students" of MHRD Government of India.
- Qualified GATE Examination in consecutive four years 2013, 2014, 2015, 2016 and scored 565, 607, 548, and 599 respectively.

Publications

- **Verma, A.**, & Sen, D. (2023). Generative Augmentation Driven Prediction of Diverse Visual Scanpaths in Images. *IEEE Transactions on Artificial Intelligence*. (Accepted/In-Press)
- Bhuyan, S., **Verma, A.**, Sen, D., & Deb, S. (2023, October) "Estimated Depth Based Progressive Interactive Framework for RGB Salient Object Detection in Images." *2023 IEEE International Conference on Image Processing (ICIP)*. IEEE, 2023. (Accepted)
- Pillai, G. V., **Verma, A.**, & Sen, D. (2022, October). Transformer Based Self-Context Aware Prediction for Few-Shot Anomaly Detection in Videos. In 2022 *IEEE International Conference on Image Processing (ICIP)* (pp. 3485-3489). IEEE.
- **Verma, A.**, & Sen, D. (2019, September). Hmm-based convolutional lstm for visual scanpath prediction. In *2019 27th European Signal Processing Conference (EUSIPCO)* (pp. 1-5). IEEE.
- **Verma, A.**, & Pradhan, G. (2016, November). Electrocardiogram denoising using Wavelet decomposition and EMD domain filtering. In *2016 IEEE Region 10 Conference (TENCON)* (pp. 2185-2189). IEEE.
- Venkatrao, C., Pal, R., **Verma, A.,** & Sen, D. (2021, December). Image Re-Attentionizing using Particle Swarm Optimization. In *International Conference on Pattern Recognition and Machine Intelligence (PReMI)*. Springer, 2021.