Jitesh Joshi

✉ jitesh.joshi.20@ucl.ac.uk   in https://www.linkedin.com/in/jnj256

Professional Summary

Researcher specializing in computer vision and deep-learning, with focused expertise in attention mechanisms, representational learning and diffusion models. Designed robust approaches for extracting physiological signals from challenging multidimensional data, with research published in NeurIPS, BMVC, and leading journals. Proficient in designing edge computing solutions for resource-constrained environments. Effectively managed cross-disciplinary teams to develop AI-enabled edge devices suitable for regulated sectors, combining innovative system design with pragmatic deployment considerations.

Professional Experience

University College London | Research Associate (2024 – Present)
- Leading research on photorealistic image synthesis using diffusion models with multi-modal guidance mechanisms, focusing on novel pipelines that balance visual fidelity with computational efficiency.
- Fine-tuning large language models for accessibility applications, optimizing performance for diverse user needs and deployment constraints.
- Mentoring graduate students on dissertation projects, providing guidance on research methodologies, experiment design, and implementation of advanced deep learning techniques.

Tata Elxsi | Solution Architect (2016 – 2024)
- Led development of robust AI systems for healthcare applications, designing edge-computing solutions for dense object detection and point-of-care diagnostics that balanced accuracy with deployment constraints, resulting in three patents and successful clinical implementations.
- Managed cross-functional teams on high-impact projects exceeding $1M, ensuring alignment between research innovations, engineering requirements, and regulatory compliance.
- Established comprehensive validation frameworks for AI systems in regulated environments while mentoring a team of 10+ AI engineers on deep learning and computer vision implementations.

Azoi Inc | Sr. Scientist - R&D (2014 – 2016)
- Developed algorithms for real-time physiological sensing from multi-channel sensor data, optimizing signal processing pipelines for mobile device constraints.
- Implemented comprehensive validation frameworks for medical device certification, ensuring system performance across diverse operational conditions.

Education

Ph.D. Candidate | University College London, UK (2020–2025)
Thesis Focus: Novel Multidimensional Attention Mechanisms for Robust Domain Generalization.
- Developed multi-dimensional attention mechanisms for extracting subtle signals from noisy spatiotemporal data, with applications spanning computer vision and signal processing.
- Developed efficient multi-modal models that ensure high performance and domain generalization with reduced computational needs, allowing deployment on various computing platforms.
- Developed and validated new data augmentation methods to improve model robustness against distribution shifts and out-of-distribution scenarios.

Advisors: Prof. Youngjun Cho, Prof. Nadia Berthouze

Education (continued)

🔖 **M.Sc., Cognitive Systems & Interactive Media | Pompeu Fabra University, Spain (2010–2011)**
Dissertation: EEG-based Investigation of Brain Wave Entrainment by Binaural Beats & Music.
● Applied machine learning and signal processing to analyze multi-channel data, employing independent component analysis to extract patterns and evaluate temporal signal coherence.
● Designed experiments to study synchronization effects across stimuli conditions, using statistical analyses to evaluate system responses applicable to neural sensory processing.
Advisors: Dr. Sylvain Le Groux, Prof. Paul Verschure

🔖 **B.Tech., Electronics & Communication | Nirma University, India (2004–2008)**
Key Modules: Signal Processing, Digital System Design, Modern Processor Architecture

Selected Publications and Patents

1 **J. Joshi** and Y. Cho, "Efficient and Robust Multidimensional Attention in Remote Physiological Sensing through Target Signal Constrained Factorization," *In Review*, 2025.

2 **J. Joshi**, S. Agaian, and Y. Cho, "FactorizePhys: Matrix factorization for multidimensional attention in remote physiological sensing," in *The Thirty-eighth Annual Conference on Neural Information Processing Systems*, 2024.
🔗 URL: https://openreview.net/forum?id=qrfp4eeZ47.

3 **J. Joshi** and Y. Cho, "iBVP Dataset: RGB-Thermal rPPG dataset with high resolution signal quality labels," *Electronics*, vol. 13, no. 7, p. 1334, 2024, ISSN: 2079-9292. 🔗 URL: https://www.mdpi.com/2079-9292/13/7/1334.

4 **J. Joshi**, N. Bianchi-Berthouze, and Y. Cho, "Self-adversarial multi-scale contrastive learning for semantic segmentation of thermal facial images," in *33rd British Machine Vision Conference 2022, BMVC 2022, London, UK, November 21-24, 2022*, BMVA Press, 2022. 🔗 URL: https://bmvc2022.mpi-inf.mpg.de/0864.pdf.

5 T. Tran, H. Watson, **J. Joshi**, and R. Patel, "Compensation of intensity variances in images used for colony enumeration," 2021. 🔗 URL: https://patents.google.com/patent/WO2021229337A1.

6 T. Tran, H. Watson, **J. Joshi**, A. SK, and R. Tiwari, "Detecting a condition for a culture device using a machine learning model," 2021. 🔗 URL: https://patents.google.com/patent/WO2021234514A1.

Skills & Competencies

Specializations:	🔖 Deep learning architectures, attention mechanisms, representation learning, diffusion models, contrastive learning, domain generalization, computer vision, signal processing, physiological computing, wearable devices, system engineering, cross-functional leadership, research commercialization
Certifications:	🔖 Generative AI with Large Language Models (Coursera, 2025), Executive Data Science Specialization (Coursera, 2019), Deep Learning Specialization (Coursera, 2018)
Tools & Frameworks:	🔖 PyTorch, TensorFlow, Python, C++, CUDA optimization, edge computing

Awards and Achievements

2020 🔖 **Project Excellence Awards, Tata Elxsi**
● Led the design of an AI-based edge imaging device for automated bacterial colony counting.

2019 🔖 **Hackathon Winner, Tata Elxsi**
● AI-based medical image enhancement solution.

2018 🔖 Prestigious **Tata Innovista** Award
● Point-of-care diagnostic device for malaria and sickle cell disease.