Jitesh Joshi

✉ jitesh.joshi.20@ucl.ac.uk   in LinkedIn   ⊙ GitHub   🌐 Webpage   ▯ +44.7424049730

Professional Summary

Research Scientist specializing in deep learning architectures for multi-modal data analysis and representation learning. Expert in designing efficient attention mechanisms with strong domain generalization, focusing on extracting signals from complex spatio-temporal data. Published in NeurIPS, BMVC, with work spanning machine learning theory and real-world applications. Experienced in merging research with deployment, leading edge-optimized AI and resource-efficient models for constrained environments. Proven success in managing cross-functional teams in high-impact projects, balancing innovation with practical implementation and compliance.

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 (𝒮), Prof. Nadia Berthouze (𝒮)

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 (𝒮), Prof. Paul Verschure (𝒮)

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

Work Experience [Employment History]

Research Associate | University College London (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.

Solution Architect -AI | Tata Elxsi (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.

Work Experience [Employment History] (continued)

- 🔖 **Sr. Scientist - R&D** | Azoi Inc (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.

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.

Certifications

2025	🔖	**Generative AI with Large Language Models** (Coursera).
2019	🔖	**Executive Data Science Specialization** (Coursera).
2018	🔖	**Deep Learning Specialization** (Coursera).

Technical Skills

Machine Learning:	🔖 Deep learning architectures, attention mechanisms, transformers, diffusion models, contrastive learning, domain generalization, cross-modal representation learning, computer vision, signal processing
Tools & Frameworks:	🔖 PyTorch, TensorFlow, Python, C++, CUDA optimization, edge computing
Professional:	🔖 System engineering, cross-functional leadership, research-to-product translation

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 🔗 URL.