JITESH JOSHI

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PROFESSIONAL SUMMARY

AI researcher with expertise in computer vision, deep learning, multidimensional attention mechanisms and domain generalization techniques, published in top-tier venues including NeurIPS and BMVC. Combined theoretical research with industry leadership experience, managing cross-functional teams to deliver AI-enabled healthcare solutions in regulated environments. Contributed to several open-source projects, including a widely-adopted toolkits for remote photoplethysmography (rPPG), physiological computing, as well as diffusion-model based image-inpainting applications. Track record of translating cutting-edge algorithms into patented technologies and clinically-deployed devices while mentoring technical teams.

PROFESSIONAL EXPERIENCE

Research Associate | *University College London, UK* | **2024 – Present**

- Led research on camera-based contactless sensing of physiological signals, and robust signal quality assessment for wearable biosensors
- Conducted research on photorealistic image synthesis using diffusion models with multi-modal guidance mechanisms, optimizing visual fidelity and computational efficiency
- Served as post-graduate teaching assitance for 4 course modules, mentored graduate students on dissertation projects, provided guidance on research methodologies, experiment design, and implementation of advanced deep learning techniques

Solution Architect | *Tata Elxsi, India and UK* | **2016 – 2024**

- Led development of robust AI systems for healthcare applications, resulting in three patents and successful clinical implementations
- Designed edge-computing solutions for dense object detection and point-of-care diagnostics balancing accuracy with deployment constraints
- 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
- Mentored team of 10+ AI engineers on deep learning and computer vision implementations

Sr. Scientist - R&D | *Azoi Inc, India* | **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

Senior R&D Engineer | *National Brain Research Centre, India* | **2011 – 2014**

- Conducted functional MRI (fMRI) based research investigating potential functional alterations in visuospatial perception as biomarkers for Alzheimer's disease
- Developed frameworks for synchronized acquisition of fMRI data and presentation of audiovisual stimuli

EDUCATION

Ph.D. in Computer Science | *University College London, UK* | **2020 – 2025**

- Thesis Title: Enhancing Out-of-distribution Generalization for Camera-based Remote Physiological Sensing
- Core Contributions: Developed novel attention mechanisms achieving $2\times$ better cross-dataset generalization for physiological signal extraction from facial videos, while requiring only 1/100th of the state-of-the-art model parameters and achieving lowest inference latency. Further contributed algorithms for robust thermal facial segmentation, real-time signal quality assessment and published a widely-adopted rPPG dataset.

- Core Methods: Multidimensional attention through constrained matrix factorization, multi-task learning, multimodal data, contrastive learning, generative adversarial networks
- Publications: 2 of 5 papers in top tier conferences (NeurIPS, BMVC), 1 paper under review in IJCV
- Key Skills: Computer vision, deep learning architectures, attention mechanisms, semantic segmentation, physiological computing, signal processing
- Advisors: Prof. Youngjun Cho, Prof. Nadia Berthouze

M.Sc., Cognitive Systems & Interactive Media | *Universitat Pompeu Fabra, 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, using independent component analysis

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," 2025. arXiv: 2505.07013 [cs.CV]; Currently under review at IJCV.

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.

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.

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.

5. T. Tran, H. Watson, J. Joshi, and R. Patel, "Compensation of intensity variances in images used for colony enumeration," 2021. *Patent.*

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. *Patent.*

SKILLS & COMPETENCIES

Technical Skills:	Deep learning architectures, attention mechanisms, representation learning, diffusion models, contrastive learning, domain generalization, computer vision, signal processing, physiological computing, wearable devices, system engineering
Technical Stack:	PyTorch, TensorFlow, Python, C++, model optimization, edge computing, TensorRT, ONNX
Certifications:	Generative AI with Large Language Models (Coursera, 2025)
	Executive Data Science Specialization (Coursera, 2019)
	Deep Learning Specialization (Coursera, 2018)

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	