

JITESH JOSHI

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PROFESSIONAL SUMMARY

An AI researcher specializing in computer vision, deep learning, advanced attention mechanisms, and methods for domain generalization, with publications in top-tier forums such as 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 widely adopted remote photoplethysmography (rPPG) toolbox, physiological computing, and 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

Post-graduate Teaching & Research Associate | *University College London, UK* | **2020 – Present**

- Served as post-graduate teaching assistant for 4 course modules, mentored graduate students on dissertation projects, provided guidance on research methodologies, experiment design, implementation of deep learning as well as signal processing techniques
- Conducted research on photorealistic image-inpainting using diffusion models with controlnet-based multi-modal guidance, optimizing visual fidelity and computational efficiency

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
- Optimized Faster R-CNN architecture for NVIDIA Jetson TX2 and Nano deployment, achieving optimal balance between accuracy and computational efficiency for edge computing applications
- Managed cross-functional teams on high-impact projects exceeding \$1M, ensuring seamless alignment between R&D, optical imaging, software engineering, hardware, and verification and validation teams
- Mentored team of 10+ AI engineers on implementing advanced deep learning architectures and computer vision solutions, accelerating technical skill development and improving project delivery outcomes

Sr. Scientist - R&D | *Azoi Inc, India* | **2014 – 2016**

- Architected real-time algorithms for multi-channel physiological sensing (ECG, PPG, respiratory, cuff-less blood pressure), optimizing signal processing and machine learning-based health-tracking within mobile device constraints while leading cross-functional R&D as well as clinical validation team
- Developed frameworks for FDA/CE medical device certification, authored technical documentation for regulatory approval, and ensured system performance across diverse operational conditions through rigorous testing protocols

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

- Conducted functional MRI (fMRI) research, applying multivariate pattern analysis and machine learning techniques to identify statistically significant visuospatial perception biomarkers for early-stage Alzheimer's disease detection
- 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
- Contributions: Developed novel matrix factorization-based multidimensional attention mechanism which achieved $2\times$ better cross-dataset generalization for physiological signal extraction, while reducing model parameters by 99% and setting a benchmark for inference latency. In addition, contributed frameworks for robust thermal facial segmentation, real-time signal quality assessment for wearable biosensors, and published an rPPG dataset that is now widely used by researchers in remote physiological sensing.

- Methods: Multidimensional attention through constrained matrix factorization, multi-task learning, multi-modal 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
- An examination of phase coherence was conducted on multi-channel EEG data that had been pre-processed using independent component analysis to investigate the effect of auditory stimulus on functional brain connectivity, among healthy individuals and comatose patients.

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; *in review-IJCV*. | [Paper](#) | [Code](#)
2. **J. Joshi**, S. Agaian, and Y. Cho, “FactorizePhys: Matrix factorization for multidimensional attention in remote physiological sensing,” in *NeurIPS, 2024*. | [Paper](#) | [Code](#)
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**. | [Paper](#) | [Dataset access](#)
4. **J. Joshi**, K. Wang, and Y. Cho, “Physiokit: An Open-source, Low-cost Physiological Computing Toolkit for Single-and Multi-user Studies”, *Sensors*, 23(19), 2023 | [Paper](#) | [Code](#)
5. **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, BMVC 2022*, London, UK, November 21-24, 2022. | [Paper](#) | [Code](#)
6. T. Tran, H. Watson, **J. Joshi**, “Imaging device with illumination components,” 2021. | [Patent](#) | [Product](#)
7. 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](#) | [Product](#)

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