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 the development of robust AI systems and optical imaging technologies for healthcare applications, successfully translating research innovations into clinically deployed solutions.
- 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× 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