

# JITESH JOSHI

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## PROFESSIONAL SUMMARY

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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

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**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 assistant 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

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**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 the extraction of physiological signals from facial videos, while requiring only 1/100th of the state-of-the-art model parameters and achieving the 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**

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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**

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

## **AWARDS AND ACHIEVEMENTS**

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<b>2020</b>	<b>Project Excellence Awards, Tata Elxsi</b> Led the design of an AI-based edge imaging device for automated bacterial colony counting
<b>2019</b>	<b>Hackathon Winner, Tata Elxsi</b> AI-based medical image enhancement solution
<b>2018</b>	<b>Prestigious Tata Innovista Award</b> Point-of-care diagnostic device for malaria and sickle cell disease