Sanket Kachole, Ph.D.

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Google Scholar Github Repository

My research has extensively explored neuromorphic vision, video analysis in robotic systems, and, most recently, multimodal AI for oral cancer diagnosis. During my Ph.D., I gained valuable experience in data collection, annotation, model training, evaluation, and presenting research at international conferences. I have published papers in top journals, leveraging advanced methodologies like Generative Neural Networks, Transformers, Multi-modal Networks, Graph Neural Networks, and Spiking Neural Networks. Currently, at UCL, I am leading research on early detection of oral cancer by integrating genetic data with medical imaging using AI. My career spans from being a Research Assistant at Kingston University to a Data Scientist at Santander Group, where I applied machine learning, computer vision, and NLP to drive innovation. Recognitions such as the Best Paper award at CVPR and substantial research funding underscore my expertise and contributions to the field.

Education

2021 – 2024 **Ph.D., Kingston University, United Kingdom** in Artificial Intelligence.
Thesis title: *Advancing Autonomous Perception in Robotics through Neuromorphic Vision Systems.*

2017 – 2019 **M.Sc., Kingston University, United Kingdom** in Advanced Engineering.
Dissertation title: *A computer vision Approach to Monitoring the Activity and Well-being of Honeybees*.

2012 – 2016 **B.E. Pune University, India** in Mechanical Engineering.
Dissertation title: *Optimizing 3-D Welding Processes with Special Purpose Machines*.

Employment History

Apr 25 – Current **Postdoctoral Research Fellow,** Indiana University, Indianapolis. Web Page
Conducting research in the Computational Pathology group, focusing on breast cancer. My work involves reconstructing 3D histopathology volumes from serial sections and developing multimodal generative models that integrate histology images with transcriptomic data for cancer progression analysis.

Apr 24 – Apr 25 **Postdoctoral Research Fellow,** University College London. Project Page
Leading research on oral cancer diagnosis using multimodal Artificial Intelligence, integrating genetic data with imaging techniques to improve early detection. My work involves developing innovative diagnostic tools that combine advanced AI models with genetics and medical imaging to enhance accuracy in cancer screening.

Aug 23 – Mar 24 **Research Associate,** Kingston University. Project Webpage
In Innovate UK's Pressure to Posture Technology Project and collaboration with TGO company, I played a key role in motion capture data collection, processing, algorithm creation, and model training. The built model predicted the human body poses from a pressure map using Generative deep learning.

Employment History (continued)

Sep 23 – Mar 24 — **Data Scientist.** Santander UK.
Developed Machine Learning models for identifying financial crime risks and set up vital data pipelines. My role encompassed writing and testing production-grade code, engaging in algorithm design, and innovating methodologies. I integrated new data, refined models, and adjusted parameters for optimal performance.

July 21 – Aug 23 — **Data Scientist.** homeprotect Home Insurance, London.
Computer Vision : Leveraged Vision-Transformer for image segmentation to identify damaged walls in properties, streamlining home insurance claims and eliminating the need for on-site surveyors, resulting in significant time and cost savings.
NLP : Implemented BERT's transformer architecture to automatically classify insurance claims into "building" or "content" categories with 93% accuracy. Enhanced the accuracy and efficiency of the process, eliminating the need for manual claim handling and categorization.

Research Publications

Journal Articles

1. X. Huang, S. Kachole, A. Ayyad, F. B. Naeini, D. Makris, and Y. Zweiri, "A neuromorphic dataset for tabletop object segmentation in indoor cluttered environment," *Nature Scientific Data*, vol. 11, no. 1, p. 127, 2024.
2. S. Kachole, X. Huang, F. B. Naeini, R. Muthusamy, D. Makris, and Y. Zweiri, "Bimodal segnet: Fused instance segmentation using events and rgb frames," *Pattern Recognition*, vol. 149, p. 110 215, 2024, ISSN: 0031-3203. DOI: https://doi.org/10.1016/j.patcog.2023.110215.
3. S. Kachole, H. Sajwani, F. B. Naeini, D. Makris, and Y. Zweiri, "Asynchronous bioplausible neuron for spiking neural networks for event-based vision," 2023. arXiv: 2311.11853 [cs.NE].
4. F. B. Naeini, S. Kachole, R. Muthusamy, D. Makris, and Y. Zweiri, "Event augmentation for contact force measurements," *IEEE Access*, vol. 10, pp. 123 651–123 660, 2022.

Conference Proceedings

1. S. Kachole, Y. Alkendi, F. Baghaei Naeini, D. Makris, and Y. Zweiri, "Asynchronous events-based panoptic segmentation using graph mixer neural network," in *2023 IEEE/CVF Conference on Computer Vision and Pattern Recognition Workshops (CVPRW)*, 2023, pp. 4083–4092. DOI: 10.1109/CVPRW59228.2023.00429.

Books and Chapters

1. S. Kachole, G. Hunter, and O. Duran, "A computer vision approach to monitoring the activity and well-being of honeybees," in *Intelligent Environments 2020*, IOS Press, 2020, pp. 152–161.

Skills

Coding	Python, MATLAB, R, SQL.
Frameworks	OpenCV, TensorFlow, PyTorch, Keras, scikit-learn, Pandas, NumPy, Matplotlib.
Tools	Git, LaTeX, Jupyter Notebook, Docker, Linux, Google Colab, Tableau.

Skills (continued)

AI Techniques
- Image Segmentation, Object Detection, Facial Recognition, Optical Character Recognition, NLP-Text Classification.

Misc.
- Academic research, teaching, training, consultation, typesetting and publishing.

Achievement

Awards

2023
- **Best Paper Award**, CVPR Event based Vision Workshop, Vancouver, Canada.
- **Best Oral Presentation Award**, ECE Conference, Kingston University.

Fundings Received

- **Distinguished Research Achievement and Funding Award**. Awarded by Kingston University.
- **Faculty Research Student Conference and Training Fund**. Awarded by Kingston University.

References

Available on Request