Jimut Bahan Pal

Research Fellow

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Research Interests

My research focuses on developing deep learning methodologies for medical image segmentation, emphasizing statistically grounded and interpretable supervised algorithms. I work on model robustness under constraints such as limited data availability, incorporation of mathematical priors, low computational budgets, and outlier presence across diverse imaging modalities. Currently, I explore the integration of visual data and Natural Language Processing of clinical reports to develop unified diagnostic systems that enhance accuracy and provide deeper clinical insights.

Education

Ph.D. in Machine Intelligence and Data Science *2022 – Present*

Indian Institute of Technology Bombay

M.Sc. in Computer Science *2019 – 2021*

Ramakrishna Mission Vivekananda Educational and Research Institute

Thesis: Instance Segmentation of Peripheral Blood Smear and Refining Classification via Domain Adaptation

B.Sc. (Hons.) Computer Science *2016 – 2019*

St. Xavier's College, Kolkata

Dissertation: Wisp: A Preference Based Location Finder Application

Publications

Refereed Journal Publications

- [**Core-B, Q1, IF: 8.5**] Pal, J. B., Bhattacharyea, A., Banerjee, D., & Maharaj, B. T. (2024). Advancing instance segmentation and WBC classification in peripheral blood smear through domain adaptation: A study on PBC and the novel RV-PBS datasets. *Expert Systems with Applications*, 123660.
- [**Q2, IF: 1.175**] Pal, J. B., & Mj, D. (2023). Improving multi-scale attention networks: Bayesian optimization for segmenting medical images. *The Imaging Science Journal*, 71(1), 33-49.

Refereed Conference Publications

- [**Core-A, WACV 2025**] Pal, J. B., Welling, S., Saini, H., & Awate, S. (2025). Reviving Poor Object Segmentations in OOD Medical Images using Variational Deep-PCA Modeling on Segmentation Maps with Sampling-Free Learning. *IEEE/CVF Winter Conference on Applications of Computer Vision*, 9364-9373.
- [**Core-A, MICCAI 2024**] Pal, J. B., & Awate, S. (2024). Convex Segments for Convex Objects Using DNN Boundary Tracing and Graduated Optimization. *International Conference on Medical Image Computing and Computer-Assisted Intervention*, 91-101.
- [**Core-B, ICIP 2024**] Pal, J. B., & Awate, S. (2024). A hard convex-shape constraint in DNNs for object segmentation. *IEEE International Conference on Image Processing*, 2074-2080.
- [**IEEE 2022**] Pal, J. B., & Paul, N. (2022). Classifying Chest X-Ray COVID-19 images via Transfer Learning. *Ethics and Explainability for Responsible Data Science*, 1-8.

Workshop Papers

- [**MICCAI Workshop 2022**] Pal, J. B. (2022). Holistic Network for Quantifying Uncertainties in Medical Images. In: Crimi, A., Bakas, S. (eds) *Brainlesion: Glioma, Multiple Sclerosis, Stroke and Traumatic Brain Injuries. BrainLes 2021. Lecture Notes in Computer Science*, vol 12963. Springer.

Selected Preprints

- **[2024]** Bran, H., ... Pal, J. B., ... Menze, B. (2024). QUBIQ: Uncertainty Quantification for Biomedical Image Segmentation Challenge. *CoRR*, abs/2405.18435.
- **[2022]** Eisenmann, M., Reinke, A., ... Pal, J. B., ... Maier-Hein, L. (2022). Biomedical image analysis competitions: The state of current participation practice. *arXiv:2212.08568*.

Awards & Honors

Prime Minister's Research Fellowship (PMRF) *October 2023*
Awarded as a Lateral Fellow of Cycle 11

C-MInDS Fellowship *June 2022*
For securing highest scores in CMInDS, IIT Bombay

MICCAI-2024 RISE Registration Grant *2024*

1st Runner Up - Generative AI Art Competition *ICIP 2024*

Google Cloud Arcade Champion *2025*

Teaching Experience

Instructor: CS/BDA 411 *2024 – 2025*
Applications of Computer Vision and Deep Learning (3 credits), RKMVERI
Course Website 2025 | Course Website 2024

Teaching Assistant: DS 203 *2023*
Programming for Data Science (6 credits), IIT Bombay

Computer Application Teacher *March – April 2020*
RKMVERI, Belur, Howrah
Taught PGDY (2020-21) class of 12 students about computer applications

Professional Activities

Guest Lecture *2025*
Convolutional Neural Networks for CS772 DL-NLP, IIT Bombay
Slides | Recording

Conference Reviewer *2025*
International Conference on Acoustics, Speech, and Signal Processing (ICASSP) 2025

Journal Reviewer
Multimedia Tools and Applications

Committee Member *2024 – Present*
Internal Quality Assurance Cell (IQAC), RKMVERI

Interview Panel Member *April 2024*
MSR admissions at C-MInDS, IIT Bombay, with Prof. Pushpak Bhattacharyya

Selected Experience

Key-note Speaker (Google Sponsored) *September 2018*
Machine Learning Crash Course, St. Xavier's College, Kolkata

Created coursework and delivered lectures for ML seminars

Project Intern *January – March 2019*

Data Sutram, Kolkata
Analyzed, visualized and gained valuable insights from data

Developer *November 2017 – January 2018*

Xavotsav 2018 Website
Designed website for cultural fest of St. Xavier's College, Kolkata

Selected Open Source Software

Jimutmap *February 2019*

Tool to download satellite images and road maps with ease
Over 20K total downloads from python3-pip package

Jimner *January 2019*

Create ASCII Art writing for terminal
Generated banner of 314 samples of styles using Python-3

Management Information System *November 2018*

CRUD system built using Python3 and Tkinter from scratch

Online Specializations

Deep Learning Specialization *December 2019*

DeepLearning.AI, Coursera

TensorFlow in Practice Specialization *March 2019*

DeepLearning.AI, Coursera

Applied Data Science Specialization *September 2018*

IBM, Coursera

Python for Everybody Specialization *January 2018*

University of Michigan, Coursera

Technical Skills

Programming Languages: Python, LaTeX

Deep Learning: PyTorch, Keras, Computer Vision, Medical Image Analysis

Tools: Linux, Git

Web Development: HTML, Jekyll, CSS, JavaScript

Miscellaneous

- Maintain active technical blog documenting research insights and tutorials
- Developed several interactive games playable online
- Selected in second phase of Service Selection Board (SSB), Indian Army (January 2016)
- Active participant in NSS social work, organizing educational tours for underprivileged communities

References available upon request