Soumya Snigdha Kundu

+44-7436-215-187 | Linkedin | G-Scholar | Github | Website | PyTorch-Forums | alphaxiv | E-mail | London, United Kingdom

Education

King's College London — `Ph.D. Biomedical Engineering and Imaging Science Research` Oct. 2023 – Oct. 2027 (Expected)
`Advisors:` Prof. Tom Vercauteren (Computational) and Dr. Jonathan Shapey (Clinical)
`Thesis:` Artificial Intelligence-driven Management of Brain Tumours

Queen Mary University of London — `M.Sc. Machine Learning for Visual Data Analytics (Distinction)` Sep. 2022 – Sep. 2023
`Advisors:` Prof. Greg Slabaugh (Computational) and Mr. Vineet Batta (Clinical)
`Thesis:` Unveiling the Localization Advantage in Automated Orthopaedic Identification

SRM Institute of Science and Technology — `B.Tech. Computer Science and Engineering (Distinction)` Jul. 2018 – May. 2022

Selected Publications

- **S. S. Kundu** et al., "Spinal Osteophyte Detection Via Robust Patch Extraction on Minimally Annotated X-Rays", in IEEE International Symposium on Biomedical Imaging (***ISBI***), 2024.
- R. Naidu and **S. S. Kundu**, "Improved variants of Score-CAM via Smoothing and Integrating", in Responsible Computer Vision Workshop @ Conference on Computer Vision and Pattern Recognition (***CVPR Workshop***), 2021.
- **S. S. Kundu**, "A Distributed Deep Learning Framework for Federated Big Medical Image Analysis", in IEEE International Conference on Big Data (**Big Data**), 2021.

Reviewing: MICCAI, ICML, NeurIPS, ICLR, AISTAS and IEEE-ISBI.

Research Experience

University of Oxford — Research Intern Prof. Bartek Papiez | Fall 2023
- Developed the 1^{st} spinal new bone formation (osteophytes) identification pipeline achieving a 200% increase from baseline precision scores through a custom multi-view post-processing strategy *SegPatch*. [ISBI'24]
- Investigated weighed ensembling for knee radiographic performance evaluation to handle extreme class imbalance. [MICAD'24]

TRIUMF-Canada's particle accelerator centre — Research Intern Prof. Akira Konaka & Dr. Patrick De Perio | Summer 2021
- Collaborated with engineers and physicists at the *Water Cherenkov Machine Learning Group* to design a robust scaling function to facilitate a 70% loss decrease for the reconstruction of energy, position and angles of electrons in a *regression* neural network.

National Institute of Technology, Durgapur — Research Intern Prof. Debashis Nandi | Winter 2021
- Engineered a compound classification + segmentation pipeline for segmenting multiple sclerosis lesions that outperforms stand-alone segmentation networks by 10-12% dice score. [Computer methods and programs in biomedicine 2022]

Industry Experience

TCS Research & IIIT-Hyderabad — Research Scientist Mrs. Ramya Hebbalaguppe & Prof. Ranjitha Prasad | Fall 2024
- Responsible for instituting complete explainablity throughout the NORD-F pipeline by generating class activation maps, and reporting Out-of-domain specific fairness and calibration metrics.
- Devised multiple large-scale ablations to surmount the efficiency of NORD-F and improved the the performance by 5% through the integration of a ConvNeXt based backbone.

Stealth Startup — Founding Engineer Oct. 2020 – Sept. 2022
- Raised ∼ £50000 for the 1^{st} end-to-end automated system to identify 10 separate orthopaedic implants in plain radiographs, while reducing data requirements by >90% and achieving 98% F1-Score. [ISBI'23, MIUA'23]
- Spearheaded a multi-institutional collaboration involving renowned Orthopaedic Surgeons, gathering valuable insights and perspectives to publish an in-depth systematic review of 50+ papers on automated orthopaedic implant identification. [SICOT'21, IOACON'22, EFORT'22]
- Maintained the internal *HPC* and *MLOps* infrastructure along with reviewing monthly software updates of junior members, identifying potential improvements and increasing code performance metrics by an average of 15%.

Open-Source Software & Hackathons/Competitions

UltraFlwr: Federated Object Detection Jun 2024 - March 2025
- Developed a library which combines Flower and Ultralytics libraries to perform and benchmark Federated Object Detection.
- Proposed a novel partial aggregation strategy YOLO-PA, specifically to perform partial aggregation in YOLO models. [MICCAI'25]

Insta-Match Jan 2024 - Oct 2024
- The 1^{st} GPU optimised library to compute *segment matching* based performance metrics for segmentation. [SPIE Medical Imaging'25]

GPU Optimised Random Walker and Random Walker with Restart Algorithm Jan 2024 - March 2023
- Re-purposed the commonly used random walker repository for speed ups with PyTorch and CUDA.

Promptly-Cited: Citation based Inference via Pseudo-Retrieval-Augmented Generation Dec 2023
- Developed test-time citation based LLM inference in small context scenarios. [NeurIPS Workshop 25]

Anthropic London Hackathon Dec 2023
- Built a Python debugging agent based a novel prompting scheme which earned the recognition of Top 8 finalist in the Hackathon.

Programming and Software Development

Python, C++, HTML, CSS, Javascript | PyTorch, JAX, NumPy, OpenCV, Docker, Git, Slurm, Bash, LaTeX.

Fellowships, Grants and Awards.

MRC DTP Postgraduate *Studentship* — King's College London || < 2% Selection rate. || ∼ £205000 || 2023 Cohort
BDI Summer *Internship* Programme — University of Oxford || 1 of 4 selected applicants || 2023 Cohort
Summer Research *Internship* Program — IIT - Gandhinagar || < 0.008% Selection rate. || 2023 Cohort
UKRI Fast Start: Innovation *Grant* — Co-Applicant || ∼ £50000 || 2022 Cohort
MITACS Globalink Research *Internship* — TRIUMF (UVic) || < 3% Selection rate || 2021 Cohort
SPIE Medical Imaging'25 — Travel Grant Award || $1000
IEEE ISBI'24 — Best Student Poster Award Finalist. (Top 8 out 717 Acceptances)
IEEE ICETCI'21 *Competition* — 3^{rd} Place (Electronic Substation Detection)

Graduate Teaching

Journal Club – Biomedical Enggineering | Winter 24 & Spring 25 (Short Course) Prof. Monica Agromayor
Statistics – Biomedical Enggineering | Spring 25 (Short Course) Prof. James Housden