Soumya Snigdha Kundu

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

Education

King's College London — London, United Kingdom
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 — London, United Kingdom
M.Sc., Machine Learning for Visual Data Analytics; Grade: Distinction — *Sep. 2022 – Sep. 2023*
Advisors: Prof. Greg Slabaugh (Computational) and Dr. Vineet Batta (Clinical)
Thesis: Unveiling the Localization Advantage in Automated Orthopaedic Implant Identification

SRM Institute of Science and Technology — Chennai, India
B.Tech., Computer Science and Engineering; Grade: Distinction — *Jul. 2018 – May. 2022*

Selected Publications

1. *Kundu, S.S.* and Mo Y. et al., 'Spinal Osteophyte Detection via Robust Patch Extraction on Minimally Annotated X-rays', 2024 IEEE 21st International Symposium on Biomedical Imaging (**ISBI**), Athens, Greece, 2024, pp. 1-5.
2. *Kundu, S.S.*, "A Distributed Deep Learning Framework for Federated Big Medical Image Analysis," 2021 IEEE International Conference on Big Data (**Big Data**), Orlando, FL, USA, 2021, pp. 5938-5940.
3. Kumar, A., Ghosal, P., *Kundu, S.S.* et al., 2022. A lightweight asymmetric U-Net framework for acute ischemic stroke lesion segmentation in CT and CTP images. **Computer Methods and Programs in Biomedicine**, 226, p.107157.
4. Wang, H., Naidu, R., Michael, J. and *Kundu, S.S.*, 2020. SS-CAM: Smoothed Score-CAM for sharper visual feature localization. arXiv preprint arXiv:2006.14255. (Poster at RCV@**CVPR**'21 Workshop)

Reviewing: NeurIPS 2024, MICCAI-FAIMI, CaPTion@MICCAI, ICML-ML4LMS, IEEE-ISBI 2024.

Research Experience

University of Oxford — Prof. Bartek Papiez
Research Intern – Deep Learning; Li Ka Shing Centre for Health Information and Discovery — *Jul. 2023 – Sep. 2023*

- Developed the 1^{st} spinal new bone formation (osteophytes) identification pipeline achieving 84% precision.
- Implemented a multi-view post-processing strategy *SegPatch* to efficiently extract regions of interests from vertebrae segmentation masks.
- Helped in the development of an automated severity classifier for Knee osteoarthritis, rivaling state of the art methods by achieving 71% Accuracy.

Luton and Dunstable University Hospital — Dr. Vineet Batta
Research Assistant – Software Engineering & Medical Image Computing; Department of Orthopaedics — *Oct. 2020 – Sept. 2022*

- Raised $\sim$ £50000 to develop an end-to-end automated system to identify 10 separate make and models of orthopaedic implants via deep learning, while reducing data requirements by >90% and achieving 98% F1-Score.
- 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 and develop the 1^{st} automated orthopaedic implant annotator.
- Reviewed and analyzed monthly updates of 12 students' software submissions, identifying potential improvements and increasing code performance metrics by an average of 15%.

National Institute of Technology - Durgapur — Prof. Debashis Nandi
Research Intern – Deep Learning; Machine Intelligence and Medical Imaging Research Group — *Jun. 2020 – May. 2021*

- Published a lightweight asymmetric U-Net architecture to segment stroke lesions in the brain; optimising inference times and achieving the 2^{nd} highest test dice score on the ISLES Challenge 2018 - Ischemic Stroke Lesion Segmentation.
- Designed a joint segmentation and classification pipeline encompassing 3 separate challenge brain MRI datasets for severity classification of Alzheimer's while achieving a marginal 5% deviation on a held-out test set.
- Engineered a compound segmentation model for multiple sclerosis lesions that outperforms stand-alone backbone networks by 10-12% dice score.

Selected Project

Large Language Model Based Automated Debugging Enhancement Tool.

- Proposed a novel Error Analysis Prompting method integrating Error Analysis and Code-Context-Aware Prompting, achieving equivalent performance to Chain of Thought Prompting in 1 iteration.
- Finalist at the Anthropic London Hackathon. Top 8 out of 50 teams.

Programming and Software Development

Python, C++, Torch, OpenCV, JAX, NiBabel | 3D-Slicer, ITK-SNAP, LangChain, Docker, Git, Slurm and LaTeX.

Fellowships, Grants and Awards.

MRC DTP Postgraduate *Studentship* — King's College London || < 2% Selection rate. || $\sim$ £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
MITACS Globalink Research *Internship* — TRIUMF (UVic) || < 3% Selection rate || 2021 Cohort
UKRI Fast Start: Innovation *Grant* — Co-Applicant || $\sim$ £50000 || 2022 Cohort
IEEE ISBI'24 — Best Student Poster Award Finalist. (Top 8 out 717 Acceptances)
IEEE ICETCI'21 *Competition* — 3^{rd} Place (Electronic Substation Detection)