

Passionate Research Scientist with a PhD (awaiting degree) and extensive research experience in neuroimaging, specializing in segmentation and classification of brain tumors, hippocampus segmentation, Alzheimer's disease classification, and genetic mutation detection in brain tumors. Published author in prestigious conferences like ICPR, ICIP, and EMBC, and recognized journals. Strong expertise in Python, PyTorch, TensorFlow, MONAI, and SimpleITK, complemented by over 3 years of software development experience. Adept at solving complex real-world problems through innovative deep learning techniques and collaborative research.

Skills

- Languages: Python, Java, C++, SQL
- Technologies: PyTorch, Tensorflow, Scikit-Learn, OpenCV, Medical Open Network for AI (MONAI), SimpleITK, Git
- Theoretical: Compute Vision, Deep Learning, Machine Learning, Data Science, Data Structures and Algorithms.

Publications

1. **A. De**, A. S. Chowdhury: "Shape induced Multi-Class Deep Graph Cut for Hippocampus Subfield Segmentation", 27th International Conference on Pattern Recognition (*ICPR*), Kolkata, India, (**2024**) (accepted)
2. **A. De**, N. Das, PK. Saha, A Comellas, E Hoffman, S Basu, T Chakraborti. MSO-GP: 3-D segmentation of large and complex conjoined tree structures. *Methods*. **2024** June 3;229:9-16. doi: 10.1016/j.ymeth.2024.05.016. Epub ahead of print. PMID: 38838947.
3. **A. De**, P. Ebenezer, "Sleep Apnea sub-type detection from Polysomnography signals," 2024 IEEE International Conference on Interdisciplinary Approaches in Technology and Management for Social Innovation (*IATMSI*), Gwalior, India, **2024**, pp. 1-6
4. **A. De**, M. Tiwari, & A. S. Chowdhury. 3D Hippocampus Segmentation Using a Hog Based Loss Function with Majority Pooling. In 2023 IEEE International Conference on Image Processing (*ICIP*), Kuala Lumpur, Malaysia **2023**, October, pp. 2260-2264.
5. **A. De**, R. Mhatre, M. Tiwari and A. S. Chowdhury, "Brain Tumor Classification from Radiology and Histopathology using Deep Features and Graph Convolutional Network," 2022 26th International Conference on Pattern Recognition (*ICPR*), Montreal, QC, Canada, **2022**, pp. 4420-4426
6. **A. De**, M. Tiwari, E. Grisan, A.S. Chowdhury, "A Deep Graph Cut Model for 3D Brain Tumor Segmentation", 44th Annual International Conference of the IEEE Engineering in Medicine & Biology Society (*EMBC*), **2022**.
7. **A. De**, A.S. Chowdhury, "DTI based Alzheimer's Disease Classification with Rank Modulated Fusion of CNNs and Random Forest", *Expert Syst. Appl.* 169 (**2021**), 114338. DOI: 10.1016/j.eswa.2020.114338
8. **A. De**, A. Santra, M. Tiwari, A. S. Chowdhury: "Predicting Genetic Markers for Brain Tumors Using a Composite Loss", IEEE/ACM Transactions on Computational Biology and Bioinformatics (*TCBB*). (Communicated)

Work Experience

Machine Learning Engineer

ML Model Development Team

mVizn Pte. Ltd.

Singapore (Remote)

Jan 2024 – Present

- Led the development of a comprehensive Deep Learning pipeline for semantic segmentation of 3D point clouds by applying the latest theories and innovations from cutting-edge research papers to enhance model performance and robustness. This involved end-to-end tasks such as understanding and learning from papers, model building, training, hyperparameter tuning, and rigorous testing using state-of-the-art tools like PyTorch, Polars, and Pandas.
- Spearheaded the backend development of a web application that integrates a semantic segmentation model, ensuring seamless interaction between the model and the application. Responsibilities included API integration, implementing robust logging and error-handling mechanisms, and optimizing the backend for efficient data transfer, contributing to improved software performance.

Data Quality Analyst Mercedes-Benz Research and Development India Aug 2018 – Jan 2020
Data Management Team Bengaluru, India

- Developed tools (in PyQt) for manual quality control of annotated images for Vulnerable Road User (VRU) detection.
- Involved in training and validation of YOLO models for VRU detection.
- Created python scripts for automatic quality checks and data analysis/visualization of labeled/annotated data which increased annotation throughput by 20%. Also involved in dataset preprocessing for gesture recognition of VRU.

Systems Engineer Tata Consultancy Services Aug 2014 – April 2015
Software Maintenance Team Kolkata, India

- Was involved in maintenance of the TCS internal website - "Ultimatix".
- Handled feature requests in both frontend (HTML, Bootstrap CSS, JavaScript) and backend (Java, MySQL).

Voluntary Activities

- Participated in the **IEEE EMBS Student Mentorship Program (SMP) 2023** as a mentee. Gained exposure in healthcare related signal processing and published a paper on Sleep Apnea Detection using Machine Learning Methods. Publication - **A. De, P. Ebenezer**, "Sleep Apnea sub-type detection from Polysomnography signals," 2024 IEEE International Conference on Interdisciplinary Approaches in Technology and Management for Social Innovation (**IATMSI**), Gwalior, India, **2024**, pp. 1-6. Link - <https://ieeexplore.ieee.org/document/10503128>

Projects

- **Spiritual Chatbot (Jan'24 - Feb'24)** - An LLM chatbot that personifies a Hindu God. Uses OpenAI GPT-3.5 turbo model and Langchain for creating prompt templates. Attempted prompt engineering techniques to make chatbot stay within context and purpose. The front end was built using streamlit while python was at backend. Live link - <https://spiritualchatbot.streamlit.app/>, Github Link - <https://github.com/arijitde92/SpiritualChatBot>
- **Github Code Analysis Tool (Apr' 23 - Jun' 23)** - An LLM based github repository analyzer that can tell the most technically complex repository among all the repositories of a given github user. Built using OpenAI GPT3.5 turbo, Langchain, DeepLake vector database, Python and Flask. Github Link - https://github.com/arijitde92/Github_Code_Analysis_Tool
- **Docuplus Website (Sep'15 – Jan'16)** - Developed a Responsive website for Canadian client Docuplus. Built in PHP with MySQL. Hosted in GoDaddy Server. Link – <http://www.docuplus.ca>

Open Source Contributions

- Contributed to AI-Code (<https://github.com/Avdhesh-Varshney/AI-Code>) repository as part of Social Summer of Code (**SSoC**) **2024** Hackathon.
- Contributed to DL-Simplified (<https://github.com/abhisheks008/DL-Simplified>) repository as part of the Social Winter of Code (**SWoC**) **2023** Hackathon.
- Contributed to [nexB](#) and [TheAlgorithms](#) repositories pertaining to both feature enhancements and documentations.

Education and Certifications

- **PhD (Awaiting Degree)**, Jadavpur University, Kolkata, India. **2020–2024**
- **M.Tech. Computer Science & Engineering**, Jadavpur University, Kolkata, India. GPA - 8.83 **2016–2018**
- **B.Tech. Computer Science & Engineering**, Techno India, Kolkata, India. GPA - 8.81 **2010–2014**

Certifications

- **Deep Learning, a 5-course specialization**, by Deeplearning.ai. Verify [here](#).
- **TensorFlow in Practice Specialization**, by Deeplearning.ai. Verify [here](#).
- **MCPS: Microsoft Certified Professional**, Microsoft Certification No.: 1042C4-5DHF30
- **Microsoft Specialist: Programming in HTML5 with JavaScript and CSS3**, Microsoft, Certification No.: A3ZB72-B495D8