SAGNIK DE

+91 9432341459 | sagnikde22@ieee.org | LinkedIn | Github | Google Scholar

EDUCATION

University of Calcutta **2021-2025**
Bachelor of Technology (B.Tech) | Electronics and Communication Engineering *Kolkata, India*
CGPA: **8.54/10**

Don Bosco School **2021**
Indian School Certificate Examination (ISC) | Class XII *Liluah, India*
Aggregate: **96.25%**

Don Bosco School **2019**
Indian Certificate of Secondary Education (ICSE) | Class X *Liluah, India*
Aggregate: **95.40%**

RESEARCH EXPERIENCE

Indian Institute of Technology (IIT), Jodhpur **May 2025 – Present**
Research Assistant | Advisor: Dr. Dipanjan Roy *Jodhpur, India*

- Developing **computational models toolbox** of brain resting-state dynamics by associating **neurotransmitter kinetics**
- Modulation of **brain oscillations** with **tACS** to influence **Speech perception**

Indian Institute of Technology (IIT), Delhi **Dec 2024 – March 2025**
Winter Research Intern | Advisor: Dr. Tapan Kumar Gandhi *Delhi, India*

- Optimization of deep learning models for **multimodal anxiety detection** using biopotential signals

Maulana Azad National Institute of Technology **Aug 2024 – Present**
Research Intern | Advisor: Dr. Varun Bajaj *Bhopal, India*

- Optimization of deep learning models for **multimodal anxiety detection** using biopotential signals

International Institute of Information Technology **Dec 2023 – Apr 2024**
Winter Research Intern | Guide: Dr. Anurag Singh *Naya Raipur, India*

- Multimodal approach for **Major Depressive Disorder** diagnosis using advanced deep learning methods

Centre for Development of Advanced Computing (CDAC) **Apr 2023 – Aug 2023**
Summer Research Intern | Guide: Dr. Anil Kumar Gupta *Pune, India*

- **Deep Learning algorithms** for distinguishing normal and pathological brain states (healthy vs. disease)
- EEG-based early detection of **Parkinson's Disease** using deep learning techniques

University of Calcutta **Oct 2022 – Apr 2025**
Undergraduate Researcher | Guide: Dr. Anisha Halder Roy *Kolkata, India*

- Multimodal deep learning approach using **EEG and sEMG** signals for **Objective Pain assessment**
- Explored **brain activity patterns** associated with different **Olfactory** and **Basic Taste** perception, integrating deep learning methods for enhanced classification

SELECTED PUBLICATIONS

150+ citations across all publications. A complete list of publications can be found on my **Google Scholar**

Journal Articles

- **S. De**, P. Mukherjee, and A. H. Roy, **"GLEAM: A Multimodal Deep Learning Framework for Chronic Lower Back Pain Detection using EEG and sEMG Signals,"** ***Computers in Biology & Medicine, Elsevier***
- **S. De**, A. Singh, V. Tiwari, H. Patel, GN Vivekananda, D.S Rajput, **"SLiTRANet: An EEG-based Automated Diagnosis Framework for Major Depressive Disorder Monitoring using a Novel LGCN and Transformer-based Hybrid Deep Learning Approach,"** ***IEEE Access***

- **S. De**, P. Mukherjee, and A. H. Roy, **"TasteNet: A Novel Deep Learning Approach for EEG-Based Basic Taste Perception Recognition Using CEEMDAN Domain Entropy Features,"** ***Journal of Neuroscience Methods, Elsevier***
- **S. De**, S. Pavuluri, and A. K. Gupta, **"Identification of patients with de novo Parkinson's Disease from chemosensory EEG signals using ICEEMDAN domain Entropy Features,"** ***IEEE Sensors Letters***

Under Review/Pre-prints

- **S. De**, A. Singh and A.K. Bhandari, **"A Novel Vision Transformer based Multimodal Fusion Approach for Clinical MDD Diagnosis Using EEG and Audio Signals,"** ***IEEE Transactions on Computational Biology and Bioinformatics***
- **S. De** and T.K. Gandhi, **"HYGRA: A Hybrid Graph Connectivity Framework for EEG-based Human Anxiety State Identification,"** ***IEEE Signal Processing Letters***
- **S. De**, V. Bajaj and A. J. Prakash, **"A Modified Vision Transformer for Identification of Frontotemporal Dementia and Alzheimer's Disease using EEG Signals,"** ***IEEE Sensors Journal***

Conferences

- **S. De**, S. Pavuluri, A. Sayyad and A. K. Gupta, **"Maestro: A Robust Multi-Head Attention Enhanced CNN Architecture for Heat-Induced Stress Recognition Using EEG Signals," IEEE CSITSS 2024**
- **S. De**, A. Sayyad, H. Kotian and A.K. Gupta, **"ParViT: A modified Vision Transformer architecture for Parkinson's Disease identification using EEG signals," IEEE ICSSES 2024**
- **S. De**, and A.K. Gupta, **"A Quantum Machine Learning framework for Driver Drowsiness Detection using Biopotential Signals and Head Movement Analysis," IEEE ICWITE 2024**

PATENTS

An Innovative Method for Estimating Blood Pressure and Classifying Hypertension Levels Using PPG, Sagnik De, Prithwijit Mukherjee, Anisha Halder Roy, Application No.: 202431068453 A, Indian Patent Journal, India **(Published on 20/09/2024)**

AWARDS & ACHIEVEMENTS

Recepient of **IASc-INSA-NASI Summer Research Fellowship Program 2024** and **Satyendra Nath Bose Summer Research Internship Program 2024**, **NIT Silchar**

Serving as Reviewer for **IEEE Access**, **Biomedical Signal Processing & Control**, **Food Chemistry**, **Biological Psychology**, **Scientific Reports** journals

Among **top 5 students** for academic performance in undergraduate program in the department

Won the 3rd Runners Up in **TELECAST 2024** organized by **University of Calcutta, Kolkata** in collaboration with **CTiF, India**

Won the 1st Prize in **COGNITECH 2023**, organized by the **AI & Robotics Club** in collaboration with the **IEEE Calcutta University Student Branch**.

Won the 1st Prize in **Research Work Presentation 2023** organized by **IEEE Photonics Society Kolkata Chapter, IEEE APS Kolkata Chapter** & **IEEE Calcutta University Student Branch**

POSITIONS OF RESPONSIBILITY

Secretary, IEEE Calcutta University Student Branch	**Nov 2023 – Apr 2025**
President, AI & Robotics Club, IEEE CUSB	**Nov 2023 – Apr 2025**
Secretary, AI & Robotics Club, IEEE CUSB	**May 2023 – Oct 2023**
Media Coordinator, Hult Prize, University of Calcutta Chapter '23	**Sep 2022 – Jan 2023**
Outreach Coordinator, Hult Prize, University of Calcutta Chapter '22	**Jan 2022 – Mar 2022**

RELEVANT COURSEWORK

Artificial Intelligence & Machine Learning, Data Structures and Algorithms, Digital System Design, Signals and Systems, Engineering Mathematics, Computer Architecture and Organization, Digital Signal Processing

TECHNICAL SKILLS

Programming: Python, Java, C, Javascript, MATLAB
Softwares: Freesurfer, Nilearn, FSL, SPM, AFNI, Anaconda, EEGLab, Git
Frameworks & Libraries: PyTorch, TensorFlow, Keras, NiBabel, OpenCV, Sci-Kit Learn, Pillow, Flask

REFERENCES

Dr. Tapan Kumar Gandhi
Professor
Dept. of Electrical Engineering
Indian Institute of Technology (IIT), Delhi, India
tgandhi@iitd.ac.in

Dr. Anisha Halder Roy
Assistant Professor
Institute of Radio Physics & Electronics
University of Calcutta, Kolkata, India
ahrrpe@caluniv.ac.in

Dr. Varun Bajaj
Associate Professor
Dept. of Electronics & Communication Engineering
Maulana Azad National Institute of Technology (MANIT), Bhopal, India
varun.bajaj@manit.ac.in

Dr. Anurag Singh
Associate Professor
Dept. of Electronics & Communication Engineering
International Institute of Information Technology, Naya Raipur, India
anurag@iiitnr.edu.in