SAGNIK DE

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EDUCATION

University of Calcutta

Oct 2021 - Present

Bachelor of Technology (B. Tech) | Electronics and Communication Engineering

Kolkata, India

CGPA: **8.83/10**

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: **95.00**%

RESEARCH EXPERIENCE

Indian Statistical Institute

June 2023 - Aug 2023

Summer Research Intern | Guide: Prof. Sankar Kumar Pal

Kolkata, India

- Working on the development of a novel architecture **Granulated Mask-RCNN**, which incorporates the principles of granulation in Deep Learning models.
- Future Direction -We aim to apply this architecture on real-time videos for tracking of objects.

Carnegie Mellon University

Feb 2023 – Present

Remote Research Intern | Guide: Prof. Min Xu

Pittsburgh, United States

- Currently working on the **visualization** and **analysis** of **RNAscope images**, in collaboration with **Centre for Neuroscience**, **University of Pittsburgh**.
- Performed manual annotation for **semantic segmentation** of cell nuclei on a **novel dataset** and subsequently fine tuned the **UNet** model trained on **S-BSST265 dataset** against our annotated data.

Centre for Development of Advanced Computing [Certificate]

Jan 2023 – June 2023

Research Intern | Guide: Dr. Anil Kumar Gupta

Pune, India

• Co-authored two book chapters by analytically reviewing the importance of **Knowledge Graphs** and **Federated Learning** and their application in Smart Healthcare.

University of Calcutta [Certificate]

Oct 2022 – Ongoing

Undergraduate Researcher | Guide: Prof. Anisha Haldar Roy

Kolkata, India

- Developed hybrid deep learning classifiers for human activities based on acquired EEG and PPG signals.
- Implemented diverse handcrafted and automated feature extraction techniques on EEG data.
- Designed a hardware architecture for data acquisition and processing through wireless sensors.

PUBLICATIONS

CONFERENCES:

- D. Konar, S. De, P. Mukherjee, and A. H. Roy, A Novel Human Stress Level Detection Technique Using EEG [ACCEPTED], IEEE NMITCON 2023 [Paper]
- S. De, P. Mukherjee, and A. H. Roy, A Novel Deep Learning-Based Approach for Hypertension Level Detection Using PPG [ACCEPTED], IEEE SILCON 2023
- S. De, P. Mukherjee, and A. H. Roy, A Hybrid Pain Assessment Approach with Stacked Autoencoders and Attention-Based CP-LSTM [ACCEPTED], IEEE AIKIIE 2023
- S. De, P. Mukherjee, and A. H. Roy, EEG-Based Intelligence Quotient Assessment Using 1D Convolutional Neural Network [ACCEPTED], IEEE CODEC 2023
- S. De, ResNet-152 Based Squeeze and Excitation Neural Network for Alzheimer's Disease Classification [UNDER REVIEW], IEEE CAI 2024

- S. De, P. Mukherjee, D. Konar, and A. H. Roy, AromaNet: Integrating Attention Mechanism with Convolutional Neural Network for Olfactory Perception Classification Using EEG signals [UNDER REVIEW], IEEE C216 2023
- S. De, IntelliNet: EEG-Based IQ Classification Using Stacked Sparse Autoencoders and Attention-enhanced Modified TLSTM Neural Network [UNDER REVIEW], IEEE ICIITCEE 2024
- S. De, P. Mukherjee, D. Konar, and A. H. Roy, EEG-Based Taste Perception Classification Using PCA enhanced Attention-TLSTM Neural Network [UNDER REVIEW], IEEE C2I6 2023

BOOK CHAPTERS:

- Sagnik De, Soumit Ghosh and Anil Kumar Gupta, *Powering Digital Healthcare with Knowledge Graphs and Federated Learning*, [ACCEPTED] for Book titled Federated Learning for Digital Healthcare Systems, Elsevier
- Sagnik De, Soumit Ghosh, Ananya Aggarwal, and Anil Kumar Gupta, Federated Learning Powered Healthcare Informatics for Digital Healthcare Systems, [UNDER REVIEW] for Book titled Federated Learning for Digital Healthcare Systems, Elsevier

KEY PROJECTS

Application of Brain-Computer Interface in Gaming Addiction Analysis

2023

- Developed and implemented a novel architecture, **Stacked Autoencoder-ATTN-BiLSTM** for predicting four distinct stages of **gaming addiction** based on acquired **EEG signals** and examined the impact of light music on urges to play in gaming addicts.
- Observed **brain activity patterns** with the identified **stages of gaming** to gain insights into the emotional experiences during gameplay.

Alzheimer's Disease Prediction

2023

- Developed and implemented a novel framework, **SE-ResNet-152** for predicting four distinct stages of **Alzheimer's Disease** dementia in humans.
- Implemented Squeeze-and-Excitation Networks (CVPR 2018) in Residual Network architecture after in-depth analysis.

Human Activity Recognition

2022-2023

- Developed a novel hybrid deep learning algorithm, CNN-TLSTM for human activity recognition.
- The experiment was conducted on **UCI HAR dataset**, which produced **better results** than the traditional approach.

AWARDS & ACHIEVEMENTS

Won the First Prize in Research Work Presentation Competition 2023 organized by IEEE Photonics Society Kolkata Chapter, IEEE APS Kolkata Chapter & IEEE Calcutta University Student Branch. [Certificate]

Won the First Prize in Cognitech 2023 organized by AI & Robotics Club in collaboration with IEEE Calcutta University Student Branch. [Certificate]

POSITIONS OF RESPONSIBILITY

Asst. Secretary, AI & Robotics Club, IEEE Calcutta University Student Branch Media Coordinator, Hult Prize, University of Calcutta Chapter '23

Outreach Coordinator, Hult Prize, University of Calcutta Chapter '22

May 2023 – Present Sep 2022 – Jan 2023

Jan 2022 - Mar 2022

RELEVANT COURSEWORK

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

TECHNICAL SKILLS

Programming: Python, Java, C, Javascript, MATLAB

Frameworks/APIs: PyTorch, Tensorflow, Keras Libraries/Modules: Matplotlib, Sklearn, OpenCV