SUVADEEP MAITI

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Examination	University	Institute	Year	GPA/%
M.S. in ECE	IIIT Hyderabad	International Institute of Information Technology, Hyderabad	2021 - Current	8.83
B.E. in EE	Jadavpur University	Jadavpur University, Kolkata	2016-20	8.93
Higher Secondary	CBSE	St. Xavier's School, Haldia	2015-16	93.4

RESEARCH INTERESTS

* Computational Neuroscience * Deep Learning * AI in Healthcare * Signal Processing

RESEARCH EXPERIENCE

- **International Institute of Information Technology, Hyderabad (IIIT-H)**
  *Research Fellow – [Advisor: **Prof. Bapi Raju**]* *(Jan'22-Present)*
  Sleep Stage Classification
  - **India Sleep Dataset**
    - Collaborating with NIMHANS, Bangalore, on a pioneering project involving a curating dataset of PSG recordings from stroke patients.
    - Developing a user-friendly preprocessing pipeline to facilitate seamless public access, encompassing comprehensive annotations such as arousals, apnea, limb movements, sleep staging, and snoring for enhanced research in sleep disorders.
  - **A Deep Dive into Sleep: Single-Channel EEGBased Sleep Stage Classification with Model Interpretability**
    - Concept Used: LSTM, Residual Networks, Attention & Squeeze-and-Excitation Block
    - Developed deep-learning technique for classifying sleep into 5 different stages as required by sleep clinician.
  - **Enhancing Healthcare with EOG: A Novel Approach to Sleep Stage Classification**
    - Concept Used: Transformer Encoder & Squeeze-and-Excitation Networks
    - Developing sleep staging algorithm utilizing EOG signals, bridging the gap in remote areas where EEGs are less accessible.

- **Institut des Sciences Cognitives Marc Jeannerod, CNRS, UMR 5229, France**
  *Research Intern – [Advisor: **Prof. James Bonuaito**]* *(May'23-Aug'23)*
  Worked on laminar source reconstruction with high-precision MEG
  - **There's life in that old MEG yet: Depth electrode-like laminar source reconstruction with high precision MEG.**
    - Concept Used: Laminar MEG, Source Reconstruction Algorithms.
    - Implemented a novel simulation approach to generate synthetic datasets comprising 11 equidistant layers between the brain's white matter and pial surfaces.
    - Conducted in-depth analysis using Current Source Density (CSD) transformations, unveiling dynamic current sources and sinks over time.

- **University of Hyderabad, Hyderabad**
  *Research Intern – [Advisor: **Prof. Joby Joseph**]* *(May'22-Aug'22)*
  - **Modeling of grasshopper optic lobe neurons**
    - Concept Used: Local Field Potential, Neural Modelling
    - Recorded in-vivo electrophysiological field potentials from grasshopper optic lobe neurons.
    - Applied advanced mathematical modeling techniques to analyze and interpret the oscillatory patterns observed in grasshopper optic lobe neurons.

PUBLICATIONS

- **A Deep Dive into Sleep: Single-Channel EEGBased Sleep Stage Classification with Model Interpretability**, *arxiv*
  Shivam Sharma*, **Suvadeep Maiti***, S.Mythirayee, Srijithesh Rajendran, Bapi S. Raju
- **Enhancing Healthcare With EOG: A Novel Approach to Sleep Stage Classification**, *(Under Review)*
  Suvadeep Maiti*, Shivam Sharma*,Raju S. Bapi
- **There's life in that old MEG yet: Depth electrode-like laminar source reconstruction with high precision MEG.**
  Maciek J Szul, **Suvadeep Maiti**,Ishita Agarwal, Siqi Zhang, Gareth R Barnes, Sven Bestmann, James J Bonaiuto

** indicates equal contribution*

SELECTED PROJECTS

- **Wilson-Cowan model to investigate Working Memory** | *Cog Sci Lab, IIIT-Hyderabad* *(Jan'22-May'22)*
  - Implemented Wilson-Cowan model to describe dynamics of interactions between populations of simple excitatory and inhibitory model neurons
- **RoadFinder: Mapping Roads with K-Means** | *Image Processing Course Project, IIIT-Hyderabad* *(Aug'21-Nov'21)*
  - Implemented the K-means algorithm on satellite images to segregate roads from other objects, applied various morphological operations to extract the road segment, and then compared the results with a reference image for evaluation.
- **Building LeNet-5 from Scratch for Brain-Score Evaluation** | *SMAI Course Project, IIIT-Hyderabad* *(Aug'21-Nov'21)*
  - Developed 7-layered LeNet-5 architecture, conducted a rigorous evaluation on the MNIST dataset, and leveraged the Brain-Score platform to gauge its performance relative to standardized benchmarks in the field of computational models for the ventral stream.
- **Toward improved control of prosthetic fingers using EMG signals** | *Bachelor's Project, Jadavpur University* *(Jan'20-May'20)*
  - Developed an EMG-based machine learning system using PCA, ANN, and LDA was trained and tested on offline data to control different prosthetic hand poses based on finger movements..

TECHNICAL SKILLS

Programming Language: Python, Matlab

Library: Scikit-learn, Numpy, Matplotlib, Pandas, Nilearn, Brian2

Framework: PyTorch, PyTorch Lightening

Techonologies & tools: draw.io, Anaconda (Python), LINUX, LaTeX, MS-excel

TEACHING

- Teaching Assistant for CS9.427.S22 Introduction to Neural and Cognitive Modeling | *IIIT-Hyderabad* *(Aug'22-Dec'22)*
  - Taught by Prof. Bapi S. Raju
- Teaching Assistant for CS9.423.S23 Cognitive Science and AI | *IIIT-Hyderabad* *(Jan'23-May'23)*
  - Taught by Prof. Bapi S. Raju

ADDITIONAL EXPERIENCE & ACHIEVEMENTS

- Attended Summer School Computational Approaches to Memory and Plasticity | *NCBS, TIFR-Bangalore* *(July'22-Aug'22)*
  - 35 candidates were selected out of 150+ applications worldwide
- Attended 7th Summer School on AI | *CVIT, iHub-Data, IIIT-Hyderabad* *(July'23-Aug'23)*
  - Focused on Computer Vision & Machine Learning
- Secured 9^{th} rank among all the 2016-20 batch B.Tech students of the EE department, Jadavpur University *(2020)*
- Lead Organiser: For paper presentation event in technical fest at Jadavpur University. *(2019)*
- 2^{nd} in Decisia 2018, an analog circuit design competition, Electrical Engg. Dept., Jadavpur University. *(2018)*