Suvam Dey

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Masters of Technology in Signal Processing

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EDUCATION

Year	Degree	Institute	CGPA*/Percentage
2024-2026	Masters of Technology in Signal Processing	Indian Institute of Science, Bengaluru	8.2**
2020-2024	Bachelors of Technology	Indian Institute of Engineering Science and Technology, Shibpur	9.13
2020	Senior Secondary (Grade 12)	Bhavan's G K Vidyamandir (CBSE-AISSCE)	93.6%
2018	Secondary (Grade 10)	Bhavan's G K Vidyamandir (CBSE-AISSE)	96.6%

*Cumulative Grade Point Average on a Scale of 10

**At the end of second semester

ACADEMIC INTEREST

I wish to explore the upcoming and challenging fields of machine learning and deep learning, and applying these techniques to advance research in Image and Video Processing, Speech processing and Biomedical Applications.

PUBLICATIONS

- S. Besrour, **S. Dey**, G. S. Mubibya and J. Almhana, "Subject Identification Using Behavioral Cues and Machine Learning," ICC 2024 - IEEE International Conference on Communications, Denver, CO, USA, 2024, pp. 2877-2882, doi: 10.1109/ICC51166.2024.10622796.
- **S. Dey**, A. S. Anusha and A. G. Ramakrishnan, "Differential effects of slow deep inhalation and exhalation on brain functional connectivity," 2023 IEEE International Conference on Electronics, Computing and Communication Technologies (CONECCT), Bangalore, India, 2023, pp. 1-5, doi: 10.1109/CONECCT57959.2023.10234767.

ACADEMIC HONORS

2024	Awarded the GAABESU Research Excellence Award (link to presentation)
2024	Selected for the Erasmus Mundus Brain and Data Science MS program
2023	Scored 325 on the **GRE General Test**
2023	Selected for the **Mitacs Globalink Research Internship** Program for a 3-month long research internship at Universite de Moncton, Canada
2023	Ranked 204 at the GATE 2024 Data Science and AI Examination, Qualified GATE ECE 2023
2022	Selected for the **Summer Research Fellowship Program** of the Indian Academies of Science, for a two-month research internship
2020	Secured 98.76 percentile in JEE Mains and qualifying JEE Advanced.
2018	Selected as a **JBNSTS Junior Scholar**
2018	Essay selected for the final round of **National Essay Competition** on the Challenging Problems of Science where I delivered a presentation on the same topic

RESEARCH EXPERIENCE

- **Subject Identification using Behavioral Cues and ML, Universite de Moncton, Canada**   *May 2023 - Aug. 2023*

  MITACS Globalink Research Intern, Departement d'Informatique, UdeM   Certificate

  Supervisor: Professor Jalal Almhana, Departement d'Informatique, UdeM
  - Worked on subject identification using IoT Devices with acceleration and magnetic sensors with a focus on data privacy. Collected data from 4 consenting volunteers using IoT devices after defining and planning scenarios.
  - Explored time series classification methods and tried them out on the collected data for subject identification and classification. Attempted to implement Federated Learning and Real Time Implementations achieving 98.04% accuracy within 0.06 ms of processing time (PT).
  - **Impact**: We discovered a promising alternative to invasive methods of subject identification, such as facial recognition. This alternative hinges on subject-specific behavioral cues, which, in the event of data theft, would result in far less severe consequences.
  - **Paper based on our findings accepted and presented at IEEE ICC 2024 conference.**

- **Functional Connectivity Analysis of Brain at Slow Breathing Using EEG, IISc, Bengaluru**   *May 2022 - July. 2022*

  Indian Academy of Science SRFP Intern, Department of Electrical Engineering, IISc   Certificate

  Supervisor: Professor A. G. Ramakrishnan, MILE Lab, IISc

- Worked on previously collected EEG data signals to find functional connectivity across brain regions during and inhale and exhale. Learnt about electroencephalography, functional connectivity and explored and used related software like MNE Python, Brainconn etc.
- After filtering the preprocessed data and removing faulty channels, functional connectivity measures were calculated. Using these values and using graph theoretical measures, binary classification was performed.
- **Impact**: Validated the hypothesis that inhalation and exhalation causes significant brain activity, by binary classification of inhale and exhale epochs with an accuracy of 99.08%.
- Our work led to paper presentation at IEEE CONECCT 2023 conference. winning the best paper award.

- **Undergraduate Thesis, BCI Speller using p300, IIEST, Shibpur** *August 2023 - May 2024*
Supervisor: Professor Sourav Kundu, Department of Electronics and Telecommunications, IIEST

  - Using BCI Competition III speller Dataset to utilise p300 event related potential to identify what the subject wishes to spell from a grid of 36 characters.

PROJECTS

- **Image Processing Projects** *IISc, Bengaluru*
  Digital Image Processing Final Term Project
  - **Lane Detection in Low Light Conditions using Retinex Enhancement**: Implemented lane detection using Hough transform, on enhanced images with the help of Retinex theory.
  - **Otsu's Binarization** Implemented Otsu's binarization form scratch, and applied it on images using adaptive method by dividing the images into tiles.
  - **Image Denoising** Explored image denoising techniques using Gaussian and Bilateral filtering, observing their effects.
  - **Image Classification using Transferred Learning** Finetuned pretrained deep neural network to classify images on a custom dataset.

- **Compilations of Machine Learning Projects** *2021 - Present*
  Self Project, IIEST, Shibpur
  - India Covid 19 analysis and regression, Classification of handwritten Numbers of MNIST Dataset, Presidential Doggy Door using Transferred Learning, Twitter sentiment prediction were all done as a guided exercise within courses

- **Python Projects**
  Self Projects
  - **Blink Chrome Dino**: Control the chrome dino by just blinking. Used facial recognition and eye blink detection following this tutorial: link.
  - **Snake Game from the Featurephone Era**: Recreated the snake game on python implementing OOP concepts in python. I intend to use this environment to learn and train reinforcement learning agent to play the game in the future.

- **DSB-C Amplitude Modulator - Demodulator using Gilbert Cell Amplifier and Envelope Detector** *July 2022-December 2022*
  BTech Mini Project, IIEST Shibpur
  - Implemented Gilbert Cell Multiplier, after simulated using NI Multisim and implemented on breadboard which was used to modulate high frequency sinusoid with low frequency signal and transmitted over wired channel
  - Link to Project Report.

- **Air Pollution Monitoring and Purification** *August 2022-March 2023*
  Digital Image Processing Lab, IIEST Shibpur
  - Used arduino and gas and humidity sensors for air quality monitoring and simulated purification during high pollution.
  - Project group created a web page to display in real time the air quality.

TECHNICAL SKILLS

- **Programming**: Python (NumPy, Pandas, Sklearn, Tensorflow, matplotlib, Seaborn, OpenCV), Arduino, C, C++, MATLAB

COMPETITIONS, WORKSHOPS AND CONFERENCES

2024	Paper presented at IEEE ICC 2024 at Denver, CA.
2023	Participated and became finalists finishing in top 20 teams at COMSYS 2023 Hackathon organized by IIT Mandi
2023	Attended the presentation session of our paper at IEEE CONECCT and won the track best award