Pronoma Banerjee

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Education

Birla Institute of Technology and Science, Pilani, Goa — Aug '19- Present
B.E. Computer Science, Integrated MSc. Mathematics — *CGPA: 8.3/10*

Delhi Public School, Ruby Park, Kolkata — 2017-2019
Class XII — *CBSE: 95.2/100*

Loreto House, Kolkata — 2006-2017
Class X — *ICSE: 97.8/100*

Experience

CVC group, Oden Institute of Computational Sciences, UT Austin — Remote
Research Intern, Supervisor: Dr. Chandrajit Bajaj [Presentation] — *June 2022 - Present*

- Combining two low resolution multispectral and hyperspectral video streams into a single super-resolution stream by developing fusion algorithms utilizing graph Laplacian regularization of the higher spatial resolution stream.
- Training a function that transforms SRI to HSI with an adaptive convolutional filter, using a sparse and progressive Bayesian Gaussian process CNN, and training over multiple HSI-MSI and different resolution RGB samples.
- Parallelly trying to implement the Stackelberg framework in soft actor-critic algorithms for improved performance by mitigating cycling of the gradient around the optimal solution.

AI song contest 2022
Participant [Process document][Appendix][Team page] — *April 2022 - Present*

- Developing a software called SynthBreeder, which implements the genetic algorithm on various setups of the modular synthesizer, called 'organisms'. Each organism produces a particular kind of sound.
- The organisms evolve by undergoing the graph-based processes of mutation and crossover, and natural selection, resulting in changes in connections and setups, evolving from fragments of sound to a section of a musical piece.
- Worked on creating the animated music video using AI with help of Disco Diffusion.

Birla Institute of Technology and Science, Pilani, Goa
Undergraduate Researcher, Supervisor: Dr. Snehanshu Saha [Preprint] — *November 2021 - Present*

- Working on a generative modeling paradigm called skipGAN which combines GANs and Approximate Bayesian Computing, with skip connections, which aims at correcting likelihood misspecification in prior models.
- Implementing our model on TabNet, CatBoost and Stats Model priors, on several synthetic and real-life datasets.

Swecha (Andhra Pradesh Free Software Foundation) — Gachibowli, India
Summer Engineering Intern (Remote) — *June 2021 - July 2021*

- Contributed to the open source project for building a web-extension for fake news detection for English and Hindi news, as well as news texts obtained from images and videos using OCR.
- Created a database by scraping some trustworthy sites, and implemented a model for doc-to-doc comparison, measuring cosine similarities for classification and textual entailment.

Graphics Research Group, IIIT Delhi — Delhi, India
Summer Research Intern (Remote), Supervisor: Dr. Ojaswa Sharma [GitHub Link][Report] — *May 2021 - July 2021*

- Prepared 3D volumes from the CT, MRI and cryo-sectioned images obtained from the VKH dataset.
- Performed rigid and deformable volumetric registration and segmentation of the volumes using SimpleITK, Elastix frameworks in python and 3D Slicer. Analysed the differences in results and suggested improvements.

Indian Statistical Institute, Kolkata — Kolkata, India
Summer Research Intern (Remote), Supervisor: Dr. Subhamoy Maitra [GitHub Link] — *June 2020 - July 2020*

- Designed a version of Quantum tic-tac-toe using C programming, inspired from this paper.
- Calculated the probabilities of winning, in both quantum and classical systems, when using different states of the board, applying different strategies and tried developing a subgame perfect Nash Equilibrium for the game.

Technical Skills

Languages: Python, C/C++, Java, HTML/CSS, MATLAB
Libraries: Pandas, NumPy, Keras, Tensorflow, PyTorch, SimpleITK, Elastix
Courses: Machine Learning, Deep Learning, Computer Vision, Graph and Networks, Discrete Mathematics, Mathematical Modelling, Microprocessors and Interfaces, Linear Algebra, Computer programming.

Achievements

Merit Scholarship and Workshop: by INSPIRE-DST in collaboration with JBNSTS, for being among top 0.5% students of West Bengal in board examinations.
Award: All India (National) Rank 1 in Science in ICSE (100/100 PCB).

Positions of Responsibility

Project lead- Applications of Adversarial and Generative Modeling (CS Department, BITS Goa).
Teaching Assistant- Graphs and Networks, Computer Programming.
Course Instructor and Project Mentor- Introduction to Data Science (QSTP, BITS Goa).
Academic Mentor- Probability and Statistics (Academic Assistance Program, CTE, BITS Goa.)
Student Coordinator- Student Faculty Committee, Department of Mathematics, BITS Goa.
Project lead- Music Society website, from scratch.

Communities

CTE - Member of the Center of Technical Education, BITS Goa.
MuSoc - Lead vocalist at the Music Society, BITS Goa.
Abhigyaan - Volunteer work for the education of mess workers at BITS Goa campus.
Others - Active on multiple platforms as an artist, content writer and vocalist.