Sai Niranjan

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PUBLICATIONS

- **Towards Disease-aware Image Editing of Chest X-rays , Medical Imaging Meets Neurips , Neurips Workshop , 2020**: Aakash saboo (CARING Research)*; Sai Niranjan Ramachandran (Indian Institute Of Science); Kai Dierkes (Pupil Labs Research); Hacer Yalim Keles (Ankara University)

EDUCATION

- **Indian Institute of Science** — Bangalore, India
  Bachelor of Science - Mathematics; GPA:8.5 — Aug 2018- July 2022
- **Delhi Public School , R.K. Puram** — New Delhi, India
  School Education — 95 % in CBSE Board Examination, 2018

RELEVANT COURSES SUMMARY

- **MA 363: Probability in High Dimensions, Anirban Basak (ICTS), Jan 2021**: A
- **E2 335 : Topics in Artificial Intelligence Aditya Gopalan, Himanshu Tyagi (ECE) , Jan 2021** : A
- **MA 241: Ordinary Differential Equations, AK Nandkumaran (MA), Jan 2021**: A
- **DS 211 : Numerical Optimization, Deepak Subramani (CDS), Aug 2020**: A
- **E0 250: Deep Learning, Sargur Srihari (visiting prof, CSA) , Jan 2020**: A
- **E0 248 : Theoretical Foundations of Cryptography , Bhavana Kanukurthi (CSA) , Jan 2020**: A+
- **MA 231: Topology , Basudeb Datta (MA) , Aug 2020**: A
- **MA 219 : Linear Algebra , Apoorva Khare (MA) , Aug 2020**: A

RELEVANT COMPUTING SKILLS SUMMARY

- **Pytorch (> 1.0) , Tensorflow(> 2.0) , Scientific Computing Libraries in python (Numpy, scipy ,Pandas, matplotlib, etc,) , Matlab, Facebook's AX Platform (for bayesian optimization and model hypertuning), Basic (C,C++ , Linux Computing)**:

EXPERIENCE

- **Strand Life Sciences** — Remote
  Student Researcher (Intern) — May 2019 - Sep 2019
  - **Deep Learning on Genomics**: Engaged in using genomic markers to create a classifier for prediction of Autism Spectral Disorder. Causes for ASD are not well understood and this project was aimed to pinpoint possible genomic effects that could cause ASD. Sourced the data from Strand's NGS and validated various classification paradigms from Logistic Classifiers to SVMs (Support Vector Machines) and Deep CNNs (Convolutional Neural Newtorks). Worked under the supervision of Prof Ramesh Hariharan

- **Caring Research** — Remote
  Student Researcher (Intern) — May 2020 - Dec 2020
  - **Worked on a X-Ray to CT image transfer model**: Considering the expenses involved and increased risk to patients undergoing a CT scan due to higher radiation, alternative means are necessary to mitigate these problems. Worked on designing an image to image transfer model from chest X-rays to corresponding CT. Work involved fine-tuning and improving the Cycle GAN Architecture for medical imaging contexts.
  - **Research Project with help of supervisor - Image Editing in Chest X-rays**: Worked on a research project with help of supervisor (Aaaksh Saboo) and external collaborators (Kai Dierkes, Pupil Labs, Germany and Hacer Keles , Ankara University) on the open source ChexPert Dataset (Ng, et.al , Stanford). Goal was to construct an efficient GAN-inversion paradigm for chest X-rays that will allow fine grained manipulation of disease specific features which is important due to highly skewed data in the medical domain (only available for some dieases, machine induced error, unclear features causing erroneous diagnoses,etc). GAN (Generative Adversarial Network) chosen was the Style GAN architecture and the inversion paradigm was based on Hacer's previous work CRG (Cyclic Reverse Generator). Work was published as a first author publication in Medical Imaging meets Neurips (2020) , a workshop in Neurips conference.

- **Cognition Lab , IISc** — Remote
  Student Researcher (Intern) — May 2021 - Aug 2021
  - **Generative Modelling on MRI Images**: Worked on using Variational Autoencoders (VAEs) for anomaly detection and brain aging prediction.Understanding which factors lead to pathologies and how age causes change in neuronal connections is a topic of great interest in the neuroscience field. This work was attempted to use a Variational Inference method to investigate such problems.Work involved adapting the standard VAE and the more recent VQ(Vector Quantized) VAE for the same.

- **COLT 2020, 2021** — Remote
  Mentorship Student (Undergrad) — March 2021 , August 2021
  Was invited to the main conference and an ad-joint mentorship workshop twice. Hosted by the Learning Theory Alliance which is an organization including prestigious researchers such as Peter Bartlett , Avrim Blum , etc, and is a forum designated to nurture talented students across the world interested in researching in Learning Theory which it does for instance, by mentorship sessions and conference invitations.

- **Audio Visual Lab, CVIT , IIIT Hyderabad** Remote
  Research Fellow *Oct 2021 - Sep 2022*
  Joined as a Research Fellow in the Audio Visual Lab as part of the CV group at IIIT Hyderabad. Working under the supervision of Prof CV Jawahar and Prof Vinay Nmboothiri (faculty, University of Bath) on topics related to generative modelling and ,ulti-modal synthesis with Audio Visual Data.

OTHER RELEVANT PROJECTS

- **Causal Modelling in various environments**: (Work in progress) , Started out as a group final project along with fellow undergraduate from the physics department Sanket Tripathy for the course E2:335 Topics in Artificial Intelligence. Based on the Deepmind paper Causal Analysis of Agent Behaviour for AI Safety https://arxiv.org/abs/2103.03938 , initially attempted to incorporate causal mechanisms in training of models in a RL setting.Later, with help of Eshwar SR (PhD , CSA) investigating the underlying causal behaviour of Deep Learning models in order to better understand the bias , use-cases and failure situations of such models.

- **Analysis of the paper High Dimensional Bayesian Optimization with Elastic Gaussian Process**: As part of the coursework of the course MA 363 : Probability in High Dimensions, this paper from ICML 2017 was chosen for an analysis mainly due to prior interest in Bayesian Optimization (used the Botorch Library for hypertuning) , available at https://github.com/rsn870/Project-Reports/blob/main/Project_report.pdf

- **Comparative Study Of Image Classifiers**: Started out as project from the course E0 250: Deep Learning, later did a more thorough study of classifiers (CNN based) on the Fashion MNIST Dataset using Tensorflow 2.0, available at https://github.com/rsn870/Project-Reports/blob/main/Deep_Learning_Report_2.pdf

- **Analysis of Low Weight Discrete Logarithm and Subset Sum in $2^{0.65n}$ with Polynomial Memory** : An analysis of a paper from Eurocrypt (2020) for the course E0 248: Theoretical Foundations of Cryptography. Chosen because it involved a classical problem (which was of interest) in Computer Science, the Subset Sum Problem and its applications to cryptographical design. Available at https://github.com/rsn870/Project-Reports/blob/main/Cryptography_Final_Report_15543.pdf

HONORS AND AWARDS

- Awarded with the prestigious KVPY fellowship - 2017- Govt of India to nurture undergraduate research and science education
- Awarded with the National Talent Search (NTS) Scholarship - Govt of India - 2015 - To award outstanding young talent in the sciences
- Awarded with the Junior Talent Search (JSTS) Scholarship - Govt of Delhi - 2014 - To award outstanding talent in the sciences in the NCT , Delhi

OTHER EXPERIENCE

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  Vice President, EntIISc Bangalore, India
  Vice President of the Entrepreneurship Society of IISc Bangalore.

  Have been interested in application of research based solutions in the real world setting for a long time ("Deep Tech" organizations.)
  Personally involved in the Incubator of the campus and management and strategy for nascent startups incubated at IISc by students Aug 2020 - Present

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  Volunteer and mentor , Notebook Drive , IISc Bangalore, India

  As part of social responsibilities, taking science education to the young underprivileged children in Bangalore
  Also included as a mentor in Mathematics for students interested in learning Mathematics and gaining scholarships such as the prestigious NTS Jan 2019 - Present