

Goirik Chakrabarty

RESEARCHER · PROGRAMMER · BS-MS (MAJOR IN MATHEMATICS)

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“Aut viam inveniam aut faciam tibi.”

Summary

My research focuses on two primary areas. Firstly, lifelong learning, where I investigate techniques to enable AI systems to accumulate knowledge continuously, adapting to changing environments. Secondly, I am dedicated to advancing robust and reliable machine learning, aiming to enhance model stability and performance in real-world scenarios.

Interests

- Computer Vision
- Continual learning
- Foundations of Transfer learning
- Casual Machine Learning
- Explainable AI

Publications

- 2023 **Goirik Chakrabarty**, Manogna S and Soma Biswas, A Simple Signal for Domain Shift, In *ICCV Workshop (VCL)*
- 2023 Manogna S, **Goirik Chakrabarty** and Soma Biswas, P-STAR: Pseudo-Source Guided Target Clustering for Fully Test-Time Adaptation, *Under Review* [arxiv](#)
- 2023 **Goirik Chakrabarty**, Manogna S and Soma Biswas, SATA: Source Anchoring and Target Alignment Network for Continual Test Time Adaptation, *Under Review*, [arXiv](#)
- 2023 **Goirik Chakrabarty**, Manogna S and Soma Biswas, Domain Shift Signal for Low Resource Continuous Test-Time Adaptation, In *ICLR Workshop (PML4DC)*, [video](#)

Work Experience

Pre-Doctoral Researcher

TCS Innovation Hub, Delhi, India

MENTORED BY: RAMYA HEBBALAGUPPE AND DR. PRATHOSH AP

June 2023 - Present

- Understanding Diffusion models and CLIP model for image editing using diffusion models
- Exploring limitations such as multi-concept editing and iterative editing
- Increase reliability and robustness of image generation

Master's Thesis: Test time Domain Adaptation with Deep Learning

IISc, Karnataka, India

MENTORED BY: DR. SOMA BISWAS

July 2022 - May 2023

- Did literature review which included papers such as BNStats Adapt, TENT, CoTTA
- Implemented various Domain adaption techniques such as MixStyle, Prototype classifier, various regularisation etc.
- Our novel Continual Test time Adaptation framework, SATA is Under Review
- Our novel signal for domain shift got accepted in ICCV'23 Workshop, a previous version also got accepted in ICLR'23 Workshop

Semester Project: Unsupervised Learning and Bayesian Methods

IISER-Pune, Maharashtra, India

MENTORED BY: DR. LEELAVATI NARLIKAR

Jan 2022 - April 2022

- Read Bayesian inference and clustering algorithms
- Compared Gibbs Sampling to EM (made by fellow project student) and KMeans (sklearn implementation)
- Link to project site

Generative Adversarial Network in Climate data science

IITM, Maharashtra, India

MENTORED BY: DR. BIPIN KUMAR AND DR. MANMEET SINGH

July 2021 - Jan 2022

- Reviewing various GAN implementation which have application in climate sciences
- Reproducing relevant techniques such as GAIN, SRGAN, TAnoGAN
- Link to project draft

Curem Biotech (Start up)

MACHINE LEARNING AND DEEP LEARNING LEAD

AIC-Pune, Maharashtra, India

June 2022 - Oct 2022

- Developing cell segmentation model for classifying parasitic and healthy RBCs
- Further, detecting species and estimating infected cell ratios
- Investigating various methodologies for addressing this problem statement

IAS-SRFP: Model Predictive Control on a Covid-19 Scenario

MENTORED BY: DR. D. MANJUNATH

IIT-Bombay, Maharashtra, India

May 2021 - Sept 2021

- Understanding concepts of model predictive control, mathematical optimisation and economics
- Projecting and framing real life situation as a Control Problem
- Link to Final Report

Image Segmentation using PSPNet

MENTORED BY: DR. BIPIN KUMAR AND DR. MANMEET SINGH

IITM, Maharashtra, India

Mar 2021 - May 2021

- Reviewing Image Segmentation and instance segmentation
- Reproducing FloodNet Image Segmentation model, my repo
- The model was made using SuperComputer facility at IISER Pune

Education

Indian Institute of Science Education and Research (IISER)

Pune, Maharashtra

BS - MS DUAL DEGREE

Aug 2018 - May 2023

- CGPA: 8.1/10 (top 20%) The grading system is relative.
- MS Thesis: 8.9/10 GPA
- Subjects (till second year): Mathematics, Physics, Chemistry, Biology, Earth Sciences, Humanities, and Computer Programming

Faith Academy Senior Secondary School

New Delhi, Delhi

XII (CBSE)

Aug 2016 - May 2018

- Overall percentage: 94.4%
- Science percentage (PCM and CS): 95.75%

Faith Academy Senior Secondary School

New Delhi, Delhi

X (CBSE)

Starting - May 2016

- CGPA: 10/10
- Subjects - Science, Mathematics, English, Social Studies, Hindi

Skills

Programming	Python(numpy, pandas, tensorflow, pytorch, seaborn), MATLAB, R, C++, SQL
Typesetting	Latex, Markdown, HTML, CSS (with Sass)
Tools	Git, GitHub, VScode, MS-Excel, Linux and command line
Soft Skills	Resourceful, Adaptable, Disciplined, Good Communication and Presentation skills
Languages	English, Hindi, Bengali (fluent in all three)

Achievements

- 2022 **Attended ACML**, i.e. 14th Asian Machine Learning Conference as a selected student scholar.
- 2019 **Attended National Science(VIJYOSHI) Camp**, organised by Kishore Vaigyanik Protsahan Yojana and DST, at Indian Institute of Science, Bangalore (incapacity of KVPY Scholar).
- 2019 **All India Rank - 6**, KVPY fellowship 2018, SB scholar. This is organised and given by Department of Science and Technology (DST).
- 2018 **Attended National Science(VIJYOSHI) Camp**, organised by Kishore Vaigyanik Protsahan Yojana and DST, at Indian Institute of Science, Bangalore (incapacity of Selected Student from IISER).
- 2018 **Recipient**, of INSPIRE SHE scholarship from Department of Science and Technology (DST).
- 2018 **Waitlist Rank 2**, after interviewing for B.Stat. course in Indian Statistical Institute, Kolkata

Selected Courses

ONLINE COURSES

- 2019 Machine learning, Probability and Statistical inference, Biology Meets Programming: Bioinformatics
Financial Engineering and Risk Management I, Network Analysis in R, Welcome to Game Theory. Game
2020 Theory, Importing and Managing Financial Data in Python, Getting and Cleaning Data, Statistical Inference, R
Programming, The Data Scientist's Toolbox, Data Visualisation using Seaborn, Intermediate Machine
Learning
2021 Practical Reinforcement Learning

Note: The Online courses are clickable. Some Coursera courses are audited and certificates will be available on purchase if required. For more details about the courses and other reading projects (self-taught as well as advised by professors [click here](#))

INSTITUTE COURSES

- Sem 1, 2 Single and Multivariable Calculus, Introduction to Proofs in Mathematics, Programming with Python,
Mathematical Methods (Vector calculus, ODE, Fourier analysis etc.)
Sem 3, 4 Linear Algebra, Probability and Statistics, Basic Structures in Mathematics, Quantum Physics
Sem 5 Statistical Inference, Random Processes and Queueing Theory, Real Analysis, Group Theory, Combinatorics,
Topology, Economics and Public Policy, Biostatistics
Sem 6 Data Science, Mathematical Optimisation (Linear and Dynamic Programming), Graph Theory, Complex
Analysis, Vectorspace, Rings and Modules [Audited]
Sem 7 Probability, Measure Theory and Integration, Algorithms, Parameter Estimation and Inverse Theory,
Bioinformatics, Numerical Analysis [Audited]
Sem 8 Stochastic Process, Partial Differential Equations, Functional Analysis, Mathematical and Computational
Biology, Development Studies
Sem 9, 10 I am Auditing the course Advance Deep Representation Learning (ADRL) in IISc during my MS Thesis

Extracurricular Activity

Corporate Relation Head

KARAVAN 2020

Mar. 2020 - Present

- Karavaan is IISER-Pune's Annual Science-Art-Cultural Festival.
- Event was not held due to Covid-19 outbreak.
- Me and my team analysed all past Karavaan records and refreshed sponsor contact databases.
- Made detailed documentation of how Sponsorship work is to be done for whenever normal life resumes.

Coordinator of Resource Team

DISHA

Apr. 2019 - Aug. 2020

- Disha is a social non-profit organisation completely run by students of IISER Pune to spread the light of Education and Scientific Temperament among the underprivileged section of the society.
- Provide and manage inventory for Disha.
- Started shooting science demonstration videos for kids.

Finance and Sponsorship Coordinator

TEDxIISERPUNE

Aug. 2019 - Aug. 2020

- This was the first TEDx event organised by any IISER and we were the founding members
- Arranged for Rs.250,000/- through Sales and Sponsorships

Center Coordinator (Hyderabad)

MIMAMSA

Nov. 2019 - Feb. 2020

- Mimansa is the Largest All India Undergraduate Quiz held Annually by IISER Pune

Finance Coordinator

MATH CLUB

Feb. 2020 - Aug. 2020