

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
- Robust Machine Learning
- Vision Language Model
- Foundations of Transfer learning
- Explainable AI

Publications

- 2024 **Goirik Chakrabarty***, Aditya Chandrasekar*, Ramya Hebbalaguppe and Prathosh AP, LoMOE: Localized Multi-Object Editing via Multi-Diffusion, *Preprint* [arXiv](#)
- 2024 **Goirik Chakrabarty***, Aditya Chandrasekar*, Jai Bardhan, Ramya Hebbalaguppe and Prathosh AP, ReMOVE: A Reference-free Metric for Object Erasure, Accepted in *CVPR Workshop (EVGENFM)*
- 2024 Manogna S, **Goirik Chakrabarty** and Soma Biswas, P-STAR: Pseudo-Source Guided Target Clustering for Fully Test-Time Adaptation, Accepted in *WACV'24* [PDF](#) [Code](#)
- 2023 **Goirik Chakrabarty**, Manogna S and Soma Biswas, SANTA: Source Anchoring Network and Target Alignment for Continual Test Time Adaptation, Accepted in *TMLR* [PDF](#) [Code](#)
- 2023 **Goirik Chakrabarty**, Manogna S and Soma Biswas, A Simple Signal for Domain Shift, In *ICCV Workshop (VCL)* [PDF](#) [Poster](#)
- 2023 **Goirik Chakrabarty**, Manogna S and Soma Biswas, Domain Shift Signal for Low Resource Continuous Test-Time Adaptation, In *ICLR Workshop (PML4DC)*, [PDF](#) [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
- Our novel solution to Localised Multi-Object Editing (LoMOE) has been submitted to CVPR'24

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, SANTA is accepted in TMLR
- 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)

AIC-Pune, Maharashtra, India

MACHINE LEARNING AND DEEP LEARNING LEAD

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

IIT-Bombay, Maharashtra, India

MENTORED BY: DR. D. MANJUNATH

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

IITM, Maharashtra, India

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

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: 8.7/10 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

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, Welome to Game Theory. Game 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 ML
- 2020
- 2021 Practical Reinforcement Learning

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 audited the course Advance Deep Representation Learning (ADRL) in IISc during my MS Thesis

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)

Extracurricular Activity

Corporate Relation Head

KARAVAN 2020

Mar. 2020 - May 2022

- Karavan 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 Karavan 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

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

Referees

Dr. Soma Biswas

IISc, Bangalore, India

ASSOCIATE PROFESSOR

- Advisor for Master's Thesis
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Dr. Leelavati Narlikar

IISER Pune, Bangalore, India

ASSOCIATE PROFESSOR

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