Ninad Aithal

Project Associate at Vision and AI Lab, IISc Bengaluru

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Education

Indian Institute of Technology Madras Jan '20 – Sept '24

Bachelor of Science in Data Sciences and Applications; GPA: 8.06/10.0

Relevant Coursework: Deep Learning for Computer vision, Machine Learning, Deep Learning, Statistics I & II, Math I & II, Tools in data science, AI Search Strategies, Big Data & Biological networks

Srinivas University Institute of Engineering and Technology Aug '20 – May '24

Bachelor of Technology in Robotics, AI and Machine Learning; GPA: 9.17/10.0 *Gold Medallist*

Thesis:MCI Detection using fMRI time series embeddings of Recurrence plots

Jawahar Navodaya Vidyalaya, Chara 2020

CBSE-AISSCE; Percentage: 96.4% *Institute Rank 1*

Experience

Indian Institue of Science Aug '24 - Present

Project Associate - Full time | *PI: Prof. Venkatesh Babu* | *Lab: Vision and AI Lab* *Bengaluru, India*

- Working on project supported by EMSTAR grant in collaboration with Prof. Vinod Menon, Dr. Srikant Rayli (Stanford Medicine) and Prof. Neelam Sinha (CBR, IISc)
- Researching biomarkers through Explainable AI techniques on deep neural network (DNN)-based brain age prediction, identifying differences in aging patterns across diverse populations and comparing them with the Indian cohort

Centre for Brain Research - IISc Aug '23 - Jun '24

Research Intern - Full time | *PI: Prof. Neelam Sinha* | *Lab: Multi Modal Nueroimaging Lab* *Bengaluru, India*

- Identified biomarkers for dementia through Non-linear and Topology based approaches on fMR images to investigate brain function disparities between cognitively impaired and unimpaired subjects
- Contributed to CBR's flagship project, the Tata Longitudinal Study of Aging (TLSA), focusing on cross-cohort differences in brain function associated with neurodegeneration between the Indian cohort and the Caucasian cohort (ADNI)

Publications

1. Ninad Aithal, Chakka Sai Pradeep and Neelam Sinha (2024); "MCI Detection using fMRI time series embeddings of Recurrence plots"; *IEEE International Symposium on Biomedical Imaging (ISBI) 2024*

2. Ninad Aithal, Debanjali Bhattacharya and Neelam Sinha (2024); "Investigating Mild cognitive impairment through persistent homology on fMRI time series"; 27^{th} *International Conference on Pattern Recognition (ICPR) 2024*

3. Debanjali Bhattacharya, Ninad Aithal, Manish Jayswal and Neelam Sinha (2024); "Analyzing Brain Tumor Connectomics using Graphs and Persistent Homology"; *TGI3 International Conference on Medical Image Computing and Computer-Assisted Intervention (MICCAI) Workshop 2024*

4. Suraj Kumar Behera, Debanjali Bhattacharya, Ninad Aithal and Neelam Sinha (2024); "Non-linear Analysis Based ECG Classification of Cardiovascular Disorders"; *npj Cardiovascular health*

5. Debanjali Bhattacharya, Rajneet Kaur, Ninad Aithal, Neelam Sinha, Thomas Gregor Issac (2024); "Persistent Homology for MCI Classification: A Comparative Analysis between Graph and Vietoris-Rips Filtrations"; *Accepted at Frontiers Neuroscience*

6. Ammu R, Debanjali Bhattacharya, Ameiy Acharya, Ninad Aithal and Neelam Sinha (2024); "Multi-scale fMRI time series analysis for understanding neurodegeneration in MCI"; *preprint*

7. Ninad Aithal, Neelam Sinha, Srikanth Ryali, Venkatesh Babu and Vinod Menon; "Cross-Population Analysis of Brain Aging Biomarkers";In preparation

Abstracts, Posters & Presentations

1. Ninad Aithal & N. Sinha; "Simple fully convolutional network to estimate Brain Age"; *Alzheimer's Association International Conference 2024*; conference abstract & poster

2. Ninad Aithal & N. Sinha; "Simple fully convolutional network to detect Alzheimer's Disease"; *Alzheimer's Association International Conference 2024*; conference abstract & poster

3. Ninad Aithal, V. Kancharala & N. Sinha; "Adaptive Deep Learning for MR Imaging"; *Winter School on "Recent trends in machine learning" 2024*; presentation & tutorial

4. Ninad Aithal & N. Sinha; "Classification between Healthy and MCI subjects using Recurrence plots of fMRI timeseries from default mode network"; *IEEE Digital Health Symposium and Roundtable 2023*; conference abstract & poster

Workshops

Workshop on "Applications of Data science in healthcare" | **IIT Madras** *Dec '23 - Jan '24*

2-month workshop learning healthcare analytics from MIMIC-IV dataset

Workshop on "Understanding and Modeling Data from the Electro-Encephalograph" | **CMI** *July '23*

1-week workshop involving hands-on EEG data recording and analysis

Workshop on "Large Scale Brain Data Computing" | **IIT Madras** *May '23*

Explored cellular-level brain labeling techniques at the Human Brain Center, IIT Madras

Outreach through Projects

NeuroLight | *Project Link* | *Medium*

- Developed a comprehensive pipeline for handling MR Images. Its lightweight, efficient and inspired from PyTorch Lightning

fMRI to fMRI timeseries | *Github* | *Medium*

- Created an end-to-end tutorial using FSL for processing fMRI data to extract time series from ROIs

Early Alzheimer's Disease Detection | *Notebook*| *Dataset*

- Dataset and tutorial received 100+ upvotes & supported 30+ projects.

Professional Experience & Organizations

Indian Conference on Computer Vision, Graphics and Image Processing - Volunteer	Dec '24
27^{th} International Conference on Pattern Recognition (ICPR) - Reviewer	July '24
Alzheimer's Association - ISTAART Member	June '23 – Present
IEEE Member	Oct '23 – Present
Group Leader: General Student Body IITM	Sept '23 – August '24
IIT Madras Sarang Student Ambassador	Aug '22 – Feb '23

Skills

Languages & Tools: Python, R, Bash, FSL, MRtrix, 3D Slicer

Data Science, TDA & Misc: PyTorch, Scikit-learn, Scikit-tda, Gudhi, Ripser, Nilearn, Captum, SHAP, Git, GCP

Neuroimaging Modalities: sMRI, fMRI, DWI, Field maps(AD, ADC, FA, RD), ASL/CBF

Datasets used: ADNI, ABIL, CAMCAN, CBR-TLSA, HPC-YA, IXI, LASI, MAYO, MPI-LEMON, SCAN-NACC, OASIS

Awards & Achievements

CHAIRMAN'S SCHOLARSHIP *Aug '20 - May '24*

Awarded a 100% tuition fee waiver. Conferred to only one student per department ($7200 in total)

Dean's Best Undergraduate Project Award *Apr '24*

Awarded to Best Project in an exhibition featuring over 50 undergraduate projects

Travel grant *Nov '23*

Travel award to attend the IEEE DHSR, IIT KGP 2023.

CERTIFICATE OF MERIT *Mar '22 & Mar '23*

Received Certificate of Merit in the 2nd and 3rd years of undergraduate studies.