

# TANAY NARSHANA

+91-9409033322 | +91-8511660901 | tanay.narshana@gmail.com | LinkedIn | Skype

## EXPERIENCE

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### Machine Learning Engineer

*Observe.AI*

August 2022 - Present

*Bengaluru, Karnataka*

- Building conversational tools for contact-centers powered by NLP.
- Worked from R&D to deployment of a service to obtain unsupervised insights from raw call transcripts.
- Maintaining and Upgrading the most critical ML services within the org.
- Recognition received for going Above & Beyond and being Customer Centric in the first six months.

### Strat Summer Analyst

*Goldman Sachs*

May 2018 – July 2018

*Bengaluru, Karnataka*

- Built a generic framework integrated with multiple systems to perform data completeness checks. Its primary goal was to strengthen and automate the process of report generation.

## EDUCATION

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### Indian Institute of Science

*Master of Technology in Computer Science*

2020 – 2022

*Bengaluru, Karnataka*

*Supported by the Reliance Foundation Scholarship in AI and CS & MHRD MTech Scholarship*

*Highest GPA & Nominated for Best Thesis Award*

### Indian Institute of Technology, Ropar

*Bachelor of Technology in Electrical Engineering*

2015 – 2019

*Rupnagar, Punjab*

## PROJECTS

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### Model Compression - Pruning Large Scale Networks

*Guide: Prof. Chiranjib Bhattacharyya*

- Goal was to prune large-scale CNNs to obtain significant inference time reduction for a minimal accuracy drop. Moreover, we focussed on developing algorithms when training data is not available.
- Published two novel ideas to prune at ICLR 2023. Compared to SOTA, one of our algorithms achieves a 2.28x GPU speed-up for a 2.3% accuracy drop for ResNet-50 on the ImageNet classification task in the data-driven regime.
- Engineering skills used in this project include - parallelization, distributing compute across machines, and compiler optimizations.

### Visual Robotics

- Using a visual cue of an object in an environment, we assist KUKA Robot to identify and pick-up the same object in a new environment in one-shot.
- We utilize Siamese Networks with Attention Layers to identify an object of interest in the new environment.

### Spoof Speech Detection

- Implemented variations of the Efficient CNN Model for detecting synthetic speech generated from text-to-speech and voice-conversion systems. We attain better F1 scores through modifications in the training procedure and better feature extraction.
- With inference times of  $\leq 50$ ms, the model attained an F1 score of 99% (97% reported in the paper) and 91% on test data obtained from the same and different distribution when trained on spectrogram features. With CQCC features, similar models achieved F1 scores of 99.9% and 70.15% on test data obtained from the same and different distribution, respectively.

### Topological Data Analysis

- Applied TDA (Mapper Algorithm) to connect historical events with the votes cast in the UN General Assembly.
- Topological insight was extracted through persistence in topological features across various resolutions.
- Used Hamming distance instead of correlation as a distance metric to extract information from sparse vote vectors.

### Prioritized Experience Replay

- Trained Deep Q-Network based agent to learn Deep Learning based policies for Atari Games.
- To make the training process faster, we replay some "important" experiences more frequently.
- We observe slight speedup in the number of iterations required to train the agent in lieu of training without PER.

## PUBLICATIONS

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- Tanay Narshana, Chaitanya Murti, and Chiranjib Bhattacharyya. DFPC: Data flow driven pruning of coupled channels without data. In *International Conference on Learning Representations*, 2023
- Chaitanya Murti, Tanay Narshana, and Chiranjib Bhattacharyya. TVSPRune - pruning non-discriminative filters via total variation separability of intermediate representations without fine tuning. In *International Conference on Learning Representations*, 2023

## SCHOLASTIC ACHIEVEMENTS

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- All India Rank 47 in GATE CS 2020; All India Rank 3903 in JEE Advanced 2015.
- National Top 1% in the National Standard Examination in Physics (NSEP) 2013-14 (top 300 out of 39000 candidates).
- Awarded the Amazing AVVite Scientist title by my high school (Science honor among the graduating students).

## EXTRACURRICULAR

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- Member of the CSA Department WebTeam at IISc.
- Teaching Assistant for Graduate level courses on Linear Algebra and Probability (Fall 2021) and Computational Topology: Theory and Applications (Spring 2022).
- Ranked 35 at the ACM-ICPC Kolkata Kanpur Regionals 2018.
- Student Representative at IIT Ropar for CDCRC (Placement Team) and BoSA (Sports Council).
- Member of the Core Organizing Team of Aarohan '17 (Sports Festival) and Advitiya '18 (Tech Festival) at IIT Ropar.
- Winner in Table Tennis tournaments of CSA Department, EECS Division, and Institute at IISc. Institute Table Tennis Team Captain at IIT Ropar 2015-19. Acting Contingent Leader at 51<sup>st</sup> Inter IIT Sports Meet. Represented Goldman Sachs' Table Tennis team in a corporate tournament during the internship.