KRISHNA SRI IPSIT MANTRI

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Education

Purdue University, West Lafayette — IN, USA
Master of Science in Computer Science — *Aug 2023 – Present*

Indian Institute of Technology Bombay — Mumbai, India
Bachelor of Technology in Electrical Engineering — *July'18 – May'22*

- Cumulative GPA: **9.36/10.0**
- Minor Degrees: (1) Computer Science and Engineering (2) Artificial Intelligence and Data Science

Professional & Research Experience

Software Engineer | **Texas Instruments** — *July'22 – July'23*
Part of Power Interfaces Firmware Team which works on USB-Type C Power Delivery and Power Over Ethernet

- Designed and developed testcases for **Firmware validation** of TPS23881 chip using **Pytest** and **Jenkins** framework
- Root caused production-blocking issues in **FreeRTOS** based firmware and provided fixes to meet **customer milestones**
- Ported the $\mathbf{I^2C}$ and **UART drivers** in the firmware from MSP430 microcontroller to **ARM**-based MSPM0 for direct usage

Learning and Maximizing Influence in Social Networks Under Capacity Constraints — *Jan'22 – May'22*
Bachelor's Thesis, Guide: Prof. Abir De - IIT Bombay CSE, Prof. Sayan Ranu - IIT Delhi CSE — *IIT Bombay*

- **Introduction:** *Influence maximization refers to the problem of finding a subset of nodes in a network through which we could maximize our reach to other nodes in the network.* ***TopK-InfluMax*** *aims at finding this set of nodes and* ***TopK-InfluNet*** *is a GNN framework to learn the process of information spreading in the network.*
- Created novel datasets from **Digg**, **Weibo** and **Cit-HepPh** networks employing node and cascade pruning
- Developed the TopK-InfluNet by exploiting the **deep submodular** nature of NNs with non-negative weights

Software Engineer | **Microsoft** — *May'21 – Jul'21*
Part of the Defensive Search team at Microsoft Bing which works on safe search recommendations

- **Automated** the query expansion pipeline that is used in enabling safe search in the Bing search engine using **C#**
- **Reduced** query treatment time by **62%** using sampling techniques to minimize the budget for crowdsourcing
- Built a **job manager** for submitting and tracking multiple workflows to improve **agility** and **quality**

Key Technical Projects

Efficient Matroid-Constraint-Based Submodular Maximization | *CS769: Optimization in ML* — *Spring 2022*

- Implemented the computationally efficient continuous greedy and **accelerated continuous greedy** algorithms
- Modified the **Pipage-Rounding** subroutine for efficient translation of fractional solutions to discrete subsets
- Implemented the **Submodular Welfare Problem**, **Separable** and **Generalized Assignment Problem** in submodlib

Post-Hoc Out-of-Distribution Detection | *CS726: Advanced Machine Learning* — *Spring 2022*

- Proposed a **scoring function** based on the assumption of a **Dirichlet** distribution on the DNN's softmax-ed logits for OOD detection
- Verified and validated that the score **outperformed** other OOD metrics on multiple datasets and tasks
- **Reduced** the number of hyperparameters to tune by demonstrating the efficacy of **marginless loss** functions for the task

Statistical Compressed Sensing of Gaussian Mixture Models | *CS754: Adv. Image Processing* — *Spring 2021*

- Exploited **statistical properties** of natural images to reconstruct them using a linear decoder in MATLAB
- Compared SCS and conventional CS using a **dictionary learned** via K-SVD on Berkeley Segmentation dataset
- Performed **blind CS** on standard images like **Lena** and **Peppers** and contrasted the results with SCS and CCS

Technical Skills

Programming Languages: C, C++, Python, MATLAB, Perl, C#
Machine Learning: PyTorch, TensorFlow, Keras, OpenCV, Numpy, Pandas, Seaborn, Sklearn, PyTorch Geometric
Web Development: HTML, CSS, JavaScript, Angular, Flask
Software: Jira, Confluence, BitBucket, Git, GNURadio, NgSpice, LaTeX, GNUPlot, XCircuit
Embedded: Keil μVision, TI Code Composer Studio, MSP430, CM3, FreeRTOS, Saleae Logic Analyser, VHDL

Publications

1. Pritish Chakraborty, Sayan Ranu, **Krishna Sri Ipsit Mantri**, Abir De, "**Learning and Maximizing Influence in Social Networks Under Capacity Constraints**", accepted for publication at the 16th ACM International Web Search and Data Mining Conference (WSDM), 2023.
2. Nevasini Sasikumar, **Krishna Sri Ipsit Mantri**, "**STAGCN: Spatial-Temporal Attention Based Graph Convolutional Networks for COVID-19 Forecasting**", accepted for oral presentation at the 2023 ICLR First Workshop on Machine Learning & Global Health.
3. Nevasini Sasikumar, **Krishna Sri Ipsit Mantri**, "**Attention Based Variational Graph Auto-Encoder (AVGAE)**" invited to archive at ICLR 2023, Tiny Papers.
4. Nevasini Sasikumar, **Krishna Sri Ipsit Mantri**, "**Advancing Visual Understanding and Accessibility for All: Image Captioning for Low Vision**" accepted (poster) at 2023 VizWiz Grand Challenge Workshop, CVPR 2023
5. **Krishna Sri Ipsit Mantri**, Nevasini Sasikumar, "**Interactive Fashion Content Generation Using LLMs and Latent Diffusion Models**" accepted for poster presentation at Third Ethical Considerations in Creative applications of Computer Vision workshop, CVPR 2023.
6. **Krishna Sri Ipsit Mantri**, Nevasini Sasikumar, "**Image Denoising Using Diffusion Models**" accepted for Work-in-progress spotlight at 8th IEEE Workshop on Computer Vision for Microscopy Image Analysis, CVPR 2023.
7. Nevasini Sasikumar, **Krishna Sri Ipsit Mantri**, "**Monitoring Parkinson's Disease Progression Through Egocentric Vision: A Precision Health Approach**", accepted as an extended abstract at the Joint International Third Ego4D and Eleventh EPIC Workshop, CVPR 2023.
8. **Krisha Sri Ipsit Mantri**, Nevasini Sasikumar, "**Developing Methods for Identifying and Removing Copyrighted Content from Generative AI Models**", accepted at 1st Workshop on Generative AI and Law at ICML 2023
9. Nevasini Sasikumar, **Krishna Sri Ipsit Mantri**, "**Transfer Learning for Low-Resource Clinical Named Entity Recognition**", accepted at The 5th Clinical Natural Language Processing Workshop at ACL 2023
10. Nevasini Sasikumar, **Krishna Sri Ipsit Mantri**, "**Lending a Listening Ear: Generating Suitable Soundscapes for Classic Silent Movies**" accepted for poster presentation at Computational Cameras and Displays Workshop at CVPR 2023
11. Nevasini Sasikumar, **Krishna Sri Ipsit Mantri**, "**Gastro Intestinal Disease Detection Using Transformer Based Image Segmentation**", accepted for poster presentation at the MIT-MGB AI Cures 2023 Conference
12. **Krishna Sri Ipsit Mantri**, Nevasini Sasikumar, "**Synthetic Medical Image Generation Using Latent Diffusion Models and Large Language Models**", accepted for poster presentation at the Medical Imaging with Deep Learning Conference (MIDL) 2023.

Scholastic Achievements

- Accepted to **The Cornell, Maryland, Max Planck Pre-doctoral Research School** 2023 (*2023*)
- Reviewer for **ICML 2023** Workshops - SPIGM, GenLaw, NCW (*2023*)
- Reviewer for **CVPR 2023** Workshop on TAG in Pattern Recognition with Applications Workshop (*2023*)
- Achieved **perfect GPA of 10.0/10.0** in the 8th semester (*2022*)
- Received a **certificate of merit** for extraordinary performance in the Digital Signal Processing course (*2020*)
- Secured an **All India Rank of 242** in JEE Advanced among 0.2 million candidates (*2018*)
- Secured an **All India Rank of 123** in JEE Mains (Engineering) among 1.3 million candidates (*2018*)
- Ranked in the **national top 1%** in NSEC and NSEA and selected to appear for INChO and INAO (*2018*)
- Recipient of the **KVPY Fellowship** by Department of Science and Technology, Government of India (*2016*)

Key Coursework

Computer Science: Advanced Machine Learning, Optimization in Machine Learning, Intelligent and Learning Agents - I, Programming for Data Science, Introduction to Machine Learning, ML for Remote Sensing - II, Digital Image Processing (I & II), Operating Systems, Logic in CS, Computer Networks, Data Structures and Algorithms

Electrical Engineering: Nonlinear Dynamical Systems, Wavelets, Control Theory, Communication Systems, Microprocessors, DSP, Probability & Random Processes, Analog Circuits, Digital Systems, Network Theory, EM Waves

Mathematics: Differential Equations, Calculus, Linear Algebra, Complex Analysis