

Krishna Sri Ipsit Mantri

<https://ipsitmantri.github.io>

Google Scholar 

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Education	Purdue University , West Lafayette, IN, United States Master of Science in Computer Science Specialization: Machine Learning GPA: 3.74/4.0	August 2023 - Present Graduation: May 2025
	Indian Institute of Technology Bombay , Mumbai, India Bachelor of Technology in Electrical Engineering GPA: 9.36/10.0 Minor Degrees: (1) Computer Science and Engineering (2) Artificial Intelligence and Data Science	Jul 2018 - May 2022
Scholastic Achievements	2024 NeurIPS Travel Award for presenting research on DiGRAF. 2023 Accepted to the Cornell, Maryland, Max Planck Pre-doctoral Research School at MPI-SWS, Saarbrücken, Germany. 2022 Perfect GPA of 10.0/10.0 in the final semester at IIT Bombay. 2018 Secured All India Rank of 242 in JEE Advanced (top 0.1% of candidates). 2016 KVPY Fellowship (declined), Government of India.	
Publications	Or Feldman, Krishna Sri Ipsit Mantri , Carola-Bibiane Schönlieb, Chaim Baskin, Moshe Eliasof. <i>NOMAD: Node Memory Adaptation for Temporal Graph Neural Networks</i> . Under Review at ICML, 2025 Krishna Sri Ipsit Mantri , Carola-Bibiane Schönlieb, Bruno Ribeiro, Chaim Baskin, Moshe Eliasof. <i>DiTASK: Multi-Task Fine-Tuning with Diffeomorphic Transformations</i> . Accepted at The IEEE/CVF Conference on Computer Vision and Pattern Recognition (CVPR), 2025 Krishna Sri Ipsit Mantri , Xinzhi Wang, Carola-Bibiane Schönlieb, Bruno Ribeiro, Beatrice Bevilacqua, Moshe Eliasof. <i>DiGRAF: Diffeomorphic Graph-Adaptive Activation Function</i> . Accepted at The 38th Annual Conference on Neural Information Processing Systems (NeurIPS), 2024 [arXiv] Krishna Sri Ipsit Mantri , Moshe Eliasof, Carola-Bibiane Schönlieb, Bruno Ribeiro. <i>Rethinking Fine-tuning Through Geometric Perspective</i> . Accepted In UniReps: 2nd Edition of the Workshop on Unifying Representations in Neural Models at NeurIPS 2024[OpenReview] 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. [OpenReview] 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. [ACM]	
Research Experience	Multi-Task Fine-Tuning with Diffeomorphic Transformations Masters Thesis with Prof. Ribeiro, Prof. Baskin and Dr. Eliasof <ul style="list-style-type: none">Challenge: Existing parameter-efficient fine-tuning methods for Vision Transformers (ViTs), like LoRA, force tasks to compete within constrained subspaces, degrading performance in multi-task learning (MTL) settings.Key Insight: Task-specific adaptations can be achieved without altering pre-trained representations by leveraging singular value modulation through diffeomorphic transformations.Contribution: Developed a method that reduces parameter overhead by 75% while achieving a 26.27% improvement in average task performance on the PASCAL MTL benchmark.Impact: Positioned this work as a step towards resource-efficient, scalable fine-tuning for diverse tasks, with potential applications in fields like medical imaging and autonomous systems. Diffeomorphic Graph-Adaptive Activation Functions Graduate Research Project	August 2024 - Present Purdue University December 2023 - May 2024 Purdue University

tasks like molecular property prediction.

- **Key Innovation:** Introduced DiGRAF, an activation function that adapts dynamically to graph topologies using diffeomorphic transformations, preserving essential geometric properties.
- **Outcome:** Enabled more expressive and flexible GNNs, demonstrating up to **4.7% improvement** over baseline methods. Work accepted to NeurIPS 2024.
- **Collaboration:** Worked with an international team, including Cambridge-affiliated researchers, to develop a framework that has implications for advancing drug discovery using GNNs.

Sony AI
Research Scientist Intern

May 2024 - August 2024
Tokyo, Japan

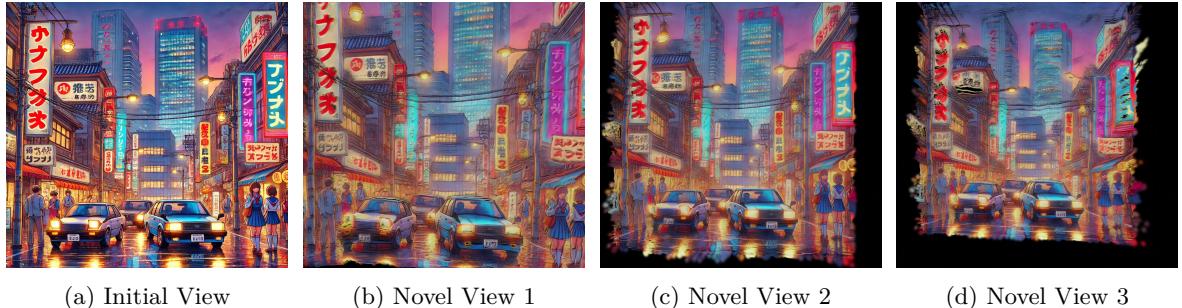


Figure 1: 3D Scene Reconstruction: Initial view and generated novel views.

- Pioneered a **deterministic zoom-enhancement framework** for single-image 3D reconstruction, addressing real-time challenges in gaming and virtual environments, without needing generative models.
- Applied **diffeomorphic transformations** to simulate diverse camera poses, enhancing the **robustness** and **realism** of single-view 3D reconstruction.
- Integrated the framework with **MVSplat**, achieving **120× speed improvement** over traditional synthesis methods and rendering high-quality scenes in **under 15 seconds**.
- Collaborated with Japanese colleagues in a multicultural, multilingual environment, gaining valuable experience in cross-cultural communication and team dynamics.

Professional Experience

- Texas Instruments** July 2022 - July 2023
Software Enginner, Power Interfaces Firmware Team Bangalore, India
- Automated the validation of firmware for Power Sourcing Equipment controllers (**TPS23881**), improving **coverage by 20%** using Pytest and Jenkins.
 - Streamlined legacy manual testing workflows, boosting efficiency and ensuring state machine compliance across multiple test scenarios.
 - Gained expertise in **PoE PSE specifications**, contributing to the debugging and development of cutting-edge firmware solutions.

- Microsoft** May 2021 – July 2021
Software Engineer Intern, Defensive Search @ Bing Hyderabad, India
- Automated the **query expansion pipeline** for Bing Safe Search, **enhancing the filtering** of racially inappropriate and derogatory content.
 - Designed and implemented sampling techniques, **reducing query processing time by 62%**, significantly lowering crowdsourcing costs.
 - Integrated the solution into Bing's **workflow manager**, improving operational scalability and safety compliance.

Leadership and Teaching

- Class Representative, Electrical Engineering Department** July 2020 – May 2022
Junior and Final Year, IIT Bombay Mumbai, India
- Elected as class representative, representing a cohort of **80** students during the **COVID-19 pandemic**.
 - Facilitated online learning by addressing logistical and academic concerns with faculty, including **re-exams, exam schedules, and access to online classes** for students affected by the pandemic.
 - Ensured clear communication between students and faculty, advocating for classmates' needs in a remote learning environment.

- Volunteered to teach deep learning during the summer of 2020 as part of a professor-led initiative, offering free classes to the community of **200** undergraduates in India to foster learning opportunities during the pandemic. Website [🔗](#)
- Served as a **Teaching Assistant (TA)** at IIT Bombay, contributing to courses in Machine Learning, Ordinary Differential Equations, and Operating Systems.
- Tutored undergraduate students at Purdue University in **MATLAB programming** for Engineering 101 and **Data Structures and Algorithms**, enhancing their foundational understanding.

Projects

PropertyManager.ai – GenAI for Property Inspection Hacklytics 2024 Demo 🎥 Website 🔗 Code 🔗	February 2024 – March 2024
<ul style="list-style-type: none"> Built a multi-modal Generative AI solution to assess property damages and streamline insurance claims processing. Fine-tuned the BLIP text-to-image model using a custom dataset for damage identification and reporting. Designed few-shot prompting with GPT-4, providing tailored solutions aligned with insurance policies. 	
Diagnosing Supply Chain Optimization Problems using LLMs Department of Chemical Engineering, Purdue University	August 2023 – May 2024
<ul style="list-style-type: none"> Developed a GPT-4-powered chatbot to solve large-scale supply chain optimization problems using Mixed Integer Programming (MIP). Integrated advanced features like infeasibility troubleshooting, sensitivity analysis, and counterfactual reasoning. Proposed a novel framework leveraging code generation and Retrieval-Augmented Generation (RAG) for enhanced problem-solving. 	
Code Review Automation using LLMs and RAG CS 592 - AI-Assisted Software Engineering Seminar with Prof. Tianyi Zhang - Code 🔗	January 2024 – May 2024
<ul style="list-style-type: none"> Designed a multi-stage code review framework combining Retrieval-Augmented Generation (RAG) and LLMs (GPT-3.5, Mistral 7B, Llama 3 70B). Deployed as a GitHub App, automating pull request reviews to enhance code quality and developer productivity. Evaluated performance across LLMs of varying capacities, demonstrating effectiveness in real-world software workflows. 	
xkcd-style Comic Generation using T2I Models CS 587 - Foundations of Deep Learning with Prof. Raymond Yeh - Code 🔗	January 2024 – May 2024
<ul style="list-style-type: none"> Fine-tuned Stable Diffusion with LoRA on 2,240 comics to generate xkcd-style illustrations. Improved text coherence by training a ResNet-18 reward model and applying Direct Preference Optimization. 	

References

Dr. Moshe Eliasof Department of Applied Mathematics at University of Cambridge, Email: me532@cam.ac.uk.
Prof. Bruno Ribeiro Department of Computer Science at Purdue University, Email: ribeirob@purdue.edu.
Prof. Chaim Baskin School of Electrical and Computer Engineering at Ben-Gurion University of the Negev, Email: chaim-baskin@bgu.ac.il.