

Mallikarjuna TUPAKULA

Research Engineer - ML Research | Multimodal AI | Computer Vision | Language Modeling

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Multimodal AI researcher and engineer experienced in vision-language modeling, diffusion-based perception, and mechanistic interpretability for safe and human-aligned AI systems. Skilled in large-scale training, multimodal dataset curation from social media platforms (YouTube, Amazon, X), and inference optimization. Accepted first-author at **NeurIPS'25** (FM4LS) and **INFORMS** (IJO); prior research spans LLMs, fMRI-vision alignment for diffusion based generation, drug-text alignment, and social bias quantification for AI Safety.

EXPERIENCE

Present September 2024	Rochester Institute of Technology [🌐] ML Research Graduate Research Assistant Advisor : Prof. Ashique KhudaBhuksh <ul style="list-style-type: none">> Sole-authored publication at NeurIPS 2025 (FM4LS) on Thin Bridges for Drug Text Alignment, achieving Recall@1 = 0.762 on ChEMBL and 3× scaffold-split gain over frozen baselines.> Co-authored publication in INFORMS Journal on Computing, developing a multimodal machine-comprehension framework evaluating 48,956 YouTube Kids videos; achieved 77.5% accuracy on ScienceQA and F1 = 0.82 on the CVQA dataset.> Developing diffusion-based brain decoding pipelines in compute efficient way (fMRI → image reconstruction) for multimodal perception tasks using Stable Diffusion and CLIP embeddings.> Developing large-scale empathetic dialogue systems using the CANDOR dataset (1 TB video/audio/text) and studying LLM neuron interpretability to align multimodal agents with human values for safer reasoning in medical and financial domains.	Rochester, USA
August 2024 December 2020	Indian School of Business [🌐] Pre-doctorial Program Research Assistant Advisor : Prof. Sumeet Kumar <ul style="list-style-type: none">> Worked on AI for Social Good and AI Safety problems on social media platforms by processing large multimodal datasets (YouTube, Amazon, Twitter) at TeraByte scale, leading to publications at AAAI, ASONAM, INFORMS, and ACL.> Applied PyTorch, OpenCV, and CUDA to accelerate large-scale computer vision pipelines, optimizing training and inference speed for terabyte-scale datasets.	Hyderabad, India
November 2020 August 2020	Spacept [🌐] Core ML Team Research Intern Advisor : Sergiu Iliev (Founder) <ul style="list-style-type: none">> Developed a custom DL model for oil spill classification using Google Earth Engine and Sentinel satellite data of the Mauritius oil spill (July 2020), engineering scalable pipelines and augmentations that improved accuracy from 65% to 78%, demonstrating transferability to real-world autonomous sensing.	Stockholm (Remote), Sweden
March 2020 December 2019	Indian Institute of Technology Madras [🌐] Neuromotive Team Research Intern Advisor : Prof. Srinivasa Chakravarthy <ul style="list-style-type: none">> Implemented Elman-Jordan-based CT reconstruction halving projections (360 → 180) for efficient imaging AI, techniques extendable to on-device simulation.	Chennai, India
July 2019 May 2019	Indian Institute of Management Bangalore [🌐] Research and Development Team Research Intern Advisor : Prof. Trilochan Sastry <ul style="list-style-type: none">> Analyzed the real-time data sales from Farmveda and predicted future sales, even further improving the sales by being actively involved in the Digital Marketing team.	Bangalore, India

EDUCATION

Present August 2024	Rochester Institute of Technology MS in Computer Software Engineering Awarded a prestigious, fully funded merit-cum-means scholarship from the University	Rochester, USA
May 2020 June 2016	Acharya Nagarjuna University B.Tech in Computer Science and Engineering Secured a full merit-cum-means scholarship from the Government of Andhra Pradesh.	Guntur, India

PUBLICATIONS

[1] **Thin Bridges for Drug Text Alignment : Lightweight Contrastive Learning for Target Specific Drug Retrieval** Mallikarjuna Tupakula. *NeurIPS 2025 2nd Workshop on Multi-modal Foundation Models and Large Language Models for Life Sciences (NeurIPS'25 FM4LS)*

[2] **Quantifying the Academic Quality of Children's Videos Using Machine Comprehension**, Sumeet Kumar, Mallikarjuna Tupakula, Ashique KhudaBukhsh. *INFORMS Journal on Computing* **Accepted at (IJOC)**

[3] **Gender Biases and Stereotyping in Children's Videos : A Study on 100 Popular Kids Channels on YouTube.**, Sumeet Kumar, Mallikarjuna Tupakula, Ashique KhudaBukhsh. *submitting to Nature Human Behaviour* **(Accepted at Association for Computational Linguistics (ACL SRW'23))**

[4] **Anonymous Dissent in the Digital Age : A YouTube Dislikes Dataset.** Sujan Dutta, Mallikarjuna Tupakula, Sumeet Kumar, Ashique KhudaBukhsh. *The 16th International Conference on Advances in Social Networks Analysis and Mining* **(Accepted)**

[5] **Large Language Models for Rating the Language of Children's Videos on YouTube.** Mallikarjuna Tupakula, Sumeet Kumar, Ashique KhudaBukhsh. *INFORMS Journal on Computing* *(Submitting to IJOC)*

[6] **Do Vision Transformers and Convolutional Neural Networks fit together?** Mallikarjuna Tupakula *Under Conference Submission*

AWARDS AND HONORS

1. Received CVPR'25 Broadening Participation Participant Award May 13, 2025
2. Received registration support from the Machine Learning and the Physical Sciences Workshop, NeurIPS 2024, for serving as a reviewer November 26, 2024
3. Received funding from Linux Foundation for attending PyTorch 2024 conference at San Francisco September 8, 2024
4. Awarded full merit scholarship for Graduate studies at Rochester Institute of Technology April 15, 2024
5. Awarded Kathuria Pre-Doctoral Scholarship from Shri Nihal Chand Kathuria Education Trust for showing excellence in pre-doctorialship at Indian School of Business. January 21, 2023
6. Awarded full scholarship for undergraduate studies in lieu of exceptional performance in the entrance examination and prior academic record. June 20, 2016 - April 18, 2020
7. Awarded Highly Competitive and Prestigious Facebook AI Scholarship. September 13, 2019

TEACHING

1. Teaching Assistant - Advanced Qualitative Research Analysis (executive Ph.D.), Indian School of Business. Spring, 2024

TECHNICAL SKILLS

Core ML	Machine Learning, Deep Learning, Computer Vision, Natural Language Processing, Large Language Models, Large Vision Models, Medical Imaging, Computational Neuroscience, AI for Social Good, Statistical Modelling
Research Skills	AI Safety, Multimodal AI, AI Alignment, Bias detection, Interpretability, governance relevant social science research, LLM evaluation
Programming Frameworks	Python (Adoptable to any python library conveniently), C/C++, MATLAB, Java, HTML
Developer Tools	PyTorch, Numpy, OpenCV, selenium, pandas, scikit-learn, Transformers, TensorFlow, JAX
	Git, AWS, Google Cloud, PySpark

VOLUNTEERING

1. Served as a Reviewer for CVPR 2025 Workshops on Responsible Generative AI, and Image Matching : Local Features & Beyond
2. Served as a Reviewer for NeurIPS 2024 Workshops on Creativity & Generative AI, SoLar, MINT, and ML4PS.
3. Served as a PC member of the committee of the 2024 INFORMS Workshop on Data Science.
4. Volunteered at AI4ALL as a portfolio project mentor to guide high school students on their ML projects.