Rishav Mukherji

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Education

Carnegie Mellon University — Pittsburgh, PA
Master of Science in Machine Learning
Ongoing Coursework: Advanced Introduction to Machine Learning, Probability & Mathematical Statistics — Dec 2025

Birla Institute of Technology & Science, Pilani (GPA: 9.36/10) — Goa, India
Bachelor of Engineering in Electronics & Communication Engineering | Minor in Data Science — May 2024
Coursework: Deep Learning, Artificial Intelligence, Applied Statistical Methods, Information Theory & Coding

- Recipient of the BITS Goa Merit Scholarship for all semesters, awarded to the top 3% of students across the institute.

Publication

Latent Representation Matters: Human-like Sketches in One-shot Drawing Tasks : V Boutin, ***R Mukherji***, A Agrawal, S Muzellec, T Fel, T Serre and R Van Rullen — **NeurIPS 2024** : Poster *(2406.06079)*

Weight Sparsity Complements Activity Sparsity in Neuromorphic Language Models : ***R Mukherji****, M Schöne*, K K Nazeer, C Mayr, D Kappel and A Subramoney — **IEEE / ACM ICONS 2024** : Full Talk (Algorithm) *(2405.00433)*

Language Modelling on a SpiNNaker 2 Neuromorphic Chip : K K Nazeer, M Schöne, ***R Mukherji***, B Vogginger, C Mayr, D Kappel and A Subramoney — **IEEE AICAS 2024** : Proceedings *(2312.09084)*

Activity Sparsity Complements Weight Sparsity for Efficient RNN Inference : ***R Mukherji***, M Schöne, K K Nazeer, C and A Subramoney — **ML with New Compute Paradigms @ NeurIPS 2023** : Poster *(2311.07625)*

Diffusion Models as Artists: Are we Closing the Gap between Humans and Machines? : V Boutin, T Fel, L Singhal, ***R Mukherji***, A Nagaraj, J Colin and T Serre — **ICML 2023** : Oral Poster *(2301.11722)*

Experience

Serre Lab, Brown University *(serre-lab.clps.brown.edu)* — Providence, RI
Research Intern — Sep 2022 - May 2024

- Collaborated with a large team to implement and analyze **visual generative models**, focusing on **diffusion models** to get a detailed understanding of one-shot/few-shot generation. Resulted in a publication at **ICML 2023**.
- Worked on a categorization algorithm to help curate the **QuickDraw-FewShot dataset** for one-shot generation on human drawings.
- Studied the impact of different inductive biases on the **latent space of Latent Diffusion Models** by experimenting with **regularizers**, leading to **near-human-like drawings** with feature importance maps achieving high correlation with humans ($p < 10^{-3}$). Published these results in a paper accepted to **NeurIPS 2024**.

Chair of HPSN, Technische Universität Dresden *(tu-dresden.de/ing/elektrotechnik/iee/hpsn)* — Dresden, Germany
Research Intern — May 2023 - Dec 2023

- Spearheaded the development of an algorithm that **combined weight compression and parameter sparsity** for event-based recurrent neural networks to reduce memory footprint and deploy the model on neuromorphic chips.
- Achieved up to **20× reduction of computation** while maintaining perplexities below 60 on the Penn Treebank language modelling tasks. Authored a paper highlighting these findings, accepted to the Machine Learning with New Compute Workshop at **NeurIPS 2023**.

Selected Projects

Carnegie Mellon University — Pittsburgh, PA
Student Researcher supervised by Prof. Ruslan Salakhutdinov — Sep 2024 - Ongoing

- Improving language models by augmenting the training procedure for text encoders to **make the embedding space predictable and controllable.**
- Developing and scaling large vision models by using **self-supervised representations to create fine-grain tasks**.

Society of Artificial Intelligence and Deep Learning, BITS Goa — Goa, India
VFormer (github.com/SforAiDl/vformer) — Feb 2022 - Jul 2022

- Developed an open-source **PyTorch library** that packages implementations of different **Vision Transformers** like Vanilla ViT, SWiN-T, CrossViT, etc., achieving **150+ stars on GitHub** and **6,000+ downloads on PyPI**.

Skills

Programming Languages: *Experienced* : Python, MATLAB, C++, C | *Familiar* : Java, Julia
Libraries: PyTorch, NumPy, Pandas, Keras, OpenCV, SciPy, Scikit, Matplotlib

Awards

- Recipient of the DAAD WISE 2023 scholarship to carry out a 3-month research internship at TUDresden, Germany.