

Swapnanil Mukherjee

LinkedIn: <https://www.linkedin.com/in/Swapnanil/>

GitHub: <https://github.com/SwapnanilMukherjee>

Email : swapnanil.mukherjee_ug25@ashoka.edu.in

Address: Ashoka University, Sonapat, Haryana 131029

EDUCATION

- **Ashoka University** Sonapat, Haryana
Bachelor of Science, Computer Science (3.66/4) 2022 - 2026
- **Hem Sheela Model School** Durgapur, West Bengal
11th and 12th; Science with CS (92%) 2020 - 2022

WORK EXPERIENCE

- **Precog Lab, IIIT Hyderabad** Hyderabad, India
Research Intern June 2025 - Present
 - ◇ Devising a defence against camouflaged poisoning attacks that exploit the machine unlearning paradigm for which no defences currently exist. Collaborating with Prof. Amartya Sanyal, University of Copenhagen.
 - ◇ Evaluating the representational alignment of large neural models of different modalities to propose a feasibility framework for model stitching and obtain an estimate of performance across various kinds of downstream tasks based on the alignment, in collaboration with Microsoft Research, India.
- **SarvamAI** Bangalore, India (Remote)
ML Engineer Intern June - August 2024
 - ◇ Independently developed the first prototype of Sarvam's document text recognition pipeline from scratch for 10+ Indic languages.
 - ◇ Set up the data curation, collection, and preparation pipelines. Experimented with different end-to-end multimodal architectures, including various encoder, decoder models, and came up with an appropriate modality fusion mechanism and fine-tuning recipe for this task. Trained the entire system end-to-end on large-scale data in a multi-node distributed training cluster framework.
 - ◇ Contributed to Sarvam's Parsing API by benchmarking, evaluating, and generating training data for the underlying models.
- **Koita Centre for Digital Health - Ashoka (KCDH-A)** Sonapat, India
Research Intern March - October 2024
 - ◇ Working with Prof. Debayan Gupta in collaboration with Prof. Steven Clipman of Johns Hopkins Medicine Institute on machine learning-based methods for enhanced forecasting of critical antiretroviral therapy (ART) drugs for the National AIDS Control Organization, Ministry of Health.
 - ◇ Set up the data cleaning and processing pipeline and experimented with different models. Developed the first few iterations of the forecasting tool. Presented our initial results in a presentation to senior executives at NACO.
 - ◇ Our method is being adopted by NACO for country-wide forecasting of 17+ HIV drugs which will optimise drug availability and positively impact lakhs of patients living with HIV in India.
- **Ashoka Mphasis Lab** Sonapat, India
Research Intern March - August 2023
 - ◇ Research Intern under Prof. Debayan Gupta on the *AISCan* project for precision profiling of cancerous tumor cells to determine and quantify their correspondence to human stem cells for a predictive analysis of cancer metastasis and progression.
 - ◇ Under Prof. Raghavendra Singh to develop compute-efficient, and easily scalable methods of dataset distillation (data pruning) through a graph and network-analysis centred approach.

RESEARCH

- **Commonsense Reasoning in Vision-Language Models:** Worked with Prof. Somak Aditya (IIT Kharagpur) to improve the performance of small Vision-Language Models (VLMs) on visual-question answering (VQA) tasks through externally retrieved commonsense knowledge. We benchmarked a host of commonsense knowledge bases, retrieval models, and knowledge-integration mechanisms across multiple VLMs and benchmark VQA datasets and observed that supplying an LLM with contextual information about the image, question and relevant commonsense facts can enable it to generate informative and accurate explanations which enhance the performance of the base VLM up to 15% in the best case, and outperform or match large generative VLMs with 2-4B params. (*Under review*)
- **Precision Profiling of Tumor Stem Cells Using Machine Learning-Based Digital Cytometry:** Worked with Prof. Debayan Gupta and Prof. Subhashis Halder's lab to develop a novel ML-based method of classification and quantification of gene expression data corresponding to human stem cells for highly accurate profiling of cancerous tumors which will aid the diagnosis and treatment of the disease in patients. Responsible for collating and preparing the data used for training, running all ML-based experiments, and developing the primary codebase for a software package that integrates the aforementioned functionality into a user-friendly tool. (*Under review*) **[pre-print]**
- **Coreset Selection for Image Datasets:** Came up with a novel zero-shot method for coreset selection (on image datasets) using a simple graph-based approach for dataset distillation. The highlight of the method is that can identify important examples in a given dataset without requiring any training on the target dataset. It is comparable to current SOTA methods while being much more computationally simple and efficient. (*Sep '23*)
- **Hate Speech Detection in Social Media with Transformed-based Language Models:** Evaluated the performance of state-of-the-art Transformer-based models to detect hate speech in datasets collected from three different social media platforms and compared their performance to conventional Machine Learning models. Transformer-based models outperformed all existing methods by significant margins in all tasks. (*Dec '21*) **[paper]**
- **Miscellaneous:**
 - ◊ Presented our poster on machine learning-based enhanced forecasting of antiretroviral therapy demand in India at the Johns Hopkins GKII Meet (2024) **amongst 50+ groups sponsored by the GKII Breakthrough grant** in India.
 - ◊ Poster on Federated Learning with tree-based models on tabular medical data accepted to ICGA 2023. **[Poster]**
 - ◊ Led a research project for NeuroMatch Academy 2022 to explore whether the behaviours of the different visual cortices of a human brain upon exposure to a visual stimulus could be imitated by the layers of a convolutional network. **[Code]**
 - ◊ Developed the prototype of an emotion recognition module during my internship at BrainEnTech Neuroscience. **[Code]**

SKILLS AND TOOLS

- **Languages:** Python, C, Java, SQL, HTML, CSS
- **Tools:** PyTorch, Transformers/HF, Pytorch Lightning, LlamaFactory, TransformerLens, vLLM, Keras, Numpy, SKLearn, SciPy, Pandas, Matplotlib, Gradio, Git, Docker, \LaTeX
- **Special Skills:** Kyo-Kushin Karate

HONORS AND AWARDS

- Indian Academy of Sciences Summer Research Fellowship 2025 Awardee
- Dean's List (for academic excellence in a semester; **thrice**).
- College Board India Scholar 2022.
- CCIR Summer TechCamp Distinguished Scholar Award for exemplary performance in the programme (Aug '21).