# Rishi Shah

Masters in Machine Learning
Carnegie Mellon University
rishisha@cs.cmu.edu
Rishi Shah in | GitHub

## EDUCATION

- **Carnegie Mellon University, Pittsburgh** *Masters in Machine Learning* *Aug '24- Dec '25*
- **Indian Institute of Technology, Delhi** *Bachelors in Computer Science and Engineering,* ***GPA - 9.564*** *Jul'19-May'23*
  - **All India Rank 75** in **JEE Advanced** 2019 among 200,000+ applicants from all over India.
  - **Computer Science Department Top 10%** in 5th, 6th, 7th and 8th semester with SGPA of **9.7**+ at IITD.
  - **Key Courses**: Data Structures and Algorithms, Probability and Stochastic Processes, Linear Algebra, Machine Learning, Natural Language Processing, Artificial Intelligence, Computer Vision, Parallel Programming, Operating Systems
  - **Teaching Experience**: Teaching assistant for Data Structures and Algorithms Course

## KEY WORK EXPERIENCES

- **Samsung Electronics, South Korea - Research Engineer** *Generative AI Team* *Sept '23 - Aug '24*
  - Fine-tuned Samsung **Gauss-i** using **LORA** and **Dreambooth** for generating themed images for TV background.
  - Generated text-to-image datasets using prompt engineering and SDXL, filtered using **CLIPScore** and **OpenCV** tools.
  - Leveraging LLMs using **Retrieval-Augmented Generation** improving user experience on Bixby(AI bot).
  - Received the **Best SW Project Award of the Year 2023/24**, given to the top 2 projects in the GenAI division.
- **Samsung Electronics, South Korea - Research Associate** *Visual Display, AI* *May-Jul '22*
  - Designed supervised **Time Series** and unsupervised **Clustering** model to predict television replacement.
  - Incorporated **Key Performance Indicators** from sensors with RFM values to improve performance by **6%**.
- **KnowDis, Delhi - Data Science Intern** *Query Search and Recommendation Engine* *May-Jul '21*
  - Worked on a **multi-classification problem**, fine tuned **fastText model** to generate the embeddings.
  - Implemented a framework using **faiss** and **annoy** libraries to optimize **nearest neighbor** search for query embedding.
  - Build a scalable architecture where batch of queries took **55 secs** compared to baseline's **140 mins**.

## KEY PUBLICATIONS

- **Dissecting Adversarial Robustness of Multimodal LM Agents** *Neurips'24, Prof. Aditi Raghunathan* *May-Oct'24*
  - Introduced **ARE** framework to analyze adversarial robustness in **multimodal language model agents**.
  - Demonstrated imperceptible image perturbations (<5% pixels) could achieve targeted attacks with **67%** success rate.
  - Quantified component impact, finding **evaluators** and **value functions** reduce ASR while vulnerabilities increase ASR.
- **NEUROCUT : Neural Approach for Robust Graph Partitioning** *KDD'24, Prof. Sayan Ranu* *Jul'22- Jun'23*
  - Designed a novel **GNN** based **inductive** architecture to find near optimal solutions of cut related NP hard problems.
  - Modelled an **RL based auto-regressive** framework using **policy gradient** methods to find the optimal partitions.
  - Developed framework generalizes to any cut objective and specified number of partitions, **outperforming all baselines**.
- **Packet Routing using Multi-Agent Reinforcement Learning** *COMSNETS'23, Prof. Rajeev Shorey* *Jan-Jul '22*
  - Trained **DDQNs** for routing IoT data transmitted by a UAV network by implementing Multi-Agent RL.
  - Formulated a novel cross-agent **reward function** to achieve **48.7% throughput gain** over baselines.

## KEY PROJECTS

- **Object-Centric Video Prediction** *Advanced Topics in ML, Prof. Sayan Ranu* *Jan-Mar '23*
  - Developed a novel frame prediction model using a structured **graph-based latent representation** of state dynamics.
  - Implemented an encoder-decoder architecture built upon **attention based temporal network** A3-TGCN.
  - Enhanced accuracy by integrating the **Segment Anything** model for segmentation, **ResNet** features for object tracking.
- **Neural Style Transfer** *Computer Vision, Prof. Anurag Mittal* *Oct-Nov '22*
  - Conducted exploratory research on the seminal framework of NST using varied **Content Loss** and **Style Loss**.
  - Investigated alternative architectures like **VGGNet**, **GoogleNet**, and **ResNet** for content extraction and style transfer.
- **Task Oriented Dialogue System using PLMs** *Natural Language Processing, Prof. Mausum* *Mar-Apr '23*
  - Developed a parser by conditioning the decoder output on auxiliary task classifying input based on linguistic patterns.
  - Conducted extensive fine-tuning experiments on various **PLMs (BART, T5, GPT2)** to achieve top scores in the class.

## TECHNICAL SKILLS

- **Languages/Tools:** Python, C++, Java, Rust , Bash, SQL, Linux, Git, HPC, OpenMP, MPI, Flutter, Flask, Firebase
- **Libraries:** PyTorch, Langchain, LlamaIndex, Networkx, PyTorch Geometric, Diffusers, OpenCV, Gymnasium

## LEADERSHIP

- **Trend Research Group Lead, Samsung GenAI**: Weekly presentations on cutting-edge ML research *Sep'23-Present*
- **Algorithms and Coding Club IITD - Coordinator** *Aug'21-Apr'22*
- **Mentor, Board for Student Welfare**: Mentored **5 Freshmen** at IITD. *Aug'21-May'23*