Rikhil Gupta

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EDUCATION

Birla Institute of Technology and Science (BITS-Pilani) **Pilani, India**
Bachelor of Engineering, Computer Science. **GPA: 8.33/10** OCT 2021-Present

RESEARCH INTERESTS

I derive immense joy and fascination from the realms of Machine Learning, Computer Vision, and Large Language Models. The amalgamation of diverse mathematical techniques captivates my intellect, and witnessing their manifestation through various computational tools and methodologies brings me unparalleled satisfaction and delight.

SCHOLASTIC ACHIEVEMENTS

- Ranked within the **top 0.1% out of over 150,000 candidates** (All India Rank **122**) in the KVPY examination and was awarded the KVPY (Kishore Vaigyanik Protsahan Yojana) fellowship by the Government of India in 2019.
- Ranked within the **top 0.5% out of 1 million candidates** in the JEE 2021 examination. Received an All-India Rank of **2749** in JEE Advanced examination

TEACHING & MENTORING

Peer Mentorship Program, BITS, Pilani **2022**
Institute Student Mentorship Program (mentored 6 freshmen through the challenges of freshman year)

RESEARCH PUBLICATIONS

COMPARATIVE ANALYSIS OF UNSUPERVISED PRE-TRAINING MODELS FOR LULC CLASSIFICATION WITH LIMITED LABELLED DATA [Published at IEEE InGARSS 2023]
Deeksha Aggarwal, Uttam Kumar, ***Rikhil Gupta***

RESEARCH & WORK EXPERIENCE

Novel view synthesis using 3D Gaussian Splatting **AUG 2024 – Present**
Research Intern at Visual Image Processing Lab, ***Indian Institute of Science, Bangalore***
Guide: Dr. Rajiv Soundararajan

- Benchmarked 3D Gaussian Techniques such as 3DGS, FSGS, CoR-GS, DNGaussian on multiple datasets such as NeRF-LLFF, MipNerf360, Tanks and Temples with various settings**.**
- Researching the application of augmented models to generate and supervise depth maps using valid masks, reprojection to different views, patch generation and loss calculation.

Flipkart Labs, Bangalore **JUN 2024-JUL 2024**
Summer Intern at ***Flipkart,*** *Subsidiary of Walmart Inc.*

- Fixed the issues in the present 3D Asset compression pipeline, and developed a novel compression pipeline using Draco Compression and Texture-Material Optimization. Achieved lossless compression of 90%, and outperforming older pipeline by 10% saving significant business costs in storage and transport.
- Performed 3D SDK optimization by removing unused modules from the build, and enabling dynamic imports for modules that would be selectively required, lightening the SDK by 25%.

Opening the Black-box of Large Language Models **JUL 2023 - NOV 2023**

Research Assistant at *Fluid Interfaces group,* ***MIT Media Lab****, Cambridge, USA*

Guide: Dr. Pattie Maes

- Developed and implemented neuron-knockout and manipulation capabilities, and performed experiments using the base model Llama-2 with fine tuning methods like Alpaca and Vicuna.
- Analyzed cluster activations on questions from a custom database containing math, character, odd-one-out types of questions.

Hyperspectral Image dimensionality reduction and Classification **FEB 2023 - SEP 2023**

Research Assistant at ***Spatial Computing lab, IIIT-Bangalore****, India*

Guide: Dr. Uttam Kumar [Code]

- Worked on hyperspectral image datasets, like Pavia University, Pavia Center and Salinas A.
- Performed comparative analysis of six combined generative pre-training and discriminative models with two standalone discriminative models in the context of Land Use Land Cover classification.
- Recorded results and analyses were published at IEEE InGARSS 2023 conference.

Python Tool for Probability Density Functions **MAY 2023 - JUL 2023**

Intern at ***Atomic Energy Regulatory Board****, Department of Atomic Energy, Government of India*

Guide: Dr. Sanjib Dey, Shri Subrata Bera [Code]

- Developed a Python tool utilizing Monte Carlo Sampling and Latin Hypercube Sampling techniques to generate diverse data samples. The tool plots the generated sample and outputs a distribution plot.
- Studied and analyzed the effects of parameters on various distribution functions like Gaussian, Exponential, GEV, Weibull, etc.

Crops and Crop Disease identification **JUL 2022 - AUG 2022**

Data Science Intern at ***Wingsure****, A subsidiary of Stanford Research Institute, Menlo Park, California*

Guide*: Dr Bikram Sengupta, Chief Scientist, Wingsure* [Certificate] [Letter of Recommendation]

- Wingsure is an Insurtech company, leveraging deep tech to deliver instant access to personalized insurance products and advisories for small farmers and rural communities globally.
- Built, trained and tested custom-made CNN models, Resnet50 and VGG16 to classify crops and identify crop diseases.

PROJECTS

Converting Bokeh models into federated learning setup| Federated Learning **OCT 2023-APR 2024**

Guide: Dr. Pratik Narang

- Worked on converting centralized training approaches to Bokeh rendering into a federated learning set up with the aim to achieve privacy in Bokeh rendering.

Segmentation and detection of ortho-drone imagery | Computer Vision, Python **NOV 2022**

Guide: Dr. Kamlesh Tiwari and MapMyIndia

- Trained a U-net architecture-based model on a dataset containing 1200 images of landscapes to perform semantic segmentation and detection of classes including pools, pavement, roofs, telephone poles and roads.

Mound Data Structure Implementation | C Programming **APR 2023**

Guide: Dr. Jagat Sesh Challa, BITS-Pilani, Pilani [Code]

- Designed and implemented a C program to incorporate the Mound Data Structure, as outlined in a research publication by Lehigh University researchers from Pennsylvania.

TECHNICAL SKILLS AND CERTIFICATIONS

Languages: Python, C/C++, Java, MySQL, LaTeX, R

Technologies/Frameworks: Pandas, Numpy, TensorFlow, PyTorch, Keras, Matplotlib, SciPy, scikit-learn.

Domains: Machine Learning, Deep Learning - Neural Network, Convolutional Neural Networks(CNN), GANs, Large Language Models

Certifications : **Generative AI with Large Language Models** , **Machine Learning from Stanford University**