

Kartik Sharma

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Research Interests: Multi-modal Perception/Reasoning, RL, LLMs, Diffusion Models

Education

Birla Institute of Technology and Science, Pilani, Pilani Campus

B.E.(Hons.) Computer Science and MSc.(Hons.) Economics

GPA: 8.67/10

2018 - 2023

Work Experience

Senior Engineer - Samsung R&D Institute India

Bengaluru, IN

Language AI Team, Manager: Kunal Sharma

November 2023 - May 2025

- Developed and optimized a multilingual safety filter using BERT to block unsafe inputs and outputs in Samsung's LLM, achieving **95%** accuracy across **12+** locales. Safeguarded LLM against prompt injection, gibberish attack, and prompt leakages. Trained and quantized student model for on-device deployment with a **45%** reduction in size.
- Designed and implemented an **android** service to enable **on-device language & vision models** across flagship devices, used in notes app, camera, keyboard; reduced inference latency by **~5s** and memory usage by **~1GB**.
- Worked on **cross-lingual** image grounding task using **contrastive learning** to transfer object localization from high-resource to low-resource languages, improving bounding box accuracy in underrepresented locales.

Data Scientist - PrivateBlok

Bengaluru, IN

Manager: Sachin Manchanda

February 2023 - November 2023

- Engineered and fine-tuned a GPT-3.5 Turbo-powered financial **QA chatbot** for a **SaaS** platform, capable of answering diverse types of queries related to **10K+** private companies.
- Optimized vector **retrieval** with a custom re-ranking algorithm and efficient **RAG** pipeline, minimizing *hallucination* in responses and maintaining **accurate** context for the LLM to deliver financial insights.
- Curated and vectorized a temporal **knowledge graph** of company data and optimized the **GPT-LangChain** pipeline with advanced prompting, allowing detailed analysis of company's financials, growth metrics, vision, and competitors.

Project Assistant - Video Analytics Lab, IISc Bangalore

Bengaluru, IN

Supervisor: Prof. R. Venkatesh Babu

August 2022 - January 2023

- Analyzed and implemented state-of-the-art GAN conditioning and regularization techniques to address challenges in **long-tailed** image generation, prevalent in real-world datasets.
- Mitigated mode-collapse and class-confusion for tail classes by de-correlating **W** latent space, setting a new benchmark on long-tailed datasets like ImageNet-LT and iNaturalist2019 with average FID improvement of **19%**.

Software R&D Intern - Samsung R&D Institute India

Bengaluru, IN

Visual Intelligence Team, Manager: Sathish Chalasani

May 2022 - July 2022


- Designed and developed a **production-ready, scalable, and reliable** method to detect objects associated with actions in images with **82% precision** and **67% recall**.
- Implemented a dynamic way to pass query embeddings in **multi-head transformers** for any action present in gallery images, for example "Playing with Dog", optimizing it for a large number of possible actions.

Publications

- *NoisyTwins: Class-Consistent and Diverse Image Generation through StyleGANs* 
Rangwani H., Bansal L., **Sharma K.**, Karmali T., Jampani V., Babu R.V.
Proceedings of the IEEE/CVF Conference on Computer Vision and Pattern Recognition (**CVPR 2023**)
- *A Generalized Multimodal Deep Learning Model for Early Crop Yield Prediction* 
Kaur A., Goyal P., **Sharma K.**, Sharma L., Goyal N.
Published in 2022 IEEE International Conference on Big Data (Big Data) (**Big Data 2022**)

Projects

A Generalized Multimodal Deep Learning Model for Early Crop Yield Prediction

Advanced Data Analytics and Parallel Technologies Lab, BITS Pilani, Project Supervisor: **Dr. Poonam Goyal** 

- Proposed and developed a generalized multi-modal deep-learning model, **CropYieldNet**, for crop yield prediction with **limited** high-resolution satellite data, achieving superior **generalizing capability** compared to existing models.
- Improved model performance up to **7.8%** by modeling the depth variant information of soil data and achieved the best **RMSE** for in-season prediction of **11.328** for India and **5.99** for US for corn and soybean crop yield, respectively.

Wake-up Word Detection

- Constructed a synthesized speech dataset and implemented a trigger word detection model with over **90% accuracy**.
- Trained a **GRU(Gated Recurrent Units)** to detect when someone has finished saying the word **ACTIVATE**.

Crypto-currency price prediction using Machine Learning Techniques

- Employed various machine learning models (**SVM, LSTM**) for **short-term prediction** of bitcoin market, analyzing a broad set of potential market-predictive features, and predicting binary market action with **75%** accuracy.
- Conducted **sentiment analysis** of textual data from Google News, Reddit, and Bitcoin exchanges to judge historical cryptocurrency values.

Achievements

2 x Awarded SPOT Award for excellent co-ordination with HQ to resolve critical issues on time during commercialization 2024
Selected for Research Week with Google by Google Research India in Computer Vision track 2023
Finished Top 50 of 3500 participants in Amazon ML Challenge 2021

Relevant Courses

- Academic courses* - Machine Learning, Data Structures and Algorithms, Neural Network and Fuzzy Logic, Linear Algebra, Probability and Statistics, Object-Oriented Programming, Database Systems, Design and Analysis of Algorithms, Computer Networks, Operating Systems
- Online Certifications* - Machine Learning (Stanford University), Deep Learning Specialization (by DeepLearning.AI)

Academic Service & Volunteering

Volunteer	National Service Scheme BITS Pilani
Volunteer	Friends of Tribal Society, Bhopal Chapter, India
Teaching	Teaching Assistant of the course Neural Networks and Fuzzy Logic at BITS Pilani

Skills

Languages and Tools	Python, Java, C++, Kotlin, \LaTeX , Git, Linux
Libraries and Software	PyTorch, LangChain, TensorFlow, Open CV, Diffusers Keras, Pandas, NumPy, Sci-kit Learn