

Varun Sampath Kumar

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RESEARCH INTERESTS

Privacy Preserving Machine Learning, Machine Unlearning, Language Models, Mechanistic Interpretability

EDUCATION

University Of Southern Denmark
PhD Student in Responsible AI

Aug, 2025 - July, 2028

PSG College Of Technology, Coimbatore
Integrated MSc Data Science

2020 - 2025
CGPA: 8.7

Relevant Coursework: Machine Learning, Deep Learning, Natural Language Processing

SKILLS

Programming and Query language: Python, C++, SQL

Libraries/Frameworks: PyTorch, Ray, PySpark, DuckDB, Huggingface, FastAPI, Scikit-learn

WORK EXPERIENCE

KLA

Chennai

Software Engineer Intern

December 2024 - June 2025

- Designed and deployed a FastAPI-based dashboard to display **real-time** Iceberg table **metrics** and predictive maintenance operations via Pylceberg and PySpark.
- Optimized an existing clustering algorithm, achieving a **3-4x execution time improvement** using OpenMP, and experimented with Ray for distributed processing.
- Generated and ingested **520 billion records** to benchmark the performance of Trino and DuckDB using IBIS, evaluating large-scale query efficiency.

KLA

Chennai

Software Engineer Intern

May 2024 - July 2024

- Fine-tuned LLM** with **PEFT** for analyzing system metrics & application log, enabling automated error diagnosis and resolution suggestion.
- Optimized large dataset processing by profiling code, rewriting SQL queries, and switching DB connectors (SourcePro to Pro C) thereby having **2-3x faster execution**.

KLA

Chennai

Software Engineer Intern

June 2023 - November 2023

- Built an **Image Clustering** pipeline using **Self Supervised Representational Learning** Techniques.
- Explored **gRPC** based image streaming instead of SFTP which improved the latency by 4x.
- Elevated the performance of the Wafer defect classification pipeline by 1.25x incorporating Pre Training.
- Accelerated the Inference pipeline by 2.5x using Model Quantization, Model Fusion, and Pruning techniques.

RagaAI

Data Science Intern

Remote

May 2023 - June 2023

- Trained various state-of-the-art Vision Transformer architectures such as ViT, DINO etc.
- Deployed embedding visualization using Dash on AWS, enhancing model understanding. Also, created Streamlit for an internal demo application.

PUBLICATIONS

1. **Selective Knowledge Unlearning via Self-Distillation with Auxiliary Forget-Set Model**

Varun Sampath Kumar

ICML 2025 Workshop on Machine Unlearning for Generative AI

2. **RAFGIC: Retrieval Augmented Fine Grained Image Classification**

Varun Sampath Kumar, Anrutha J K

NCVPRIPG 2024

3. **Deep Federated Learning for Sentiment Analysis**

Varun Sampath Kumar, Anrutha J K, Poonthalir G

Under Review in Elsevier Information Sciences

PROJECTS

CarBot [[Github](#)]

- Developed Streamlit based web application where the users can ask multimodal queries (Text, Text+Image) based on the car manuals.
- Extracted the image and table description using Google Gemini LLM stored them along with text embedding in Qdrant.
- Implemented Retrieval Rank Fusion RAG, Semantic chunking, Semantic caching, Parallel processing to elevate the performance of the application with Cohere LLM.

OpsGenius [[Github](#)]

- Developed an AI-driven IT Operations & Network Management solution featuring a network monitoring chatbot using Mistral 7B LLMs, & federated learning for real-time network anomaly detection.
- Integrated these into a unified portal to enhance efficiency, security, and overall IT performance.

ACHIEVEMENTS

- Selected for **Amazon ML Summer School 2024**, as the **top 3,000** out of around 85,000 students.
- **Winner** in **Bosch FitFest 2024 Hackathon** for building a **Multimodal** chatbot for Car Manuals.
- **Second Runner up** in the Data Science Student Championship Organised by **Machine Hack** among 1000+ students.
- Secured **All India Rank 488 / 50,000+** in GATE Data Science and Artificial Intelligence 2024.