Geetha Charan

7893437194 geethacharan31@gmail.com linkedin.com/in/geethacharan

Education

Indian Institute of Science, Bangalore **Aug 2022 - Jun 2024**
M.Tech in Computer Science and Automation

Jawaharlal Nehru Technological University, Anantapur **Jun 2018 - Jun 2022**
B.Tech in Computer Science and Engineering

Work Experience

AI Researcher | *Indian Institute of Science* **Feb 2026 – Present**

- Lead AI research spanning NLP, deep learning, explainable AI, and cooperative game theory.
- Built resource-efficient multilingual LLMs end-to-end: data curation, continual pretraining, SFT, preference optimization, and evals.
- Built explainable agricultural advisories by integrating **LLMs with simulators** to generate context-aware farmer guidance (published at IEEE CASE 2026).
- **Fine-tuned small language models** (SLMs) for agricultural applications; explored various RAG architectures for related agricultural decision-support systems.
- Developed custom deep learning and foundation-model pipelines for **crop price forecasting**; explored LLMs as zero-shot time-series predictors.
- Designed novel cooperative game-theory frameworks (Core, Nucleolus, Gately Point) for **model interpretability** beyond Shapley values.

Founding AI Researcher | *Finrep AI* **Jun 2024 – Jan 2026**

- Led AI research team building end-to-end ML infrastructure: indexing, retrieval, architecture, verification, and evaluation for financial intelligence.
- Built a **multi-agent system** for financial disclosure generation with specialized agents for content drafting and regulatory compliance.
- Developed an **agentic retrieval-based answering system** with hybrid RAG, reranker, and HyDE, along with tool calling and ReAct loop capabilities, for financial queries.
- Designed a dual-BERT encoder architecture with a custom cross-encoder for financial document compliance scoring, incorporating pairwise interaction modeling and masked max pooling.
- Developed a hierarchical BERT-based classification architecture for financial statement classification, achieving over 95% accuracy on benchmark datasets.
- Built a structured report generation system analyzing 1,000+ individual reports (comment letters) to identify behavior patterns, employing a summarization pipeline with rule-based logic and ML-based filtering techniques.
- Directed multiple financial NLP proofs-of-concept including PR-QA generation, LLM–Knowledge Graph integration, text-to-SQL, invoice processing system, and prompt induction.

Machine Learning Intern | *Accenture* **Jun 2023 – Jul 2023**

- Implemented advanced classification models like XGBoost and LightGBM for methane emission detection, optimizing their performance through dataset scaling and efficient feature engineering.
- Addressed data scarcity by employing oversampling and synthetic data generation techniques to enhance the diversity and volume of training data, ultimately improving the models ability to generalize across different scenarios.

Publications

[1] Vedant B, **Geetha Charan** et al. *Agri-SAGE: Simulation-Grounded Multi-Agent LLM for Context-Aware Agricultural Advisory Generation.* IEEE CASE 2026. [online]

[2] Priyanka V, **Geetha Charan** et al. *Carbon Farming: An Expository, Inter-Disciplinary Survey.* Journal of IISc, Special Issue on Digital Agriculture, 2026, Springer. [online]

Master's Thesis

Agent Based LLMs and Finetuning LLMs | **Game Theory Lab IISc** ***Prof. Narahari***

- Developed an LLM-powered agentic interface for an end-to-end ML platform, enabling natural language-driven function calls for data analysis and model building via a fine-tuned function-calling model.
- Designed and deployed a domain-adapted QA system by fine-tuning LLaMa 3.1 8B, TinyLlama 1.1B on a curated research corpus and with FAISS-powered RAG pipeline.

ML Platform for Agricultural Data Analysis | **Game Theory Lab IISc** ***Prof. Narahari***

- Designed and developed an end-to-end ML platform to streamline problem analysis in the field of Agriculture.
- The pipeline has various tools to help integrate, clean, impute, and visualize the data. On top of that, it provides a diverse model selection that deals with tabular and time series datasets.

Relevant Coursework

- **Foundational Courses** : Natural Language Processing, Machine Learning, Game Theory, Computer Architecture.
- **Advanced Courses** : Advanced Deep Representation Learning, Deep Reinforcement Learning.
- **Mathematical Courses** : Applied Linear Algebra and Optimization, Probability and Statistics.

Technical Skills

- **Programming Languages** : Python, C, Java.
- **ML/DL Frameworks** : PyTorch, JAX, HF Transformers, PEFT, LoRA, TRL, Scikit-learn.
- **LLM/GenAI Tooling** : vLLM, LangChain, LangGraph, Pydantic AI, FAISS, Chroma.
- **Backend/Infra** : Django, Docker, AWS EC2, AWS SageMaker, Git.
- **Data** : Pandas, NumPy

Lectures / Presentations

- Guest Lecture, E1 254: Game Theory 2026, Indian Institute of Science, Bengaluru.
- Instructor, MBAV 447M: Databases, Christ University, Bengaluru.

Achievements / Responsibilities

- **All India Rank 15** in GATE Computer Science Exam 2022.
- **Teaching Assistant** E1 214: Game Theory and Mechanism Design; UE 101: Algorithms and Programming.