Ritvik Garimella

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Education

University of South Carolina — *Columbia, SC*
Doctor of Philosophy in Computer Science, GPA: 4.0/4.0, *(anticipated graduation - 05/28)* — *Jan 2025 – Present*
Masters in Computer Science, GPA: 4.0/4.0, *(anticipated graduation - 05/26)* — *Sept 2024 – Present*

National Institute of Technology, Andhra Pradesh — *Tadepalligudem, India*
Bachelor of Technology in Computer Science | GPA: 8.25/10 — *Oct 2020 - May 2024*

Experience

Artificial Intelligence Institute of USC, Graduate Research Assistant — *Aug 2024 - present*
Advisor: Dr. Amit Sheth — Columbia, SC

- Building Multi-Agent Neurosymbolic Framework for explainable workflow orchestration
  – Developing a dynamic orchestrator for neurosymbolic heterogeneous multi-agent systems with structured knowledge and expert feedback, targeted towards automating workflows for mission critical enterprise applications.
  – Building evaluation suite for testing reliability, consistency, safety, explainability and grounding on agentic systems.
- Hybrid Small Models Construction for domain specific tasks
  – Building Small Foundational Model (SFM) with integrated structured knowledge representations (Knowledge Graphs, Ontologies) for reasoning based Knowledge-Infused Learning with Financial asset management as a use-case.
- Automating Schema generation using Foundational Models
  – Evaluating Language models for task-specific schema generation from datasets on downstream tasks.

ADT, Artificial Intelligence Intern — *May 2025 - July 2025*
Mentors: Abhishek Nalamothu, Helena Fopiano — *Boca Raton, FL*

- Automated chat containment using knowledge infused inference (Led to Patent filing)
  – Developed a continual learning pipeline for chat containment leveraging Knowledge-Infused Inference (KII) to integrate structured domain knowledge into existing model reasoning.
  – Achieved a 40% improvement in containment, and reduced human intervention by 10.5K hours ($\$1.6M$ annually).

Artificial Intelligence Institute of USC, Research Specialist — *Jan 2024 - May 2024*
Guide: Dr. Amit Sheth — Columbia, SC

- External Knowledge for Scholarly article searches
  – Developed a Flask-based full-stack application incorporating external knowledge graphs for scholarly article searches; reduced review time by 90%.

Indian Institute of Science, Research Intern — Sept 2022 - March 2023
Guide: Dr. S. N. Omkar — Bengaluru, India

- Computer Vision for Bio-mechanical sports analysis
  – Built a computer vision–based postural and sports biomechanics analysis (MoveNet model) platform, reducing assessment time by 98% and boosting precision by 27%.
- Platform for Nutrition and Fitness QnA
  – Developed a fine-tuned BERT model for fitness and nutrition Q&A; improved accuracy by 44% over previous models.
  – Built a full stack website and integrated existing nutrition and fitness courses with chatbot and postural analyser.

Indian Institute of Technology Madras, Research Intern — June 2022 - August 2022
Guide: Dr. Raghunathan Rengaswamy — Chennai, India

- Air Quality-based route optimization
  – Built interactive maps and routing algorithms using route prioritization for custom deployed air quality sensors over volunteered vehicles (cars, buses, taxis) using Graph neural Networks (GNNs).
  – Integrated real-time traffic monitoring and air quality interactive maps via APIs reduced route calculation time by 14% and improving accuracy by 37%.

Indian Institute of Science Education and Research, Research Intern — May 2022 - July 2022
Guide: Dr. Vinod Kurmi — Bhopal, IN

- Fine-tuning CNN models for smoking detection
  – Fine-tuned seven CNN models for ensemble based smoker vs. non-smoker image classification, improving accuracy by 48% and reducing false positives by 82% on challenging (dim/noisy) images.

Patents **(Pending)**

Multi-Agent Framework for proactive security anomaly detection using multimodal knowledge graphs
Digital Twin-driven Home Navigation System for First Responders
Agentic Framework for Chat Containment using Knowledge Infused Inference
Smart Neighborhood Watch

Selected Publications (for more, please visit google scholar)

In-Situ Eval: A Modular Framework for Custom and Real-Time RAG Benchmarking *(First Author)* **(*AAAI Demo '26*)**
DYNO : Dynamic Neurosymbolic Orchestrator for Multi-Agent Systems *(First Author)* **(*AAAI Workshop '26*)**
Building Multimodal Knowledge Graphs: Automation for Enterprise Integration *(First Author)* **(*IEEE Internet Computing '25*)**
Chatsparent: An Interactive System for Detecting and Mitigating Cognitive Fatigue in LLMs **(*AAAI Demo '26*)**
Exploring The Potential of LLMs for Assisting with Mental Health Diagnostic Assessments **(*ACM Transactions '25*)**
AI-Augmented Search for Systematic Reviews: A Comparative Analysis **(*ASIS&T '25*)**
FACTIFY3M: A benchmark for multimodal fact verification with explainability through 5W Question-Answering **(*EMNLP '23*)**

Projects

In-Situ Eval: Real-time evaluation framework for RAG benchmarking *March 2025*
Built a streamlit-powered pipeline to run real-time evaluations on custom datasets with sub-sampling, retrieval techniques, configurable LLMs and inclusive of generic and RAG centric evaluation metrics.
GearUP: Human-in-the-Loop Scholarly Search *March 2024*
Developed a full-stack application that operationalized a human-in-the-loop pipeline for scholarly article searches by integrating Generative AI and Knowledge Graphs (Neuro-Symbolic AI).
Kreeda: Bio-mechanical Posture Analysis *March 2023*
Developed and deployed a real-time posture analysis platform for training regiments and sports - cricket, tennis.
Kaatru: Air Quality-Based Route Optimization *August 2022*
Developed and deployed real-time route optimizer integrating air-quality and google maps APIs.

Leadership & Community Service

Advisor of Artificial Intelligence – ADT *Aug 2025 - Present*
– Advising the MLOps team towards strategic initiatives and building multi-agent architectures in customer support containment, proactive anomaly prediction in home security and incorporation of digital twin for enhanced neighborhood safety.

Organizational Leadership
– AlmaConnect founding member, Student Coordinator - 2023 to 2024 and Secretary General - 2024 to 2026
– Google Developer Student Clubs Lead 2023 - NIT Andhra Pradesh

Reviewer
– Reviewer for top-tier conferences (AAAI, ACM Transactions, IEEE IC, IEEE Computational Social Systems)

Teaching and Mentorship

Teaching Experience:
- **TA (CSCE102) - Web Development**: Taught web design to 60+ students (*Sept 2024 - April 2025*) **(UofSC)**
- **TA (CSCE101) - Python**: Taught 70+ students with real-world implementations (*Sept 2024 - April 2025*) **(UofSC)**
- **TA (CS205) - Operating Systems Lab**: Conducted tutorials for 150+ sophomores (*Sept 2022 - April 2023*) **(NIT-Andhra)**

Mentorship:
- **Mentor - Intro to Python**: Taught Python to 180+ students ranging from grade 6 to 12 (*Oct 2020 - March 2021*) **(Tekie)**
- **Guest Lecture** : Taught NeuroSymbolic AI with applications to 300+ 2nd & 3rd years (*Jan 2025*) **(NIT-Andhra)**

Skills

Languages & Frameworks: Python, C, JavaScript, SQL, NoSQL (Firebase, MongoDB), React
Libraries: Pandas, PyMC, PyG, TensorFlow, PyTorch, Matplotlib, Seaborn, NumPy, Scikit-learn, Keras
Tools & Technologies: Docker, DevOps, MLOps, Google ADK, Cloud Deployment (AWS, Azure, Google Cloud), Neo4j, Git
Research Topics: Neurosymbolic AI, Knowledge Graphs, Multi-modal Reasoning, Language Models(SLM/LLM), RAG, GenAI Evaluations, Reinforcement Learning, Representation Learning, Natural Language Understanding, Computer Vision, Machine Learning, Deep Learning, Data Science, Full-Stack Development, UI/UX design, Human Computer Interactions

Certifications

- NVIDIA DLI - Fundamentals of Deep Learning
- Stanford Online - Machine Learning
- IIT Roorkee - Python for Machine Learning
- Microsoft Technology - Introduction to programming using python. (CertID: erKk-4TpH)

Achievements - Extracurriculars

- 2 times Featured Article in AIM (top AI magazine in India)
- Voluntary Guest Lecturer for Python and Full Stack Development courses - NIT Andhra Pradesh