Nihar Purshottam Sanda

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EDUCATION

Northeastern University - Khoury College of Computer Sciences **Aug 2023 - Dec 2025**
MS in Computer Science — GPA: 4/4 *Boston, MA, USA*
- Master's Thesis: *"Cross-Domain Knowledge Retrieval Using LLM-Enhanced Graphs"*

Indian Institute of Information Technology, Dharwad **2019 - 2023**
Bachelor of Technology, Computer Science and Engineering — GPA: 3.7/4 *Karnataka, India*
- Director's Gold Medal for Best Outgoing Student

EXPERIENCE

The Institute for Experiential AI - Northeastern University **Jan 2026 – Present**
Machine Learning Engineer *Boston, MA*
- Led end-to-end knowledge aggregation infrastructure for **PRISM**, a production-deployed hybrid **GraphRAG + VectorRAG** platform using distributed AI agent swarms for autonomous graph construction, achieving **200x faster** performance.
- Architected PRISM's integration with **INDRA**, delivering evidence-grounded biomedical causal insights at **5x lower cost** than commercial AI platforms for increasing efficiency in drug discovery.
- Developed **eGoT (enhanced Graph-of-Thoughts)**, a novel multi-hop GraphRAG algorithm combining adaptive graph traversal with LLM-driven reasoning, improving retrieval precision by **44%** and faithfulness by **27%** over prior SOTA on benchmarks.
- Co-designed **BRAHMA**, a multi-agent system for automated hypothesis generation with dual validation layers, performing co-occurrence analysis, claim verification, and global literature cross-referencing via a **Neo4j**-backed knowledge graph at scale.

Institute for Software Integrated Systems - Vanderbilt University **May 2024 - Dec 2024**
Machine Learning Engineer Intern *Nashville, TN*
- Architected **scalable real-time inference endpoints** for **Livekit Agents** to process **100 requests/second** for Emotion Recognition and YOLO models on a 20-node Kubernetes cluster, reducing latency by 40% and maintaining 99.9% uptime.
- Developed a **Human Activity Tracking** system for collaborative learning environments, integrating state-of-the-art **Kalman filters** and **triplet loss-based ReID models**, achieving 92% mAP across 10+ hours of video data from 10 classrooms.
- Engineered a **multimodal fusion technique for emotion recognition**, attaining 87% accuracy in affect mapping for the NSF AI Engage Institute's project, impacting 1000+ students across 5 universities.

Google Summer of Code, PEcAn Project **2022 and 2023**
Data Science Student Intern *Chicago, IL*
- Developed the **various PEcAn packages** of **data assimilation and meta-analysis** for Carbon and Land geospatial data.
- Leveraged **R Shiny** to create a **robust and user-friendly dashboard**, empowering users to generate dynamic **SDA (State Data Assimilation) and forecasting graphs** for various researchers around the world.
- Enhanced the **authentication of the existing REST APIs** by incorporating robust **API Key authentication** and implementing efficient **rate-limiting features**.

PROJECTS

GeoSAFE - Geospatial Artificial Intelligence Safety Assurance Framework and Interpretability | *NLP, AI-Safety* **Nov 2022**
- Designed a novel **safety assurance framework GeoSAFE**, for geospatial AI, introducing a taxonomy encompassing **six critical hazard categories** and addressing domain-specific safety concerns.
- Curated a dataset of **12,078** LLM-human interaction **prompts and responses**, annotated for **safety evaluation**, leveraging data-centric AI principles to remove bias and fairness in the prompts.
- Improved AI-safety classification accuracy by **fine-tuning** large language models like LLamaGuard, NeMo Guardrails achieving a **97% F1 score** and significantly reducing false safe rates in geospatial AI prompts.

PRISM: Unified AI-Augmented Knowledge Aggregation Platform for BioTech | *Knowledge Graphs, NLP, RAGs* **Jan 2024**
- Built a scalable LLM-based knowledge graph and RAG system, achieving **200x faster** document processing vs. Neo4j.
- Developed a SOTA Graph-of-Thoughts retrieval method, improving precision by **44%**, faithfulness by **27%**, and outperforming prior SOTA on **Multi-Hop QA benchmarks**.
- Integrated biomedical ontology knowledge graphs, enabling evidence-grounded insights at **5x lower cost** than cloud AI platforms.

RESEARCH PAPERS AND PUBLICATIONS

- **eGoT: Enhanced Graph-of-Thoughts for Improved Knowledge Retrieval** - ISMB 2026
- **GeoSAFE - Geospatial Artificial Intelligence Safety Assurance Framework and Evaluation** - AACL-IJCNLP 2025
- **Idea11y: Enhancing Accessibility in Collaborative Ideation for Blind or Low Vision Screen Reader Users** - CHI 2026
- **Challenges of Applying Computer Vision for Emotion Detection in Educational Settings: A Study on Bias** - International Conference on Artificial Intelligence in Education (AIED) 2025
- **An Effective Framework for Protein Fold Prediction through the Fusion of Evolutionary Information and Attention Mechanism with Deep Neural Networks** - IEEE Journal for Biomedical and Health Informatics 2025

SKILLS

Languages: Python, R, Java, Golang, CUDA, C++, C, JavaScript, TypeScript
ML / NLP: PyTorch, TensorFlow, JAX, Scikit-learn, NLTK, spaCy, Transformers, BERT, GPT, LLMs, Guardrails
LLM Stack: Fine-tuning, Prompt Engineering, RAG, Vector Databases, PEFT, AI Agents, MCP Servers, LangChain
Infrastructure: Docker, Kubernetes, Jenkins, CI/CD, RESTful APIs, Flask, Django, R Shiny
Databases: PostgreSQL, MySQL, MongoDB, Neo4j, DynamoDB, Redis, SQLite