Sanidhya Vijayvargiya

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EDUCATION

Carnegie Mellon University   GPA: 4.17/4.33
Masters in NLP and Machine Learning (MIIS, Language Technologies Institute)   *Dec 2025 (expected)*

- **OpenHands AI Agent**: Enhancing the agent to effectively handle ambiguous prompts, boosting solution accuracy and resource efficiency in software development tasks advised by **Dr. Graham Neubig**. Under Review at **ICML 2025**.
- **OpenAgentSafety**: Leading project on creating an open source framework to simulate user-AI-tool interactions and developing SafetyAgent model to assess safety risks advised by **Dr. Maarten Sap**.
- Relevant coursework: Multimodal Machine Learning, Advanced NLP, Generative AI, Search Engines, Speech Technology for Conversational AI. Graduate Teaching Assistant for Advanced NLP

Birla Institute of Technology & Science, Pilani   GPA: 9.22/10
Bachelor of Engineering - Computer Science   *July 2024*

- Published **8 research papers** in NLP applications for code and software engineering, focusing on productivity improvements in development environments. Designed innovative solutions for code refactoring, software requirements classification and malware prediction in code. Awarded **Best Paper** at ICCSA 2022.
- Investigated **in-context learning** in LLMs by discouraging the formation of induction heads as a continuation of the work done by Anthropic in *In-context learning and induction heads*.
- Relevant coursework: Natural Language Processing, Data Mining, Reinforcement Learning, Information Retrieval

EXPERIENCE

MITACS Globalink Internship   Dalhousie University, Canada
Research Intern   *June 2023 - April 2024*

- Led a project using fine-tuned MLMs and **RLHF** to address **identifier renaming in code**, increasing code readability and maintainability.
- Curated a dataset of 236,745 high-quality variable name–code snippet pairs. Developed a novel **code readability assessment tool** to measure improvements from proposed model.
- The 125M parameter renaming model outperformed Gemini Pro by 62.5% and the original identifier names by 22%. The model is accessible on HuggingFace.

Undergraduate Thesis at Nanyang Technological University   Singapore (Remote)
Research Intern   *July 2023 - April 2024*

- Enhanced **code-switched text generation** by integrating grammatical information into multi-head fine-tuning of RoBERTa on POS tag prediction and masked language modeling tasks.
- Applied few-shot prompting with Chain-of-Thought (CoT) reasoning for **multi-lingual LLMs** such as PaLM and SeaLLM, improving text generation quality between code-switch points.
- Generated augmentation sentences had **48% lower perplexity** than those produced by GPT-3.5 and led to a 4% decrease in perplexity when added to the SEAME dataset.

SELECTED PUBLICATIONS

- **Enhancing Identifier Naming Through Multi-Mask Fine-tuning of Language Models of Code**: First author for paper published at 24th IEEE International Conference on Source Code Analysis and Manipulation 2024. **Paper**

- **Software Requirements Classification using Deep-learning Approach with Various Hidden Layers**: First author for paper published at 17th Conference On Computer Science and Intelligence Systems FedCSIS 2022. **Paper**

- **Empirical Analysis for Investigating the Effect of Machine Learning Techniques on Malware Prediction**: First author for paper published at 18th International Conference on Evaluation of Novel Approaches to Software Engineering (ENASE 2023). **Paper**

PROJECTS

- **Synthetic data generation for LLM routers**: Trained various **LLM router** architectures solely on synthetically generated preference data between models that did not previously have any training data and outperformed generic routers by 12%.

- **RAG model for domain-specific queries**: Developed a Retrieval-Augmented Generation (**RAG**) pipeline with Llama 3.1, optimizing for domain-specific queries, achieving top performance in the class employing techniques such as cross encoders and HyDE.

SKILLS

- **Languages:**   Python, TensorFlow, Pytorch, C++, MySQL, SQLite
- **ML:**   Natural Language Processing, Reinforcement Learning, Information Retrieval, Image Generation, AI agents
- **NLP:**   RLHF, Code Generation, Summarization, Sentiment Analysis, Multilingual NLP, Search Engines, PEFT