

# Varad Patwardhan

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## EDUCATION

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<b>Ph.D. Student in Computer Science</b> North Carolina State University	Aug 2025 - May 2030 GPA : 4.0/4.0
<b>Master of Science in Computer Science</b> North Carolina State University	Aug 2023 - Jul 2025 GPA : 4.0/4.0
<b>Thesis:</b> <i>Reconstructing Student Coding Behavior from Keystroke-Level Data: A Plugin-Based Approach</i>	

## EXPERIENCE

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<b>Teaching Assistant</b>   <i>NC State University</i> <ul style="list-style-type: none"><li>Mentored 100+ students in algorithms/Java, focusing on correctness, edge cases, and complexity.</li><li>Assisted with grading and labs for 100+ students using rubrics, ensuring fair, consistent feedback.</li></ul>	Aug 2025 – Present
<b>Graduate Research Assistant</b>   <i>NC State University</i> <ul style="list-style-type: none"><li>Master's Thesis: Built Eclipse plugin logging 15 event types + full save snapshots (Java, Eclipse).</li><li>Collected 8.1M+ keystroke-level events across CS course cohorts.</li><li>Designed reconstruction/analysis pipeline (session segmentation, replay, trend metrics).</li></ul>	Jan 2024 – Aug 2025
<b>Pentair Fellow (Studios Advisor)</b>   <i>NC State University Libraries</i> <ul style="list-style-type: none"><li>Built and Optimized a RAG assistant (LangChain, ChromaDB, OpenAI), cutting response time from minutes to seconds.</li><li>Deployed secure retrieval over staff FAQs/policies; delivered instant, context-aware answers.</li><li>Created and demoed LLM/chatbot/game-AI prototypes; adopted in 10+ pop-ups/trainings.</li></ul>	Jan 2024 – Aug 2025
<b>NLP Research Intern</b>   <i>L3Cube</i> <ul style="list-style-type: none"><li>Collected and processed Hindi-English code-mixed datasets; built language-aware embeddings for BERT/HingBERT.</li><li>Optimized models to 95% F1 on downstream Natural Language Processing tasks.</li><li>Benchmarked BERT, RoBERTa, HingBERT, HingRoBERTa for low-resource code-mixed languages.</li></ul>	Jun 2022 – May 2023

## PROJECTS

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<b>CacheForge++ (Graph-Of-Thought)</b>   <i>Graph-Of-Thought, LLM, Cache Replacement</i> <ul style="list-style-type: none"><li>Implemented a Graph-of-Thought-based system for LLM-driven cache replacement policy generation by decomposing workloads into sub-iterations, generating candidate policies, and combining them into a final cross-workload policy.</li><li>Conducted temperature sensitivity experiments with GPT-OSS-120B, comparing policy robustness and performance statistics across decoding settings.</li></ul>	Dec 2025
<b>StudiosLLM</b>   <i>LangChain, GPT-5, ChromaDB</i> <ul style="list-style-type: none"><li>Staff-facing RAG assistant indexing internal policies, workflows, and IT docs to answer complex queries in natural language.</li><li>Optimized assistant to achieve <math>\approx 10x</math> faster lookups via hybrid retrieval, caching, and prompt/tooling guards.</li><li>Supports multi-session chat with persistent history; self-improves via feedback loops and periodic retraining.</li></ul>	Aug 2025
<b>LLM-Geolocation</b>   <i>Computer Vision, OpenAI, OSINT</i> <ul style="list-style-type: none"><li>Developed an OSINT image geolocation pipeline with a vision-LLM (GPT-4V).</li><li>Curated and evaluated a dataset of 80 images; designed 4 prompt types and computed errors with the Haversine metric.</li><li>Achieved 80–81% location ID on constrained prompts; correct coordinates for 38/80 images with median error of 0.11 km.</li></ul>	May 2024

## TECHNICAL SKILLS

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**Languages:** Python, C/C++, Java, JavaScript, SQL, Bash, C#  
**AI/ML:** PyTorch, TensorFlow, Keras, Hugging Face, LangChain (RAG), OpenAI API, LLaMA, DeepSeek  
**Tools:** Git, Docker, Jupyter, Android Studio, Firebase  
**Areas:** Artificial Intelligence, Machine Learning, Deep Learning, Natural Language Processing, LLMs, Data Analytics

## PUBLICATIONS

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**Patwardhan, V. (2025) Reconstructing Student Coding Behavior from Keystroke-Level Data: A Plugin-Based Approach.** *Master's Thesis, NC State University*  
URI: [lib.ncsu.edu/resolver/1840.20/45432](http://lib.ncsu.edu/resolver/1840.20/45432)

Islam, S.; Gao, Z.; Bacher, J.; Silva De Oliveira, G.; **Patwardhan, V.**; Heckman, S.; Lynch, C. (2025). **EclipseMonitor: A Real-Time Student Programming Environment Data Collection Tool.** *SIGCSE TS 2025 (Posters)*, pp. 1489–1490.  
DOI:10.1145/3641555.3705170

Takawane, G.; Phaltankar, A.; **Patwardhan, V.**; Patil, A.; Joshi, R.; Takalikar, M.S. (2023). **Language Augmentation for Code-Mixed Text Classification.** *Natural Language Processing Journal*, 5, 100042.  
DOI:10.1016/j.nlp.2023.100042