Varad Patwardhan

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Education

Ph.D. Student in Computer Science — Aug 2025 - May 2030 (expected)
North Carolina State University

Master of Science in Computer Science — Aug 2023 - Jul 2025
North Carolina State University — GPA : 4.0/4.0
Thesis: *Reconstructing Student Coding Behavior from Keystroke-Level Data: A Plugin-Based Approach*

Experience

Teaching Assistant | *NC State University* — Aug 2025 – Present
- Mentored 100+ students in algorithms/Java via office hours and 1:1s, focusing on correctness, edge cases, and complexity.
- Assisted with grading and labs for 100+ students using rubrics, ensuring fair, consistent feedback.

Graduate Research Assistant | *NC State University* — Jan 2024 – Aug 2025
- Master's Thesis: Built Eclipse plugin logging 15 event types + full save snapshots (Java, Eclipse).
- Collected 8.1M+ keystroke-level events across CS course cohorts.
- Designed reconstruction/analysis pipeline (session segmentation, replay, trend metrics).

Pentair Fellow (Studios Advisor) | *NC State University Libraries* — Jan 2024 – Aug 2025
- Built a staff-facing RAG assistant (LangChain, ChromaDB, OpenAI), cutting response time from minutes to seconds.
- Deployed secure retrieval over staff FAQs/policies; delivered instant, context-aware answers.
- Created and demoed LLM/chatbot/game-AI prototypes; adopted in 10+ pop-ups/trainings.

NLP Research Intern | *L3Cube* — Jun 2022 – May 2023
- Collected and processed Hindi–English code-mixed datasets; built language-aware embeddings for BERT/HingBERT.
- Optimized models to 95% F1 on downstream Natural Language Processing tasks.
- Benchmarked BERT, RoBERTa, HingBERT, HingRoBERTa for low-resource code-mixed languages.

Projects

StudiosLLM | *LangChain, GPT-5, ChromaDB* — Aug 2025
- Staff-facing RAG assistant indexing internal policies, workflows, and IT docs to answer complex queries in natural language.
- Achieved ≈10x faster lookups (minutes to seconds) via hybrid retrieval, caching, and prompt/tooling guards.
- Supports multi-session chat with persistent history; self-improves via feedback loops and periodic retraining.

LLM-Geolocation | *Computer Vision, OpenAI, OSINT* — May 2024
- Developed an OSINT image geolocation pipeline with a vision-LLM (GPT-4V).
- Curated and evaluated a dataset of 80 images; designed 4 prompt types and computed errors with the Haversine metric.
- Achieved 80–81% location ID on constrained prompts; correct coordinates for 38/80 images with median error of 0.11 km.

Detecting Osteoarthritis in Dogs | *Machine Learning, Computer Vision, Python* — Apr 2024
- Built a multi-modal pipeline over gait videos and Tekscan COP (FSX) files, fusing spatial + temporal signals.
- Benchmarked CNN, LSTM (window=120), and Random Forest on a dataset of ≈120 dogs (walk/trot trials).
- Achieved 92% accuracy via targeted feature engineering, deep-learning training, and reproducible validation notebooks.

Technical Skills

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

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

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