Nalin Wadhwa

Research Fellow, Microsoft Research

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Education

Aug 2025 – Present | **University of Illinois** — **Urbana-Champaign**
PhD in Computer Science – Advisor: Prof. Gagandeep Singh

Jun 2023 – Aug 2019 | **Indian Institute of Technology, Delhi** — **Delhi, India**
Bachelor of Computer Science and Engineering, *CGPA: 8.00/10.00*

Research Experience

Present – Jul 2023 | **Microsoft Research India** — **Bangalore, India**
Research Fellow | Advisors: Dr. Sriram Rajamani
Collaborators: Dr. Aditya Kanade, Nagarajan Natarajan
Projects: CORE: Resolving code quality issues using LLMs; MASAI: Modular Architecture for Software Engineering AI agents.

Jul 2022 – Jun 2022 | **Microsoft IDC** — **Hyderabad, India**
Data & Applied Research Intern | Manager: Ram Shankar
Projects: Code Summarization for Bing Code Answers

Publications

[1] **BEAVER: An Efficient Deterministic LLM Verifier**
Nalin Wadhwa*, Tarun Suresh*, Debangshu Banerjee, Gagandeep Singh
BEAVER is the first practical framework for deterministic LLM verification, computing probability bounds on semantic constraint satisfaction and achieves 6-8× tighter bounds than baseline methods across correctness, privacy, and security tasks.
[**Preprint**]

[1] **Code Researcher: Deep Research Agent for Large Systems Code and Commit History**
Ramneet Singh*, Sathvik Joel*, Nalin Wadhwa, Abhav Mehrotra, Ramakrishna B Bairi, Aditya Kanade, Nagarajan Natarajan
Code Researcher is the first deep research agent for code, performing multi-step reasoning over large codebases and commit histories to generate patches for systems-level crashes. On the Linux kernel benchmark kBenchSyz, it achieves a 48% crash-resolution rate.
[**Preprint**]

[3] **MASAI: Modular Architecture for Software Engineering AI agents**
Nalin Wadhwa*, Daman Arora*, Atharv Sonwane*, Abhav Mehrotra, Saiteja Utpala, Ramakrishna Bairi, Aditya Kanade, Nagarajan Natarajan
Proposed a novel pipeline to fix Github issues raised on large code repositories using multi-agent framework; Used various PL techniques and prompting strategies for each sub-agent & analysed for optimal setup for each task; Got SOTA performance on competitive benchmark SWE-Bench Lite.
[**OWA Workshop NIPS 2024**]

[4] **CORE: Resolving CodeQL issues using LLMs**
Nalin Wadhwa, Jui Pradhan, Atharv Sonwane, Surya Prakash Sahu, Nagarajan Natarajan, Aditya Kanade, Suresh Parthasarathy, Sriram Rajamani
Created a strategy to correctly fix 52 Python CodeQL and 30 Java SonarQube Queries; Got SOTA performance wrt. competing methods, along with a more scalable & practical design; Implemented it to fix bug on large internal repositories at Microsoft.
[**FSE 2024**]