Nalin Wadhwa

Research Fellow, Microsoft Research

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Education

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

Apr 2019 | **Army Public School** — **Kolkata, India**
Apr 2017 | Central Board of Secondary Education, *95.2% (2^{nd} in school)*

Experience

Present | **Microsoft Research India** — **Bangalore, India**
Jul 2023 | *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 | **Microsoft IDC** — **Hyderabad, India**
Jun 2022 | *Data & Applied Research Intern | Manager: Ram Shankar*
Projects: Code Summarization for Bing Code Answers

Publications

[1] **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.
[**Preprint | OWA Workshop NIPS 2024**]

[2] **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.
[**Preprint | FSE 2024**]

Select Research Projects

Code Summarization for Bing Code Answers (NLP, AI4Code) — Microsoft IDC
Advisors: Ram Shankar
› Used code summarization for summary from code snippets from webpages to improve dev query results on Bing Search Engine.
› Improved dev query results on sample Bing Search results by 25% and offered PPO for my performance.

Sentiment Analysis for context separation in words (Deep Neural Networks, NLP) — IIT Delhi
Advisors: Prof. Mausam
› Wrote an attention only encoder decoder model that separates same word used in different context in different sentences.
› Got 78% accuracy on training set and 68% on final test set (2nd in course).

Program Synthesis for Vectorized array functions (C, Systems) — IIT Delhi
Advisors: Prof. Sorav Bansal
› Using x86 intrinsics, built a layer of highly optimized vector operation code blocks to form a layer of abstraction over assembly.
› Implemented Glibc functions & made an auto vectorizer using the abstraction.