Atharv Sonwane

Research Fellow, Microsoft Research

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Research Interests: *Self-improving systems, Reasoning + Learning, Robotics, Software engineering*

Education

Cornell University *2024 -*
PhD, Computer Science

Birla Institute of Technology and Science, Pilani *2018 - 2022*
Bachelor in Engineering, Computer Science.

Experience

Microsoft Research India *2022 - 2024*
Research Fellow | Advisors: Dr. Aditya Kanade and Dr. Sriram Rajamani

- **MASAI**: A modular agentic framework for software engineering with 28.3% on SWE-bench-lite (SOTA at the time).
- **CodePlan**: Repository-level code editing tasks using program analysis as interface for LLMs. **FSE '24**
- Studied self-evaluation and ranking of LLM generated rewrites for code-quality issues. **FSE '24**

Robot Vision and Learning Lab, University of Toronto *2021*
Research Intern | Advisor: Dr. Florian Shkurti

- Designed and implemented a lazy search together with learning from experience for task and motion planning (TAMP) problems for tabletop robotics tasks. **ICRA '23**. Best Paper @ Long Horizon Planning Workshop @ CoRL 2022

TCS Research & Innovation *2021*
Research Intern | Advisor: Dr. Gautam Shroff

- Searching for neural programs to represent analogical concepts. Student Poster **AAAI '21**, **NeSy '21**.

APP Centre for Artificial Intelligence Research *2021*
Undergraduate Researcher | Advisor: Prof Ashwin Srinivasan

- Solving visual reasoning (Bongard) problems using program synthesis (Dreamcoder) for representation and Inductive Logic Programming (ILP) for concept identification. **AAIP '21**

Research

MASAI: Modular Architecture for Software-engineering AI Agents
Atharv Sonwane*, *Daman Arora**, *Nalin Wadhwa**, *Abhav Mehrotra, Saiteja Utpala, Ramakrishna Bairi, Aditya Kanade, Nagarajan Natarajan*
Preprint. Link.

CodePlan: Repository-level Coding using LLMs and Planning
*Ramakrishna Bairi, **Atharv Sonwane**, Aditya Kanade, Vageesh D C, Arun Iyer, Suresh Parthasarathy, Sriram Rajamani, B. Ashok, Shashank Shet*
ACM International Conference on the Foundations of Software Engineering (**FSE**) 2024. Link.
Foundation Models for Decision Making (**FMDM**) Workshop at **NeurIPS** 2023

Policy-Guided Lazy Search with Feedback for Task and Motion Planning
*Mohamed Khodeir, **Atharv Sonwane**, Ruthrash Hari, Florian Shkurti*
International Conference on Robotics and Automation (**ICRA**). 2023. Link.
Best Paper Award at the Long-Horizon Planning Workshop, **CoRL** 2022

Neural Analogical Reasoning
Atharv Sonwane*, Abhinav Lalwani, Sweta Mahajan, Gautam Shroff, Lovekesh Vig*
International Workshop on Neural-Symbolic Learning and Reasoning (**NeSy**). 2022. Link.

Solving Visual Analogies Using Neural Algorithmic Reasoning
Atharv Sonwane*, Gautam Shroff, Lovekesh Vig, Ashwin Srinivasan, Tirtharaj Dash.*
Finalist in the Oral Presentation Competition. Student Abstract and Poster Program, **AAAI-22**. Link.

Using Program Synthesis and Inductive Logic Programming to solve Bongard Problems.
Atharv Sonwane*, Sharad Chitlangia*, Tirtharaj Dash, Lovekesh Vig, Gautam Shroff, Ashwin Srinivasan.*
International Workshop on Approaches and Applications of Inductive Programming (**AAIP**) 2021. Link.

Frustrated with Code Quality Issues? LLMs can Help!
Nalin Wadhwa, Jui Pradhan, ***Atharv Sonwane****, Surya Prakash Sahu, Nagarajan Natarajan, Aditya Kanade, Suresh Parthasarathy, Sriram Rajamani*
ACM International Conference on the Foundations of Software Engineering (**FSE**) 2024. Link.

Selected Engineering Projects

AutoFill.jl | Julia library for data manipulation | CODE
Implemented FlashFill program synthesis for tabular data analysis during Google Summer of Code (GSoC) 2022

GenRL | PyTorch Reinforcement Learning Library | CODE
Contributed implementations of Deep Contextual Bandits along with distributed RL support using RPC.

Trotbot | Autonomous Delivery Robot | CODE
Obstacle detection and path planning stack built with Robot Operating System (ROS).

Other Roles

Teaching

Meta Learning (BITS G513), Deep Learning (CS F425), Machine Learning (BITS F464)
Discrete Structures for Computer Science (CS F222)

Leadership

- Hardware Lead @ Curem Biotech
- President of the Society for Artificial Intelligence and Deep Learning:
- Student Coordinator of the Electronics and Robotics Club

Reviewing

FMDM Workshop @ NeurIPS 2023

Technical Skills

Programming	Python, Julia, C/C++, MATLAB, SQL, Bash
Deep Learning	PyTorch, NumPy, JAX, pandas, scikit-learn
Robotics	Robot Operating System (ROS), Gazebo, MAVROS, PX4