

Aaditya Naik

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Research Interests: Scalable Neurosymbolic Programming, Differentiable Reasoning, Program Synthesis, AI for SE

EDUCATION

University of Pennsylvania

Ph. D., Computer and Information Science

Sept. 2020 – Present

NMIMS Mukesh Patel School of Tech. Mgmt. and Engg. (MPSTME)

B. Tech., Computer Engineering

July 2016 – May 2020

PUBLICATIONS

* Co-first author

Dolphin: A Programmable Framework for Scalable Neurosymbolic Learning

Aaditya Naik, Jason Liu, Claire Wang, Saikat Dutta, Mayur Naik, Eric Wong

Submitted to ICLR '25

TorchQL: A Programming Framework for Integrity Constraints in Machine Learning

Aaditya Naik, Adam Stein, Yinjun Wu, Mayur Naik, Eric Wong

Proceedings of OOPSLA '24

LLM-Based Test-Driven Interactive Code Generation: User Study and Empirical Evaluation.

Sarah Fakhoury, **Aaditya Naik**, Georgios Sakkas, Saikat Chakraborty, Shuvendu K. Lahiri

IEEE Transactions on Software Engineering '24 (Volume 50, Issue 9)

Relational Query Synthesis Decision Tree Learning

Aaditya Naik, Aalok Thakkar, Adam Stein, Mayur Naik, Rajeev Alur

Proceedings of VLDB '24

Do Machine Learning Models Learn Statistical Rules Inferred from Data?

Aaditya Naik, Yinjun Wu, Mayur Naik, Eric Wong

Proceedings of ICML '23

Learning to Walk over Relational Graphs of Source Code.

Pardis Pashakhanloo, **Aaditya Naik**, Hanjun Dai, Petros Maniatis, Mayur Naik

Proceedings of DL4C Workshop @ ICLR '22

CodeTrek: Flexible Modeling of Code using an Extensible Relational Representation.

Pardis Pashakhanloo, **Aaditya Naik**, Yuepeng Wang, Hanjun Dai, Petros Maniatis, Mayur Naik

Proceedings of ICLR '22

Sporq: An Interactive Environment for Exploring Code Using Query-by-Example.

Aaditya Naik, Jonathan Mendelson, Nathaniel Sands, Yuepeng Wang, Mayur Naik, Mukund Raghothaman

Proceedings of UIST '21

Example-Guided Synthesis of Relational Queries.

Aalok Thakkar, **Aaditya Naik**, Nate Sands, Mukund Raghothaman, Mayur Naik, Rajeev Alur
Proceedings of PLDI '21

GenSynth: Synthesizing Datalog Programs without Language Bias.

Jonathan Mendelson*, **Aaditya Naik***, Mukund Raghothaman, Mayur Naik
Proceedings of AAAI '21

Code2Inv: A Deep Learning Framework for Program Verification.

Xujie Si*, **Aaditya Naik***, Hanjun Dai, Mayur Naik, Le Song
Proceedings of CAV '20

WORK EXPERIENCE

Microsoft Research

Summer Research Intern

June 2021 – Sept. 2021

- Formalized the problem for interactive test-driven code generation, potential solutions and workflows, and evaluated it at scale.
- Conducted comprehensive studies of its impact on the Codex model.

University of Pennsylvania

Research Intern

Jan. 2019 – May 2020

- Worked on a project *Code2Inv* to make it compatible with various input representations including C programs and CHC constraints.
- Conducted a comprehensive study on the state-of-the-art software checkers.
- Implemented an SSA transformation for *Code2Inv* benchmarks using the *Clang C++ API*.

GetParking

Summer Intern

May 2018 – Jul. 2018

- Used transfer learning to build a deep learning model based on the InceptionV3 architecture to identify the make and model of a car given its image.
- Thoroughly reviewed existing state-of-the-art image classification models.

AWARDS

Google PhD Fellowship

2023 - Present

TEACHING EXPERIENCE

University of Pennsylvania

Teaching Assistant

May 2020 – Aug 2023

- TA for *CIS 547: Software Analysis* for Summer and Fall 2020 which covers concepts including static and dynamic analyses, symbolic executors and automated debugging.

ACM Student Chapter, MPSTME

Instructor

Sep. 2019

- Taught core C concepts to college freshman students over a 4 day workshop.

PROJECTS

Sporq

An interactive extension to VS Code for exploring code using query-by-example. It provides a flexible, easy-to-use and familiar interface to allow developers to conveniently synthesize custom program analyzers over their code.

GenSynth

gensynth.cis.upenn.edu

A genetic algorithm which synthesizes Datalog queries given a set of input and output data without requiring language biases.

Code2Inv

code2inv.org

A general end-to-end deep reinforcement learning framework which learns a valid loop invariant for any given verification task in a manner similar to how a human expert would learn the invariant.

SKILLS

Programming Languages : Python, C/C++, Bash, Java

Tools : Git, L^AT_EX, Docker

Miscellaneous : LLVM/Clang APIs, PyTorch, Keras, Z3

REFERENCES

Mayur Naik (PhD Advisor)

Professor and Graduate Chair

Computer and Information Science

University of Pennsylvania

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Mukund Ragothaman

Assistant Professor

Department of Computer Science

University of Southern California

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