

Sumith Kulal sumith@stanford.edu

Abstract

I work on the intersection of programming languages and computer vision. I build systems that benefit from combining symbolic and neural learning techniques. My current focus is on such systems for visual domains.

Education

- 2018-now **Stanford University**, Ph.D. in Computer Science.
Advisor: Alex Aiken & Jiajun Wu
- 2014-18 **Indian Institute of Technology Bombay**, B.Tech. in Computer Science & Engineering.
Advisor: Supratik Chakraborty

Publications

- 2019-20 **Boolean Functional Synthesis: Hardness and Practical Algorithms.** [Paper](#). [Webpage](#).
S. Akshay, Supratik Chakraborty, Shubham Goel, [Sumith Kulal](#), Shetal Shah. FMSD 2020.
- 2018-19 **SPoC: Search-based Pseudocode to Code.** [Paper](#). [Webpage](#).
[Sumith Kulal](#), P. Pasupat, K. Chandra, M. Lee, O. Padon, Alex Aiken, Percy Liang. NeurIPS 2019.
- 2017-18 **Scalable Synthesis with Symbolic Syntax Graphs.** [Paper](#).
Rohin Shah, [Sumith Kulal](#), Rastislav Bodik. SYNT 2018.
- 2017-18 **What's hard about Boolean Functional Synthesis?.** [Paper](#).
S. Akshay, Supratik Chakraborty, Shubham Goel, [Sumith Kulal](#), Shetal Shah. CAV 2018.
- 2016 **Contract-based Resource Verification for Higher-order Functions with Memoization.** [Paper](#).
Ravichandhran Madhavan, [Sumith Kulal](#), Viktor Kuncak. POPL 2017.
- 2015-17 **SymPy: Symbolic computing in Python.** [Paper](#).
SymPy Development Team. PeerJ Journal of Computer Science, 2017.

Work

- summer 2019 **Microsoft Research AI.** Improving generation in neural program synthesis by learning to backtrack.
- summer 2018 **TU Darmstadt.** Designed a protocol for trusted data sharing in a key-value store using blockchains.
- summer 2017 **University of Washington.** Worked on synthesis of scalable expressions and incremental programs.
- summer 2016 **EPFL.** Contributed to extension of the LEON verification system for resource utilization verification.
- summer 2015 **Google Summer of Code.** Designed and implemented a symbolic polynomial module for SymEngine.

Teaching

- winter 2020 **Artificial Intelligence: Principles and Techniques** (CS 221). TA, Stanford.
- fall 2017 **Formal Specification and Verification of Programs** (CS 615). Head TA, IIT Bombay.
- spring 2017 **Logic for Computer Science** (CS 228). TA, IIT Bombay. **Best TA Award**
- spring 2016 **Data Structures and Algorithms** (CS 213x). TA, IIT Bombay.
- fall 2015 **Advanced Calculus** (MA 105). TA, IIT Bombay.

Talks

- 2018 Scalable Synthesis with Symbolic Syntax Graphs. University of Oxford.
- 2017 Automatic Incrementalization through Synthesis. University of Washington.
- 2016 Resource Verification of Lazy Evaluation and Memoization. EPFL
- 2015 Symbolic computation with Python, SymPy. PyCon India & SciPy India