Saswat PADHI

Applied Scientist, Amazon Inc.

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Interested in building reliable secure systems with strong correctness & performance guarantees.

Employment

Amazon	Applied Scientist II	Aug '20 — Present
Boston, MA	Automated Reasoning Group (ARG) • Amazon Web Services (AWS)	

Led the *inductive proofs* effort: correctness and termination for loops in C • Built and extended several compiler and verifier primitives • Delivered proofs of correctness for multiple AWS projects • Collaborated with product teams to fix discovered bugs • Managed 3 PhD interns

Microsoft	Research SDE (Part-Time Contract)	Oct '17 — Aug '18
Remote	Research in Software Engineering (RiSE) • Microsoft Research (MSR)	

Designed a neural approach to identify *data frames* in spreadsheets • Implemented a convolutional neural network (CNN) that achieved human-level accuracy

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Education

Ph. D. (UCLA)	Computer Science (Advisor: Prof. Todd Millstein)	Fall '14 — Spring '20
	University of California, Los Angeles • CA, USA	
B. Tech. (IIT-B)	Computer Science and Engineering (with Honors)	Fall '10 — Spring '14
	Indian Institute of Technology, Bombay • India	

Selected Awards

UCLA	Outstanding Research in CS Award	2020
PLDI	ACM SIGPLAN Distinguished Paper Award	2020
UCLA	Dissertation-Year Fellowship	2019 — 2020
SyGuS	Invariant Synthesis (Inv) Competition Winner	2017, 2018
Microsoft Research	PhD Fellowship	2017 — 2019

Publications

Journals & Conferences Proceedings

1C •   PLDI '20   Data-Driven Inference of Representation Invariants.
A Miltner, S Padhi, T Millstein, D Walker.
📄 *41st ACM SIGPLAN Conf. on Programming Language Design and Implementation Proc., pages 1 − 15.*

2C •   CAV '19   Overfitting in Synthesis: Theory and Practice.
S Padhi, T Millstein, A Nori, R Sharma.
📄 *31st Intl. Conf. on Computer-Aided Verification Proc., pages 315 − 334.*

3C •   CC '19   A Static Slicing Method for Functional Programs and Its Incremental Version.
P Kumar, A Sanyal, A Karkare, S Padhi.
📄 *28th Intl. Conf. on Compiler Construction Proc., pages 53 − 64.*

4J •   OOPSLA '18   FlashProfile: A Framework for Synthesizing Data Profiles.
S Padhi, P Jain, D Perelman, O Polozov, S Gulwani, T Millstein.
📄 *Proceedings of the ACM on Programming Languages 2 (OOPSLA), 2018, pages 150:1 − 128.*

5C •   PLDI '16   Data-Driven Precondition Inference with Learned Features.
S Padhi, R Sharma, T Millstein.
📄 *37th ACM SIGPLAN Conf. on Programming Language Design and Implementation Proc., pages 42 − 56.*

Patents Grants & Applications

6G • US 10394874 B2 **Record Profiling for Dataset Sampling.**
↗ D G Simmons, K D J Grealish, S Gulwani, R Kumar, K M Ellis, S Padhi.

7G • US 10394874 B2 **Syntactic Profiling of Alphanumeric Strings.**
↗ S Gulwani, P Jain, D A Perelman, S Padhi, O Polozov.

8A • US 20200019603 A1 **Systems, Methods, and Computer-Readable Media for Improved Table Identification Using a Neural Network.**
↗ B Zorn, M M J Brockschmidt, P Choudhury, O Polozov, R Singh, S Padhi.

Work Experience

Princeton Univ. Verifying Data Structure Implementations
(Visiting Student RA) with *Prof. David Walker*, PL Group • Princeton, NJ — Apr '19 — Jun '19

Microsoft Mitigating Overfitting in Program Synthesis
(Intern) with *Rahul Sharma*, Systems Group • Bengaluru, India — Sep '18 — Mar '19

Microsoft Recovering Data Frames and Formulas in Spreadsheets
(Intern) with *Ben Zorn*, RiSE Group • Redmond, WA — Jun '17 — Jun '18

Microsoft Synthesizing Pattern-Based Profiles for String Datasets
(Intern) with *Sumit Gulwani*, PROSE Group • Redmond, WA — Jun '16 — Dec '16

UCLA Automated Synthesis of Specifications and Invariants
(Graduate RA) with *Prof. Todd Millstein*, PL and SE Lab • Los Angeles, CA — Sep '14 — Jun '20

IIT-B Lazy Static Slicing of Functional Programs
(Undergraduate RA) with *Prof. Amitabha Sanyal*, Compilers Group • Mumbai, India — Sep '13 — Apr '14

Google Automated Testing of Components in Omega Cluster Scheduler
(Intern) with *Smeeta Jalan*, Technical Infrastructure Team • Mountain View, CA — May '13 — Jul '13

TU-Br Estimating Topical Similarity of Scientific Documents
(Intern) with *Prof. Wolf-Tilo Balke*, Institut für Informationssysteme • Germany — May '12 — Jul '12

Academic Service

PC Program Committee Member
PLDI ⟨2021⟩, SYNT (at CAV) ⟨2021⟩, DebugML (at ICLR) ⟨2019⟩

Reviewer External Reviewer for Research Papers
CAV ⟨2019⟩, ISEC ⟨2019⟩, PLDI ⟨2020⟩, TSE ⟨2021⟩

AEC Artifact Evaluation Committee Member
OOPSLA ⟨2018, 2019⟩, POPL ⟨2020⟩, SAS ⟨2019⟩

OC Organizing Committee Member
SyGuS-Comp ⟨since 2019⟩

Teaching

UCLA Graduate Teaching Assistant — Spring '16 • Fall '14
Programming Languages

IITB Abstractions and Paradigms in Programming — Spring '14
Undergraduate Teaching Assistant

IITB Computer Programming and Utilization — Fall '13 • Fall '11
Undergraduate Teaching Assistant