Kia Rahmani, Ph.D.

Post-doctoral Scientist

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Austin, TX | kiarahmani.github.io | kia-rahmani

I am a computer scientist with over 10 years of research experience in the industry and academia. I am passionate about designing programming language-based tools to enable more generalizable, interpretable, and reliable machine/robot learning algorithms. I am a highly motivated team player and am always eager to learn new things.

Education

Purdue University 2017 – 2022
Ph.D. in Computer Science *IN, USA*
- Thesis: *Symbolic Analysis of Weak Concurrency Semantics in Modern Database Programs*
- Advisors: *Suresh Jagannathan & Benjamin Delaware*

Purdue University 2015 – 2017
M.Sc. in Computer Science *IN, USA*
- Selected Courses: *Programming Languages, Adv. Topics in Programming Languages, Computer-aided Reasoning, Distributed Database Systems, Verifying Systems At Scale, Formal Methods In Databases, Information Security*

Sharif University of Technology 2010 – 2015
B.Sc. in Computer Science *Tehran, IRAN*
- Undergraduate Thesis: *A Survey on Three-ballot Voting Mechanism: Algorithms and Attacks*

Work Experience

The University of Texas at Austin 09/2022 – Current
Post-doctoral Scientist *TX, USA*
- Research Focus: *Symbolic Methods for Robot Learning from Demonstration and Experience*
- Advisors: *Isil Dillig & Joydeep Biswas*

Microsoft Corporation 06/2020 – 12/2020
Research Intern *WA, USA*
- Project: *Program Inference using Large Language Models*
- Supervisors: *Sumit Gulwani & Mohammad Raza*

Purdue University 08/2015 – 08/2022
Graduate Research and Teaching Assistant *IN, USA*

Publications & Patents

Programmatic Imitation Learning from Unlabeled and Noisy Demonstrations (arxiv) Under Submission
- Jimmy Xin, Linus Zheng, Jiayi Wei, *Kia Rahmani*, Jarrett Holtz, Isil Dillig, Joydeep Biswas

Programming-by-Demonstration for Long-Horizon Robot Tasks (arxiv) POPL'24
- Noah Patton, *Kia Rahmani*, Meghana Missula, Joydeep Biswas, Isil Dillig

Multi-modal Program Inference (USPTO Application) US 20230176829A1
- *Kia Rahmani*, Mohammad Raza, Sumit Gulwani, Vu Le, Daniel Morris, Arjun Radhakrishna, Gustavo Soares, Ashish Tiwari

Multi-modal Program Inference: LLMs and Component-based Synthesis (doi) OOPSLA'21
- *Kia Rahmani*, Mohammad Raza, Sumit Gulwani, Vu Le, Daniel Morris, Arjun Radhakrishna, Gustavo Soares, Ashish Tiwari

Repairing Serializability Bugs in Distributed Database Programs via Automated Schema Refactoring (doi) PLDI'21
- *Kia Rahmani*, Kartik Nagar, Benjamin Delaware and Suresh Jagannathan

CLOTHO: Directed Test Generation for Weakly Consistent Database Systems (doi) OOPSLA'19
- *Kia Rahmani*, Kartik Nagar, Benjamin Delaware and Suresh Jagannathan

Fine-grained Distributed Consistency Guarantees with Effect Orchestration (doi) PaPoC'18
- *Kia Rahmani*, Gowtham Kaki and Suresh Jagannathan

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Skills

Programming Languages I have worked on numerous projects written in various programming languages, and I am proficient in `C/C++, Java, C#, Python, Haskell, OCaml,` etc.

Formal Methods I have a deep knowledge of logical frameworks for specifying computer systems and their properties, which I have utilized in my past research, including temporal logics (such as `LTL, CTL, STL`, etc.), rely-guarantee reasoning (`RG`), separation logic (`SL`), correctness/incorrectness logic, etc.

Model Checking and Verification I have acquired extensive experience in reducing a wide range of program analysis and verification problems to `SAT` and `SMT` instances. I am proficient in utilizing several prominent tools in this domain, such as `Z3, Spin, Dafny, Alloy, Ultimate, SeaHorn, CVC-5`, and `Coq`.

Databases and Data Management I have an extensive background in analyzing and implementing distributed data management systems with a wide range of concurrency semantics. I have developed multiple software applications that utilize various off-the-shelf database systems, including `MongoDB, Apache Cassandra, Spanner, CosmosDB, PostgreSQL, MySQL,` and more. I have also used several libraries for MVC design, including `Django, Ruby on Rails,` and `Spring`.

Machine Learning I have knowledge of various deep learning algorithms, with a particular focus on higher-level frameworks such as imitation learning, behavior cloning, and reinforcement learning. I am familiar with existing libraries such as `PyTorch`, `TensorFlow`, `Keras`, `OpenAI Gym`, and `Stable-Baselines3`.

DevOps Tool I am familiar with many software engineering and infrastructure automation tools, including `Git, Docker, Kubernetes, Ansible, Jira, Unix system programming and AWS cloud programming`.

Mentorship

Noah Patton CS Ph.D. Student , The University of Texas at Austin

Meghana Missula CS M.Sc. Student , The University of Texas at Austin → Quantitative Strategist Intern @Goldman Sachs

Aneesh Shetty CS M.Sc. Student , The University of Texas at Austin → SDE Intern @Amazon

Justus Fasse CS Ph.D. Student, KU Leuven through Sigplan-M long-term Mentorship Program

Jimmy Xin Turing Undergraduate Scholar, The University of Texas at Austin → Software Development Intern DLZP Group

References

Isil Dillig Professor, The University of Texas at Austin, isil@cs.utexas.edu

Suresh Jagannthan Samuel D. Conte Professor, Purdue University, suresh@cs.purdue.edu

Sumit Gulwani Partner Research Manager, Microsoft Corporation, sumitg@microsoft.com

Benjamin Delaware Assistant Professor, Purdue University, bendy@purdue.edu

Joydeep Biswas Associate Professor, The University of Texas at Austin, joydeepb@cs.utexas.edu