Anand Balakrishnan

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📍 Los Angeles, CA, USA

Education

- **Ph.D. Computer Science** *Ongoing*
  University of Southern California
  Advisor: *Jyotirmoy Deshmukh*
- **B.S. Computer Engineering** May 2018
  University at Buffalo
  Distinction: *Magna Cum Laude*

Relevant Experience

- **Research Assistant**
  CPS-VIDA Group, University of Southern California
  Developed and published several algorithms for designing, verifying, and monitoring autonomous systems for end-to-end safety.
  Since August 2018.
- **Technical Intern**
  Siemens Corporation
  Developed framework to monitor for reliability and consistency of multi-modal sensor data for safety certification of learning-enabled systems.
  June 2023 – August 2023
- **ADAS Software Engineering Intern**
  INDI EV, Inc.
  Assisted in building the initial prototype for Level 2 autonomy from the ground up on a test vehicle as part of a small team.
  June 2021 – August 2021
- **Research Intern**
  Toyota Research Institute, North America
  Developed open-source tool that uses a logical monitoring specification languages for monitoring the output of perception systems (object detectors and trackers).
  May 2020 – August 2020
- **Undergraduate Researcher**
  Distributed Robotics and Networked Embedded Systems Lab, University at Buffalo
  Deployed a ROS-based system to collect data to assist in testing the performance of Wi-Fi augmented SLAM algorithms in indoor environments.
  February 2016 – May 2018

For more information regarding my research, please refer to my website or my DBPL page (dblp.org/pid/132/8908)

Skills

- **Expert (5+ years):** C++ (11, 14, 17), Python, ROS (1, 2), PyTorch, Numpy, Scipy
- **Intermediate (2+ years):** C (99, 11, 17), Rust
- **Familiar (1-2 years):** Jax, Lua
- **Hobby:** Zig, OCaml

Projects

- **Argus** [github:anand-bala/argus]
  A Rust library (with Python bindings) for efficiently working with Signal Temporal Logic (STL) and its quantitative semantics.
  Rust, Python
- **PerceMon** [github:anand-bala/PerceMon]
  A tool for online monitoring of perception systems using Spatio-Temporal Quality Logic specifications.
  C++
- **Automatix** [github:anand-bala/automatix]
  A library to define and deploy symbolic (weighted) automata on GPUs using matrix operators with the ability to differentiate through them.
  Python, Jax

Select Publications

- A. Balakrishnan *et al.*, "Motion Planning for Automata-based Objectives using Efficient Gradient-based Methods," in *2024 IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS)*, Accepted, Oct. 2024.

- A. Balakrishnan *et al.*, "Model-Free Reinforcement Learning for Spatiotemporal Tasks Using Symbolic Automata," in *2023 62nd IEEE Conference on Decision and Control (CDC)*, Dec. 2023. DOI: 10.1109/CDC49753.2023.10383559.

- A. Balakrishnan *et al.*, "PerceMon: Online Monitoring for Perception Systems," in *Runtime Verification*, Oct. 2021. DOI: 10.1007/978-3-030-88494-9_18.

- A. Balakrishnan and J. V. Deshmukh, "Structured Reward Shaping Using Signal Temporal Logic Specifications," in *2019 IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS)*, Nov. 2019, pp. 3481–3486. DOI: 10.1109/IROS40897.2019.8968254.