Anand Balakrishnan

anandbal@usc.edu (716) 650-8717 anandb.me anandb1597 anand-bala

Education

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

Experience

- **Research Assistant** **Ongoing**
  CPS-VIDA Group University of Southern California
  Advisor: *Jyotirmoy V. Deshmukh*
- **Undergraduate Researcher** **Feb 2016 – May 2018**
  Distributed Robotics and Networked Embedded Systems Lab University at Buffalo Advisor: *Karthik Dantu*
- **Undergraduate Teaching Assistant** **Fall 2017**
  CSE331: Algorithm Analysis and Design University at Buffalo
  Supervisor: *Atri Rudra*

References

1. A. Balakrishnan and J. Deshmukh, "Structured reward functions using signal temporal logic specifications," in prep.

2. A. Balakrishnan and J. V. Deshmukh, "Structured Reward Functions Using STL: Poster Abstract," in *Proceedings of the 22Nd ACM International Conference on Hybrid Systems: Computation and Control*, ser. HSCC '19, New York, NY, USA: ACM, Apr. 2019, pp. 270–271, ISBN: 978-1-4503-6282-5. DOI: 10.1145/3302504.3313355. [Online]. Available: http://doi.acm.org/10.1145/3302504.3313355 (visited on 04/10/2019).

3. A. Balakrishnan, A. G. Puranic, X. Qin, A. Dokhanchi, J. V. Deshmukh, H. Ben Amor, and G. Fainekos, "Specifying and Evaluating Quality Metrics for Vision-based Perception Systems," in *IEEE Proceedings of Design, Automation and Test in Europe (DATE)*, Florence, Italy: IEEE, Mar. 2019, ISBN: 978-3-9819263-3-0.

4. Z. S. Hashemifar, C. Adhivarahan, A. Balakrishnan, and K. Dantu, "Augmenting Visual SLAM with Wi-Fi Sensing For Indoor Applications," en, Mar. 2019. [Online]. Available: https://arxiv.org/abs/1903.06687v1 (visited on 04/18/2019).

5. A. Balakrishnan, P. Behara, Z. Hashemifar, and K. Dantu, "Poster: Dataset for Experimental Validation of Wi-Fi Sensing," in *6th Annual Northeastern Robotics Colloquium*, ser. NERC '17, Poster, Northeastern University, Boston MA, Oct. 2017.

Research Projects

Structured Rewarding for Reinforcement Learning

CPS-VIDA Group, University of Southern California

- Investigate use of Temporal Logics in the training and validation of safe reinforcement learning agents.
- This is ongoing work

Dataset for WiFi Augmented Sensing

Distributed Robotics and Networked Embedded Systems Lab, University at Buffalo

- Compile a dataset that incorporates streams of depth images (RGB-D) along with WiFi data for development of simultaneous localization and mapping algorithms that are augmented with WiFi.
- Involves collecting large amounts of visual and laser data, WiFi signals, and ground-truth layout, in sessions that span several hours.
- Designed robot setup consisting of a Turtlebot 2 fitted with a Microsoft Kinect RGB-D camera and a Velodyne VLP-16 LIDAR for collecting depth images and laser scans, along with an NVIDIA Tegra X1 single-board computer for collecting WiFi signal information.
- The data is collected using the Robotics Operating System (ROS) and stored in the *rosbag* log format, along with more human readable formats like images and text files.
- The groundtruth is generated using the Google Cartographer SLAM package and then manually smoothed using the floor-plan as a reference.

Additional Projects

Pendragon `GitHub.com/PendragonGame/pendragon`

- Using: JavaScript
- A HTML5 and JavaScript based, desktop RPG game, built with a realistic reputation engine that uses gossip protocols.
- Implements a probability-based information spread algorithm that simulates conversations.

WeeDigDug `GitHub.com/anand-bala/wee-dig-dug`

- Using: ARM Assembly
- A text-based simulation of the popular arcade game DigDug by Namco, Japan.
- Developed in ARM assembly for the LPC2138 Education Board (ARM7TDMI).

Another Real-Time Embedded OS (arte-os) `GitHub.com/anand-bala/arte-os`

- Using: C, Assembly
- A simple real-time, embedded operating system containing using tools and concepts learned from coursework and projects.
- Currently contains bare-bones thread and scheduler implementation.
- Tested working on Raspberry Pi 0 (BCM2835 processor).

ShoutOut `GitHub.com/anand-bala/ShoutOut`

- Using: Node
- A platform to facilitate relief and aid in disaster affected areas.
- Uses SMS as a means of communication, when connection to the Internet is unavailable.
- Uses SMS parsers to deliver information to relief parties subscribing to the platform channels.
- Developed in response to the severe floods in Chennai, India in November 2015.

Honors and Awards

- CURCA Undergraduate Grant for Multi-robot Systems Research University at Buffalo, Fall 2017