Aravind Kumaraguru

Research Assistant @ USC RESL · Software Engineer · Roboticist

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Software engineer looking for a full-time position with a focus on ML for perception and planning.

Education

University of Southern California — *Los Angeles, CA*

M.S. in Computer Science (GPA: 3.94) — *Aug 2018 - May 2020 (Intended)*

University of California, Berkeley — *Berkeley, CA*

B.S. in Electrical Engineering and Computer Science (GPA: 3.75) — *Aug 2013 - May 2017*

Experience

USC Robotics Embedded Systems Laboratory — *Los Angeles, CA*

Research Assistant — *Aug 2018 - Current*

- Collaborated with a team of biologists to autonomously monitor harmful algal blooms in Clearlake, CA with aquatic robots.
- Researched methods to improve sample efficiency in reinfocement learning through topologically structured, curiosity-driven exploration (TMAX).
- Developed smoothing and mapping algorithm for BlueQuilt, a framework that can orthomosaic images over open water.

Cisco Meraki — *San Francisco, CA*

Software Engineer — *Aug 2017 - Aug 2018*

- Worked as a platforms engineer to bring up Z3C mobile teleworker gateway with integrated LTE and WiFi.
- Tasks included bootloader configuration, implementing hardware-verified secureboot, database migrations, and adding new UI features.

Google — *Mountain View, CA*

Software Engineering Intern — *June 2016 - Aug 2016*

- Worked with the GCam group (part of Google Brain) to develop firmware and DSP algorithms for precise 3D localization system.
- Wrote performance-critical code to process high-speed (~10MHz) data packets in real time on a Beaglebone Black with a PRUDAQ.

Projects

BlueQuilt — *Los Angeles, CA*

USC Robotics Embedded Systems Laboratory — *Aug 2019 - Current*

- Developed a framework for orthomosaicing aerial imagery over water, a domain traditional SFM stitching algorithms struggle with.
- Floating April tags instrumented with GPS and IMU sensors are deployed in the water while a drone flies overhead.
- Factor-graph smoothing algorithm jointly estimates the pose of the drone and ground control points from GPS+IMU data of tags and drone.

TMAX — *Los Angeles, CA*

USC Robotics Embedded Systems Laboratory — *Jan 2019 - May 2019*

- Extended the intrinsic motivation framework by Pathak et al. 2017 by adding a topological graph of landmarks to diversify environment exploration.
- Designed maze-like environments in a Doom PC port to reward exploration and developed diagnostic tools for measuring policy performance.

Kickstarting Meta-RL with Expert Demonstrations — *Los Angeles, CA*

USC Robotics Embedded Systems Laboratory — *Aug 2018 - Jan 2019*

- Extended meta-RL framework developed by Hausman et al. 2018 to initialize task embeddings with expert demonstrations.
- Developed an imitation learning framework in Tensorflow and built new environments and expert datasets for testing.

Publications

Chris Denniston*, **Aravind Kumaraguru***, and Gaurav S. Sukhatme. "Comparison of Path Planning Approaches for Harmful Algal Bloom Monitoring." OCEANS 2019 MTS/IEEE SEATTLE. IEEE, 2019.

Skills

Technical Skills Machine Learning, State Estimation, Full-Stack Development, Firmware, Hardware Bringup

Languages Python, C++, C, Ruby, Java

Software Tensorflow, PyTorch, OpenCV, ROS, MuJoCo, Ruby on Rails, Docker

Licenses FAA Part 107 Remote Pilot License, Ham Radio Operator (Technician)