

# Arjun Earthperson

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## EDUCATION

**University of California Los Angeles**  
*B.S. Electrical Engineering*

Fall 2017

## EMPLOYMENT

The B. John Garrick Institute for the Risk Sciences, UCLA  
Software Development Engineer

May 2018 - current

- Development lead for all in-house and on-contract software deliverables at the research institute.
- Responsibilities include collaborating with researchers to brainstorm research opportunities, specify design requirements, negotiate constraints and implement scalable, production-ready solutions.
- Trained and managed over 20 developers to deliver 4 web-based software tools over the last 2 years.

Center for SMART Health, UCLA

Jun 2016 - Dec 2017

*Student Researcher, Sensing At-Risk Populations (SARP) Project*

- Lead a team of 6 to develop a remote health monitoring system currently servicing 1000+ patients.
- Tasks included embedded development, database design, and API integration for web and mobile applications.
- Implementation of machine learning algorithms (TensorFlow) tackling time-series health-care datasets.
- Design and implementation of a cloud-based fleet management platform using AWS for 1000+ devices.

Embedded & Re-configurable Systems Lab, UCLA

Aug 2014 - Jun 2016

Student Researcher

- Improved wearable battery life by 3x by designing an efficient, multi-threaded CPU scheduler.
- Enforced system-wide HIPAA-compliance by securing patient data by implementing end-to-end AES encryption.
- Developed clustering algorithms for predicting re-hospitalization risk of heart failure patients using EHR dataset.

## COURSEWORK

Risk Assessment for Engineers, Program Management for Engineers, Digital Signal Processing, FPGA Design, Algorithm Design, Operating Systems, Feedback Control, Automata Theory

## SKILLS

*Programming:* C/C++, Java, Typescript, React, MATLAB, Verilog, Python, UNIX Shell, L<sup>A</sup>T<sub>E</sub>X  
*Frameworks:* NodeJS, Django, Docker, Kubernetes, TensorFlow, Android, SpringBoot, OpenCV, Weka, Xilinx  
*Hardware:* EAGLE, NgSpice, Arduino, PCB Design & Etching, SMT soldering rework

## PROJECTS

**Human Activity Recognition on Smartwatch:** Real-time detection using supervised learning on wrist-worn MEMS inertial motion sensor data. Distinguishes between *walking, running, lying down, sitting, standing* or *inactive*. 256 extracted features include energy & entropy in time & frequency domains. Classification using deep neural networks performs at >85% accuracy in real-world scenarios. Currently being used by 300+ patients in an LA rehab facility.

**Indoor Location Fingerprinting Using Ambient Wi-Fi:** Models multimodal WiFi RSSI as Gaussian Processes and performs Bayesian Estimation for probabilistic location classification. Time-segmented feature extraction on highly sparse datasets. Written for Android with near-real-time feedback and online supervised learning.  $\geq 70\%$  accurate within 3 seconds.  $>90\%$  accurate with 10 seconds.

**Convex Polygon Detector:** Real-time polygon detection for low-powered ARM DSPs. The multistage pipeline includes IIR Deriche filter, progressive blurring kernel, gradient detection, non-maximal suppression, hysteresis thresholding and Hough Transform. Final step computes polygon edge count, orientation and side-lengths.

**Analog Utility Meter Reader:** Power consumption detection in real-time from analog dials in LA power meters using snapshots from mounted USB cameras. OpenCV implementation pipeline includes noise suppression, SIFT, circular Hough Transform & needle angle detection.

## PUBLICATIONS

Rabiei, E.; Huang, L.; Chien, H.; **Arjun**; Diaconeasa, M.; Woo, J.; Iyer, S.; White, M.; Mosleh, A. *“Electronic COTS Parts Reliability Estimation in Space Application: The Expert System”*, Part O: Journal of Risk and Reliability (Submitted Jan 2020).

R. Malavalli, **Arjun**, N. Gupta, “*Indoor Localization Through Machine Learning on WiFi Fingerprints*”, International Conference on Indoor Positioning and Navigation (IPIN’17).

**Arjun**, “*DSP optimization techniques for LCDK with focus on IoT applications*”, Undergraduate Capstone Design Project, DOI: 10.13140/RG.2.2.20822.40008, June 2017

Bouchard K., Ramezani R., **Arjun**, Naeim A., “*Evaluation of Bluetooth Beacons Behavior*”, The 7th IEEE Annual Ubiquitous Computing, Electronics and Mobile Communication Conference (UEMCON’16), pp.1-3, IEEE, 2016.

B. Moatamed, **Arjun**, F. Shahmohammadi, R. Ramezani, A. Naeim, M. Sarrafzadeh, “*Low-cost indoor health monitoring system*”, Wearable and Implantable Body Sensor Networks Conference (BSN 2016), pp.159-164, IEEE, 2016.

## PATENTS

PCT/US2016/037398: “Subject assessment using localization, activity recognition and a smart questionnaire”, A.Naeim, R. Ramezani, **Arjun**, B. Moatamed, M. Sarrafzadeh

US Provisional Application (62/330,730) filed May 2, 2016: *"Indoor Health Monitoring System"*, A.Naeim, R. Ramezani, **Arjun**, B. Moatamed, M. Sarrafzadeh