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EDUCATION

North Carolina State University — *Expected Fall 2024*
Ph.D. Nuclear Engineering

North Carolina State University — *Summer 2023*
M.S. Nuclear Engineering

University of California Los Angeles — *Fall 2017*
B.S. Electrical Engineering

EMPLOYMENT

Idaho National Laboratory (INL), Idaho Falls — *May 2021 - August 2021*
Graduate Summer Intern, Full-Time

- Developed methodologies to assess the reliability of fission batteries (FB) using dynamic PRA methods.
- Modeled PID software failure modes in FB reactor control systems (RCS) using error propagation (DEPM CTMC), probabilistic model checking (PCTL), and discrete-dynamic event trees (DDET).
- Collaborated with INL's PRA software development team to integrate OpenPRA OpenEPL with EMRALD.

The B. John Garrick Institute for the Risk Sciences, UCLA — *May 2018 - July 2020*
Software Development Engineer, Full-Time

- Development lead for all in-house and on-contract software deliverables at the research institute.
- Responsibilities included 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 2 years.

Center for SMART Health, UCLA — *June 2016 - Dec 2017*
Undergraduate Student Researcher, Part-Time

- 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.

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, LaTeX
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 $\geq$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, $\geq$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.

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

JOURNAL ARTICLES

[1] Ramin Ramezani, Minh Cao, Arjun Earthperson, et al. "Developing a Smartwatch-Based Healthcare Application: Notes to Consider". en. In: *Sensors* 23.15 (July 2023), p. 6652. ISSN: 1424-8220. DOI: 10.3390/s23156652. URL: https://www.mdpi.com/1424-8220/23/15/6652 (visited on 08/07/2023).

[2] Arjun Earthperson, Courtney M. Otani, Daniel Nevius, et al. "A combined strategy for dynamic probabilistic risk assessment of fission battery designs using EMRALD and DEPM". en. In: *Progress in Nuclear Energy* 160 (June 2023), p. 104673. ISSN: 0149-1970. DOI: 10.1016/j.pnucene.2023.104673. URL: https://www.sciencedirect.com/science/article/pii/S0149197023001087 (visited on 03/30/2023).

[3] Elaheh Rabiei, Lixian Huang, Hao-Yu Chien, et al. "Method and software platform for electronic COTS parts reliability estimation in space applications". en. In: *Proceedings of the Institution of Mechanical Engineers, Part O: Journal of Risk and Reliability* (Mar. 2021), p. 1748006X2199823. ISSN: 1748-006X, 1748-0078. DOI: 10.1177/1748006X21998231. URL: http://journals.sagepub.com/doi/10.1177/1748006X21998231 (visited on 03/25/2021).

CONFERENCE PAPERS

[4] Egemen M. Aras, Asmaa S. Farag, Arjun Earthperson, et al. "Benchmark Study of XFTA and SCRAM Fault Tree Solvers Using Synthetically Generated Fault Trees Models". In: *Volume 9: Mechanics of Solids, Structures, and Fluids; Micro- and Nano-Systems Engineering and Packaging; Safety Engineering, Risk, and Reliability Analysis; Research Posters*. Columbus, Ohio, USA: American Society of Mechanical Engineers, Oct. 2022, V009T14A016. ISBN: 978-0-7918-8671-7. DOI: 10.1115/IMECE2022-95783. URL: https://asmedigitalcollection.asme.org/IMECE/proceedings/IMECE2022/86717/V009T14A016/1157443 (visited on 02/15/2023).

[5] Courtney Otani, Robby Christian, Arjun Earthperson, et al. "Probabilistic Methods for Cyclical and Coupled Systems with Changing Failure Rates". en. In: *Probabilistic Safety Assessment and Management*. Honolulu, O'ahu, Hawaii, USA, 2022, p. 11. URL: https://www.osti.gov/servlets/purl/1885929.

[6] Bineh Ndefru, Karthik Sankaran, Theresa Stewart, et al. "Risk-Informed Decision-Making Tool for Covid-19 Community Behavior and Intervention Scenario Assessment". English. In: *Proceedings of the 16th International Conference on Probabilistic Safety Assessment and Management (PSAM)*. Vol. 3. Honolulu, Hawaii, USA: Curran Associates, Inc., July 2022. ISBN: 978-1-71386-375-5. URL: https://www.iapsam.org/PSAM16/papers/KS45-PSAM16.pdf.

[7] Arjun Earthperson and Mihai A. Diaconeasa. "Verification Study of the Nuclear PRA for the Mars 2020 Mission Following Accidental Orbital Re-Entry". In: *Volume 13: Safety Engineering, Risk, and Reliability Analysis; Research Posters*. Virtual, Online: American Society of Mechanical Engineers, Nov. 2021, V013T14A019. ISBN: 978-0-7918-8569-7. DOI: 10.1115/IMECE2021-71359. URL: https://asmedigitalcollection.asme.org/IMECE/proceedings/IMECE2021/85697/V013T14A019/1133290 (visited on 02/04/2022).

[8] Priyanka Pandit, Arjun Earthperson, Alp Tezbasaran, et al. "A Quantitative Approach to Assess the Likelihood of Supply Chain Shortages". In: *Volume 13: Safety Engineering, Risk, and Reliability Analysis; Research Posters*. Virtual, Online: American Society of Mechanical Engineers, Nov. 2021, V013T14A023. ISBN: 978-0-7918-8569-7. DOI: 10.1115/IMECE2021-73696. URL: https://asmedigitalcollection.asme.org/IMECE/proceedings/IMECE2021/85697/V013T14A023/1133260 (visited on 02/04/2022).

[9] Priyanka Pandit, Alp Tezbasaran, Arjun Earthperson, et al. "Evaluating the Implementation of Distributed Ledger Technology for the Licensing and Regulation of Nuclear Power Plants". In: *Volume 8B: Energy*. Virtual, Online: American Society of Mechanical Engineers, Nov. 2021, V08BT08A016. ISBN: 978-0-7918-8564-2. DOI: 10.1115/IMECE2021-71730. URL: https://asmedigitalcollection.asme.org/IMECE/proceedings/IMECE2021/85642/V08BT08A016/1132953 (visited on 02/04/2022).

[10] Rahul Malavalli, Arjun Earthperson, and Nilesh Gupta. "Indoor Localization Through Machine Learning on WiFi Fingerprints". en. In: *IPIN 2017*. Sapporo, Japan, Sept. 2017, p. 4. URL: https://www.researchgate.net/profile/Arjun_Earthperson/publication/323355438_Indoor_Localization_Through_Machine_Learning_on_WiFi_Fingerprints/links/5a8f64480f7e9ba429697e4d/Indoor-Localization-Through-Machine-Learning-on-WiFi-Fingerprints.pdf.

[11] Babak Moatamed, Arjun Earthperson, Farhad Shahmohammadi, et al. "Low-cost indoor health monitoring system". In: *2016 IEEE 13th International Conference on Wearable and Implantable Body Sensor Networks (BSN)*. San Francisco, CA, USA: IEEE, June 2016, pp. 159–164. ISBN: 978-1-5090-3087-3. DOI: 10.1109/BSN.2016.7516252. URL: http://ieeexplore.ieee.org/document/7516252/ (visited on 02/13/2021).

[12] Kevin Bouchard, Ramin Ramezani, Arjun Earthperson, et al. "Evaluation of Bluetooth beacons behavior". In: *2016 IEEE 7th Annual Ubiquitous Computing, Electronics & Mobile Communication Conference (UEMCON)*. New York City, NY, USA: IEEE, Oct. 2016, pp. 1–3. ISBN: 978-1-5090-1496-5. DOI: 10.1109/UEMCON.2016.7777846. URL: http://ieeexplore.ieee.org/document/7777846/ (visited on 02/15/2021).

CHAPTERS

[13] A. Wijangco, A. Earthperson, I. de Monbrison, et al. "haze-space". In: *Impeccable Warriors: 1/22 Down in the Dirt* 191.1/22 (Jan. 2022). ISSN: 979-8784094520. URL: https://books.google.com/books?id=RdHbzgEACAAJ.

[14] Zhihua Wang, Toko Hata, Shakti Pada Mukhopadhyay, et al. *Running Out of Time: Scars Publications 2022 collection book*. English. Scars Publication, Nov. 2022. ISBN: 9798364501523.