Randy Ardywibowo

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Education

Texas A&M University
Ph.D. in Electrical Engineering, **GPA: 4.0** 2017 - 2022

Work Experience

Apple Inc. **Cupertino, CA**
Senior Machine Learning Engineer (Search & Language Understanding) 2022 – Present

- Developed Large Language Model (LLM) post-training techniques for language understanding and reasoning.
- Developed and productionized contextual bandits & off-policy reinforcement learning for alleviating bias.
- Researched LLM continual self-training for math, reasoning, and coding capabilities.
- Developed infrastructure to accelerate research (Triton kernels, FSDP, Tensor/Pipeline/Data Parallelism)

Texas A&M University, ECE Department **College Station, TX**
Research Assistant (Variational Inference, Uncertainty Quantification) 2017 – 2022

- Growing Mixture of Experts (MoE) for continual learning using anomaly detection.
- Anomaly detection using Neural Architecture Search (NAS) for normalizing flows.
- Variational inference for dynamic & energy-efficient deep learning models.
- Uncertainty quantification for image segmentation using Bayesian neural networks.
- Time-series adaptive monitoring using Gaussian Processes and Kalman Filters.
- Co-authored proposals to DARPA & NSF.
- Applications: computer vision, time-series data, recommender systems.

Qualcomm Technologies Inc. **San Diego, CA**
Research Intern (Camera Machine Learning) 2020

- Dynamic quantization and compression methods for energy-efficient computer vision models.
- Developed image super-resolution, segmentation, and classification models.

University of Washington **Seattle, WA**
Research Scientist (Computer Vision, Healthcare) 2018

- Computer vision for automated surgical site infection detection, evaluation, and care.
- Developed convolutional neural networks for skin disease image segmentation and classification.
- 4th place in the 2018 International Skin Imaging Collaboration challenge. (87% accuracy, 73% IoU).

Research Interests

- Reasoning & Language Understanding
- Reinforcement Learning
- Contextual Bandits
- Sampling Methods
- Uncertainty Quantification
- Variational Inference

Publications

- **R. Ardywibowo**, R. Sunki, L. Kuo, S. Nayak, “BayesCNS: A Unified Bayesian Approach to Address Cold Start and Non-Stationarity in Search Systems at Scale”, in submission.
- **R. Ardywibowo,** “Learning under Data Irregularity and Uncertainty”, Ph.D. diss., 2022.
- **R. Ardywibowo**, Z. Huo, Z. Wang, B. Mortazavi, S. Huang, X. Qian, “VariGrow: Variational Architecture Growing for Task-Agnostic Continual Learning based on Bayesian Novelty”, ICML 2022.

- **R. Ardywibowo**, V. Dayana, H. Hwang. "Dynamic quantization for energy efficient deep learning." U.S. Patent Application No. 17/488,261.
- **R. Ardywibowo**, Z. Wang, B. Mortazavi, S. Huang, X. Qian, "VFDS: Variational Foresight Dynamic Selection in Bayesian Neural Networks for Efficient Human Activity Recognition", AISTATS 2022.
- **R. Ardywibowo**, Z. Wang, X. Qian, "NADS: Neural Architecture Distribution Search for Uncertainty Awareness," ICML2020.
- S**.** Boluki, **R. Ardywibowo**, S. Z. Dadaneh, M. Zhou, X. Qian, "Learnable Bernoulli Dropout for Bayesian Deep Learning", AISTATS2020.
- **R. Ardywibowo**, Z. Wang, B. Mortazavi, S. Huang, X. Qian, "Adaptive Activity Monitoring with Uncertainty Quantification using Switching Gaussian Process Models," AISTATS2019.
- Z. Jiang, **R. Ardywibowo**, A. Samareh, H. L. Evans, W. B. Lober, X. Chang, X. Qian, Z. Wang, S. Huang. "A Roadmap for Automatic Surgical Site Infection Detection and Evaluation Using User-Generated Incision Images." Surgical infections 20, no. 7 (2019): 555-565.
- **R. Ardywibowo**, C. Xiao, S. Gui, Y. Cheng, J. Liu, S. Huang, X. Qian, "Analyzing Daily Behavioral Data for Personalized Health Management," Journal of Healthcare Informatics Research, 1-20.
- **R. Ardywibowo**, "Analyzing Daily Behavioral Data for Personalized Health Management." B.S. diss., 2017.

Invited Talks

- **AstraZeneca Symposium:** "Bayesian Methods in Continual Learning", July 2022.
- **Indonesian Research Colloquium: "**Machine Learning under Uncertainty and Irregularity**",** July 2021

Service

- **Reviewer:** AAAI 2020, ICML 2021, NeurIPS 2021, AISTATS 2021, ICML 2022, AISTATS 2022, Pattern Recognition

Teaching

ECEN 491: Robot Navigation and Mapping (Link) **College Station, TX**
Team Lead 2016

- Developed a tele-operated robot that can autonomously map a building and identify lights in it.
- Implemented on device Simultaneous Localization and Mapping (SLAM).

Side Projects

AutoInfra (Link) 2023

- Automated DevOps, QA testing, and server diagnosis using LLMs.
- 2nd place in SHACK15 Hackathon ($2000 prize).
- Backed by Y Combinator in YC23 batch (now Lingtual.com)

K-Nearest Neighbors Augmented Language Models (Link) 2023

- K-NN augmented language model generation for generalization and memorization.
- Fast distributed training and vector store generation using DeepSpeed and DDP.
- Seamless integration with HuggingFace Transformers and Lightning.

Triton Mode (Link) 2023

- Implementation of various high performance Triton kernels.

FrankCMS (Link) 2017

- Developed a WordPress-like content management system from scratch using Node, Angular, and MongoDB.