

RESEARCH INTERESTS

I am interested in Bayesian learning and mathematical optimization. Specifically, methods that can reliably express uncertainty, make open-set predictions, and incorporate prior domain knowledge. I am currently researching sensor placement and informative path planning using sparse Gaussian processes.

RESEARCH EXPERIENCE

- Bayesian Sensor Placement and Informative Path Planning** **May 2020—May 2023**
Researching Bayesian approaches for sensor placement and informative path planning in continuous and discrete domains
- Pose Estimation and Action Recognition with mmWave Radar Devices** **May 2019—May 2020**
Analyzed and developed deep learning algorithms for pose estimation and action recognition from mmWave radar data
- User Recognition with WiFi routers and mmWave Radar Devices** **May 2019—May 2020**
Pioneered deep learning algorithms for gait-based user recognition with WiFi routers and mmWave radars
- Real-time Depth Estimation from Monocular Images** **Jan 2017—Dec 2017**
Studied, implemented, and deployed deep learning methods for real-time depth estimation from monocular images in autonomous underwater and aerial drones
- Autonomous Indoor Environment Mapping Drone (Team)** **Aug 2015—May 2016**
Developed path planning and object avoidance algorithms for an indoor environment mapping aerial drone

PUBLICATIONS

- [1] **Kalvik Jakkala** and Srinivas Akella. “Bayesian Sensor Placement for Multi-source Localization of Viruses in Wastewater Networks”. Manuscript submitted for publication. 2023. URL: <https://kdkalvik.github.io/publications/wastewater>.
- [2] **Kalvik Jakkala** and Srinivas Akella. “Efficient Sensor Placement from Regression with Sparse Gaussian Processes in Continuous and Discrete Spaces”. Manuscript submitted for publication. 2023. URL: <https://kdkalvik.github.io/publications/SGP-SP>.
- [3] **Kalvik Jakkala** and Srinivas Akella. “Multi-Robot Informative Path Planning from Regression with Sparse Gaussian Processes”. Manuscript submitted for publication. 2023.
- [4] **Kalvik Jakkala** and Srinivas Akella. “Probabilistic Gas Leak Rate Estimation Using Submodular Function Maximization With Routing Constraints”. In: *IEEE Robotics and Automation Letters* (2022). URL: <https://kdkalvik.github.io/publications/gas-leak-estimation>.
- [5] **Kalvik Jakkala**. “Deep Gaussian Processes: A Survey”. In: *CoRR* abs/2106.12135 (2021). URL: <https://kdkalvik.github.io/publications/DGP>.
- [6] Prabhu Janakaraj, **Kalvik Jakkala**, Arupjyoti Bhuyan, Zhi Sun, Pu Wang, and Minwoo Lee. “STAR: Simultaneous Tracking and Recognition through Millimeter Waves and Deep Learning”. In: *12th IFIP Wireless and Mobile Networking Conference, WMNC 2019*. IEEE, 2019. URL: <https://kdkalvik.github.io/publications/STAR>.
- [7] **Kalvik Jakkala**, Arupjyoti Bhuyan, Zhi Sun, Pu Wang, and Zhuo Cheng. “Deep CSI Learning for Gait Biometric Sensing and Recognition”. In: *CoRR* abs/1902.02300 (2019). URL: <https://kdkalvik.github.io/publications/CSI>.
- [8] Akarsh Pokkunuru, **Kalvik Jakkala**, Arupjyoti Bhuyan, Pu Wang, and Zhi Sun. “NeuralWave: Gait-Based User Identification Through Commodity WiFi and Deep Learning”. In: *44th Annual Conference of the Industrial Electronics Society, IECON 2018*. IEEE, 2018. URL: <https://kdkalvik.github.io/publications/Neuralwave>.

SKILLS

- Research Methods:** Gaussian Processes, State-Space Models, Probabilistic Models, Variational Inference, Graph Neural Networks (GNNs), Convolutional Neural Networks (CNNs), Generative Adversarial Networks (GANs), Transformers, Generative Flow Networks (GFlowNets-RL), Energy-Based Models, Flow-Based Models, Diffusion Models, Contrastive Representation Learning, Metric Learning
- Libraries:** Tensorflow, PyTorch, OpenCV, Robot Operating System (ROS), SciPy, Pandas, Pyro, GFlow, Numpy
- Languages:** Python, C/C++, Matlab, Bash Scripting, SQL
- Platforms:** Linux, Unix, OpenStack, Amazon Web Services (AWS), Microsoft Azure, Google Cloud Platform (GCP), Slurm

TEACHING EXPERIENCE

Teaching Assistant (University of North Carolina at Charlotte) Taught and mentored graduate students in the following courses - Machine Learning (ITCS8156) - Algorithms & Data Structures (ITCS8114)	Jan 2021—May 2022
B.S. Teaching Fellow (Wichita State University) Co-instructed, graded and tutored undergraduate students in the following programming classes - Object-oriented programming (CS311) - Data structures (CS300) - Introductory C++ programming (CS211)	Aug 2016—May 2018

EDUCATION

University of North Carolina at Charlotte (PhD) - Computer Science, Machine Learning	Aug 2018—Dec 2023
University of North Carolina at Charlotte (MSc) - Computer Science, concentration in AI, Robotics, and Gaming - Cumulative GPA: 4.00	Aug 2018—May 2021
Wichita State University (BSc) - Computer Science, minor in Mathematics - Cumulative GPA: 3.45	Aug 2014—May 2018

ACTIVITIES/AWARDS

UNC Charlotte GSSF Grant Recipient - Awarded the UNC Charlotte Graduate School's Summer Fellowship (GSSF) grant	May 2022
Deans Honor Roll - Recognized for outstanding academic performance by the Deans office	May 2018, May 2017, Dec 2016, Dec 2014
Vice President, Association for Computing Machinery (ACM) - Managed the local chapter of ACM and organized educational events on campus	Aug 2015—Dec 2016
Vice President, Institute of Electrical and Electronics Engineering (IEEE) - Managed the local chapter of IEEE and organized educational events on campus	Aug 2015—Dec 2016