Kalvik Jakkala

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Research Interests

I am interested in Mathematical optimization and Deep learning. Specifically, methods that can reliably express uncertainty, make open-set predictions, and incorporate prior domain knowledge. I am currently researching deep learning for operations research problems.

Education

University of North Carolina at Charlotte (PhD), 2018—
- Computer Science, Machine Learning

University of North Carolina at Charlotte (MSc), 2018—2021
- Computer Science, concentration in AI, Robotics, and Gaming
- Cumulative GPA: 4.00

Wichita State University (BSc), 2014—2018
- Computer Science, minor in Mathematics
- Cumulative GPA: 3.45

Publications

[1] **Kalvik Jakkala**. "Deep Gaussian Processes: A Survey". In: *arXiv preprint arXiv:2106.12135* (2021).

[2] **Kalvik Jakkala** and Srinivas Akella. "Bayesian Sensor Placement for Multi-source Localization of Viruses in Wastewater Networks". Manuscript submitted for publication. 2021.

[3] **Kalvik Jakkala** and Srinivas Akella. "Probabilistic Methane Leak Rate Estimation using Submodular Function Maximization with Routing Constraints". Manuscript submitted for publication. 2021.

[4] **Kalvik Jakkala**, Chen Chen, Minwoo Lee, Arupjyoti Bhuyan, Zhi Sun, and Pu Wang. "Spatio-Temporal Domain Adaptation for Gait Based User Recognition from Radar Data". Manuscript submitted for publication. 2020.

[5] 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'19)*. Paris, France, 2019.

[6] **Kalvik Jakkala**, Arupjyoti Bhuyan, Zhi Sun, and Pu Wang. "Deep CSI Learning for Gait Recognition At-Scale". In: *Third International Balkan Conference on Communications and Networking (BalkanCom'19)*. Skopje, Macedonia, the former Yugoslav Republic of, 2019.

[7] Akarsh Pokkunuru, **Kalvik Jakkala**, Arupjyoti Bhuyan, Pu Wang, and Zhi Sun. "NeuralWave: Gait-based User Identification through Commodity WiFi and Deep Learning". In: *Proc. of 44th Annual Conference of the IEEE Industrial Electronics Society (IECON'18)*. 2018.

Research Experience

Methane Leak Rate Estimation July 2020—Sep 2021
Researching Bayesian approaches for estimating methane gas leak rates from oil wells. I Improved the computation time of leak rate estimation and informative path planning by five orders of magnitude and at least one order of magnitude, respectively

Sensor Placement for Multi-source Localization July 2020—Sep 2021
Developed an optimization objective that we can use to find sensor placements for accurate source localization of viruses in wastewater networks using Bayesian approaches

Human Authentication using Gait Information in Novel Environments May 2019—May 2020
Uncovered limitations of radar-based gait recognition algorithms in novel environments and improved their data efficiency along with prediction robustness in foreign environments

Pose Estimation and Action Recognition from mmWave Radar Devices May 2019—May 2020
Analysed and developed deep learning algorithms for pose estimation and action recognition from 76-80 GHz band devices

Human Detection and Authentication using Gait Information May 2017—May 2019
Pioneered deep learning algorithms for user detection and authentication from human gait, based on sub-6 GHz Wi-Fi band and 76-80 GHz band device data

Real-time Depth Estimation from Monocular Images Jan 2017—Dec 2017
Studied and deployed deep learning methods for real-time depth estimation from monocular images in autonomous underwater and aerial drones

Real-time Color Correction of Monocular Underwater Images Jan 2017—Dec 2017
Developed learning algorithms for mitigating distortions and light attenuation in underwater images

Autonomous Indoor Environment Mapping Drone (Team) Aug 2015—May 2016
Worked on path planning and object avoidance algorithms for a quad-copter capable of indoor environment mapping

TEACHING EXPERIENCE

Teaching Assistant, Jan 2021—
- Teaching assistant for graduate level Machine Learning course (ITCS8156)
- Teaching assistant for graduate level Algorithms & Data Structures course (ITCS8114)

B.S. Teaching Fellow, Aug 2016—May 2018
- Teaching assistant for undergraduate Object-oriented Programming course (CS311)
- Teaching assistant for undergraduate Data structures course (CS300)
- Teaching assistant for undergraduate Introductory C++ programming course (CS211)

ACTIVITIES/AWARDS

Deans Honor Roll, May 2018, May 2017, Dec 2016, Dec 2014
- Recognized for outstanding academic performance by the Deans office

Vice President, Association for Computing Machinery, Aug 2015—Dec 2016
- Managed the local chapter of ACM and organized educational events on campus

Vice President, Institute of Electrical and Electronics Engineering, Aug 2015—Dec 2016
- Managed the local chapter of IEEE and organized educational events on campus

SKILLS

Platforms: Windows, Linux, Unix, OpenStack, Amazon Web Services, Microsoft Azure, Google Cloud Platform, Slurm
Programming Languages: Python, C/C++, Matlab, SQL, Shell Scripting
Libraries: Tensorflow, PyTorch, PyCaffe, OpenCV, Robot Operating System, Open MPI, SciPy, Gazebo Simulator, DoWhy, CVXOPT, pgmpy