

- Neuromorphic Computing
- Machine Learning
- Computer Vision

RESEARCH INTERESTS

My research aims to build more *bio-inspired* machine intelligence where the system can achieve both energy-efficiency and robust performance. I develop the learning algorithms which facilitate binary communication (like the human brain) in AI systems, while having hardware-friendly features. Also, I look into various tasks, such as distributed learning and domain adaptation, enabling learning systems to tackle real-world scenarios.

EDUCATION

Ph.D. Candidate, Electrical Engineering , Yale University [Advisor: Prof. Priyadarshini Panda]	Sep. 2020 — Current
M.S., Electrical Engineering , Korea Advanced Institute of Science and Technology (KAIST)	Mar. 2018 — Feb. 2020
B.S., Electrical Engineering , Sogang University	Mar. 2012 — Feb. 2018

EXPERIENCE

Neuromorphic algorithm research internship Samsung Advanced Institute of Technology (SAIT)	Jun. 2021 — Aug. 2021 South Korea
AI research internship SK-Tbrain	Jan. 2020 — July. 2020 South Korea
AI research internship Kakao Corporation	June. 2019 — Sep. 2019 South Korea

PUBLICATIONS [CONFERENCE]

- Moitra, A., Bhattacharjee, A., **Kim, Y.**, & Panda, P., *XPert: Peripheral Circuit & Neural Architecture Co-search for Area and Energy-efficient Xbar-based Computing*. ACM/IEEE Design Automation Conference (DAC) (2023).
- Kim, Y.**, Li, Y. Park, H., Venkatesha, Y., Hambitzer, A., & Panda, P., *Exploring Temporal Information Dynamics in Spiking Neural Networks*. AAAI Conference on Artificial Intelligence (AAAI) (2023).
- Li, Y., Yin, R., Park, H., **Kim, Y.**, and Panda, P., *Wearable-based Human Activity Recognition with Spatio-Temporal Spiking Neural Networks*. Accepted to NeurIPS 2022 Workshop.
- Kim, Y.**, Li, Y. Park, H., Venkatesha, Y., Yin, R., and Panda, P., *Lottery Ticket Hypothesis for Spiking Neural Networks*. **Oral Presentation (2.7% of submitted papers)**, European Conference on Computer Vision (ECCV) 2022.
- Kim, Y.**, Li, Y. Park, H., Venkatesha, Y., and Panda, P., *Neural Architecture Search for Spiking Neural Networks*. European Conference on Computer Vision (ECCV) 2022.
- Li, Y., **Kim, Y.**, Park, H., and Panda, P., *Neuromorphic Data Augmentation for Training Spiking Neural Networks*. Accepted to European Conference on Computer Vision (ECCV) 2022.
- Bhattacharjee, A.* , **Kim, Y.***, Moitra, A., and Panda, P. Examining the Robustness of Spiking Neural Networks on Non-ideal Memristive Crossbars. Accepted in ACM/IEEE International Symposium on Low Power Electronics and Design (ISLPED) (2022), **Best Paper**. (* equal contribution)
- Kim, Y.**, Park, H., Moitra, A., Bhattacharjee, A., Venkatesha, Y., and Panda, P. Rate Coding Or Direct Coding: Which One is Better for Accurate, Robust, and Energy-efficient Spiking Neural Networks?. Accepted in IEEE International Conference on Acoustics, Speech and Signal Processing (ICASSP) (2022).
- Kim, Y.**, Kim, H., Kim, S., Kim, S. J., & Panda, P. *Gradient-based Bit Encoding Optimization for Noise-Robust Binary Memristive Crossbar*. Accepted in Design, Automation and Test in Europe Conference (DATE) (2022).
- Kim, Y.**, Venkatesha, Y., & Panda, P., *PrivateSNN: Privacy-Preserving Spiking Neural Networks*. AAAI Conference on Artificial Intelligence (AAAI) (2022).
- Choi, S., Lee, S., **Kim, Y.**, Kim, T., & Kim, C. *Hi-cmd: Hierarchical cross-modality disentanglement for visible-infrared person re-identification*. IEEE/CVF conference on computer vision and pattern recognition (CVPR) (2020).
- Kim, Y.**, Kim, S., Kim, T., & Kim, C. *Cnn-based semantic segmentation using level set loss*. IEEE/CVF Winter Conference on Applications of Computer Vision (WACV) (2020).

Kim, Y., Choi, S., Lee, H., Kim, T., & Kim, C. *RPM-Net: Robust Pixel-Level Matching Networks for Self-Supervised Video Object Segmentation*. IEEE/CVF Winter Conference on Applications of Computer Vision (WACV) (2020).

Yang, S., Kim, Y., **Kim, Y.,** & Kim, C. *Combinational class activation maps for weakly supervised object localization* IEEE/CVF Winter Conference on Applications of Computer Vision (WACV) (2020).

Lee, H., Choi, S., **Kim, Y.,** & Kim, C. *Bilinear Siamese Networks with Background Suppression for Visual Object Tracking*. British Machine Vision Conference (BMVC) (2019).

PUBLICATIONS [JOURNAL]

Han, K., **Kim, Y.,** Han, D., Lee, H., & Hong, S. "TL-ADA: Transferable Loss-based Active Domain Adaptation." *Neural Networks - Elsevier* (2023).

Kim, Y., Chough, J., & Panda, P. "Beyond Classification: Directly Training Spiking Neural Networks for Semantic Segmentation." *Neuromorphic Computing and Engineering* (2022).

Yin, R., Moitra, A., Bhattacharjee, A., **Kim, Y.,** and Panda, P., *SATA: Sparsity-Aware Training Accelerator for Spiking Neural Networks*. IEEE Transactions on Computer-Aided Design of Integrated Circuits and Systems (2022).

Christensen, D.V., et al. "2022 roadmap on neuromorphic computing and engineering." *Neuromorphic Computing and Engineering* (2022).

Kim, Y., & Panda, P. , *Revisiting batch normalization for training low-latency deep spiking neural networks from scratch* *Frontiers in Neuroscience* (2021).

Kim, Y. & Panda, P., *Visual explanations from spiking neural networks using interspike intervals*. *Nature Scientific Reports* 11(2021).

Kim, Y. & Panda, P., *Optimizing Deeper Spiking Neural Networks for Dynamic Vision Sensing*. *Neural Networks-Elsevier*(2021).

Venkatesha, Y., **Kim, Y.,** Tassiulas, L., & Panda, P., *Federated Learning with Spiking Neural Networks*. *IEEE Transactions on Signal Processing*(2021).

Kim, Y., Cho, D., Han, K., Panda, P., & Hong, S, *Domain adaptation without source data*. *IEEE Transactions on Artificial Intelligence*(2021).

Bhattacharjee, A., Bhatnagar, L., **Kim, Y.,** & Panda, P., *NEAT: Non-linearity Aware Training for Accurate, Energy-Efficient and Robust Implementation of Neural Networks on 1T-1R Crossbars*. *IEEE Transactions on Computer-Aided Design of Integrated Circuits and Systems*(2021).

Kim, Y., & Hong, S, *Adaptive Graph Adversarial Networks for Partial Domain Adaptation*. *IEEE Transactions on Circuits and Systems for Video Technology*(2021).

Kim, Y., Cho, D., & Hong, S, *Towards Privacy-Preserving Domain Adaptation*. *IEEE Signal Processing Letters* (2020).

PUBLICATIONS [TECHNICAL REPORTS]

Moitra, A., **Kim, Y.,** and Panda, P., *Adversarial Detection without Model Information*. arXiv preprint arXiv:2202.04271 (2022).

Venkatesha, Y., **Kim, Y.,** Park, H., Li, Y., and Panda, P., *Addressing Client Drift in Federated Continual Learning with Adaptive Optimization*. arXiv preprint arXiv:2203.13321 (2022).

TALKS

Searching for Feedback Connection Architectures using NAS in Spiking Neural Networks

Center for Brain-Inspired Computing (C-BRIC, SRC), Aug 18, 2022

Towards Deep, Interpretable, and Robust Spiking Neural Networks: Algorithmic Approaches

Center for Brain-Inspired Computing (C-BRIC, SRC), Feb 25, 2021

TEACHING EXPERIENCE

- EENG 348, Digital Systems, 2022

ACADEMIC ACTIVITIES

Reviewer

- Program Committee (PC) Member for the Thirty-Seventh AAAI Conference on Artificial Intelligence (AAAI), 2023

- Frontiers in Neuroscience

- European Conference on Computer Vision (ECCV), 2022

- IEEE/CVF conference on Computer Vision and Pattern Recognition (CVPR), 2021
- IEEE Transactions on Pattern Analysis and Machine Intelligence (TPAMI)
- IEEE Transactions on Neural Networks and Learning Systems (TNNLS)
- IEEE Transactions on Multimedia (TMM)
- IEEE Transactions on Circuits and Systems for Video Technology (TCSVT)