7th February 2024

Professor James Leger
University of Minnesota, USA
Editor-in-Chief

Optics Express

Dear Professor Leger,

Submission of the manuscript entitled "**Spiking Neural Network Enhanced Hand Gesture Recognition Using Low-Cost Single-Photon Avalanche Diode Array**"

I would like to submit the manuscript "Spiking Neural Network Enhanced Hand Gesture Recognition Using Low-Cost Single-Photon Avalanche Diode Array" for your consideration to be published in Optics Express.

We present a compact spiking convolutional neural network (SCNN) and spiking multilayer perceptron (SMLP) to recognize ten different gestures in dark and bright light environments using a $9.6 single-photon avalanche diode (SPAD) array. Our hand gesture recognition (HGR) system leveraged photon intensity data to train and test the network. A vanilla convolutional neural network (CNN) was also implemented to compare the proposed SCNN's performance with the same network topologies and training strategies. Our SCNN was trained from scratch instead of being converted from the CNN. We tested the three models in dark and ambient light (AL)-corrupted environments. The results indicate that SCNN achieves accuracy comparable to CNN (90.8%) (92.9%) and exhibits lower floating operations with only 8 timesteps. SMLP also presents a trade-off between computational workload and accuracy. The code and collected datasets of this work are available at https://github.com/zzy666666zzy/TinyLiDAR_NET_SNN.

As for the reviewer, we would like to suggest Dr Istvan Gyongy for his expertise in deep-learning computational imaging and LIDAR using SPAD sensors. He has published research articles in Optics Express.

Thank you for arranging the review, and I hope you could consider it favourably.

Yours sincerely,

David Li, PhD
Senior Lecturer
Department of Biomedical Engineering
University of Strathclyde
Glasgow G1 1XQ
Scotland, UK

Enclosures