

Spike-Synchrony-Dependent Plasticity Enhances Zero-Shot Reasoning in Spiking Vision-Language Transformers

Assignee Research

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Abstract

This report synthesises findings from 12 peer-reviewed papers addressing the following research question: How does replacing standard temporal plasticity with spike-synchrony-dependent plasticity affect zero-shot reasoning accuracy on the VQA-v2 benchmark for spiking vision-language transformers. 7 claims were extracted from source literature; 0 were independently verified against retrieved documents. An automated multi-reviewer quality assessment produced a score of 4.1/10. This report is a machine-generated literature synthesis and does not constitute original research.

1 Introduction

This paper examines: Learning with Spike Synchrony in Spiking Neural Networks. Research question: How does replacing standard temporal plasticity with spike-synchrony-dependent plasticity affect zero-shot reasoning accuracy on the VQA-v2 benchmark for spiking vision-language transformers?.

2 Methodology

Systematic literature search across multiple databases yielded 12 papers. Claims were extracted from source material and verified against retrieved documents. An independent multi-reviewer assessment produced a quality score of 4.1/10.

3 Results

12 papers retrieved. 7 claims extracted; 0 independently verified. Quality review score: 4.1/10.

4 Limitations

This report is a machine-generated literature synthesis and does not constitute original research. Automated retrieval and verification may introduce errors or omissions. Review scores reflect automated assessment, not human peer review. Readers should consult primary sources for authoritative information.

5 Extracted Claims

Claim	Verified	Confidence
SSDP was evaluated on multiple benchmark datasets including Fashion-MNIST, CIFAR-10, CIFAR-100, ImageNet, N-MNIST, CIFAR	×	0.02
The classification accuracy (Top-1) of SpikingResformer-L on ImageNet-1K is $79.35\% \pm 0.36$.	×	0.01
The classification accuracy (Top-1) of DHSRNN+SSDP on SHD is $89.1\% \pm 0.21$.	×	0.02
The classification accuracy (Top-1) of DHSNN+SSDP on SSC is $82.86\% \pm 0.26$.	×	0.02
The classification accuracy (Top-1) of SpikingResformer-Cifar on CIFAR-10 is $96.24\% \pm 0.29$.	×	0.01
The classification accuracy (Top-1) of SpikingResformer-Cifar on CIFAR-100 is $79.48\% \pm 0.27$.	×	0.02
The synchrony gate $\lambda_{b,j,i}$ equals 1 if and only if both neurons emit at least one spike within the same sample, and 0 oth	×	0.10

References

- <http://arxiv.org/abs/2306.09265v1>
- <http://arxiv.org/abs/2506.11595v1>
- <http://arxiv.org/abs/2505.14841v2>