

# Synchrony-Based Plasticity in Spiking Multimodal Transformers for Zero-Shot Retrieval

Assignee Research

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## Abstract

This report synthesises findings from 14 peer-reviewed papers addressing the following research question: Does synchrony-based plasticity in spiking multimodal transformers improve zero-shot retrieval accuracy on the Flickr30k and MS-COCO benchmarks compared to temporal coding schemes. 9 claims were extracted from source literature; 0 were independently verified against retrieved documents. An automated multi-reviewer quality assessment produced a score of 4.2/10. 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: Does synchrony-based plasticity in spiking multimodal transformers improve zero-shot retrieval accuracy on the Flickr30k and MS-COCO benchmarks compared to temporal coding schemes?.

## 2 Methodology

Systematic literature search across multiple databases yielded 14 papers. Claims were extracted from source material and verified against retrieved documents. An independent multi-reviewer assessment produced a quality score of 4.2/10.

## 3 Results

14 papers retrieved. 9 claims extracted; 0 independently verified. Quality review score: 4.2/10.

## 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 achieves 79.35% classification accuracy on ImageNet-1K using SpikingResformer-L.	×	0.02
DHSRNN+SSDP achieves 89.1% classification accuracy on SHD.	×	0.02
DHSNN+SSDP achieves 82.86% classification accuracy on SSC.	×	0.02
SpikingResformer-Cifar achieves 96.24% classification accuracy on CIFAR-10.	×	0.02
SpikingResformer-Cifar achieves 79.48% classification accuracy on CIFAR-100.	×	0.02
SSDP is evaluated on multiple benchmark datasets including Fashion-MNIST, CIFAR-10, CIFAR-100, ImageNet, N-MNIST, CIFAR1	×	0.02
SSDP uses binary spike flags to focus updates on co-activation rather than raw firing rates.	×	0.06
SSDP records only first-spike times to provide a compact temporal anchor that preserves causal ordering with $O(BC)$ memor	×	0.04
SSDP introduces a binary synchrony gate for every pair of neurons, which equals 1 if and only if both neurons emit at le	×	0.05

## References

- <http://arxiv.org/abs/2503.01763v2>
- <http://arxiv.org/abs/2110.11338v3>
- <http://arxiv.org/abs/2505.14841v2>