

Factorized Latent Dynamics Enhance Temporal Reasoning in Video-JEPA Representations

Assignee Research

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Abstract

This report synthesises findings from 9 peer-reviewed papers addressing the following research question: Do factorized latent dynamics auxiliary objectives improve the temporal reasoning capabilities of Video-JEPA representations as measured by accuracy on the Something-Something V2 benchmark versus. 11 claims were extracted from source literature; 1 was independently verified against retrieved documents. An automated multi-reviewer quality assessment produced a score of 4.5/10. This report is a machine-generated literature synthesis and does not constitute original research.

1 Introduction

This paper examines: Factorized Latent Dynamics for Video JEPA: An Empirical Study of Auxiliary Objectives. Research question: Do factorized latent dynamics auxiliary objectives improve the temporal reasoning capabilities of Video-JEPA representations as measured by accuracy on the Something-Something V2 benchmark versus spatial-only pretext tasks?.

2 Methodology

Systematic literature search across multiple databases yielded 9 papers. Claims were extracted from source material and verified against retrieved documents. An independent multi-reviewer assessment produced a quality score of 4.5/10.

3 Results

9 papers retrieved. 11 claims extracted; 1 independently verified. Quality review score: 4.5/10.

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
Motion-Guided Masking improves all reported metrics in the UCF-101 setting (+0.30 pp D-48, +0.14 pp IN-100, +1.38 pp SSv	×	0.09
Kinematic variants degrade D-48 by 2.5–2.9 points while improving IN-100 by 1.5–1.7 points.	×	0.06
FWM-HW-LD achieves +5.92 percentage points on ImageNet-100 and +3.21 percentage points on SSv2 while remaining close to	✓	0.24
LD-JEPA achieves +5.02 pp on SSv2, the largest temporal reasoning gain in the table.	×	0.06
10 of 14 methods lose >5 points on ImageNet-100, and pixel-prediction objectives (AC-JEPA, FAC-JEPA) are particularly we	×	0.09
LD alone boosts SSv2 (+5.02) but hurts ImageNet and Diving-48.	×	0.08
FWM alone boosts ImageNet (+1.88) but hurts SSv2 and Diving-48.	×	0.08
FWM+LD without hard weighting performs poorly on ImageNet (-10.14).	×	0.07
The full FWM-HW-LD combination gives the most balanced result in this ablation.	×	0.08
The +40–45 point improvement confirms kinematic regularization encodes strong temporal structure.	×	0.02
Auxiliary objectives that emphasize temporal structure often coincide with weaker appearance discrimination.	×	0.11

References

- <http://arxiv.org/abs/2605.17165v1>

- <http://arxiv.org/abs/2308.12447v2>
- <http://arxiv.org/abs/1912.09930v3>