

# Latent Space Dimensionality and Sample Efficiency in Continuous vs Discrete Action Models

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## Abstract

This report synthesises findings from 14 peer-reviewed papers addressing the following research question: What is the impact of latent space dimensionality on the sample efficiency of continuous action models versus discrete approaches in complex navigation environments like X-Maze. 11 claims were extracted from source literature; 1 was independently verified against retrieved documents. An automated multi-reviewer quality assessment produced a score of 4.3/10. This report is a machine-generated literature synthesis and does not constitute original research.

## 1 Introduction

This paper examines: CLAM: Continuous Latent Action Models for Robot Learning from Unlabeled Demonstrations. Research question: What is the impact of latent space dimensionality on the sample efficiency of continuous action models versus discrete approaches in complex navigation environments like X-Maze?.

## 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 4.3/10.

## 3 Results

14 papers retrieved. 11 claims extracted; 1 independently verified. Quality review score: 4.3/10.

## 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
CLAM outperforms all baselines and nearly matches the performance of BC with expert data in both state- and image-based	×	0.05
CLAM improves upon the best baseline VPT by more than 2 $\times$ average normalized return on the DMControl (locomotion) tasks.	×	0.08
CLAM improves upon the best baseline VPT by around 2-3 $\times$ success rate on the MetaWorld (manipulation) tasks.	×	0.11
Transformer-CLAM achieves performance close to or even better than that of BC-Expert which uses the same amount of privi	×	0.09
All variants of CLAM outperform the best baseline VPT [11].	×	0.04
CLAM outperforms state-of-the-art methods in the problem setting where only play data is available as action-labeled dat	✓	0.18
CLAM scales to learn capable robot policies in real-world scenarios.	×	0.10
The Transformer-CLAM model uses 6 encoder layers, 6 decoder layers, a feedforward dimension of 2048, 8 attention heads,	×	0.02
The CALVIN Transformer-CLAM model uses 6 encoder layers, 6 decoder layers, a feedforward dimension of 2048, 8 attention	×	0.01
The MetaWorld environment has a maximum episode step of 100, a state dimension of 39, an action dimension of 4, an image	×	0.03
The CALVIN environment has a maximum episode step of 200, a state dimension of 39, an action dimension of 7, an image sh	×	0.02

## References

- <http://arxiv.org/abs/2505.04999v1>
- <http://arxiv.org/abs/2602.12375v1>
- <http://arxiv.org/abs/2605.15725v1>