Diffusion Trajectory-Guided Policies Outperform Distilled Action Models in Out-of-Distribution Robotic Tasks

Assignee Research

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Abstract

This report synthesises findings from 14 peer-reviewed papers addressing the following research question: How does the generalization of diffusion trajectory-guided policies to out-of-distribution scenarios compare to distilled action models when measured by success rates on unseen tasks in the RoboBench. 8 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: Diffusion Trajectory-guided Policy for Long-horizon Robot Manipulation. Research question: How does the generalization of diffusion trajectory-guided policies to out-of-distribution scenarios compare to distilled action models when measured by success rates on unseen tasks in the RoboBench evaluation suite?.

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 4.5/10.

3 Results

14 papers retrieved. 8 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
The proposed Diffusion Trajectory-guided Policy (DTP) achieves a 25% higher average success rate than state-of-the-art b	✓	0.20
The DTP approach is computationally efficient, requiring only consumer-grade GPUs for training.	×	0.03
The Diffusion Trajectory Model (DTM) predicts complete future 2D-particle trajectories from task instructions and initia	×	0.08
The DTP pipeline showcases how predicted trajectories guide the manipulation policy.	×	0.07
DTP achieves a success rate of 0.924, 0.819, 0.702, 0.603, and 0.509 for completing 1, 2, 3, 4, and 5 tasks in a row, re	×	0.04
DTP achieves a success rate of 0.890, 0.773, 0.679, 0.592, and 0.497 for completing 1, 2, 3, 4, and 5 tasks in a row, re	×	0.04
DTP achieves an average success rate of 0.84 across tasks including Pick Bread, Pick Strawberry, Open Trash, CloseSide D	×	0.04
DTP completes all tasks in sequences ABCAC, ACABC, and CABCA, and 3 out of 5 tasks in sequence CACAB, with an average le	×	0.03

References

- http://arxiv.org/abs/2502.10040v2
- http://arxiv.org/abs/2510.09786v1
- http://arxiv.org/abs/2409.00588v3