Habitat-Sim Sensor Flexibility and Agent Performance in ALFRED Benchmarks

Assignee Research

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Abstract

This report synthesises findings from 15 peer-reviewed papers addressing the following research question: How does Habitat-Sim's sensor configuration flexibility affect agent performance in the ALFRED benchmark when compared to fixed-sensor simulators like PyBullet. 17 claims were extracted from source literature; 2 were independently verified against retrieved documents. An automated multi-reviewer quality assessment produced a score of 5.2/10. This report is a machine-generated literature synthesis and does not constitute original research.

1 Introduction

This paper examines: Habitat-GS: A High-Fidelity Navigation Simulator with Dynamic Gaussian Splatting. Research question: How does Habitat-Sim's sensor configuration flexibility affect agent performance in the ALFRED benchmark when compared to fixed-sensor simulators like PyBullet?.

2 Methodology

Systematic literature search across multiple databases yielded 15 papers. Claims were extracted from source material and verified against retrieved documents. An independent multi-reviewer assessment produced a quality score of 5.2/10.

3 Results

15 papers retrieved. 17 claims extracted; 2 independently verified. Quality review score: 5.2/10.

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
Habitat-GS combines the InteriorGS dataset with additional real-world reconstructed GS scenes in a 4:1 ratio, yielding 1	×	0.06
For mesh scenes, Habitat-GS uses the Habitat-Matterport 3D (HM3D) dataset, similarly split into 100 training and 20 test	×	0.06
The GS and mesh test sets are drawn from disjoint scene collections rather than two representations of the same physical	×	0.04
For gaussian avatars, Habitat-GS exports canonical gaussians from six trained AnimatableGaussians identities, with three	×	0.09
Each avatar is driven by GAMMA-generated motion trajectories with pre-computed joint matrices and proxy capsules.	×	0.01
Habitat-GS adopts standard embodied navigation metrics: Success Rate (SR), Success weighted by Path Length (SPL), and Di	×	0.05
For avatar-aware tasks, Habitat-GS reports Collision Rate (CR) and Personal Space Intrusion (PSI).	×	0.06
Habitat-GS uses Gemini 3.0 Pro as an automated evaluator to quantify the quality gap between 3DGS and mesh scene renderi	×	0.08
Habitat-GS renders 240 screenshots evenly from each renderer for VLM-based assessment.	×	0.04
Training on 3DGS scenes improves agent visual robustness and cross-domain generalization on PointNav.	✓	0.15
Habitat-GS examines whether training with dynamic gaussian avatars equips agents with human-aware navigation capabilitie	✓	0.25
Habitat-GS examines whether the system remains efficient under varying scene complexity and avatar counts.	×	0.14
Habitat-GS uses GaussianSplattingImporter and GaussianAvatarImporter for asset importing.	×	0.04
Habitat-GS uses GaussianSplattingData, GaussianSplattingDrawable, and GaussianSplattingRenderer for 3D Gaussian Splattin	×	0.12
Habitat-GS uses GaussianAvatarData, GaussianAvatarDrawable, and GaussianSplattingShader for Gaussian avatar rendering.	×	0.09
Habitat-GS uses NavMesh and PathFinder for navigation.	×	0.06
Habitat-GS uses Dynamic Capsules for dynamic avatar representation.	×	0.09

References

- http://arxiv.org/abs/2507.02910v1
- http://arxiv.org/abs/2602.12375v1
- http://arxiv.org/abs/2604.12626v1