LiDAR-Inertial-Visual Feature Fusion Strategies and Their Impact on LIVO Accuracy in Low-Light and High-Parallax Conditions

Assignee Research

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Abstract

This report synthesises findings from 13 peer-reviewed papers addressing the following research question: What is the impact of varying LiDAR-inertial-visual feature fusion strategies on the accuracy of LIVO frameworks in low-light and high-parallax conditions, as evaluated on standard autonomous driving. 6 claims were extracted from source literature; 0 were independently verified against retrieved documents. An automated multi-reviewer quality assessment produced a score of 3.7/10. This report is a machine-generated literature synthesis and does not constitute original research.

1 Introduction

This paper examines: Benchmarking Visual Feature Representations for LiDAR-Inertial-Visual Odometry Under Challenging Conditions. Research question: What is the impact of varying LiDAR-inertial-visual feature fusion strategies on the accuracy of LIVO frameworks in low-light and high-parallax conditions, as evaluated on standard autonomous driving benchmarks?.

2 Methodology

Systematic literature search across multiple databases yielded 13 papers. Claims were extracted from source material and verified against retrieved documents. An independent multi-reviewer assessment produced a quality score of 3.7/10.

3 Results

13 papers retrieved. 6 claims extracted; 0 independently verified. Quality review score: 3.7/10.

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
Conventional LIVO systems often suffer visual degeneration due to reduced visibility caused by heavy smoke and dust, and	×	0.06
The accuracy of LiDAR measurements can be degraded by collapsed structures or complex obstacles.	×	0.03
Visual and LiDAR residuals associated with IMU-propagated states in LIVO systems become distorted, leading to divergence	×	0.07
Direct visual odometry methods rely on the photometric consistency assumption, which assumes that the same 3D point main	×	0.09
Photometric calibration, compensating for device-specific photometric properties such as camera sensor response, lens vi	×	0.04
Illumination changes, such as the sunset, switching lights on and off, or moving shadows, cannot be fully corrected usin	×	0.05

References

- http://arxiv.org/abs/2309.05249v3
- http://arxiv.org/abs/2502.08676v1
- http://arxiv.org/abs/2603.18589v1