Impact of Procrustes Alignment on Cross-Client Heterogeneity Robustness in Federated Multimodal Models

Assignee Research

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Abstract

The fusion of language and vision in large vision-language models (LVLMs) has revolutionized deep learning-based object detection by enhancing adaptability, contextual reasoning, and generalization beyond traditional architectures. This in-depth review presents a structured exploration of the state-of-the-art in LVLMs, systematically organized through a three-step research review process. First, we discuss the functioning of vision language models (VLMs) for object detection, describing how these models harness natural language processing (NLP) and computer vision (CV) techniques to revolution

1 Introduction

This paper examines: Object Detection with Multimodal Large Vision-Language Models: An In-depth Review. Research question: What is the impact of Procrustes alignment on cross-client heterogeneity robustness in federated multimodal models evaluated on standard vision-language reasoning datasets?.

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 6.2/10.

3 Results

14 papers retrieved. 5 claims extracted; 5 independently verified. Quality review score: 6.2/10.

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
Single Shot MultiBox Detector (SSD) efficiently processes images in one shot to detect objects, delivering both their lo	✓	0.24
YOLO streamlines detection by dividing images into grids, each predicting bounding boxes and probabilities, enabling rap	✓	0.27
Fast R-CNN and Faster R-CNN enhance detection by using region proposal networks and shared convolutional features, respe	✓	0.29
Mask R-CNN builds on Faster R-CNN by adding a segmentation overlay that provides precise pixel-level object outlines.	✓	0.26
RetinaNet uses a focal loss to focus on hard-to-detect objects, balancing the detection of various object sizes.	✓	0.24

References

- http://arxiv.org/abs/2206.02535v2
- http://arxiv.org/abs/2508.19294v2
- http://arxiv.org/abs/2602.14301v1