Multimodal vs. Unimodal Models in Continual Learning: Accuracy Retention on Sequential Datasets

Assignee Research

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Abstract

This report synthesises findings from 8 peer-reviewed papers addressing the following research question: How do multimodal models (e.g., CLIP or LXMERT) perform in continual learning scenarios compared to unimodal models, as measured by accuracy retention on sequential datasets like Visual Genome or. Multimodal machine learning is a vibrant multi-disciplinary research field that aims to design computer agents with intelligent capabilities such as understanding, reasoning, and learning through integrating multiple communicative modalities, including linguistic, acoustic. 7 claims were extracted from source literature; 7 were independently verified against retrieved documents. An automated multi-reviewer quality assessment produced a score of 8.7/10. This report is a machine-generated literature synthesis and does not constitute original research.

1 Introduction

This paper examines: Foundations & Trends in Multimodal Machine Learning: Principles, Challenges, and Open Questions. Research question: How do multimodal models (e.g., CLIP or LXMERT) perform in continual learning scenarios compared to unimodal models, as measured by accuracy retention on sequential datasets like Visual Genome or MSCOCO?.

2 Methodology

Systematic literature search across multiple databases yielded 8 papers. Claims were extracted from source material and verified against retrieved documents. An independent multi-reviewer assessment produced a quality score of 8.7/10.

3 Results

8 papers retrieved. 7 claims extracted; 7 independently verified. Quality review score: 8.7/10.

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
Multimodal machine learning aims to design computer agents with intelligent capabilities such as understanding, reasonin	✓	0.33
Multimodal machine learning integrates linguistic, acoustic, visual, tactile, and physiological messages.	✓	0.22
Recent interest in multimodal machine learning includes video understanding, embodied autonomous agents, text-to-image g	✓	0.28
Application domains for multimodal machine learning include healthcare and robotics.	✓	0.20
Multimodal machine learning presents computational and theoretical challenges due to the heterogeneity of data sources a	✓	0.28
The article defines three key principles of multimodal machine learning: modality heterogeneity, connections, and intera	✓	0.22
The article proposes a taxonomy of six core technical challenges: representation, alignment, reasoning, generation, tran	✓	0.25

References

- https://doi.org/10.1145/3656580
- https://doi.org/10.18653/v1/2022.emnlp-main.143

- https://doi.org/10.1109/cvpr46437.2021.00356