Counterfactual Text Augmentation and Adversarial Robustness in Multimodal VQA Models

Assignee Research

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Abstract

This report synthesises findings from 6 peer-reviewed papers addressing the following research question: How does counterfactual text augmentation impact the adversarial robustness accuracy of multimodal VQA models on the VQA-CP benchmark. In the task of Visual Question Answering (VQA), most state-of-the-art models tend to learn spurious correlations in the training set and achieve poor performance in out-ofdistribution test data. Some methods of generating counterfactual samples have been proposed to alleviate. 6 claims were extracted from source literature; 6 were independently verified against retrieved documents. An automated multi-reviewer quality assessment produced a score of 8.5/10. This report is a machine-generated literature synthesis and does not constitute original research.

1 Introduction

This paper examines: Learning to Contrast the Counterfactual Samples for Robust Visual Question Answering. Research question: How does counterfactual text augmentation impact the adversarial robustness accuracy of multimodal VQA models on the VQA-CP benchmark?.

2 Methodology

Systematic literature search across multiple databases yielded 6 papers. Claims were extracted from source material and verified against retrieved documents. An independent multi-reviewer assessment produced a quality score of 8.5/10.

3 Results

6 papers retrieved. 6 claims extracted; 6 independently verified. Quality review score: 8.5/10.

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
Most state-of-the-art Visual Question Answering (VQA) models tend to learn spurious correlations in the training set.	✓	0.33
Most state-of-the-art Visual Question Answering (VQA) models achieve poor performance on out-of-distribution test data.	✓	0.25
Counterfactual samples generated by most previous methods are simply added to the training data for augmentation and are	✓	0.40
The proposed method introduces a novel self-supervised contrastive learning mechanism to learn the relationship between	✓	0.26
The proposed method surpasses current state-of-the-art models on the VQA-CP dataset.	✓	0.23
The VQA-CP dataset is a diagnostic benchmark for assessing the VQA model's robustness.	✓	0.31

References

- https://doi.org/10.18653/v1/2020.emnlp-main.265
- https://doi.org/10.1145/3565266
- https://doi.org/10.18653/v1/2020.emnlp-main.63