

Semantic Feature Disentanglement vs. Meta-Learning in Few-Shot Object Detection under Class Imbalance

Assignee Research

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Abstract

This report synthesises findings from 7 peer-reviewed papers addressing the following research question: How does semantic feature disentanglement in few-shot detectors compare to traditional meta-learning approaches in terms of mAP on PASCAL VOC under severe class imbalance. 10 claims were extracted from source literature; 3 were independently verified against retrieved documents. An automated multi-reviewer quality assessment produced a score of 5.4/10. This report is a machine-generated literature synthesis and does not constitute original research.

1 Introduction

This paper examines: Top-Related Meta-Learning Method for Few-Shot Object Detection. Research question: How does semantic feature disentanglement in few-shot detectors compare to traditional meta-learning approaches in terms of mAP on PASCAL VOC under severe class imbalance?.

2 Methodology

Systematic literature search across multiple databases yielded 7 papers. Claims were extracted from source material and verified against retrieved documents. An independent multi-reviewer assessment produced a quality score of 5.4/10.

3 Results

7 papers retrieved. 10 claims extracted; 3 independently verified. Quality review score: 5.4/10.

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
The proposed method combines TCL-C with a category-based grouping mechanism.	✓	0.21
The proposed method significantly outperforms previous state-of-the-art methods for few-shot detection.	×	0.09
Compared with the previous competitive baseline, the proposed method improves detection APs by almost 4% for few-shot de	×	0.09
Existing methods [36], [8], and [4] use Faster R-CNN and ResNet-101 with FPN as the backbone to detect objects.	×	0.02
Existing methods fail to consider unequal detection APs and increase more parameters, resulting in slower training and p	×	0.09
Method [33] uses a contrastive branch to measure the similarity between proposals but fails to address the similarity be	×	0.02
Method [41] projects features into a category-based embedding space obtained by a large corpus of text, incurring a high	×	0.07
The proposed approach splits all categories into disjoint groups to improve detection performance without additional sub	✓	0.18
The proposed approach captures the correlation between groups or categories from category-based meta-features to reduce	✓	0.16
The input of the meta-model M is an image and a mask of only an object selected randomly.	×	0.06

References

- <http://arxiv.org/abs/2503.06282v2>

- <http://arxiv.org/abs/2003.04390v4>
- <http://arxiv.org/abs/2007.06837v6>