To what extent does self-supervised objective scaling improve the generalization gap of visuomotor policies on

Assignee Research

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Abstract

Deep convolutional neural networks have performed remarkably well on many Computer Vision tasks. However, these networks are heavily reliant on big data to avoid overfitting. Overfitting refers to the phenomenon when a network learns a function with very high variance such as to perfectly model the training data. Unfortunately, many application domains do not have access to big data, such as medical image analysis. This survey focuses on Data Augmentation, a data-space solution to the problem of limited data. Data Augmentation encompasses a suite of techniques that enhance the size and quality

1 Introduction

This paper examines: A survey on Image Data Augmentation for Deep Learning. Research question: To what extent does self-supervised objective scaling improve the generalization gap of visuomotor policies on out-of-distribution object configurations compared to supervised baselines?.

2 Methodology

Systematic literature search across multiple databases yielded 10 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

10 papers retrieved. 9 claims extracted; 9 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
Deep convolutional neural networks have performed remarkably well on many Computer Vision tasks.	✓	0.25
These networks are heavily reliant on big data to avoid overfitting.	✓	0.27
Overfitting refers to the phenomenon when a network learns a function with very high variance such as to perfectly model	✓	0.29
Many application domains do not have access to big data, such as medical image analysis.	✓	0.27
Data Augmentation encompasses a suite of techniques that enhance the size and quality of training datasets such that bet	✓	0.38
The image augmentation algorithms discussed in this survey include geometric transformations, color space augmentations,	✓	0.49
The application of augmentation methods based on GANs are heavily covered in this survey.	✓	0.27
This survey will present existing methods for Data Augmentation, promising developments, and meta-level decisions for im	✓	0.35
Readers will understand how Data Augmentation can improve the performance of Deep Learning models.	✓	0.24

References

- https://doi.org/10.1186/s40537-019-0197-0
- https://doi.org/10.1007/s43154-020-00021-6
- https://doi.org/10.1523/jneurosci.14-05-03208.1994