

Data Augmentation Effects on CNN Training Throughput and ImageNet Generalization

Assignee Research

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Abstract

This report synthesises findings from 13 peer-reviewed papers addressing the following research question: What is the impact of data augmentation techniques on the training throughput and generalization performance of large-scale convolutional neural networks, evaluated using top-k accuracy metrics on. In this work we investigate the effect of the convolutional network depth on its accuracy in the large-scale image recognition setting. Our main contribution is a thorough evaluation of networks of increasing depth using an architecture with very small (3x3) convolution filters. 5 claims were extracted from source literature; 5 were independently verified against retrieved documents. An automated multi-reviewer quality assessment produced a score of 9.0/10. This report is a machine-generated literature synthesis and does not constitute original research.

1 Introduction

This paper examines: Very Deep Convolutional Networks for Large-Scale Image Recognition. Research question: What is the impact of data augmentation techniques on the training throughput and generalization performance of large-scale convolutional neural networks, evaluated using top-k accuracy metrics on ImageNet and other object recognition benchmarks?.

2 Methodology

Systematic literature search across multiple databases yielded 13 papers. Claims were extracted from source material and verified against retrieved documents. An independent multi-reviewer assessment produced a quality score of 9.0/10.

3 Results

13 papers retrieved. 5 claims extracted; 5 independently verified. Quality review score: 9.0/10.

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 accuracy of convolutional networks in large-scale image recognition improves with increased depth.	✓	0.27
Using an architecture with very small (3x3) convolution filters, a significant improvement on prior-art configurations c	✓	0.44
The team secured the first and the second places in the localisation and classification tracks respectively in the Image	✓	0.33
The representations generalise well to other datasets, achieving state-of-the-art results.	✓	0.18
Two best-performing ConvNet models have been made publicly available.	✓	0.24

References

- <https://doi.org/10.1186/s40537-021-00444-8>
- <https://doi.org/10.48550/arxiv.1409.1556>
- <https://doi.org/10.1016/j.media.2016.10.004>