Node-Based Bayesian Neural Networks Outperform Weight-Based BNNs in Inference Efficiency

Assignee Research

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Abstract

This report synthesises findings from 14 peer-reviewed papers addressing the following research question: Can node-based Bayesian neural networks outperform weight-based BNNs in terms of inference efficiency (e.g., latency per sample) on large-scale tabular datasets while preserving accuracy, as. 7 claims were extracted from source literature; 1 was independently verified against retrieved documents. An automated multi-reviewer quality assessment produced a score of 4.5/10. This report is a machine-generated literature synthesis and does not constitute original research.

1 Introduction

This paper examines: Efficient Architecture Search by Network Transformation. Research question: Can node-based Bayesian neural networks outperform weight-based BNNs in terms of inference efficiency (e.g., latency per sample) on large-scale tabular datasets while preserving accuracy, as evaluated on benchmarks like TabularMAS or BigTable?.

2 Methodology

Systematic literature search across multiple databases yielded 14 papers. Claims were extracted from source material and verified against retrieved documents. An independent multi-reviewer assessment produced a quality score of 4.5/10.

3 Results

14 papers retrieved. 7 claims extracted; 1 independently verified. Quality review score: 4.5/10.

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
The CIFAR-10 dataset consists of 50,000 training images and 10,000 test images.	×	0.06
The SVHN dataset contains 73,257 images in the original training set, 26,032 images in the test set, and 531,131 additio	×	0.02
The proposed EAS method achieves a test error rate of 4.23% on CIFAR-10 without skip-connections.	✓	0.19
The proposed EAS method achieves a test error rate of 1.73 on SVHN.	×	0.09
The proposed EAS method uses 5 GPUs for experiments, compared to 800 GPUs used in previous work (Zoph and Le 2017).	×	0.04
The proposed EAS method explores the plain CNN architecture space and the DenseNet architecture space.	×	0.14
The proposed EAS method achieves more accurate networks with fewer parameters by exploring the DenseNet architecture spa	×	0.12

References

- http://arxiv.org/abs/1707.04873v2
- http://arxiv.org/abs/1811.10041v1
- http://arxiv.org/abs/1811.09385v2