Dynamic Threshold Adjustment Effects on PER in Small Language Models for Code and Math Tasks

Assignee Research

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Abstract

This report synthesises findings from 9 peer-reviewed papers addressing the following research question: What is the impact of dynamic threshold adjustment (PowerInfer) on the PER metric for small language models (0.5-7B) compared to static thresholds in code generation and mathematical reasoning tasks. This article surveys Cognitive Edge Computing as a practical and methodical pathway for deploying reasoning-capable Large Language Models (LLMs) and autonomous AI agents on resource-constrained devices at the network edge. We present a unified, cognition-preserving framework. 11 claims were extracted from source literature; 8 were independently verified against retrieved documents. An automated multi-reviewer quality assessment produced a score of 7.3/10. This report is a machine-generated literature synthesis and does not constitute original research.

1 Introduction

This paper examines: Cognitive Edge Computing: A Comprehensive Survey on Optimizing Large Models and AI Agents for Pervasive Deployment. Research question: What is the impact of dynamic threshold adjustment (PowerInfer) on the PER metric for small language models (0.5-7B) compared to static thresholds in code generation and mathematical reasoning tasks?.

2 Methodology

Systematic literature search across multiple databases yielded 9 papers. Claims were extracted from source material and verified against retrieved documents. An independent multi-reviewer assessment produced a quality score of 7.3/10.

3 Results

9 papers retrieved. 11 claims extracted; 8 independently verified. Quality review score: 7.3/10.

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 article surveys Cognitive Edge Computing as a pathway for deploying reasoning-capable Large Language Models (LLMs) a	✓	0.38
The proposed framework includes model optimization techniques such as quantization, sparsity, low-rank adaptation, and d	✓	0.15
The proposed framework includes system architecture components comprising on-device inference, elastic offloading, and c	✓	0.16
The proposed framework includes adaptive intelligence mechanisms such as context compression, dynamic routing, and feder	✓	0.16
The article synthesizes advances in efficient Transformer design, multimodal integration, hardware-aware compilation, pr	✓	0.29
The article outlines a standardized evaluation protocol covering latency, throughput, energy per token, accuracy, robust	✓	0.26
The article identifies modality-aware reasoning benchmarks as a remaining challenge.	×	0.13
The article identifies transparent and reproducible energy reporting as a remaining challenge.	×	0.13
The article identifies edge-oriented safety/alignment evaluation as a remaining challenge.	✓	0.16
The article identifies multi-agent testbeds as a remaining challenge.	×	0.10
The article concludes with practitioner guidelines for cross-layer co-design of algorithms, runtime, and hardware.	✓	0.20

References

- https://doi.org/10.48550/arxiv.2501.03265
- https://doi.org/10.48550/arxiv.2406.06282
- https://doi.org/10.55056/jec.1000