FLCert Client Selection Strategy Enhances Federated Learning Across Domains

Assignee Research

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Abstract

This report synthesises findings from 10 peer-reviewed papers addressing the following research question: What is the effect of FLCert's client selection strategy on the federated learning performance in a cross-domain setting, evaluated on both Shakespeare and Reddit datasets, measured by model F1. Federated Learning (FL) trains a machine learning model on distributed clients without exposing individual data. Unlike centralized training that is usually based on carefully-organized data, FL deals with on-device data that are often unfiltered and imbalanced. 8 claims were extracted from source literature; 8 were independently verified against retrieved documents. An automated multi-reviewer quality assessment produced a score of 8.0/10. This report is a machine-generated literature synthesis and does not constitute original research.

1 Introduction

This paper examines: FedBalancer. Research question: What is the effect of FLCert's client selection strategy on the federated learning performance in a cross-domain setting, evaluated on both Shakespeare and Reddit datasets, measured by model F1 scores and communication efficiency?.

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 8.0/10.

3 Results

10 papers retrieved. 8 claims extracted; 8 independently verified. Quality review score: 8.0/10.

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
Federated Learning (FL) trains a machine learning model on distributed clients without exposing individual data.	✓	0.28
FL deals with on-device data that are often unfiltered and imbalanced.	✓	0.22
Conventional FL training protocol that treats all data equally leads to a waste of local computational resources and slo	✓	0.37
FedBalancer is a systematic FL framework that actively selects clients' training samples.	✓	0.29
FedBalancer's sample selection strategy prioritizes more 'informative' data while respecting privacy and computational c	✓	0.33
FedBalancer introduces an adaptive deadline control scheme that predicts the optimal deadline for each round with varyin	✓	0.31
FedBalancer improves the time-to-accuracy performance by 1.20~4.48$\times$ while improving the model accuracy by 1.1~5.0%.	✓	0.31
FedBalancer is readily applicable to other FL approaches by demonstrating that FedBalancer improves the convergence spee	✓	0.41

References

- https://doi.org/10.1145/3498361.3538917
- https://doi.org/10.1561/2200000083
- https://doi.org/10.1038/s41467-022-29763-x