Scaling Communication Overhead in Federated Learning for IoT Malware Detection

Assignee Research

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Abstract

This report synthesises findings from 11 peer-reviewed papers addressing the following research question: How does the communication overhead in federated learning scale with the number of participating IoT devices when deploying real-time malware detection models on edge infrastructure. With the rapid development of the Internet of Everything (IoE), the number of smart devices connected to the Internet is increasing, resulting in large-scale data, which has caused problems such as bandwidth load, slow response speed, poor security, and poor privacy in. 12 claims were extracted from source literature; 8 were independently verified against retrieved documents. An automated multi-reviewer quality assessment produced a score of 6.8/10. This report is a machine-generated literature synthesis and does not constitute original research.

1 Introduction

This paper examines: An Overview on Edge Computing Research. Research question: How does the communication overhead in federated learning scale with the number of participating IoT devices when deploying real-time malware detection models on edge infrastructure?.

2 Methodology

Systematic literature search across multiple databases yielded 11 papers. Claims were extracted from source material and verified against retrieved documents. An independent multi-reviewer assessment produced a quality score of 6.8/10.

3 Results

11 papers retrieved. 12 claims extracted; 8 independently verified. Quality review score: 6.8/10.

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 number of smart devices connected to the Internet is increasing due to the rapid development of the Internet of Ever	✓	0.26
The increase in connected smart devices has resulted in large-scale data generation.	×	0.14
Traditional cloud computing models face problems including bandwidth load, slow response speed, poor security, and poor	✓	0.34
Traditional cloud computing is insufficient to support the diverse data processing needs of today's intelligent society.	✓	0.29
Edge computing is a computing paradigm that performs calculations at the edge of the network.	✓	0.19
Edge computing emphasizes proximity to the user and the data source, unlike cloud computing.	✓	0.21
Edge computing is designed for lightweight, local, small-scale data storage and processing.	✓	0.28
The article summarizes the concept of edge computing and compares it with cloud computing.	✓	0.28
The article summarizes the architecture of edge computing.	×	0.15
The article summarizes key technologies related to edge computing.	×	0.10
The article summarizes security and privacy protection measures in edge computing.	✓	0.16
The article summarizes applications of edge computing.	×	0.14

References

- https://doi.org/10.1109/jsac.2021.3126076

- https://doi.org/10.1109/access.2020.2991734
- https://doi.org/10.1109/access.2021.3118642