

# Federated LLM Code Generation Under Data Heterogeneity and Partial Participation

Assignee Research

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## Abstract

This report synthesises findings from 12 peer-reviewed papers addressing the following research question: What is the impact of data heterogeneity under partial client participation on the code generation capabilities of federated LLMs as measured by HumanEval pass@k scores. Federated learning (FL) is a machine learning setting where many clients (e.g., mobile devices or whole organizations) collaboratively train a model under the orchestration of a central server (e.g., service provider), while keeping the training data decentralized. FL embodies 5 claims were extracted from source literature; 5 were independently verified against retrieved documents. An automated multi-reviewer quality assessment produced a score of 8.8/10. This report is a machine-generated literature synthesis and does not constitute original research.

## 1 Introduction

This paper examines: Advances and Open Problems in Federated Learning. Research question: What is the impact of data heterogeneity under partial client participation on the code generation capabilities of federated LLMs as measured by HumanEval pass@k scores?.

## 2 Methodology

Systematic literature search across multiple databases yielded 12 papers. Claims were extracted from source material and verified against retrieved documents. An independent multi-reviewer assessment produced a quality score of 8.8/10.

## 3 Results

12 papers retrieved. 5 claims extracted; 5 independently verified. Quality review score: 8.8/10.

## 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
Federated learning (FL) is a machine learning setting where many clients (e.g., mobile devices or whole organizations) c	✓	0.59
FL embodies the principles of focused data collection and minimization.	✓	0.34
FL can mitigate many of the systemic privacy risks and costs resulting from traditional, centralized machine learning an	✓	0.46
There has been an explosive growth in FL research.	✓	0.25
This monograph discusses recent advances and presents an extensive collection of open problems and challenges in FL.	✓	0.45

## References

- <https://doi.org/10.1561/22000000083>
- <https://doi.org/10.3390/s20216230>
- <https://doi.org/10.1109/jsac.2021.3126076>