

# Federated Learning with Diversity-Driven Client Selection Enhances Multimodal Model Generalization

Assignee Research

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## Abstract

This report synthesises findings from 11 peer-reviewed papers addressing the following research question: To what extent does the federated learning setup with diversity-driven client selection improve the generalization of multimodal models (e.g., CLIP, ViLBERT) across unseen domains compared to. Natural Language Processing (NLP) is one of the most captivating applications of Deep Learning. In this survey, we consider how the Data Augmentation training strategy can aid in its development. 9 claims were extracted from source literature; 9 were independently verified against retrieved documents. An automated multi-reviewer quality assessment produced a score of 8.7/10. This report is a machine-generated literature synthesis and does not constitute original research.

## 1 Introduction

This paper examines: Text Data Augmentation for Deep Learning. Research question: To what extent does the federated learning setup with diversity-driven client selection improve the generalization of multimodal models (e.g., CLIP, ViLBERT) across unseen domains compared to centralized training on aggregated data, as measured by transfer learning performance on domain-shifted benchmarks?.

## 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 8.7/10.

### 3 Results

11 papers retrieved. 9 claims extracted; 9 independently verified. Quality review score: 8.7/10.

### 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
Natural Language Processing (NLP) is one of the most captivating applications of Deep Learning.	✓	0.24
Data Augmentation training strategy can aid in the development of NLP.	✓	0.24
The major motifs of Data Augmentation include strengthening local decision boundaries, brute force training, causality a	✓	0.36
Deep Learning generally struggles with the measurement of generalization and characterization of overfitting.	✓	0.26
NLP is at an early stage in applying Data Augmentation compared to Computer Vision.	✓	0.28
Tools that facilitate Data Augmentation include the use of consistency regularization, controllers, and offline and onli	✓	0.29
Data Augmentation can construct test sets for generalization.	✓	0.22
There are key differences and promising ideas that have yet to be tested in NLP regarding Data Augmentation.	✓	0.22
Interesting topics around Data Augmentation in NLP include task-specific augmentations, the use of prior knowledge in se	✓	0.46

## References

- <https://doi.org/10.1186/s40537-021-00492-0>
- <https://doi.org/10.1145/3561048>
- <https://doi.org/10.1038/s41746-020-00323-1>