

# Causal Data Augmentation and Robustness of Tabular Foundation Models in Low-Resource Settings

Assignee Research

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## Abstract

Machine learning models often fail under distribution shifts, a problem exacerbated in low-resource settings where limited data restricts robust generalization. Domain generalization(DG) methods address this challenge by learning representations that remain invariant across domains, frequently leveraging causal principles. In this work, we study two causal DG approaches for low-resource natural language processing. First, we apply causal data augmentation using GPT-4o-mini to generate counterfactual paraphrases for sentiment classification on the NaijaSenti Twitter corpus in Yoruba and Igbo. S

## 1 Introduction

This paper examines: When Distributions Shifts: Causal Generalization for Low-Resource Languages. Research question: How does causal data augmentation affect the robustness of tabular foundation models against distribution shifts in low-resource settings?.

## 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 7.4/10.

## 3 Results

12 papers retrieved. 7 claims extracted; 5 independently verified. Quality review score: 7.4/10.

## 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
Afri-SemEval is a multilingual ABSA dataset covering 17 African languages.	✓	0.22
The core objective is to test the causal invariance hypothesis, which posits that augmentations preserving causal semantics	✓	0.25
The combined configuration consistently yields higher accuracy across domains, confirming that integrating both original	✓	0.27
The validation accuracy for Yoruba with the combined dataset is 0.6934.	×	0.15
The test accuracy for Yoruba with the original test set is 0.6799.	✓	0.20
The study uses the Yoruba and Igbo subsets of the NaijaSenti corpus, a multilingual sentiment twitter dataset covering f	✓	0.29
The paraphrasing function $f : X \rightarrow X'$ produces $x' = f(x)$ .	×	0.08

## References

- <http://arxiv.org/abs/2510.27512v2>
- <http://arxiv.org/abs/2601.04110v2>
- <http://arxiv.org/abs/2211.11349v2>