Stack Overflow Pretraining Reduces Semantic Gaps in Java Code Generation

Assignee Research

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Abstract

This report synthesises findings from 13 peer-reviewed papers addressing the following research question: Does the inclusion of Stack Overflow data in pretraining reduce the semantic similarity gap between natural language queries and generated Java code as evaluated by BLEU and CodeBLEU metrics. 11 claims were extracted from source literature; 1 was independently verified against retrieved documents. An automated multi-reviewer quality assessment produced a score of 3.2/10. This report is a machine-generated literature synthesis and does not constitute original research.

1 Introduction

This paper examines: CodeSearchNet Challenge: Evaluating the State of Semantic Code Search. Research question: Does the inclusion of Stack Overflow data in pretraining reduce the semantic similarity gap between natural language queries and generated Java code as evaluated by BLEU and CodeBLEU metrics?.

2 Methodology

Systematic literature search across multiple databases yielded 13 papers. Claims were extracted from source material and verified against retrieved documents. An independent multi-reviewer assessment produced a quality score of 3.2/10.

3 Results

13 papers retrieved. 11 claims extracted; 1 independently verified. Quality review score: 3.2/10.

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
A Weights & Biases leaderboard for the CodeSearchNet Challenge is deployed at https://app.wandb.ai/github/codesearchnet/	×	0.08
Normalized discounted cumulative gain (NDCG) is used to evaluate each competing method in the CodeSearchNet Challenge.	×	0.07
Two variants of NDCG are computed: one over the subset of functions with human annotations ('Within') and one over the w	×	0.09
The baseline models use joint embeddings of code and queries to map inputs into a single, joint vector space.	×	0.04
Identifiers in code tokens are split into subtokens (e.g., camelCase becomes camel and case) during preprocessing.	×	0.03
Natural language tokens are split using byte-pair encoding (BPE).	×	0.06
The implemented architectures include Neural Bag of Words, Bidirectional RNN models using GRU cells, 1D Convolutional Ne	×	0.02
Token embeddings are combined into a sequence embedding using mean/max-pooling or an attention-like weighted sum mechani	×	0.02
The dimensionality of the embedding space is set to 128 for all models.	×	0.02
The CodeSearchNet Corpus was obtained by scraping open-source repositories and pairing individual functions with their p	×	0.12
The CodeSearchNet Corpus contains 2 million datapoints.	✓	0.21

References

- http://arxiv.org/abs/1909.09436v3
- http://arxiv.org/abs/2306.06371v1
- http://arxiv.org/abs/2104.05310v2