"Model Size Scaling and Zero-Shot Vulnerability Detection in Unseen Languages: A Cross-Language Benchmark Analysis"

Assignee Research

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Abstract

The rapid expansion of the digital world has propelled sentiment analysis into a critical tool across diverse sectors such as marketing, politics, customer service, and healthcare. While there have been significant advancements in sentiment analysis for widely spoken languages, low-resource languages, such as Bangla, remain largely underresearched due to resource constraints. Furthermore, the recent unprecedented performance of Large Language Models (LLMs) in various applications highlights the need to evaluate them in the context of low-resource languages. In this study, we present a sizeabl

1 Introduction

This paper examines: Zero- and Few-Shot Prompting with LLMs: A Comparative Study with Fine-tuned Models for Bangla Sentiment Analysis. Research question: What is the effect of model size scaling (e.g., CodeT5-small vs. CodeT5-large) on zero-shot vulnerability detection accuracy in unseen programming languages, compared to mT5, using a cross-language benchmark with standardized vulnerability datasets?.

2 Methodology

Systematic literature search across multiple databases yielded 8 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

8 papers retrieved. 20 claims extracted; 15 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
The performance measures used for all different experimental settings include accuracy, weighted precision, recall, and	✓	0.16
Weighted metrics are used to account for class imbalance.	×	0.11
For all experiments, except for LLMs, models were trained using the training set, fine-tuned with the development set, a	✓	0.20
LLMs were accessed through APIs.	×	0.12
The definitions of 'small' and 'large' models follow those discussed in (Zhao et al., 2023).	✓	0.22
LLMs refer to models encompassing tens or hundreds of billions of parameters.	×	0.13
Baseline methods used include a majority class approach and a random approach.	×	0.10
Majority and random approaches have been widely used as baseline techniques in numerous studies, for example, (Rosenthal	✓	0.25
Classical models such as SVM and Random Forest have been widely used in prior studies and remain in use in many low-reso	✓	0.30
For SVM and Random Forest experiments, standard parameter settings were used: n-gram (1 to 5) transformed into TF-IDF, C	✓	0.28
Small Language Models (SLMs) fine-tuned include BanglaBERT, mBERT, XLM-RoBERTa, and BLOOMZ (560m and 1.7B parameters mod	✓	0.17
The Transformer toolkit (Wolf et al., 2020) was used for experiments with SLMs.	✓	0.19
SLMs were fine-tuned using default settings over three epochs, with ten reruns using different random seeds, and the bes	✓	0.21
Embeddings were extracted using OpenAI's text-embedding-ada-002 model for each data split.	×	0.10
The methodology encompasses rule-based methodologies, classical machine learning approaches, and pre-trained models.	✓	0.19
Several datasets have been developed for Bangla sentiment analysis, including those by Chowdhury and Chowdhury (2014), A	✓	0.28
Chowdhury and Chowdhury (2014) developed a dataset using semi-supervised approaches and trained models SVM and Maximum E	✓	0.28
Kabir et al. (2023) proposed an annotated sentiment corpus comprising 158,065 reviews collected from online bookstores,	✓	0.28
SentiGold (Islam et al., 2023) is a well-balanced sentiment dataset containing 70K entries from 30 different domains, wi	✓	0.26

References

- http://arxiv.org/abs/2306.09269v1
- http://arxiv.org/abs/2404.14700v4
- http://arxiv.org/abs/2308.10783v2