The Name of the Title is Hope

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Static Program Analysis is a cornerstone technique in software engineering for ensuring code reliability and security. Traditional static analysis, using abstract interpretation, represents the program as a set of mathematical constraints over abstract domains. These analyzers are sound, but often imprecise due to the undecidability of program termination, leading to excessive false positives. Recent work has explored using Language Models to improve the precision of widening-based static analyzers by predicting loop invariants and abstraction heuristics. However, these approaches explode in both context size and computation time as the number of program variables increases, making them infeasible for real-world programs. In this work, we propose SLICE-ABSINT, a novel approach to static analysis that leverages Language Models to guide the analysis process while maintaining scalability. By slicing the program based on the dependencies of diverging abstract states, we dynamically prune the context window to strictly relevant code paths before querying the neural oracle. This semantic filtering prevents "context pollution," ensuring the model focuses solely on variables affecting the widening decision. Our evaluation on the SV-COMP benchmark suite demonstrates that SLICE-ABSINT reduces token consumption by XXX while improving invariant prediction accuracy by XXX compared to full-context baselines, establishing that context reduction is a prerequisite for scalable neurosymbolic verification.

1 INTRODUCTION

While recent works like LLMxCPG leverage slicing to enhance LLM-based vulnerability detection, they lack formal guarantees. SLICE-ABSINT is the first framework to apply semantic slicing specifically to the Abstract Widening Operator. Unlike heuristic bug-finders, our slices are formally proven to preserve the observational equivalence of the abstract domain, ensuring that the reduced context never compromises the soundness of the final verification."

2 OVERVIEW

3 [CONTRIBUTION 1]

4 [CONTRIBUTION 2]

5 EVALUATION

6 RELATED WORK

7 CONCLUSION

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TBD

REFERENCES

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