Towards Generalizable AI Reasoning: A Proof-Based Perspective

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Abstract

We propose a framework for integrating neural and symbolic reasoning in AI systems. Our approach builds on proof search, verification, and reinforcement learning to enable scalable theorem proving and reasoning automation. This paper outlines the architecture, preliminary experiments, and implications for AI research.

1 Introduction

Artificial Intelligence research has made significant progress in natural language understanding, perception, and planning. However, generalizable reasoning, particularly in mathematics, remains challenging. In this work, we explore ...

2 Related Work

Prior work on neural theorem provers ...

3 Method

We present a modular architecture with a planner, proof policy, and verifier-in-the-loop ...

4 Experiments

Our evaluation benchmarks the model on formal libraries (e.g., Lean's `mathlib4`) ...

5 Conclusion

We outline challenges and future directions for scaling symbolic-neural hybrid systems.