Multimodal vs Text-Only LLMs on HumanEval-V Coding Tasks with Visual Reasoning

Assignee Research

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Abstract

This report synthesises findings from 12 peer-reviewed papers addressing the following research question: How do Multimodal Large Language Models (LLMs) compare to text-only LLMs on HumanEval-V in terms of accuracy for tasks requiring diagram interpretation and complex visual reasoning. 14 claims were extracted from source literature; 1 was independently verified against retrieved documents. An automated multi-reviewer quality assessment produced a score of 4.5/10. This report is a machine-generated literature synthesis and does not constitute original research.

1 Introduction

This paper examines: HumanEval-V: Benchmarking High-Level Visual Reasoning with Complex Diagrams in Coding Tasks. Research question: How do Multimodal Large Language Models (LLMs) compare to text-only LLMs on HumanEval-V in terms of accuracy for tasks requiring diagram interpretation and complex visual reasoning?.

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 4.5/10.

3 Results

12 papers retrieved. 14 claims extracted; 1 independently verified. Quality review score: 4.5/10.

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
HumanEval-V consists of 253 human-annotated coding tasks.	✓	0.16
Each task in HumanEval-V features a diagram, a function signature, and test cases.	×	0.12
HumanEval-V diagrams span six task types.	×	0.12
HumanEval-V uses code generation tasks for evaluation instead of multiple-choice or short-answer questions.	×	0.13
Claude 3.5 Sonnet achieves a 36.8% pass@1 score on HumanEval-V.	×	0.11
Pixtral 124B achieves a 21.3% pass@1 score on HumanEval-V.	×	0.02
Claude 3.5 Sonnet achieves a 74.3% pass rate with 100 samples.	×	0.04
Claude 3.5 Sonnet reaches a 55.3% pass@1 rate with four self-refining iterations based on test case execution feedback.	×	0.04
Experiments were conducted with 22 Large Multimodal Models (LMMs).	×	0.15
The evaluation pipeline includes a variant where the model generates a structured diagram description before a coder mod	×	0.02
The Intermediate Textual Representation method produces a problem specification consisting of Problem Restatement, Visua	×	0.03
GPT-4o achieves a 27.7% pass@1 score on HumanEval-V.	×	0.02
Gemini 1.5 Pro achieves a 22.9% pass@1 score on HumanEval-V.	×	0.04
InternVL 2.5 78B achieves a 13.4% pass@1 score on HumanEval-V.	×	0.02

References

- http://arxiv.org/abs/2404.07214v4
- http://arxiv.org/abs/2410.12381v3
- http://arxiv.org/abs/2510.04514v2