1 Incoherence-Based Experiment Analysis

This report presents a statistical analysis of the model's performance across tasks, focusing on the relationship between incoherence scores (Incoherence) and execution errors (Error).

Number of tasks analyzed: 140

2 Introduction

This report summarizes the results of an automatic evaluation of code generation using the following configuration parameters.

Parameter	**Value**
Language Model	gpt_4
Temperature	0.6
m (number of candidates)	10
n (number of samples used to estimate metrics)	1000
Timeout per metric estimation (s)	60.0

The model was tested across a suite of programming tasks. We aim to explore how the model's incoherence signal relates to execution-time failures.

2.1 Summary Statistics

Metric	Mean	Std	Min	Max
Raw Incoherence	0.086	0.156	0.000	0.880
Raw Error	0.116	0.208	0.000	0.993

2.2 Error Detection Analysis

Metric	Value
Errors (Error $>$ 0)	81
Error Rate	57.86%
Detected Errors (Error $>$ 0 and Incoherence $>$ 0)	70
Detection Rate	86.42%
Confident (Incoherence = 0)	67
Confident Error Count	11
Confident Error Rate	16.42%
Mean Error When Confident	0.0402

2.3 Correlation Analysis

Metric	Pearson r	Pearson p	Spearman ρ	Spearman p
Incoherence vs Error	0.754	5.841e-27	0.824	7.500e-36

2.4 Bubble Plot of Incoherence and Error

This plot shows the density of (Incoherence, Error) points using bubble size to indicate frequency.

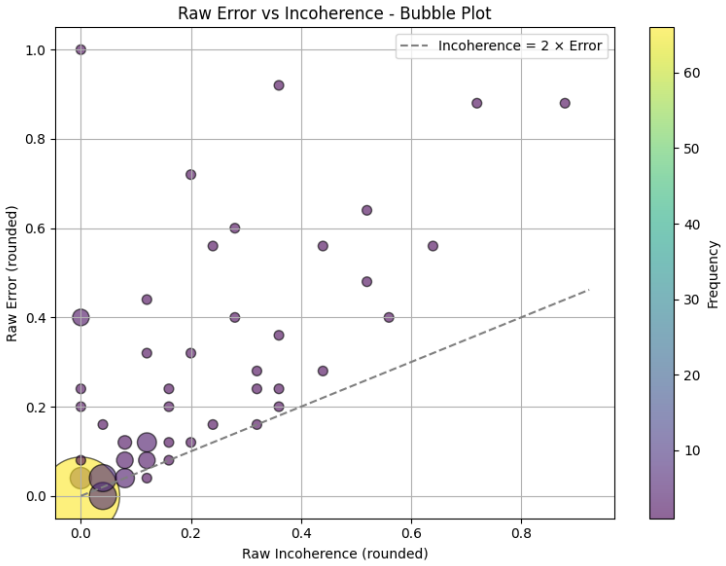

Figure 1: Bubble Plot: Incoherence vs Error

2.5 Log-Log Plot of Incoherence and Error

This plot displays the relationship between Incoherence and Error in log-log scale. Only data points where both values are strictly positive are included.

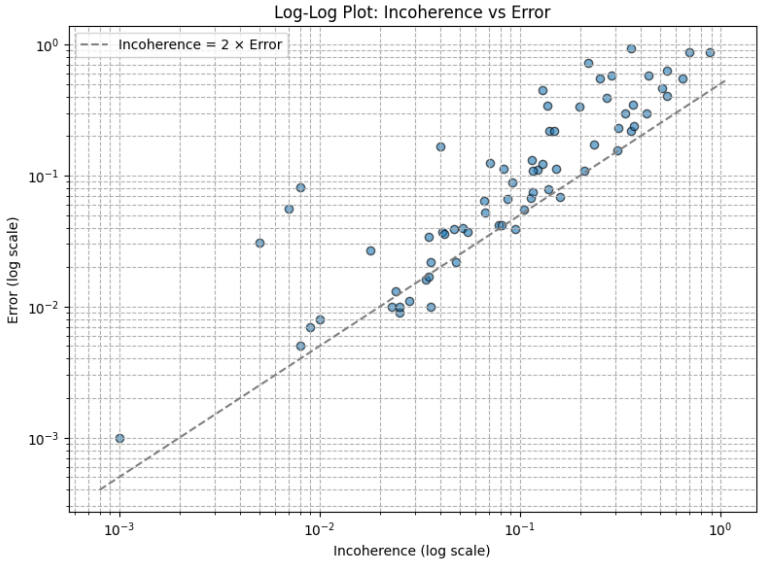

Figure 2: Log-Log Scatter Plot: Incoherence vs Error