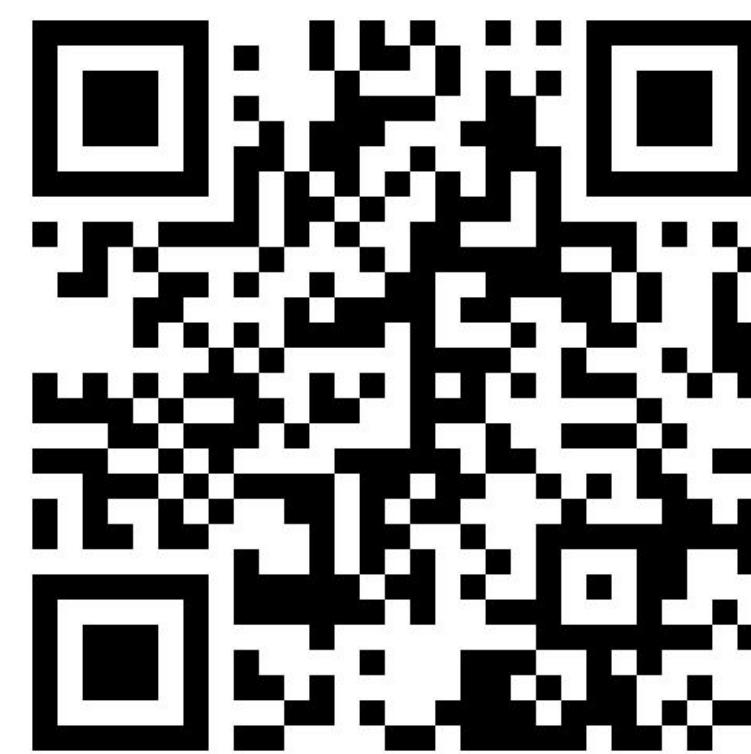




# DSPy meets HELM

## Structured Prompting Enables More Robust Evaluation of Language Models

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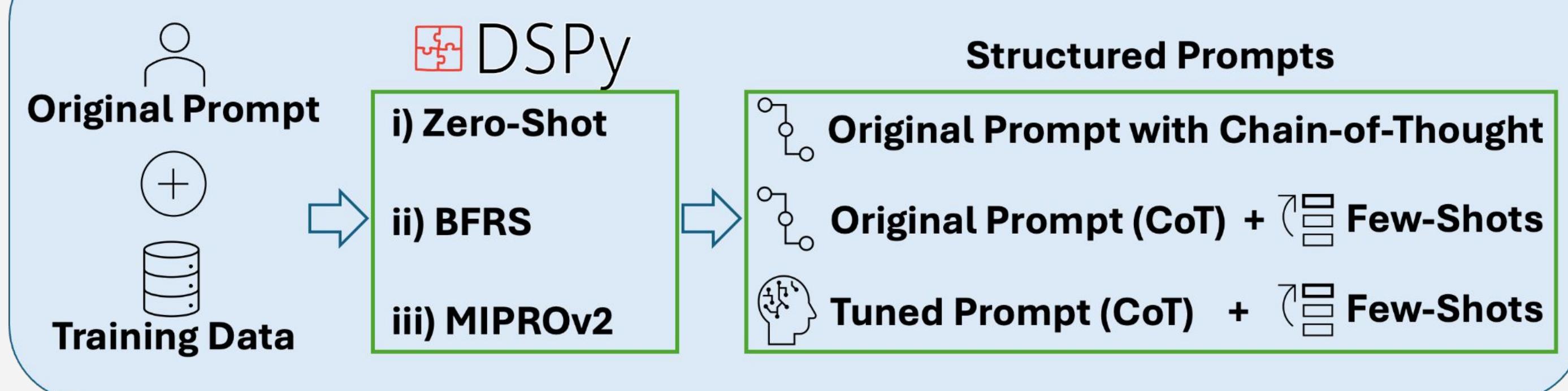
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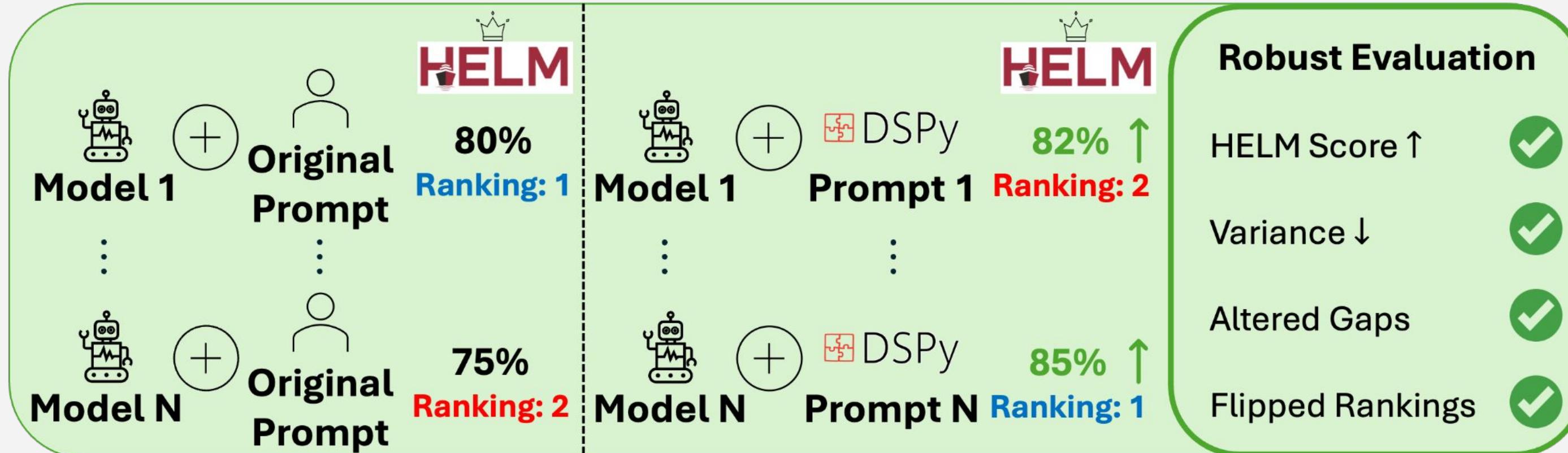
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### DSPy+HELM Pipeline

#### (a) Structured prompting with DSPy



#### (b) Performance analysis using HELM



### Structured Prompting Methods

#### Prompt 1: HELM Baseline

Given a patient note and a clinical question, compute the requested medical value.  
Patient Note and Question:

#### Prompt 2: Zero-Shot CoT

Your input fields are: "INPUTS"  
Your output fields are: "REASONING" and "OUTPUT"  
Your objective is: Given the fields "INPUTS", produce the fields "OUTPUT"  
INPUTS:  
Given a patient note and a clinical question, compute the requested medical value.  
Patient Note and Question:  
Respond with the corresponding output fields, starting with "REASONING", then "OUTPUT".

#### Prompt 3: BFRS (Few-Shot Optimized)

Your input fields are: "INPUTS"  
Your output fields are: "REASONING" and "OUTPUT"  
Your objective is: Given the fields "INPUTS", produce the fields "OUTPUT"  
IN-CONTEXT EXAMPLES (K Demos):  
INPUTS: <input text> → REASONING: <steps>, OUTPUT: <output text>  
INPUTS:  
Given a patient note and a clinical question, compute the requested medical value.  
Patient Note and Question:  
Respond with the corresponding output fields, starting with "REASONING", then "OUTPUT".

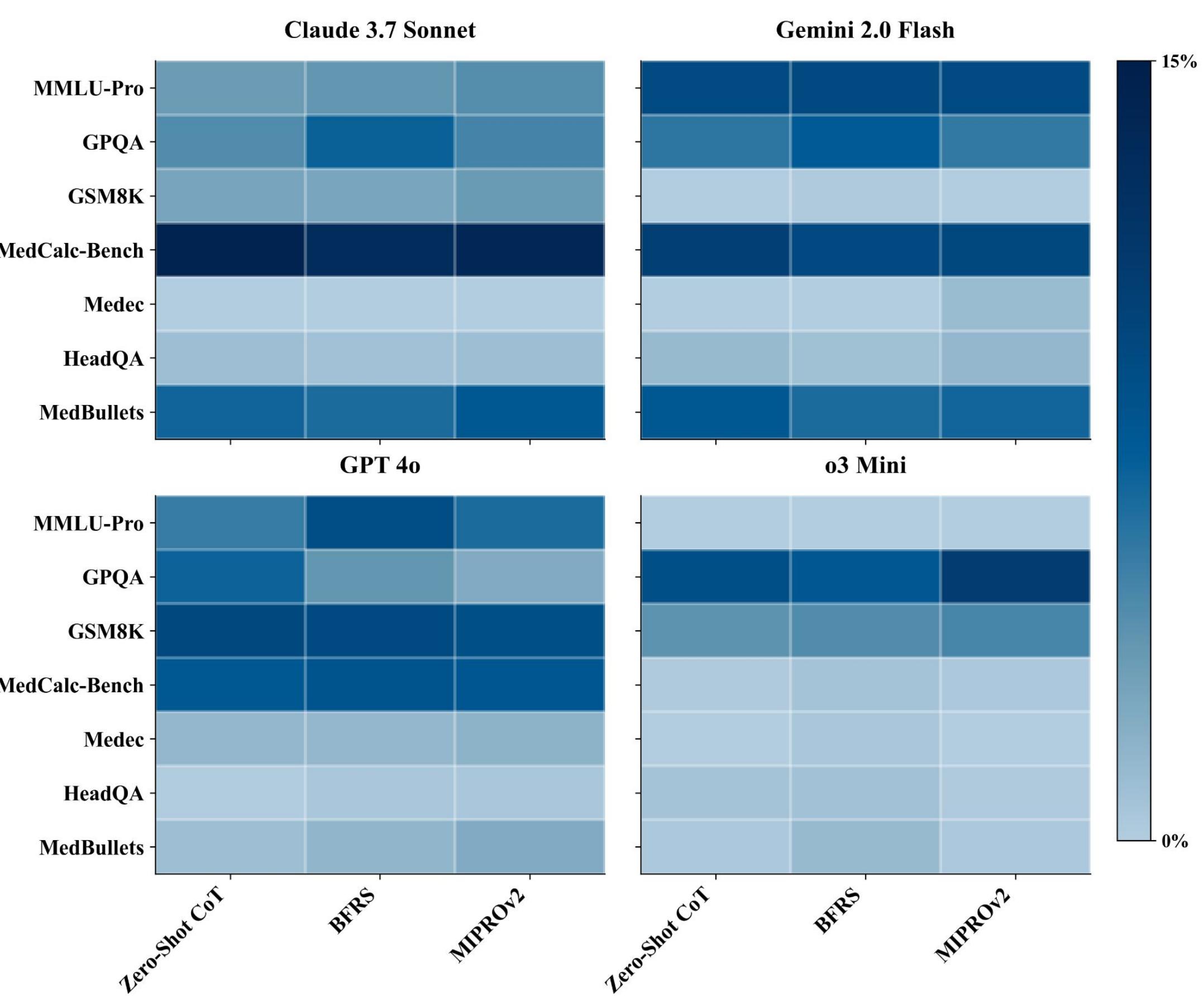
#### Prompt 4: MIPROv2 (Instruction + Few-Shot Optimized)

Your input fields are: "INPUTS"  
Your output fields are: "REASONING" and "OUTPUT"  
Your objective is: You are a highly skilled medical expert working in a busy emergency room. A patient presents with a complex medical history and concerning symptoms. The attending physician needs your immediate assistance in calculating a critical risk score to guide treatment decisions. The patient's life may depend on your accuracy.  
IN-CONTEXT EXAMPLES (K Demos):  
INPUTS: <input text> → REASONING: <steps>, OUTPUT: <output text>  
INPUTS:  
Given a patient note and a clinical question, compute the requested medical value.  
Patient Note and Question:  
Respond with the corresponding output fields, starting with "REASONING", then "OUTPUT".

### HELM Leaderboard (Macro-Averaged)

Prompting Method	Claude 3.7 Sonnet	Gemini 2.0 Flash	GPT 4o	o3 Mini
HELM Baseline	64.81% ± 22.6	61.41% ± 23.8	61.04% ± 23.9	70.93% ± 19.7
Zero-Shot Predict	65.10% ± 22.6	61.69% ± 22.7	59.69% ± 25.0	<b>73.24% ± 20.3</b>
Zero-Shot CoT	69.36% ± 18.8	<b>66.21% ± 20.9</b>	65.67% ± 22.5	72.73% ± 19.7
BFRS	69.34% ± 19.0	66.19% ± 21.2	<b>65.87% ± 22.9</b>	73.07% ± 19.7
MIPROv2	<b>69.80% ± 19.0</b>	66.19% ± 21.1	65.34% ± 23.0	73.07% ± 19.6
Ceiling – Baseline ( $\Delta$ )	+4.99%	+4.80%	+4.83%	+2.31%

### Increase in Accuracy over HELM Baseline



### Accuracy vs Cost Tradeoff

