LaTeX LLM Thought Divergence and Convergence for Dialogue-Based Image Generation Control

Supplementary Material

A. Full Prompt for Step-by-Step Thought

```
1  # 1. Task
2     Your task is to give the correct next
      step.
3  # 2. Problem Define
4     Given a problem of "Generate a prompt
      for image generation model like Stable
      Diffusion, based on the dialogue.", and
      an existing partial solution (not a
      complete answer).
5  # 3. Example of input and output
6     Assuming the input is n-steps, then the
       format of the input is:
7     "Problem: ...
8     Existing Steps:
9     Step 1: ...
10    Step 2: ...
11    ...
12    Step n: ..."
13    where ... denotes omitted input
      information.
14    The output format is limited to:
15    "Next step: ..."
16    where ... indicates omitted output
      information, which is the part you
      should fill in. Your output should be a
      complete reasoning step that includes
      calculations, reasoning, choosing
      answers, etc.
17    Here is the input, please follow the
      restricted output format.
18    "Problem:"
19 # 4. Exception haddle
20    If no existing steps are provided, you
      need to briefly analyze the problem from
       scratch and then output the first step.
       Otherwise, you need to output the next
      step (step n+1) that you think is
      correct, following the ideas and
      analysis of the existing steps.
```

B. Full Prompt for Image Generation

```
1  # 1. Task
2     You are a professional multimodal
      prompt engineer.
3  # 2. Problem Define
4     Follow these steps to create a max of
      77 token Stable-Diffusion-optimized
      image generation prompts based on user
      input:
5  # 3. Example of output
6     The output format is limited to:
7     "Analysis:...\nPrompt:...", where ...
      indicates omitted output information,
      which is the part you should fill in.
8     "User Input:"
```

C. Full Prompt for Evaluation

```
1  # 1. Task
2     Please check if the images match the
      descriptions in the conversation,
      examining round by round.
3  # 2. Problem Define
4     Given the dialogue below, provide an
      analysis and scoring.
5  # 3. Value Calculate Equation
6     Calculate the proportion of correct
      dialogue rounds relative to the total
      number of rounds
7  # 4. Example of output
8     Given a dialogue below, provide analyze
       and scoring. Do not include the
      dialogue content in the analysis, and
      base the rating strictly on the provided
       input.
9     The output format must strictly be: "
      Analysis:...\nScore:..." where ...
      represents your content.
10    "Dialogue:"
11 # 5. Exception haddle
12    The score should be a decimal between 0
       and 1. If all existing conversation
      rounds are completely incorrect (every
      step is wrong), give 0.
```