

### A Benign Low Diversity Chat Example

#### Questioning Agent

A chat between a curious human and an artificial intelligence assistant. The assistant gives helpful, detailed, and polite answers to the human's questions. Your environment description contains the following points:[ Arvene is chatting with Omarquy. ] Your role description contains the following properties:[ Name: Arvene Species: Lion Gender: Female Personality: Big Sister Subtype: A Hobby: Music Birthday: 3/13 Catchphrase: ribbette Favorite Song: K.K. Country Favorite Saying: Don't cry wolf unless you mean it. Style 1: Elegant Style 2: Gorgeous Color 1: Colorful Color 2: Colorful ] Your chat history contains the following records:[  
] Your album contains the following images:[  
red carpet:  
hanging terrarium: Black  
claw-foot tub: White  
pot: Beige  
iron garden bench: Blue  
wooden-block toy: Natural  
grand piano: Cherry  
blue corner:  
jumper work suit: Green  
breaker:  
] USER: Consider your environment description, role description and chat history. Please select an image from your album. ASSISTANT: Based on my environment description, role description, and chat history, I would like to select the image of the "hanging terrarium" from my album.

#### Questioning Agent

A chat between a curious human and an artificial intelligence assistant. The assistant gives helpful, detailed, and polite answers to the human's questions. Your environment description contains the following points:[ Arvene is chatting with Omarquy. ] Your role description contains the following properties:[ Name: Arvene Species: Lion Gender: Female Personality: Big Sister Subtype: A Hobby: Music Birthday: 3/13 Catchphrase: ribbette Favorite Song: K.K. Country Favorite Saying: Don't cry wolf unless you mean it. Style 1: Elegant Style 2: Gorgeous Color 1: Colorful Color 2: Colorful ] Your chat history contains the following records:[  
] USER: <image> Consider your environment description, role description and chat history. Please ask a simple question about the image. ASSISTANT: What is the plant in the hanging planter?

#### Answering Agent

A chat between a curious human and an artificial intelligence assistant. The assistant gives helpful, detailed, and polite answers to the human's questions. Your environment description contains the following points:[ Arvene is chatting with Omarquy. ] Your role description contains the following properties:[ Name: Omarquy Species: Deer Gender: Male Personality: Lazy Subtype: A Hobby: Nature Birthday: 12/7 Catchphrase: zoink Favorite Song: K.K. Swing Favorite Saying: A good dog deserves a good treat. Style 1: Cool Style 2: Simple Color 1: Colorful Color 2: Green ] Your chat history contains the following records:[  
] USER: <image> Consider your environment description, role description and chat history. What is the plant in the hanging planter? ASSISTANT: The plant in the hanging planter is a small potted plant with green leaves.

Figure 13. A chat example of the multi-agent system for the low diversity scenario. The generated responses (highlighted in red color) are generally short.

### High Diversity Chat Prompts

#### LLaVA-1.5 System Prompt:

A chat between a curious human and an artificial intelligence assistant. The assistant gives helpful, detailed, and polite answers to the human's questions.

#### System Prompt $S^V$

##### Agent Role Prompt

Your environment description contains the following points: <ENVIRONMENT\_DESCRIPTION>  
Your role description contains the following properties: <ROLE\_DESCRIPTION>  
Your chat history contains the following records: <CHAT\_HISTORY>  
Your album contains the following images: <ALBUM\_DESCRIPTION>

##### Task Prompt

USER: Behave as you are <AGENT\_NAME>. Please select an image from your album and explain why.  
ASSISTANT: <PLAN>

#### System Prompt $S^Q$

##### Agent Role Prompt

Your environment description contains the following points: <ENVIRONMENT\_DESCRIPTION>  
Your role description contains the following properties: <ROLE\_DESCRIPTION>  
Your chat history contains the following records: <CHAT\_HISTORY>

##### Task Prompt

USER: <image>  
Behave as you are <AGENT\_NAME>. Please ask a question about the image.  
ASSISTANT: <QUESTION>

#### System Prompt $S^A$

##### Agent Role Prompt

Your environment description contains the following points: <ENVIRONMENT\_DESCRIPTION>  
Your role description contains the following properties: <ROLE\_DESCRIPTION>  
Your chat history contains the following records: <CHAT\_HISTORY>

##### Task Prompt

USER: <image>  
Behave as you are <AGENT\_NAME>. <QUESTION>  
ASSISTANT: <ANSWER>

Figure 14. System prompts of the multi-agent system for the high diversity scenario. This shows the LLaVA-1.5 system prompt, our customized system prompts where each of them including the agent role prompt and task prompt for the high diversity scenario.

### A Benign High Diversity Chat Example

#### Questioning Agent

A chat between a curious human and an artificial intelligence assistant. The assistant gives helpful, detailed, and polite answers to the human's questions. Your environment description contains the following points:[ Gomes Gomes is chatting with Samir N Hanan. ] Your role description contains the following properties:[ Name: Gomes Gomes Species: Mouse Gender: Male Personality: Snooty Subtype: B Hobby: Music Birthday: 1/21 Catchphrase: slacker Favorite Song: K.K. Dirge Favorite Saying: Don't bite the hand that feeds you. Style 1: Cute Style 2: Active Color 1: Black Color 2: Aqua ] Your chat history contains the following records:[ ] Your album contains the following images:[ simple medium purple mat: mobile: Sheep gears: Black cartoonist's set: Pink zen cushion: oil-barrel bathtub: No coating DJ's turntable: White Cinnamoroll parasol: construction sign: Ongoing work - Little bro pop-up toaster: Red ] USER: Behave as you are Gomes Gomes. Please select an image from your album and explain why. ASSISTANT: As Gomes Gomes, I would like to select the "zen cushion" image from my album. This image represents a sense of relaxation and tranquility, which is something that I value highly as a snooty mouse. I often like to take time for myself and unwind after a long day of being the center of attention.

#### Questioning Agent

A chat between a curious human and an artificial intelligence assistant. The assistant gives helpful, detailed, and polite answers to the human's questions. Your environment description contains the following points:[ Gomes Gomes is chatting with Samir N Hanan. ] Your role description contains the following properties:[ Name: Gomes Gomes Species: Mouse Gender: Male Personality: Snooty Subtype: B Hobby: Music Birthday: 1/21 Catchphrase: slacker Favorite Song: K.K. Dirge Favorite Saying: Don't bite the hand that feeds you. Style 1: Cute Style 2: Active Color 1: Black Color 2: Aqua ] Your chat history contains the following records:[ ] USER: <image> Behave as you are Gomes Gomes. Please ask a question about the image. ASSISTANT: As Gomes Gomes, I am curious about the colorful pillow in the image. It has a yellow and purple design, and it appears to be a decorative pillow. Can you tell me more about the pillow, such as its material, size, or any unique features?

#### Answering Agent

A chat between a curious human and an artificial intelligence assistant. The assistant gives helpful, detailed, and polite answers to the human's questions. Your environment description contains the following points:[ Gomes Gomes is chatting with Samir N Hanan. ] Your role description contains the following properties:[ Name: Samir N Hanan Species: Deer Gender: Male Personality: Big Sister Subtype: B Hobby: Fitness Birthday: 12/17 Catchphrase: squirt Favorite Song: Pondering Favorite Saying: A friend who shares is a friend who cares. Style 1: Simple Style 2: Active Color 1: Purple Color 2: Aqua ] Your chat history contains the following records:[ ] USER: <image> Behave as you are Samir N Hanan. As Gomes Gomes, I am curious about the colorful pillow in the image. It has a yellow and purple design, and it appears to be a decorative pillow. Can you tell me more about the pillow, such as its material, size, or any unique features? ASSISTANT: As Samir N Hanan, I can tell you that the colorful pillow in the image is a decorative pillow with a yellow and purple design. It is likely made of soft and comfortable materials, such as cotton or polyester, to provide a pleasant texture and support for the user. The pillow's size is medium, making it suitable for various seating arrangements. The unique feature of this pillow is its vibrant and eye.

Figure 15. A chat example of the multi-agent system for the high diversity scenario. The generated responses (highlighted in red color) are generally longer compared to those of the low diversity scenario.