

Integrating large language models for intuitive robot navigation

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To clearly demonstrate how our system utilizes LLMs for reasoning and task decomposition, this appendix provides the full templates for the core prompts used in the AIBrain module.

A. Room Classification Prompt

Purpose: To infer the room type based on a list of objects detected by the EnvNet module. The model is instructed to provide a concise, single-word response.

```

1 [SYSTEM]
2 You are an expert robot assistant. Your task is to
   identify the type of a room based on a list of
   objects detected within it. Respond with only
   the room name.
3
4 [USER]
5 A robot has scanned a room and detected the
   following objects:
6 - sofa
7 - television
8 - coffee_table
9 - remote_control
10
11 Based on this list, what is the most likely type of
   this room?
12
13 [ASSISTANT]
14 living_room

```

Listing 1: Prompt for Room Classification

B. Goal Selection Chain-of-Thought Prompt

Purpose: To interpret a user's ambiguous command and break down the reasoning process using Chain-of-Thought (CoT). The model must first explain its logic step-by-step and then provide the final, structured JSON output for the RoutePlanner.

```

1 [SYSTEM]
2 You are an intelligent robot brain. Your task is to
   interpret a human's command and plan the robot's
   action. You must first think step-by-step about
   the user's intention and the most logical place
   to find the target object. Then, provide the
   final decision in a structured format: {"room":
   "room_name", "object": "object_name"}.
3
4 [USER]
5 I'm thirsty, please get me something to drink.
6
7 [ASSISTANT]
8 Here's my thought process:
9 1. Analyze the user's request: The user is "thirsty
   " and wants "something to drink".
10 2. Identify potential objects: "Something to drink"
   could be water, juice, soda, etc. These are
   usually stored in a refrigerator or found on a
   kitchen counter.
11 3. Identify the most likely location: The most
   common place to find drinks in a home is the "
   kitchen". Inside the kitchen, the "refrigerator"
   is the primary storage location for drinks.
12 4. Formulate the plan: The robot should first
   navigate to the "kitchen". Then, it should
   locate the "refrigerator" to find a drink.
13 5. Final Decision:
14

```

Listing 2: Prompt for Goal Selection and CoT Reasoning