Self-Discover Plan Generation (Part of the Workflow)

Task

"Did I put down my laptop's lid? I think it was in the office."

Select Heuristic

1. How could I devise an experiment to help solve that problem?
2. Make a list of ideas for solving this problem, and apply them one by one...
3. How could I measure progress on this problem?
4. How can I simplify the problem so that it is easier to solve?
5. What are the key assumptions underlying this problem?

...

9. How can I break down this problem into smaller, more manageable parts?

Adapt Heuristic

How can I break this into: identify office room node(s) in the scene graph; locate laptop object(s); for the relevant laptop, assess lid state from current views; then choose the most consistent option based on these cues?

Pseudocode

1. Explore to find office room node(s).
2. For each detected office:
   2.1 Go to the office.
   2.2 Query scene graph for laptop candidates within this office. If none:
      2.2.1 Sweep viewpoints around likely surfaces and seating.
3. If multiple laptops found, prioritize those on main desk; otherwise iterate all laptops.
4. For each candidate laptop in current office:
   4.1 VisuallyAnalyzeLaptopLid(laptop) using its associated images/ depth.
   4.2 If confidence is sufficient and state ∈ {up, down}: record finding for this laptop and terminate data collection.
5. If all offices explored and no confident state obtained, report insufficient evidence after exhaustive exploration.

Implement

```
1. While(True):
  1.1. Explore(find office rooms)
  1.2. If(GetInfo(office)):
  1.2.1. Break
2. For[each office]:
  2.1. Goto(office)
  2.2. Explore(find laptops in this office)
  2.3. For[each laptop in this office]:
    2.3.1. VisuallyAnalyzeLaptopLidState(laptop)
    2.3.2. If(GetInfo(laptop lid determined)):
      2.3.2.1 Return(True)
```

Repeat The Process For Every Reasoning Function (e.g., VisuallyAnalyzeLaptopLidState)

Memory Update

Findings Examples

Recent observation

Scene Graph: laptop detected at (6.4, 2.3) on floor 0

Navigation: Arrived at a node 0.4 meters away from Point 9. Find what to do next.

Camera Observation: The laptop in the office at point 9 is critical for the mission objective, confirming the need to check its lid state.

Conditioned on findings sequentially and previous memory

Memory Update

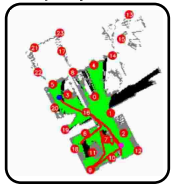
Description (Regenerated Every Timestep)

The environment consists of a hallway starting at point 0 where a staircase leads upward, indicating a vertical extension to a possible second floor. The hallway extends towards the East, passing point 1 and leading into a living room area with a fireplace, sofa, and console table, identified at point 4. This living area continues to point 5 and now connects to point 23, suggesting a well-connected corridor or extended living area. The trajectory leads further East to point 2, suggesting another room or space beyond the current visible area. The area is mostly traversable with some obstacles like furniture. The staircase at point 0 could be significant for further exploration, particularly for finding the office as part of the mission objective...

Action Log (Logged Every Action with Agent's Rationale)

At timestep 1: Explore(find office rooms) #The task starts with exploring the environment to find the office.
At timestep 71: Goto(office) #The robot has located a potential office, so the next step is to go to the office.
At timestep 116: Explore(find laptops in this office) # The robot is in the office, but has not yet found the laptop, so we need to continue exploring within the office to locate it

Occupancy



Progress Log (Logged if Agent Determines Any Progress)

At timestep 49: The robot has located a potential office at point 9, which is crucial for the mission objective of checking the laptop lid state.
At timestep 163: The robot has located the office at point 9, which is crucial for the mission objective. However, the task requires finding the laptop within the office and verifying the laptop lid's position. The robot's trajectory suggests it is currently exploring the office area but has not yet confirmed the laptop's status.
At timestep 352: The laptop lid status is not explicitly confirmed in memory, requiring verification.

Plan Execution

Select Next Step

VisuallyAnalyzeLaptopLidState() # Use visual analysis to check the position of the laptop lid with a type algorithm and a rationale: The robot has already found the office and the laptop within the office according to the scene graph statistics, so it should now analyze the laptop.

Execute Next Step

Invoke the Tool or Execute the Reasoning Function

New Finding

The analysis confirms that the laptop lid is closed, based on multiple images (IDs 335-339) showing the laptop on a wooden desk in an office setting.

Repeat