Self-Discover Plan Generation (Part of the Workflow) **Implement** Select Heuristic Pseudocode Task 1. While(True): 1. How could I devise an experiment to help solve that problem? . Explore to find office room node(s) 1.1. Explore(find office rooms) 2. Make a list of ideas for solving this problem, and apply them one 2. For each detected office: "Did I put dowr 1.2. If(GetInfo(office)): I my laptop's lid? bv one... 2.1 Go to the office. 1.2.1. Break 3. How could I measure progress on this problem? I think it was in 2.2 Ouerv scene graph for laptop candidates within this office. If none: 2. For[each office]: 4. How can I simplify the problem so that it is easier to solve? the office." 2.2.1 Sweep viewpoints around likely surfaces and seating. 2.1. Goto(office) 5. What are the key assumptions underlying this problem? 3. If multiple laptops found, prioritize those on main desk; otherwise 2.2. Explore(find laptops in this office) iterate all laptops. 2.3. For[each laptop in this office]: 9. How can I break down this problem into smaller, more 4. For each candidate laptop in current office: 2.3.1. VisuallyAnalyzeLaptopLidState(laptop) manageable parts? 4.1 VisuallyAnalyzeLaptopLid(laptop) using its associated images/ 2.3.2. If(GetInfo(laptop lid determined)): depth. **Adapt Heuristic** 2.3.2.1 Return(True) 4.2 If confidence is sufficient and state ∈ {up, down}: record finding How can I break this into: identify office room node(s) in the scene graph; locate for this laptop and terminate data collection. 5. If all offices explored and no confident state obtained, report laptop object(s); for the relevant laptop, assess lid state from current views; then Repeat The Process For Every Reasoning Function insufficient evidence after exhaustive exploration. choose the most consistent option based on these cues? (e.g., VisuallyAnalyzeLaptopLidState) Memory Plan Execution Memory Update Select Next Step Findings Examples Description (Regenerated Every Timestep) Action Log (Logged Every Action with Agent's Rationale) VisuallyAnalyzeLaptopLidState() # Use visual Recent observation analysis to check the position of the laptop lid At timestep 1: Explore(find office rooms) #The task starts with exploring the environment to find the office. The environment consists of a hallway starting at point 0 with a type algorithm and a rationale: The robot Conditioned or At timestep 71: Goto(office) #The robot has located a potential office, so the next step is to go to the office. where a staircase leads upward, indicating a vertical has already found the office and the laptop findinas At timestep 116: Explore(find laptops in this office) # The robot is in the office, but has not yet found the laptop, so we within the office according to the scene graph extension to a possible second floor. The hallway extends sequentially and need to continue exploring within the office to locate it statistics, so it should now analyze the laptor previous memory towards the East, passing point 1 and leading into a living room area with a fireplace, sofa, and Occupancy Progress Log (Logged if Agent Determines Any Progress) Execute Next Step Scene Graph: Japton detected at console table, identified at point 4. This living area (6.4.2.3) on floor 0 Invoke the Tool or Execute the Reasoning Function At timestep 49: The robot has located a potential office at point 9, which is continues to point 5 and now connects to point 23, Navigation: Arrived at a node 0.4 crucial for the mission objective of checking the laptop lid state suggesting a well-connected corridor or extended living meters away from Point 9. Find New Finding At timestep 163: The robot has located the office at point 9, which is crucial for area. The trajectory leads further East to point 2. what to do next. the mission objective. However, the task requires finding the laptop within the suggesting another room or space beyond the current The analysis confirms that the laptop lid Camera Observation: The lanton in office and verifying the laptop lid's position. The robot's trajectory suggests it is visible area. The area is mostly traversable with some the office at point 9 is critical for is closed, based on multiple images (IDs currently exploring the office area but has not yet confirmed the laptop's status. obstacles like furniture. The staircase at point 0 could be the mission objective, confirming 335-339) showing the laptop on a the need to check its lid state. significant for further exploration, particularly for finding At timestep 352: The laptop lid status is not explicitly confirmed in memory, wooden desk in an office setting. requiring verification. the office as part of the mission objective... Repeat