Agent Specification (“What do we want to accomplish”):

Create an agent situated in a virtual 3D environment. The agent should be capable of autonomously performing the following tasks:

1. Actively exploring its environment
2. Determining objects of interest within the environment based on the agent’s motivations
   1. Learning new objects
3. Categorizing objects into useful types
   1. Learning new categories

Roadmap (“How do we get there?”):

Phase 1:

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| LIDA Module | Functionality | Priority | Difficulty  (1 – lowest,  10 – highest) | Interested Researcher | Leverage Existing Algorithm/Library? |
| Environment | Integration w/ Gazebo or ROS | High | Low | Sean/Daqi |  |
| Sensory Memory | Low-Level Feature Detectors |  |  | Pulin |  |
| PAM | High-Level Feature Detectors |  |  | Pulin |  |
| Workspace (Codelets – Attention) |  |  |  |  |  |
| Workspace (Codelets – SBC) |  |  |  | Sean |  |
| Workspace | Motivation |  |  | Pulin |  |
| Global Workspace (Conscious Broadcast) |  |  |  |  |  |
| Spatial Memory |  |  |  | Tamas |  |
| Procedural Memory |  |  |  | Daqi |  |
| Action Selection |  |  |  | Daqi |  |
| Action Execution |  |  |  | Daqi |  |

Needed functionality:

* Scene/visual segmentation
  + Determining a portion of visual input that is relevant to be processed by feature detectors and to be used in the formation of new concepts
    - Background removal
  + ***Could this be done as part of the neural network – not a separate step?***
* Feature learning
  + Learning a set of features relevant for detecting objects in the environment
    - Can feature learning be a life-long activity, or does it need to be built-in (pre-trained features)
* Feature detection
* Object detection
  + Identifying objects based on a set of activated features
* Categorization
  + Using a set of features to determine if an object belongs to a category
  + What is the relationship between categorization and object detection?
* Motivation
  + Set of criteria for choosing what is important to the agent

1. Sensory Memory
2. Perceptual Associative Memory
3. Workspace
   1. Codelets
      1. Structure Building Codelets
      2. Attention Codelets
4. Episodic Memory
5. Declarative Memory
6. Spatial Memory
7. Global Workspace
8. Procedural Memory
9. Action Selection
10. Action Execution

