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General Solution To Find Objects

D3: Midterm Demonstration

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Contents

Problem Statement

The problem being addressed is described as follows:-

- Navigate through multiple coordinates in knowledge base based on ontology to find specified object
- Perceive the required object
- Fetch the user specified object and navigate back to user

Project Goals

- Implement a general strategy to find object
  - Navigate through “storage locations”
  - Perceive scenes to look for specified object(s)
  - Move to next location if object not found
- Fetch object and bring back to original location

Minimum Viable Prototype

- Given a user specified choice(string), the software shall return all the default locations (strings) relative to the specified item based on the ontology structure.
- We have to interpret the default location in the knowledge base to the natural location in the ontology.
- After obtaining the co-ordinates of the respective locations the robot shall navigate through all of the respective returned locations.

Minimum Viable Prototype

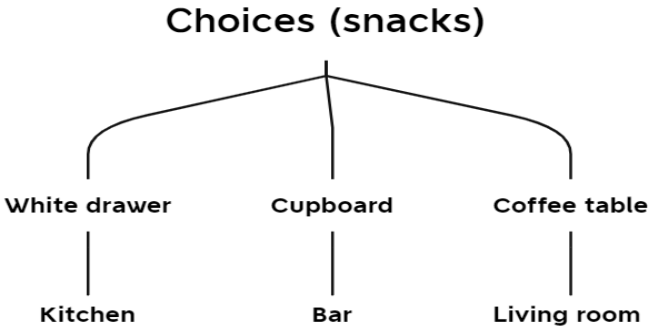

Figure 1: Example structure

Project progress

- Given a user specified choice(string), the software returns all the natural locations relative to the specified item based on the ontology structure.
- Mapped home lab and created natural location points in the map
- Interpreted the default location in the knowledge base to the natural location in the ontology
- Integrated navigation to find object package and the robot moves to all possible locations when an object name is given.

Future steps

- Perceive the user specified object:
  - Integrate the perception with the find object package to perceive the objects present in the given scene.
  - Compare the perceived objects with learned objects using the embedding calculation.
  - Identify the specified object from the perceived objects.
  - In the desired location move around and check for the objects from multiple viewpoints.
  - Change the behaviour to turn around, move the robot, and open the drawer.
  - If object is not found in the perceived location, move to the next possible location in the knowledge base.

Future Steps

- Fetch object and bring back to original location:
  - Move the robot to adjust the configuration to different viewpoints.
  - Move the arm to the respective pose of the user specified object and pick up the object.
  - Move the robot back to the location of the user.
  - Hand over the object to the user.

Future Plans(Optional)

- Adding speech recognition to Lucy, so that it might be able to fetch object by identifying it from user's speech.

Thank You!