1   Requirements

1. 3GB absolute minimum storage (I recommend at least 10GB)

2. some form of Linux (MacOS and Windows may be supported using Vagrant to run Singularity)

2   Installation

1. Download either the `tiago.sif` or `tiago-hybrid.sif` container file from RobotClub/files tab on our yammer group (tiago-hybrid for hybrid GPU)

2. Install sylabs singularity.

3. Clone tiago-lib from the sensible-robots gitlab group.

4. Move the downloaded .sif file into your cloned tiago-lib folder.

5. Change the last line of `run.sh` to "tiago.sif" in tiago-lib

3   Shell into the container

go to tiago-lib in terminal and run the bash script:

- `./run.sh` for user-space

sif containers are read-only, so you will need to rebuild tiago.sif if root access is required for things like installing software. (catkin workspaces still have user write access in the .sif)

4   Writable container (root access)

1. `singularity build --sandbox tiago-rw tiago.sif`

2. Change the last line of `run.sh` to "tiago-rw" in tiago-lib

3. Change the last line of `write.sh` to "tiago-rw" in tiago-lib

4. `./run.sh` for user-space (catkin workspaces are writable)

5. `./write.sh` to install software that require root access

6. Delete `tiago.sif` if you would like to free up space

5   Python 2.7 virtual env and pip

By default, the container runs in a python 2.7 virtual environment located in `/code/python-env/`. To install python modules via pip to the virtual environment:

- `./write.sh` to enter root access

- `/code/python-env/bin/pip` to install modules for python 2.7

- ensure any ros runnables that require the virual env are prefaced by `#!/usr/bin/env python`

6 Troubleshooting

write.sh: mount source pkgs/scripts doesn't exist:

- delete (do not comment out) the corresponding –bind flags in the write.sh script.

gazebo does not start/process died:

- could indicate nvidia driver issues, a simple workaround is to disable nvidia:
- use nvidia settings to enable power saver mode OR `sudo prime-select intel`
- remove the `--nv` flag from run.sh

custom gazebo world throws a segmentation fault, but others are fine:

- yet another problem with nvidia drivers, particularly when loading large maps
- try to load the world using `rosrun gazebo_ros gazebo world:=<world name>` and remove unnecessary large-scale 3d models (make sure the required gazebo resource and model paths are exported)
- alternatively, find the .world file and remove large-scale models in the markup using a text editor

7 Useful materials

- visit LASR Worksheets on git to try simple tasks using the simulation.
- visit sensible-robots on git for useful modules to clone into the workspace.
- clone lasr_object_detection_yolo from git to the workspace for OpenCV4 pre-built for the container. (2GB, includes YOLOv3 weights)

8 References

Please refer to tiago-lib and the handbook for other useful commands