Visual Servoing Usage Guide

Last Updated: 5/6/2014

This Document attempts to guide the user of VisualServoing2013-14 Group's visual_servo utility through proper use of the system.

Before Using our System:

Our system relies on ViSP CAO files for it's model based tracking. Provided with our code is the cube.cao file we used during our development process. It should be noted that unless Baxter's target is a cube of the same dimensions as the cube that we used during our testing, the provided cube.cao will not be of direct use to you, and should instead be used as an example for creating your own. Before our system can be used, CAO file must be created to model the specific object you want to track. Details on how to create CAO models can be found here:
http://www.irisa.fr/lagadic/visp/documentation/visp-2.6.1-tutorial-computer-vision.pdf
Also, because our system relies on edge detection, objects with ambiguous edges (e.g. cylinders), or lacking edges entirely (e.g. spheres) can not be used with our current system.
It should also be noted that the models use centimeters as units of measure.

Start an instance of roscore:

Start an instance of roscore in the background, either as a background process or in a separate terminal instance.

```
roscore &
```

Source ~/ros/ws_baxter/devel/setup.bash and baxter.sh:

```
source ~/ros/ws_baxter/devel/setup.bash
source ~/ros/ws_baxter/src/baxter/baxter.sh
```

Initialize Baxter:

```
roslaunch baxter_control baxter_hardware.launch
```

Run visual_servo:

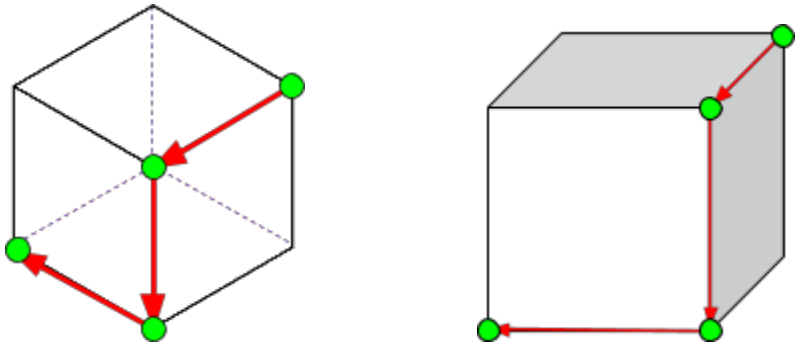
'visual_servo' must be run in a directory with the model of the target object; an example file (cube.cao) is found in the ~/ros/ws_baxter/src/visual_servo directory. visual_servo must be run with a camera feed from 'baxter-video-listener' as an argument:

```
rosrun visual_servo baxter-video-listener /cameras/right_hand_camera/image
/robot/lim/right/endpoint_state
```

or

```
rosrun visual_servo baxter-video-listener /cameras/left_hand_camera/image
/robot/lim/left/endpoint_state
```

Initialize the target: In the camera feed that appears on screen, select corner-points on the object in a sequential "Z pattern" along the volume diagonal of the object. Below we assume cube.cao has been used to initialize a cube model of the same dimensions as those in our lab.



Left click to accept the selected vertices. It is important that Baxter's arm doesn't move during the initialization process. Congratulations! The system is now tracking the object!