Robotics and Navigation in Medicine (Project)
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Medical Technology | Intelligent Systems

Instructions for Using the Provided Data

Please download the data from our server.

The directory contains two rosbag files. Rosbag is a tool for recording and playing back messages in realtime. You can inspect the content of a rosbag file with the command *rosbag info filename.bag*. You can play it back with *rosbag play filename.bag*. You can visualize the Kinect topics with rviz (Type rviz in a terminal, on the left side click on Add $->$ By topic and visualize the respective topics as an 'Image').

The calibration dataset was recorded with Kinect mounted on the Panda robot. A static checkerboard calibration pattern (40mm square size, 8x5) was placed in the view of the camera. Then, the robot moved to 40 different poses. You can use this dataset to test your implementation for both camera calibration and eye in hand calibration. For the final application you will collect these datasets yourselves with the real robot.

The files regarding the calibration are:

- calibration.bag: a rosbag containing the following topics
    - /k4a/rgb/image_raw: RGB image from the Kinect
    - /k4a/depth/image_raw: Depth image from the Kinect
    - /k4a/ir/image_raw: Infra red image from the Kinect

- calibration.zip/calibration/pose.txt: the 40 4x4 robot poses in row-major. So the first pose is

0.244948	0.076194	0.966538	0.250202
0.96417	-0.123872	-0.234584	0.444379
0.101854	0.989368	-0.103804	0.632892
0	0	0	1

- calibration.zip/joints.txt: the 40 robot joint configurations; you can use this data to verify your forward kinematics
- calibration.zip/calibration/trk.txt: the 40 marker poses (checkerboard marker in rgb frame) in the same format as the robot poses
- calibration.zip/calibration/calibration_results.txt: the factory calibration parameters to check your implementation (uses the 8 parameter rational model for intrinsic calibration)
- calibration.zip/calibration/hand_eye_results.txt: an example result for the eye-in-hand calibration

The second dataset was recorded with the robot driving the camera around the skeleton phantom. You can use this data for stitching the Kinect images to a combined scan and then doing the registration to a high resolution model. Use the provided eye-in-hand calibration results in this folder since the camera is mounted differently from before.

The files regarding the scanning are:

- scanning.bag: A rosbag containing the following topics
    - /rgb/image_raw: RGB image from the Kinect
    - /depth/image_raw: Depth image from the Kinect

– /points2: pointcloud in the rgb camera reference frame (uses the factory calibration to create the point cloud)
– /tf: transforms for the robot. You can retreive the end effector pose with tf (documentation, tutorial)
– /joint_states: the joint positions of the robot. You can also use your forward kinematics node to get the robot's end effector pose.

- calibration_results.txt: factory calibration of the Kinect (with a different imaging mode)
- handeye_result.txt: corresponding eye-in-hand calibration matrices
- Skeleton.stl: A high resolution scan of the skeleton as a CAD model.
- Skeleton_Target.stl: A high resolution scan of the skeleton with an indicated target.