

Data Collection Procedure

In this file, we will outline the steps to create a data collection procedure that tests the motor encoder numbers from -6000 to 6000, corresponding to angles from -119.06 degrees to 119.06 degrees. The PID control will control the motor and traverse all positions, while a detection program will loop to monitor the motor's traversal of all positions. When the motor reaches an incremental position, the camera will receive a shooting command, and the output will be stored using ROS. The result will include the motor angle and a set of point clouds representing the shape of the soft robot, which can be transformed into a corresponding voxel using a function.

Set up PID control for the motor.

Implement PID control to precisely control the motor position.

Set the motor to traverse all positions from -6000 to 6000 (or -119.06 degrees to 119.06 degrees).

Develop the detection program.

Create a loop in the detection program to monitor the motor's traversal of all positions.

When the motor reaches an incremental position, send a shooting command to the camera.

Configure the camera to capture images.

Set up the camera to receive shooting commands and capture images upon receiving a command.

Use the ROS framework to output and store the captured images.

Process the captured images.

Implement a detection algorithm to obtain a set of point clouds representing the shape of the soft robot.

Save the motor angle and the set of point clouds as the result.

Convert point clouds to voxels.

Create a function that takes the set of point clouds and the motor angle as input and outputs the corresponding voxel representation of the soft robot's shape.

By following these steps, you will create a data collection procedure that tests the motor encoder numbers from -6000 to 6000 and captures images of the soft robot's shape at each incremental position. The output will include the motor angle and a set of point clouds representing the soft robot's shape, which can be transformed into a voxel representation using a function.