

Computer Vision/ROS Task-

You are given 30 files in total, 10 each of types 0 (RGB), 1 (Segmentation) and 2 (Pose). The files are named in the format `<id>_<type>.<extension>` in individual folders.

Each image is 256x144 in size. The image data is collected using a projective pinhole camera, which has a horizontal field-of-view (FOV) of 90°. You can assume the distortion parameters to be zero, and the principal point of the image to be at its center. You can also assume the focal length in x and y directions to be equal.

The pose data is the position of the camera in the world coordinates in the NED (North, East, Down) coordinate system. It is stored in the form of an orientation quaternion and a position vector.



The images capture a perfect cube placed in the 3D world, with six different colored faces. The cube is resting perfectly on the flat ground. However, the z coordinate of the ground is not 0.

Using the given data, your task is to calculate:

1. The length of the side of the cube
2. The x,y,z coordinates of the centroid of the cube

You can use C++ or Python, and use any preferred library at your disposal.

You must make ROS Nodes for different functional parts and ensure they communicate with each other using appropriate ROS topics. There must be a minimum of 3 ROS nodes performing different tasks.

Hint: Try capturing the pixel coordinates of certain corners from the images and perform triangulation on them.

Feel Free to ask any questions.

All the best!