Flo Mobility Pvt. Ltd

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Disparity to Point Cloud

Overview

Given the disparity image retrieved through stereo camera, calculate and plot 3D point cloud. You can use the language of your choice for this task. However, Python, Matlab or C++ would be preferred.

Goals

1. **Calculate and plot 3D point cloud in camera frame:** create a 3D point cloud in camera frame given the disparity values per pixel and visualize it by plotting it.
2. **Transform 3D point cloud from camera frame to base frame of the Robot:** After creating the point cloud , transform it to the base frame of the Robot given the transformation matrix.

Specifications

In this assignment, you will create and plot a 3D point cloud in the camera frame given the disparity image attached in the email. This 3D point cloud should then be transformed to the base frame of the robot and the result should be plotted which should be similar to the result attached as shown in the Image below.

Disparity image and its corresponding RGB image (just for reference) and the visualization of what the end result should be are attached as a .zip file attached in the email.

Please submit the solution code as a github repo within 12 - 14 days of receiving this document.

In order to perform this task, you'll need some parameters which are given below.

Intrinsic matrix K (3x3) : [398.7956237792969, 0.0, 315.4751892089844]

[0.0, 398.7956237792969, 205.1688232421875]

[0,0,1]

Baseline : 0.075 m.

Transformation matrix for camera to base frame :

it's a 3x4 matrix of the form [R|t] , R = Rotation, t = Translation.

T_bf_cam = [0.0, 0.0, 1.0, 0.28]

[-1.0, 0.0, 0.0, 0.0375]

[0.0, -1.0, 0.0, 0.28]

References and Images

1. Disparity image (attached in email)
2. RGB Image (attached in email)
3. Result (shown below)