P6 Report: dgp34

In this project, a bagfile was provided in which a “wobbling” LIDAR scanned a block. The task was to use code to determine the dimensions of the block as well as the centroid of the block relative to the world frame.

The package that accompanies this report makes use of a modified “lidar_transformer” node. The modifications mainly include the addition of a global vector that holds the min and max values of each coordinate component, i.e. x_min, x_max, y_min, y_max, z_min, z_max. These values allow for the following relationships and analyses:

-A dimension of the block is the max value of a component minus the min value of that component, e.g. x_dim = x_max – x_min.

-In the X-Y plane, the centroid w.r.t. the world frame is half of the block's dimension added to the min value of that component, e.g. x_center = x_min + (x_max – x_min) / 2.0.

-In the Z plane, the centroid w.r.t the world frame has z value (z_max – z_min) / 2.0.

Each run of bagfile & transformer yields slightly variant answers due to errors inherent in LIDAR, but overall, the values remain within a reasonable range. Note that the most precise value is the last one displayed after all passes of the LIDAR are complete. At last run:

Dimensions (x-y-z): 0.405665 by 0.665641 by 0.179758.

Centroid (x,y,z) = (-0.007168, -0.332820, 0.089879).