User Interface Parameters

Calibration:

- Radius Error Percentage - an allowed error (in percentages) in the radius of the sphere that is found in the point cloud. Must be a value between 0 and 1. The smaller it is, the more likely that the found sphere is a valid one, but less spheres will be detected as valid spheres. As can be understood from the above - $r_\epsilon = r_{sphere} \cdot (radius\ error\ percentage)$.

  Default Value – 0.1.
- MaxNumTrials – the maximum number of iterations of MSAC for finding the sphere. Smaller values will result shorter runtime, but the calibration results would be less accurate.

  Default Value – 10^6.
- numOfTries - number of tries for finding the sphere (as described above). Smaller values will result shorter runtime, but the calibration results would be less accurate.

  Default Value – 20.
- MaxDistance - the maximum distance between a point to the sphere. Smaller values will result long runtime, but the calibration results would be more accurate.
  Default Value – 0.01.

Alignment:

- GridStep – After the transformation, every point cloud in a 3D box with a volume of $GridStep^3$ is merged into a single point.
- Default value - $5 \times 10^{-4}\ m$.

Segmentation:

- minDistance – minimum distance between points from different clusters. Values that are too small might delete wanted points from the point cloud, and values that are too big might keep unwanted points.
- Default value – $0.02\ m$.

Registration:

- GridStep – After the transformation, every point cloud in a 3D box with a volume of $GridStep^3$ is merged into a single point.

  Default value - $5 \times 10^{-4}\ m$.

- Min Error Threshold - ϵ_0.

  The minimum value of the threshold of the registration RMSE. Bigger values result in faster computation at the expense of accuracy.

  Default value - $0.005\ m^{0.5}$.

- Max Error Threshold - ϵ_t.

  The maximum value of the threshold of the registration RMSE. Smaller values result in faster computation. Values that are too big might consider a bad registration as a good one, and values that are too small might ignore good registrations.

  Default value - $0.006\ m^{0.5}$.

- Jump Error Threshold – $\Delta\epsilon$.

  The jump value in the threshold of the registration RMSE. Bigger values result in faster computation at the expense of accuracy.

  Default value - $0.0002\ m^{0.5}$.

- Min Successful Registrations - T_M.

  the minimum number of good registrations. Smaller values result in faster computation at the expense of accuracy.

  Default value – 2.

- Inliers Ratio - described in section 3.7. Bigger values result in faster computation.

  Default value - 0.95.

Denoising – Neigbors Filter:

- Radius – r_N. Points within this radius are considered as neighbors. Smaller values result in faster computation, and less points will be removed.

  Default value – $0.01\ m$.

- Noise Percentage - p_N. The percentage of points that are considered as noise. Smaller values result in less points that will be removed.

  Default value – 0.15%.

Dnoising – Guided Filter:

- Radius – r_G. Points within this radius are considered as neighbors. Smaller values result in faster computation, but a less smooth point cloud.

  Default value – $0.01\ m$.

- Regularization – ϵ_G. Smaller values result in a less smooth point cloud.
  Default value – 0.01.

Denoising – Boundary Filter:

- Radius – r_B. Points within this radius are considered as neighbors. Smaller values result in faster computation, but a less smooth point cloud.
  Default value – $0.01\ m$.
- Regularization – ϵ_B. Smaller values result in a less smooth point cloud. Should be about $\epsilon_B \approx 0.5 \cdot r_B$.
  Default value – $0.005\ m$.

Reconstruction:

- Poisson Depth – The higher the depth the more detailed the mesh. High depth reconstruction for noisy data keeps more vertices in the generated mesh that are outliers but the algorithm doesn't detect them as such. So, a low value provides a smoothing effect, but details will be lost. The higher the depth-value the higher is the resulting amount of vertices of the generated mesh.
  Default value – 5.
- Samples Per Node – The samples per node parameter defines how many points the marching cubes algorithm puts into one node of the resulting octree. For noisy data a high sample per node value provides a smoothing with loss of detail while a low value keeps the detail level high. A high value reduces the resulting count of vertices while a low value remains them high.
  Default value – 20.