

1 What I've done

- Worked on report
- Generated point clouds so I can use MATLAB's ICP function
- Talked to Jean Luc about controls

2 Parts of report to look at

- Background - intro bit (page 8), coordinate frames (page 9)
- Results – I still need to work on this. I will update it on git and/or send you an email in the next few days.

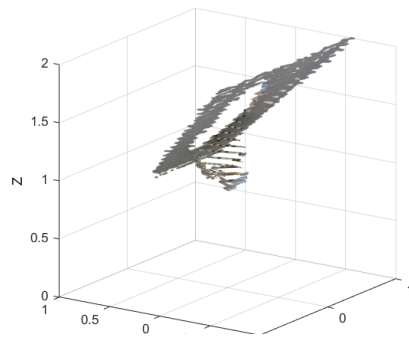
3 Questions

- Is there a different way I should be referring to "images skipped"? (Should I get a frequency using the timestamps? I'm not sure that it's constant though).
- What should I call my datasets? I'm referring to the one I'm currently using as quadcopter 3 because I'm still storing some of the old ones, but we're not actually using those as they don't have the timestamping on the ground truth.

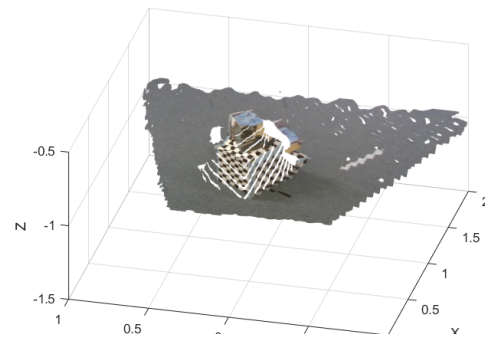
4 Comments

- I should use the "_des" velocities and yaw, I will need to integrate with respect to time to get the position/angle. I also discovered that my previous
- The point clouds have waves going through them (presumably where the depth is 0) – see Figure 1. The edges are also messed up. This helps to explain why Kabsch is so bad. I need to see if this is also the case without Vicon.
- I then aligned the point clouds with the world frame (assuming quadcopter position is at origin and facing along x -axis) to check if my frame rotations are correct. They align the point clouds properly, but I have to do the two rotations as separate affine transforms.

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- I'm currently only including one version of Kabsch (inliers found using RANSAC) and PnP (iterative) in the main results section of the report and the others are in an appendix. I had to split the tables as they were too big, and I thought it might be a bit too much information if I included everything. I guess we can see how much space I have and how necessary they are (I might just include a summary).
 - I realised my frames are still messed up. I'm pretty sure my rotations are fine (checked them with the point clouds in MATLAB), but how I'm updating the trajectories might not be. I realised this after I already started doing the results section, so I'll need to re-do bits of that. See Figure 2. My camera to quad rotation is 135 degrees around x, then 90 degrees around (new) z.



(a) Untransformed

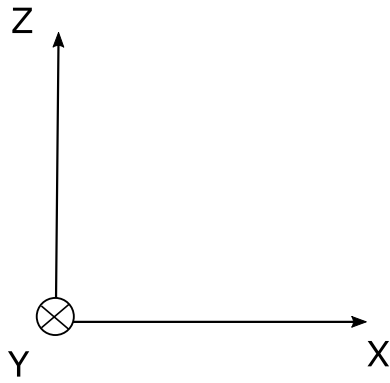
(b) Rotated into world frame (assuming quadcopter at origin and facing along x -axis)

(c) RGB image

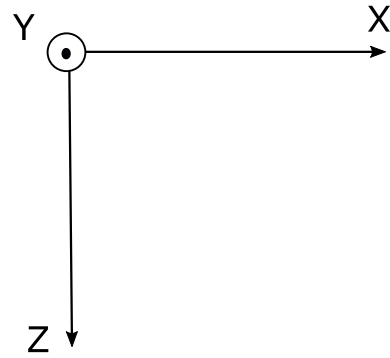


(d) Depth image

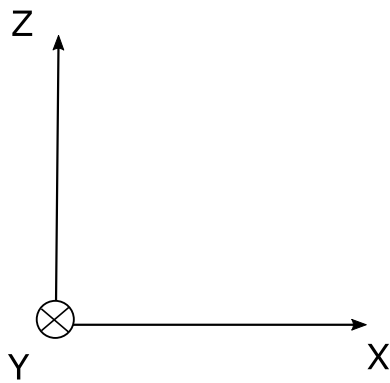
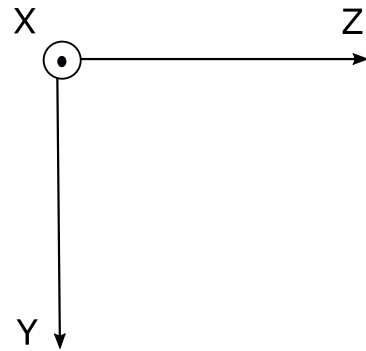
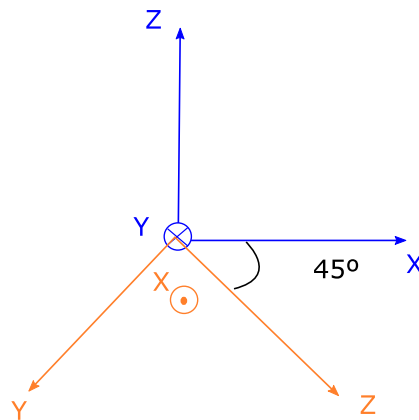
Figure 1: Point cloud generated from RGB and depth images, displayed in MATLAB. Data taken with Vicon on, from quadcopter 3 dataset (time 1533793707.61). RGB and depth images are provided for comparison, note that the RGB image is a bit blurry.



(a) World frame



(b) Quadcopter world-fixed frame (used in ground truth)

(c) Quadcopter-fixed frame, the (positive) x -axis points forward(d) Camera-fixed frame, the (positive) z -axis points forward

(e) Camera-fixed frame (orange) shown in relation to quadcopter-fixed frame (blue)

Figure 2: 3D coordinate frames