24/10/21

Redesign algorithm

Things done:

- Performed experiments with IWR6843 to obtain its specifications (range, accuracy and fov)

- Threshold velocity of IWR6843 was lowered and the point clouds increased drastically, however, it is still nowhere near expectations. In addition, when velocity was set to 0, static points are still not displayed.

- Performed experiments and testing with L515 to obtain its specifications (range, accuracy and fov). Testing with L515 showed the RGB FOV of the 3d camera to be much better than the official specification (43 degrees) as we managed to achieve approximately 55 degrees. Depth channel FOV results is consistent and hence, we were unable to find an accurate FOV. Initially, this FOV would be used in our calculation of the length between two targets by utilising the FOV, range information and Pythagoras' Theorem. However, the range measured by L515 was Euclidean distance and not the perpendicular distance, hence voiding the algorithm.

- New design of the mount is modelled by Ryan which allows the mounting of the 3d camera and the mmWave sensors side by side without the need for 2 tripods.

Current state of project:

- Everything remains relatively same, but with improved specs (more point cloud data from IWR6843) and the setting up time of the system is reduced as the new mount requires us to set up just 1 tripod.

- Still trying to cluster the point cloud data for the IWR6843

- For the measurement of distance between 2 targets using the L515, a possible solution would be to obtain the perpendicular distance of the targets using IWR6843 and using the Euclidean range from the L515, the horizontal length can be obtained by Pythagoras' Theorem. However, as the IWR6843 would not be able to detect individual targets, there will be some error introduced in our distance measurement if we were to use the same perpendicular range for all the targets in the same frame. Hence, there is a need to test and quantify this error.

Problems faced:

- As mentioned, the range measured by the L515 is Euclidean range (radius) as opposed to the perpendicular range. Hence, there is a need to redesign our length measurement algorithm.

Work to be done:

- Redesign of algorithm to obtain length between targets

- Explore the new DCA1000 board to obtain more point data from the IWR6843

- Classify the point cloud data (currently looking into DBSCAN)

- Writing a script to automate putty commands to the Jetson Nano