Research Overview

Tuesday, January 09, 2024   11:56 AM

Research Question: If sensors are replaced, can the prior sensor's FEEL Algorithm calibration data be used to accurately locate impacts and estimate impact force?

Experiment Procedure:
- Calibrate the lab floor located at 1280 Assembly St using the small hammer with a red tip and the two original sensors in the lab. This data is saved in the project folder as "Test Group A". This is the calibration data set where other data sets with the sensor swap will be tested against.
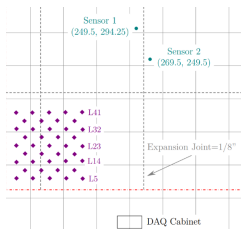 -

  - *Image of the lab testing floor with hammer, accompanied by the layout of the space*

- For the second dataset collection, one of the old sensors is taken out and replaced with a new one of the same kind. Similar to the previous collection, the same floor and calibration points are then entirely recalibrated with the same hammer and the data is saved in the project folder as "Test Group B"
- The data labelled "Test Group C" in the project folder is collected similar to B the only difference being the last original sensor is now being replaced.
- In the *feel-sensor-replacement* repository, the *FEEL_baseline.py* containing the FEEL Algorithm is used to run the collected data.

Preliminary Results:
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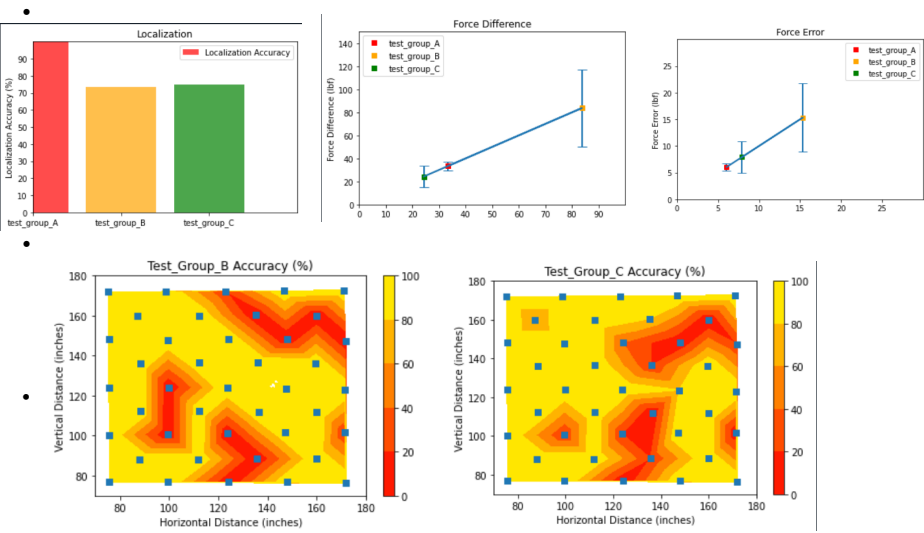
  The results from the first testing shows the test groups data having a hit localization accuracy to be slightly above 70%. The heat maps show that the areas of hit inaccuracies in both group testing are similar. Because the lab floor is suspected to have shifting floor dynamics caused by underground water erosion, the accuracy level is suspected increase if this problem is addressed.

Because the change in floor dynamics occurs with time, the working solution is to recollect the calibration and testing data all in one day.

Another working solution to improve the general results is to add a scale code to the *Feel_baseline.py*. This will change the sensitivity of the new test sensors to match that of the existing ones.

The exact experiment procedure was repeated for the data recollection with the only difference being it was completed in one day and the scaling code was added when running the algorithm.

Results:
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