Robot-Assisted FBG-sensorized Needle Calibration

Group 6: Kefan Song (Room 5)
Mentors: Dr. Iulian Iordachita, Dimitri Lezcano, Ge Sun

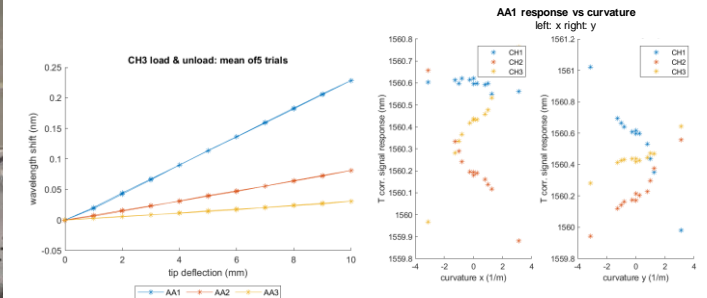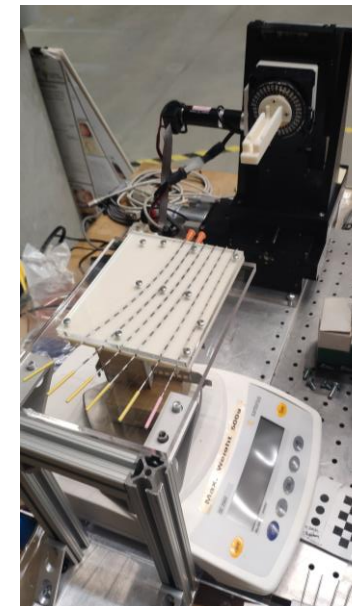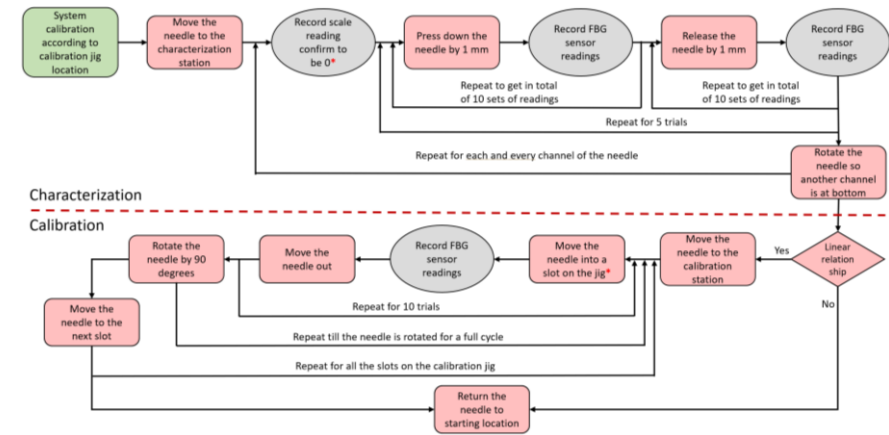**Goals:**

- To develop a robotic system that performs automatic characterization and calibration processes of FBG-sensorized needles

Significance:

- Reduce human error & time cost
- Standardize calibration process

Results:

- Built the calibration platform
- Developed MATLAB algorithm for the system
- Similar duration, but constant attention is not required anymore
- Sources of error are different from manual calibration
- Able to operate fully automatically in the future

$$C1_{rob} = \begin{bmatrix} -1.5283 & -3.7178 \\ -2.5518 & 3.6508 \\ 4.0791 & 0.0670 \end{bmatrix} \quad C2_{rob} = \begin{bmatrix} -0.3211 & -2.7145 \\ -2.1057 & 1.8308 \\ 2.4265 & 0.8837 \end{bmatrix} \quad C3_{rob} = \begin{bmatrix} -0.8032 & -4.0764 \\ -3.6630 & 2.2644 \\ 4.4657 & 1.8127 \end{bmatrix}$$

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