CSEN 1099 – Introduction to Biomedical Engineering

Assignment #2

(Due on: May 23, 2022 at mid-night)
(This assignment can be done in teams of maximum 2 students – Please include a text files with your names and IDs in the submission)
Submit the Assignment to: bmemet2022@gmail.com

Problem 1

Implement the needle EMG decomposition algorithm given in Lecture 7.pdf. Your function should take as inputs the EMG signal to process and the moving average window size T mentioned on slides 14 and 17. The function should return a vector that contains the timestamps of the peaks of the detected MUAPs for each detected MU and a vector for the template of each MU. Apply your function to the EMG signal provided in the file "Data.txt" with $T = 20$ samples and *DiffTh* defined in slide 18 is set to 12.65^5.

Deliverables:

- Your code

- A figure showing from sample 30000 to sample 35000 of the EMG signal with an "*" marking the detected MUAPs colored with different colors depending on the MU each MUAP belongs to (Similar to slide 19). Name the figure "DetectedMUAP.jpg"

- A figure showing the waveform of each template of the detected MUs (Similar to slide 20). Name the figure "Templates.jpg"