BE 521: Homework 0

Introduction

Spring 2015

15 points

Due: Tuesday 1/20/2015 11:59 PM

Objective: Working with the IEEG Portal, basic matlab commands, publishing LaTeX

Homework Policy

1. Piazza should be used for peer discussion for all questions related to course material. Please also use Piazza to contact teaching staff for all questions. TA's will be available to help during office hours and occasionally on Piazza.
2. Submit LaTeX write-up (pdf) and Matlab code to Canvas before listed deadline.
3. Assignments will be returned electronically on Canvas.
4. Collaboration is encouraged but individual write-ups are required. Please list any collaborators. Honor code will be strictly enforced. Note: submitted code is routinely passed through a plagiarism checker.
5. Late Policy: 5% per day. **No homework is accepted after the 5th late day.** (If originally due Tuesday, 11:59PM, last day to turn in is Sunday, 11:59 PM).

1 Unit Activity (15 pts)

The dataset `I521_A0001_D001` contains an example of multiunit human iEEG data recorded by Itzhak Fried and colleagues at UCLA using 40 micron platinum-iridium electrodes.

Whenever you get new and potentially unfamiliar data, you should always play around with it: plot it, zoom in and out, look at the shape of individual items of interest (here, the spikes). The spikes here will be events appx. 5 ms in duration with amplitudes significantly greater than surrounding background signal.

1. Using the time-series visualization functionality of the IEEG Portal find a single time-window containing 3 spikes (use a window width of 500 ms). The signal gain should be adjusted so that the spikes can be seen in entirety. Give a screenshot of the IEEG Portal containing the requested plot. (2 pts)
2. Instantiate a new IEEGSession in MATLAB with the `I521_A0001_D001` dataset into a reference variable called *session* (Hint: refer to the IEEGToolbox manual or class tutorial). Print the output of *session* here. (1 pt)

3. What is the sampling rate of the recording? You can find this information by exploring the fields in the *session* data structure you generated above. Give answer in Hz. (2 pts)

4. How long (in seconds) is this recording? (1 pt)

5. (a) Using the *session.data.getvalues* method retrieve the time-window you found in Q1.1 and re-plot this same window using MATLAB's plotting functionality (N.B., Always make sure to include the correct units and labels in your plots. This goes for the rest of this and all subsequent homeworks.). (3 pts)

   (b) Write a short bit of code to detect the times of each spike peak (i.e., the time of the maximum spike amplitude) within your time-window. Plot an 'x' above each spike peak that you detected superimposed on the plot from Q1.5a. (5 pts)

   (c) How many spikes do you detect in the entire data sample? (1 pt)