MATLAB programming course for beginners, supported by Wagatsuma Lab@Kyutech

Table of Contents

Specifications and requirements

1. @Time : 2017-2-20
2. @Author : Hiroaki Wagatsuma
3. @Site : https://github.com/hirowgit/1B1_matlab_signal_analysis_course
4. @IDE : MATLAB R2018a
5. @File : readEEG_Gold.m

Main program

clear all

```
clc
% clear all;
currdir=pwd;

Tnum=1;
source_F={'A-Z','B-O','C-N','D-F','E-S'};
output_F={'outA-Z','outB-O','outC-N','outD-F','outE-S'};
```

```
source_Lname={'awake state when eyes were opening','awake state
 when eyes were closed','Presurgical + opposite zone','Presurgical +
 epileptogenic zone','contained seizure activity'};
source_L2name={'eye-opening','eye-closed','opposite
 presurgical','epileptogenic presurgical','seizure activity'};

DataFolder='';
if ~isdir(source_F{1})
    prompt = 'Please specify the path of the data folders such as "A-
Z","B-O","C-N","D-F","E-S": ';
    DataFolder = input(prompt,'s');
end

all_fft=[];
for Tnum=1:length(source_F)

source_folder=fullfile(DataFolder,source_F{Tnum}); close all
output_folder=output_F{Tnum};
% source_file='Z001raw.txt';
% fname=fullfile(source_folder,source_file);
% output_folder='eeg_analyzed';
if ~exist('fignum','var'); fignum=0; end

fignum=0;
close all;
readingAllmarge_Copper;

%All EEG signals were recorded with the same 128- channel amplifier
 system,
% using an average common refer- ence ?omitting electrodes containing
 pathological activity ?C, D, and E
% ? or strong eye movement artifacts ?A and B??. After 12 bit analog-
to-digital conversion, the data were written continuou
% sly onto the disk of a data acquisition computer system at a
 sampling rate of 173.61 Hz. Band-pass filter settings were 0.53 ? 40
 Hz ?12 dB/oct.?.

%
% cd(source_folder);

ntag={'time','original','filtered'};
% eegdata=importdata(fname);
eegdata=data_all;

% tstamp=eegdata(:,1);
tstamp=importdata('timeline.txt');

fignum=fignum+1;figure(fignum);  clf
plot(tstamp,eegdata(:,2),tstamp,eegdata(:,3));

fnn=['ts_',source_folder]; fnn=strrep(fnn, '-', '_');
set(fignum,'name',fnn);
```

```
    N           = length(tstamp);
    n           = 2^(nextpow2(N-1));
    eegsignal = eegdata(1:N,:);

%
%     [mx,nx] = size(eegsignal);
%
%   d = max(mx,nx);

fs=173.61;
T=1/fs;
% yrange=[0 200];
yrange=[0 50];
yrange=[50 150];

xrange=[0 50];
xrange=[0 80];

eegs_fft=eegsignal;
fftdata=fft(eegs_fft,fs);
Cut_fft=[fftdata(1: floor(fs/2)+1,:)];
% Cut_fft=fftdata;
mag_abs=abs(Cut_fft);

freq=([0:fs/2]./(fs*T))';
freqs=repmat(freq,[1,3]);
axis_name={'Frequency (Hz)','Amplitude'};

fignum=fignum+1;figure(fignum);  clf
% ttext={'Separation of frequency '};
%s=['*','x','0','+','s','D'];
hold on
%for k2=1:6

%     plot(freq,20*log10(mag_abs(:,1)),'--
go',freq,20*log10(mag_abs(:,2)),': r * ');
%     plot(20*log10(mag_abs(:,1:3)));
    plot(freq,20*log10(mag_abs));
    title(source_Lname{Tnum});

    fnn=['fft_',source_folder]; fnn=strrep(fnn, '-', '_');
    set(fignum,'name',fnn);
    xlabel('Frequency(Hz)');
    ylabel('Power');
%   set(gca,'XLabel',axis_name{1});
 %   set(gca,'YLabel',axis_name{2});
%     set(gca,'ylim',yrange,'xlim',xrange);
       set(gca,'xlim',xrange);
grid on;


    fignum=fignum+1;figure(fignum);  clf
    mag_ave=(sum(mag_abs')./size(data_all,2))';
```

```
    plot(freq,20*log10(mag_ave));
    title(source_Lname{Tnum});

    fnn=['fft_average_',source_folder]; fnn=strrep(fnn, '-', '_');
    set(fignum,'name',fnn);
    xlabel('Frequency(Hz)');
    ylabel('Power');
%     set(gca,'ylim',yrange,'xlim',xrange);
    set(gca,'xlim',xrange);
    grid on;

    all_fft(:,Tnum)=mag_ave;
%   Hleg1 = legend (  'gamma','beta','alpha','theta','delta','EOG' );
%   Hleg1 = legend (  'original','filtered' );
% hold off

datafname=output_folder;
save_fig;
cd(output_folder);
save(fout2_name,'data_all','-ascii','-tabs');
cd(currdir);

end

close all;
    fignum=fignum+1;figure(fignum);  clf
    mag_ave=(sum(mag_abs')./size(data_all,2))';

    plot(freq,20*log10(all_fft));
    title('FFT Comparison');

    fnn=['fft_all_',source_folder]; fnn=strrep(fnn, '-', '_');
    set(fignum,'name',fnn);
    xlabel('Frequency(Hz)');
    ylabel('Power');
%     set(gca,'ylim',yrange,'xlim',xrange);
      set(gca,'xlim',xrange);
grid on;

%     all_fft(:,Tnum)=mag_ave;

    Hleg1 = legend (source_L2name);
    datafname='out_all';
save_fig;


flist =

  1×100 cell array

  Columns 1 through 4

    {'Z001.txt'}    {'Z002.txt'}    {'Z003.txt'}    {'Z004.txt'}
```

```
Columns 5 through 8

  {'Z005.txt'}    {'Z006.txt'}    {'Z007.txt'}    {'Z008.txt'}

Columns 9 through 12

  {'Z009.txt'}    {'Z010.txt'}    {'Z011.txt'}    {'Z012.txt'}

Columns 13 through 16

  {'Z013.txt'}    {'Z014.txt'}    {'Z015.txt'}    {'Z016.txt'}

Columns 17 through 20

  {'Z017.txt'}    {'Z018.txt'}    {'Z019.txt'}    {'Z020.txt'}

Columns 21 through 24

  {'Z021.txt'}    {'Z022.txt'}    {'Z023.txt'}    {'Z024.txt'}

Columns 25 through 28

  {'Z025.txt'}    {'Z026.txt'}    {'Z027.txt'}    {'Z028.txt'}

Columns 29 through 32

  {'Z029.txt'}    {'Z030.txt'}    {'Z031.txt'}    {'Z032.txt'}

Columns 33 through 36

  {'Z033.txt'}    {'Z034.txt'}    {'Z035.txt'}    {'Z036.txt'}

Columns 37 through 40

  {'Z037.txt'}    {'Z038.txt'}    {'Z039.txt'}    {'Z040.txt'}

Columns 41 through 44

  {'Z041.txt'}    {'Z042.txt'}    {'Z043.txt'}    {'Z044.txt'}

Columns 45 through 48

  {'Z045.txt'}    {'Z046.txt'}    {'Z047.txt'}    {'Z048.txt'}

Columns 49 through 52

  {'Z049.txt'}    {'Z050.txt'}    {'Z051.txt'}    {'Z052.txt'}

Columns 53 through 56

  {'Z053.txt'}    {'Z054.txt'}    {'Z055.txt'}    {'Z056.txt'}

Columns 57 through 60
```

```
    {'Z057.txt'}    {'Z058.txt'}    {'Z059.txt'}    {'Z060.txt'}

  Columns 61 through 64

    {'Z061.txt'}    {'Z062.txt'}    {'Z063.txt'}    {'Z064.txt'}

  Columns 65 through 68

    {'Z065.txt'}    {'Z066.txt'}    {'Z067.txt'}    {'Z068.txt'}

  Columns 69 through 72

    {'Z069.txt'}    {'Z070.txt'}    {'Z071.txt'}    {'Z072.txt'}

  Columns 73 through 76

    {'Z073.txt'}    {'Z074.txt'}    {'Z075.txt'}    {'Z076.txt'}

  Columns 77 through 80

    {'Z077.txt'}    {'Z078.txt'}    {'Z079.txt'}    {'Z080.txt'}

  Columns 81 through 84

    {'Z081.txt'}    {'Z082.txt'}    {'Z083.txt'}    {'Z084.txt'}

  Columns 85 through 88

    {'Z085.txt'}    {'Z086.txt'}    {'Z087.txt'}    {'Z088.txt'}

  Columns 89 through 92

    {'Z089.txt'}    {'Z090.txt'}    {'Z091.txt'}    {'Z092.txt'}

  Columns 93 through 96

    {'Z093.txt'}    {'Z094.txt'}    {'Z095.txt'}    {'Z096.txt'}

  Columns 97 through 100

    {'Z097.txt'}    {'Z098.txt'}    {'Z099.txt'}    {'Z100.txt'}

        4097         100

Warning: FFT length must be a nonnegative integer scalar.

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  1×100 cell array

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```

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  {'O025.txt'}    {'O026.txt'}    {'O027.txt'}    {'O028.txt'}

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  {'O029.txt'}    {'O030.txt'}    {'O031.txt'}    {'O032.txt'}

Columns 33 through 36

  {'O033.txt'}    {'O034.txt'}    {'O035.txt'}    {'O036.txt'}

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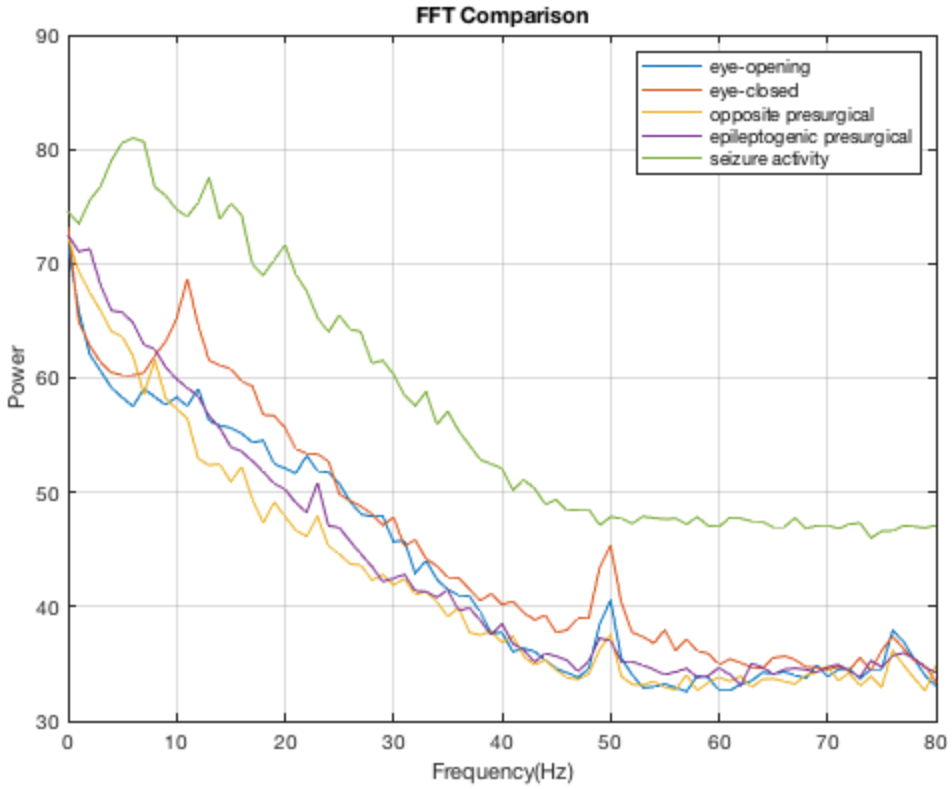

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