Nervous Activity Analyzer

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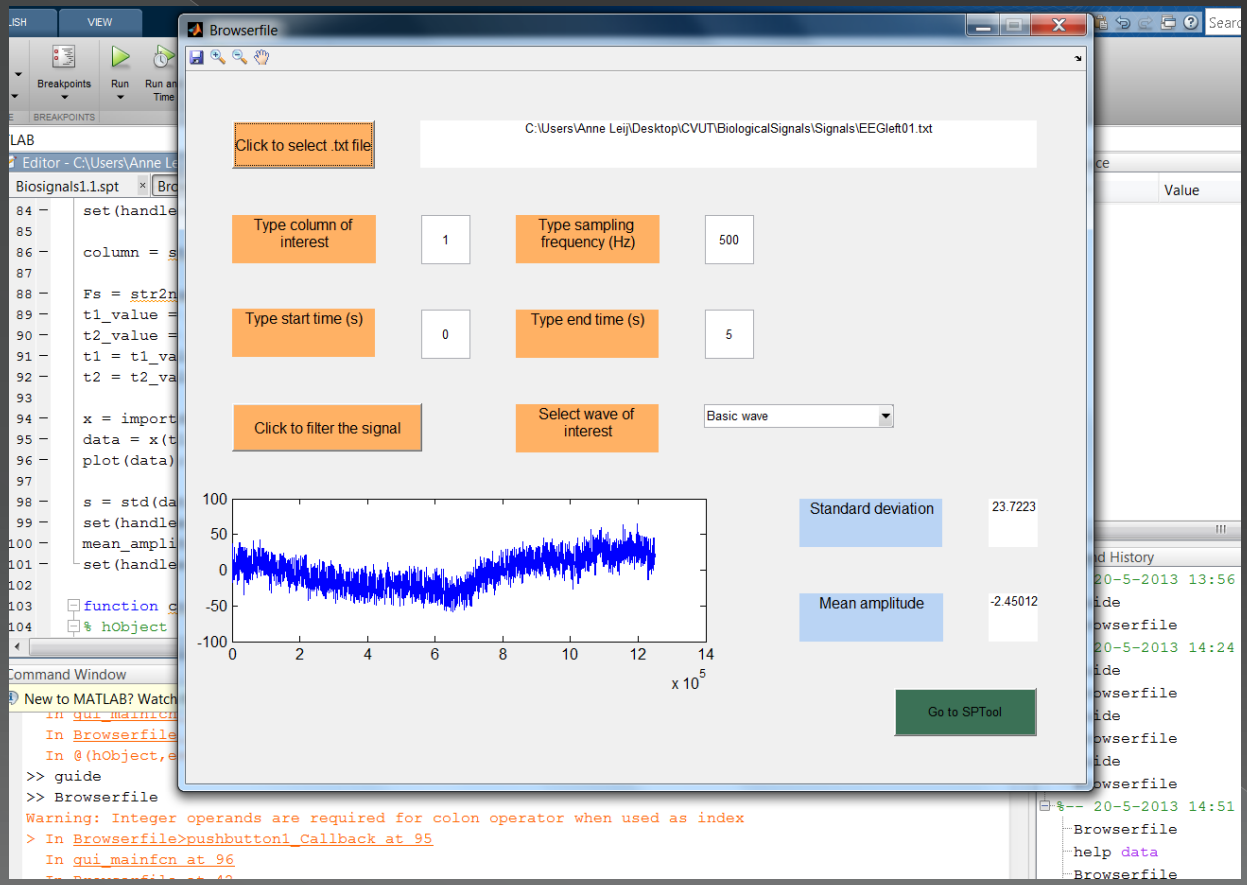
Overview of Presentation

- Our Task
- Graphical User Interface (GUI)
- Matlab code
- Discussion
- Conclusion

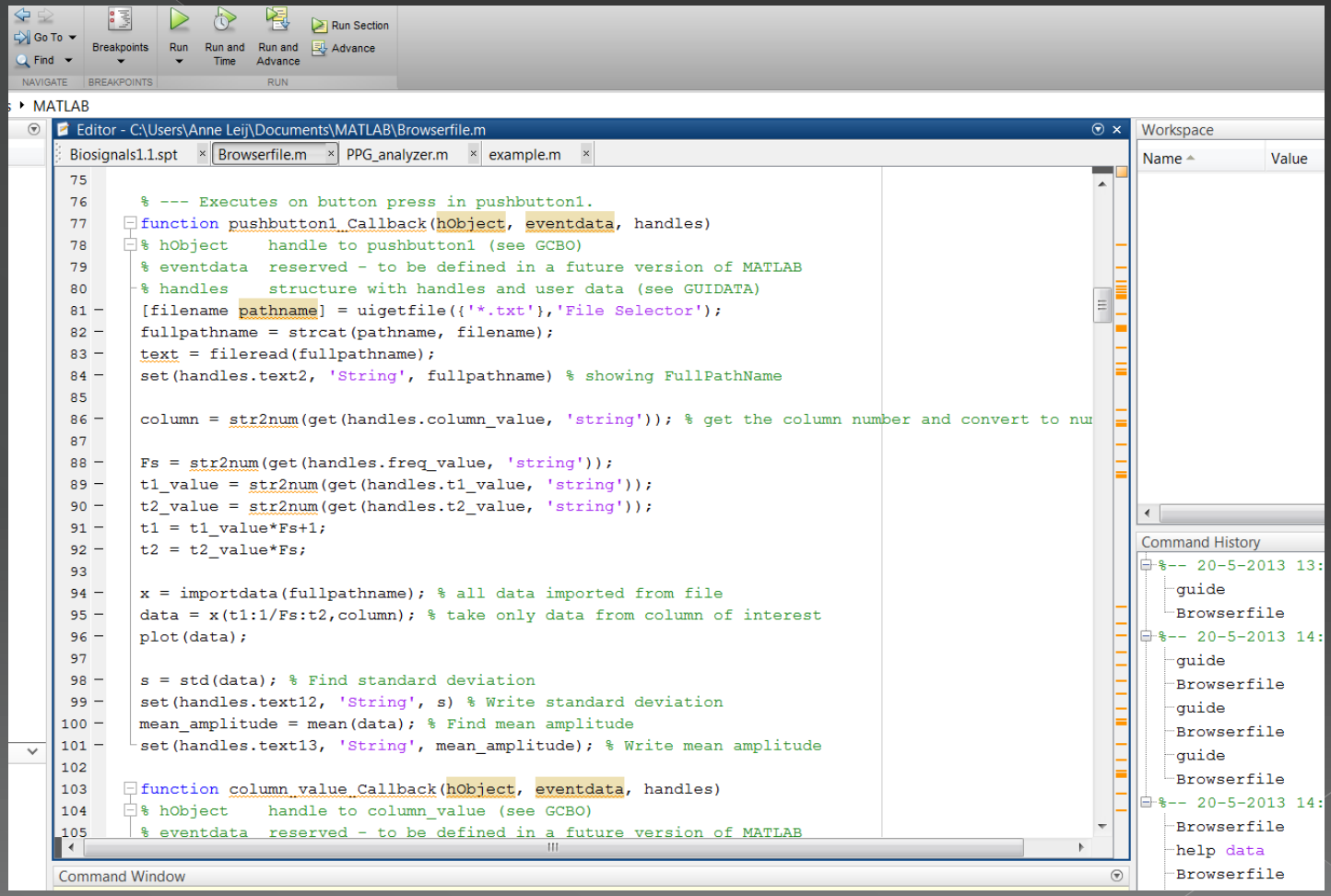
Our Task:

- Digital filtering of a raw EEG signal
- Extraction of alpha, beta, theta, delta waves from a filtered EEG signal
- Computation of STD, AVG and CC
- Implementation in Matlab, if possible with an interactive GUI
  - User should be able to import the raw signal import from a Biopac text export
  - User should be able to enter the sampling frequency
  - User should be able to filter the raw signal
  - User should be able to execute alpha, beta wave, theta, delta wave computation using Fourier or Wavelet transform or digital filtering
  - User should be able to execute STD, AVG, CC computation
  - User should be able to display plots of the raw signal for a given start and end timestamp
  - User should be able to display plots of alpha, beta wave, theta, delta waves over the time for a given start and end timestamp and display the values for STD, AVG and CC

Graphical User Interface



Matlab Code


Go To
Find
Breakpoints
Run
Run and Time
Run and Advance
Run Section
Advance
NAVIGATE
BREAKPOINTS
RUN
MATLAB
Editor - C:\Users\Anne Leij\Documents\MATLAB\Browserfile.m
Biosignals1.1.spt
Browserfile.m
PPG_analyzer.m
example.m
% --- Executes on button press in pushbutton1.
function pushbutton1_Callback(hObject, eventdata, handles)
% hObject handle to pushbutton1 (see GCBO)
% eventdata reserved - to be defined in a future version of MATLAB
% handles structure with handles and user data (see GUIDATA)
[filename pathname] = uigetfile({'*.txt'},'File Selector');
fullpathname = strcat(pathname, filename);
text = fileread(fullpathname);
set(handles.text2, 'String', fullpathname) % showing FullPathName
column = str2num(get(handles.column_value, 'string')); % get the column number and convert to nu
Fs = str2num(get(handles.freq_value, 'string'));
t1_value = str2num(get(handles.t1_value, 'string'));
t2_value = str2num(get(handles.t2_value, 'string'));
t1 = t1_value*Fs+1;
t2 = t2_value*Fs;
x = importdata(fullpathname); % all data imported from file
data = x(t1:1/Fs:t2,column); % take only data from column of interest
plot(data);
s = std(data); % Find standard deviation
set(handles.text12, 'String', s) % Write standard deviation
mean_amplitude = mean(data); % Find mean amplitude
set(handles.text13, 'String', mean_amplitude); % Write mean amplitude
function column_value_Callback(hObject, eventdata, handles)
% hObject handle to column_value (see GCBO)
% eventdata reserved - to be defined in a future version of MATLAB
Workspace
Name
Value
Command History
%-- 20-5-2013 13:
guide
Browserfile
%-- 20-5-2013 14:
guide
Browserfile
guide
Browserfile
guide
Browserfile
%-- 20-5-2013 14:
Browserfile
help data
Browserfile
Command Window

Discussion

- Program is made for .txt files (exported e.g. from Biopac), this should be taken into account using the program.
  - Data should be properly formatted (use of .).
  - Mention the right data column.
- Button refers to SPTool to change filter design (advanced users).
- Cycle Count is not showed, no wavelet transform.

Conclusion

- Program is working for available data.
- With future improvement, the Nervous Activity Analyzer could be used as part of e.g. ambulatory EEG recording.

Nervous Activity Analyzer

The new user interface for EEG recording

Thank you for your attention.
Are there any questions?