MATLAB
近紅外光血氧訊號分析使用者介面

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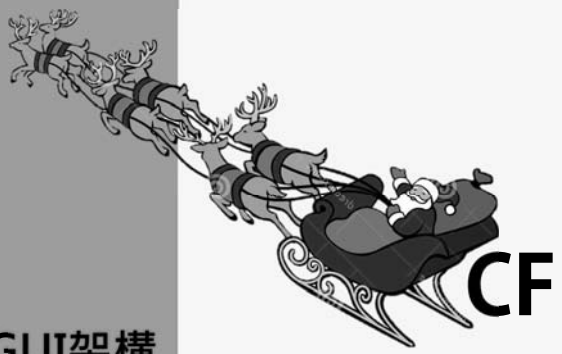
請先下載本週上課資料

- http://www.ym.edu.tw/~cflu
- 點選左欄 [課程資料] → [MATLAB圖形使用者介面]
- 下載第13週 [上課資料] materials_L13.zip，檔案大小約14.6MB

本週內容

- 近紅外光訊號分析GUI架構 (guide format)
- 近紅外光訊號分析GUI擴增

HOMER2
David Boas,
MGH-Martinos Center for Biomedical Imaging
http://www.nmr.mgh.harvard.edu/PMI/resources/homer2/home.htm



近紅外光訊號分析GUI架構

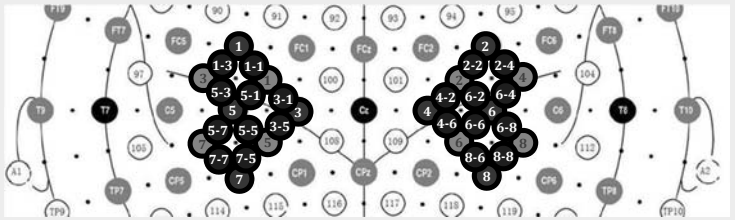
Near-infrared Spectroscopy (NIRS)

Source-Detector Locations

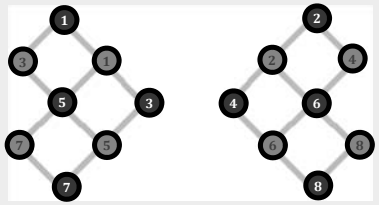
diffusive propagation

Signal Channels

anterior



left right

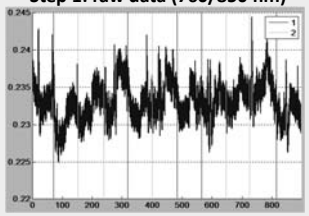


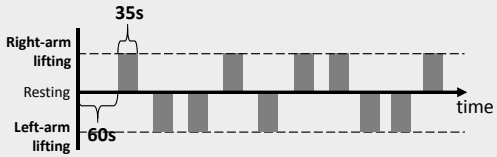
sources

detectors

Signal Processing

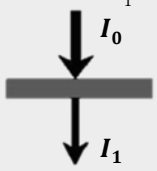
Step 1: raw data (760/850 nm)

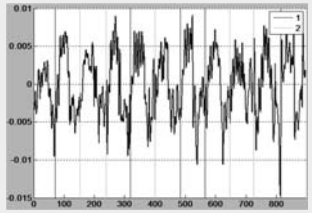




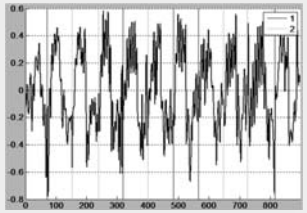
Step 2: filtering and optical density

$$D = log_{10}\frac{I_0}{I_1}$$

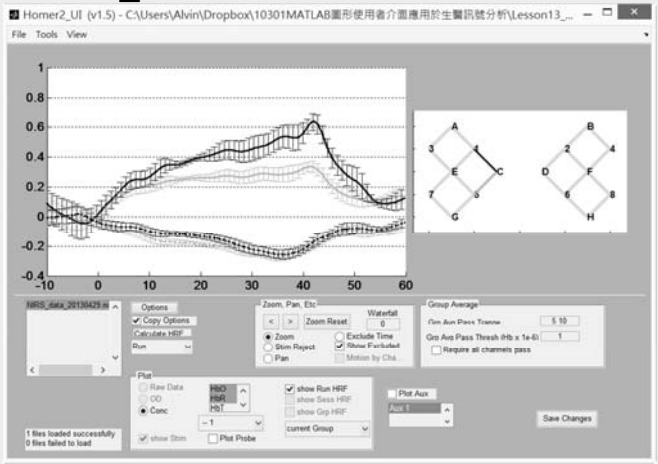




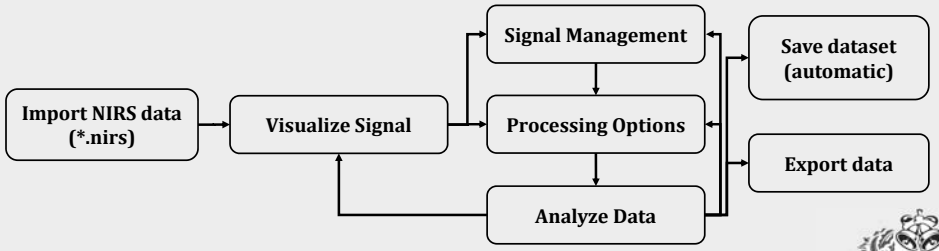
Step 3: relative HbO/HbR/Hbtotal concentration



Homer2_UI.m add path: materials_L13\Homer2



Framework of Homer2_UI

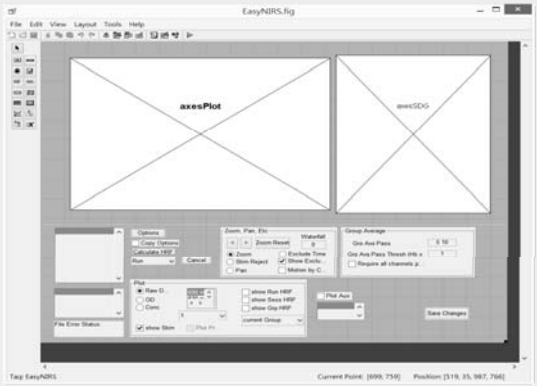


Deal with BIG packages

- 808 files, 101 folders
- 1968 lines in EasyNIRS.m

Locate a Specific Function

- Use guide interface to identify the "Tag" of objects
  - **Ctrl** + **F** to search the section of callback functions

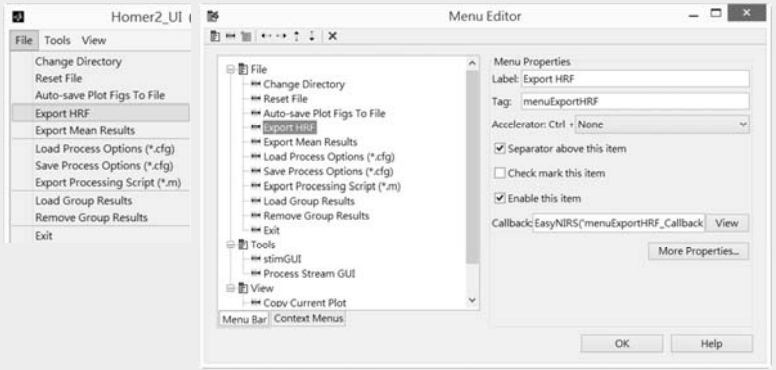


EasyNIRS.fig ?!

Why not Homer2_UI.fig ?

guide - Menu Editor

- Tools → Menu editor…



Locate a Specific Function

- Use guide interface to identify the "Tag" of objects
  - **Ctrl** + **F** to search the section of callback functions
- Please locate the codes of 

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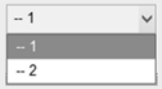
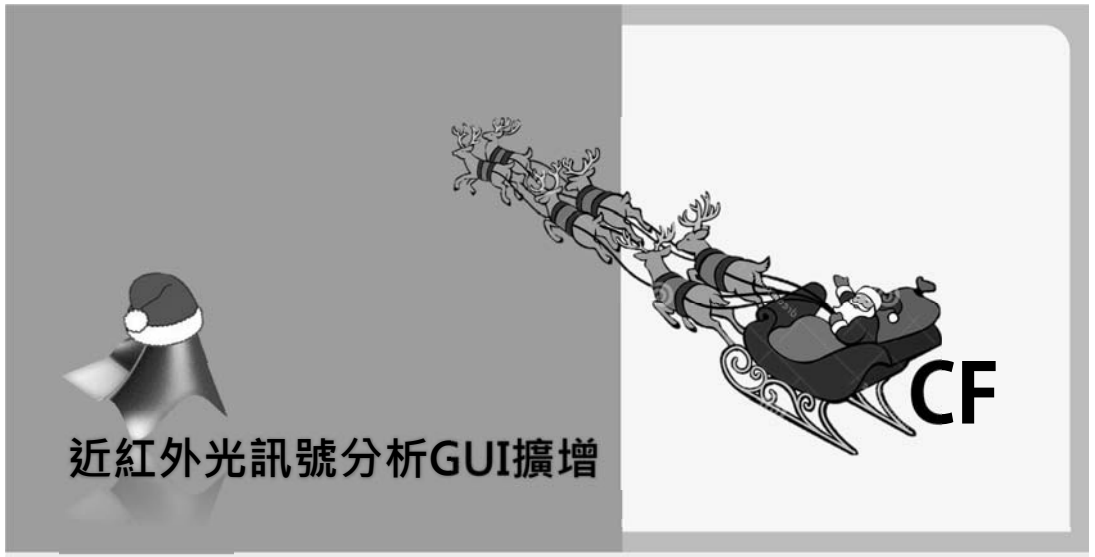
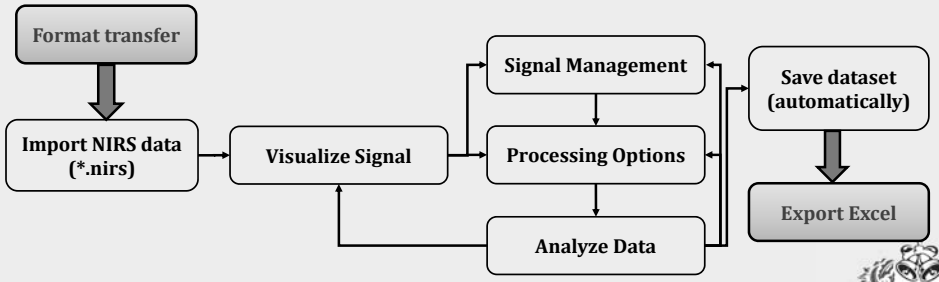
- Please locate the codes of 



Framework of Homer2_UI



Step 1: Create a pushbutton

- Create a pushbutton "**Export Excel**" using **guide**

- Modify **String** and **Tag**
  - **guide** will automatically create callback section of it.

```
1972    % --- Executes on button press in exportexcel.
1973    function exportexcel_Callback(hObject, eventdata, handles)
1974    % hObject    handle to exportexcel (see GCBO)
1975    % eventdata  reserved - to be defined in a future version of MATLAB
1976    % handles    structure with handles and user data (see GUIDATA)
1977
```

Step 2: Identify File to Export

- The files are input before create GUI
  - File names must be idenfity in EasyNIRS_OpeningFcn section.
- Using a global variable "hmr" to save all data
- Is there any field in hmr related to file name?
  - → **hmr.files**
- Key in **global hmr** in command window

Step 3: NIRS data format

- Page 4 in HOMER2_UsersGuide.pdf

or

- Simply load a *.nirs file into MATLAB
  - load('NIRS_data_20130429.nirs','-mat')
- Find out the results of processed results
  - **procResult.dc** (size: 8432 x 3 x 20)
  - **procResult.dcAvg** (size: 730 x 3 x 20 x 2)
  - **procResult.tHRF** (time axis for block average)
  - **ml**: channel order of source-detector pair
  - **s**: event markers

- **3 Hb concentrations**
  HbO/ HbR/ Hbtotal
- **20 channels**
- **2 tasks:**
  Right/left arm

Step 4: Edit the callback function

```
1972    % --- Executes on button press in exportexcel.
1973  function exportexcel_Callback(hObject, eventdata, handles)
1974  % hObject    handle to exportexcel (see GCBO)
1975    % eventdata  reserved - to be defined in a future version of MATLAB
1976    % handles    structure with handles and user data (see GUIDATA)
1977
```

- global hmr
- load *.nirs data based on the hmr.file.
- Gather the data you need.
- Export data as an Excel file.

CF

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