基于Python的MRI图像处理——数据转换与读取

Treasure琛
北漂4年，沪漂ing

最近在研究利用Python做MRI的数据处理，争取可以摆脱SPM，批量自动做分析。

但国内外的相关教程并不多，所以在这里记录学习的过程，锻炼代码和写作能力。

这篇文章主体是用Markdown写的，所以代码和说明部分就直接用英文了。

Part 1 -- Data format conversion

- Batch conversion to .nii files
- Read .nii file using nibabel
- Directly read .IMA file using pydicom

1. First install *nibabel, pydicom, dicom2nifti* using pip install

```python
import numpy as np
import os
import matplotlib.pyplot as plt
import nibabel
import pydicom
import dicom2nifti
```

2. Convert all dicom files into nii files in every folder

```python
#Get folders list
data_path = './2.2Demo data/150202_PINNA_JZL_1/FBIP_FMRI_20150202_091620_73400(
folders = os.listdir(data_path)

# Traverse all the folders
for folder in folders:
    dicom_folder = data_path + folder
    nii_folder = data_path + 'nii_'+ folder
    os.mkdir(nii_folder) #Create folder to store the .nii files
    dicom2nifti.convert_directory(dicom_folder, nii_folder, compression= False)
    print(folder + " has been converted.")


print("Conversion finished.")
```

3. Using Nibabel to read .nii files

```python
t1 = nibabel.load(data_path+'nii_T1_MPRAGE_SAG_1_0ISO_IPAT2_0003/3_t1_mprage_sa

#Rotate and transpose to get sagittal plane
t1 = np.rot90(t1)
t1 = np.transpose(t1,(0,2,1))
t1 = np.rot90(t1)
print(t1.shape)
plt.imshow(t1[:,:,100], cmap='gray')
plt.show()

(256, 256, 192)
```

```python
bold = nibabel.load(data_path + 'nii_BOLD_IPAT2_LONGBASELINEC1C3C4_0004/4_bold_
bold = np.rot90(bold)
print(bold.shape)
plt.imshow(bold[:,:,25,200], cmap='gray')
plt.show()

(88, 88, 49, 240)
```

(Alternative) Using pydicom to directly read dicom files

```python
files = os.listdir(data_path + 'T1_MPRAGE_SAG_1_0ISO_IPAT2_0003/') #Get file l:
data = []
data_all = []
for file in files:
    data = pydicom.dcmread(data_path + 'T1_MPRAGE_SAG_1_0ISO_IPAT2_0003/' + fi
    data_all.append(data.pixel_array)

#Convert list to array
t1_all = np.array(data_all)
print(t1_all.shape)
plt.imshow(t1_all[100,:,:],cmap='gray')
plt.show()
```

```
(192, 256, 256)
```

核磁共振成像　　Python　　fMRI(功能性磁共振成像)

▲ 赞同 35　　▼　　　● 1 条评论　　◢ 分享　　● 喜欢　　★ 收藏　　▣ 申请转载　　…

核磁共振成像　　Python　　fMRI(功能性磁共振成像)

▲ 赞同 35　　▼　　　● 1 条评论　　◢ 分享　　● 喜欢　　★ 收藏　　▣ 申请转载　　…