

使用 HCP 的 Work bench 进行皮层投影

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1.上 HCP 官网下载 work bench

已经下载好，文件名为 workbench-windows64-v1.5.0.zip

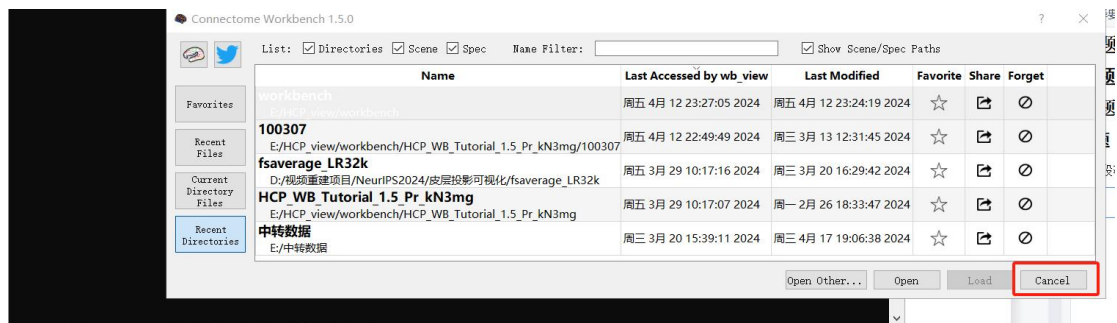
2.按照官方说明文档安装 work bench

Connectome_WB_Tutorial_v1.5.pdf

3.打开 work bench

假设安装目录为 E:\HCP_view\workbench\bin_windows64\

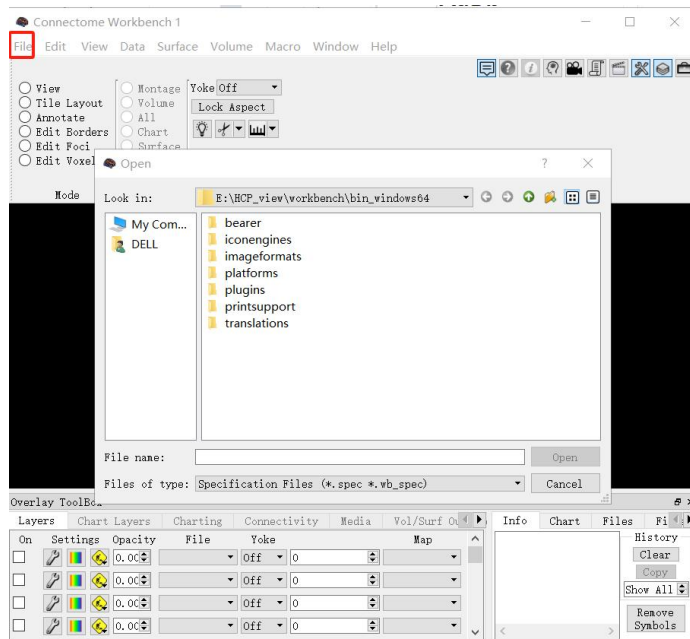
双击该文件夹下的 wb_view.exe



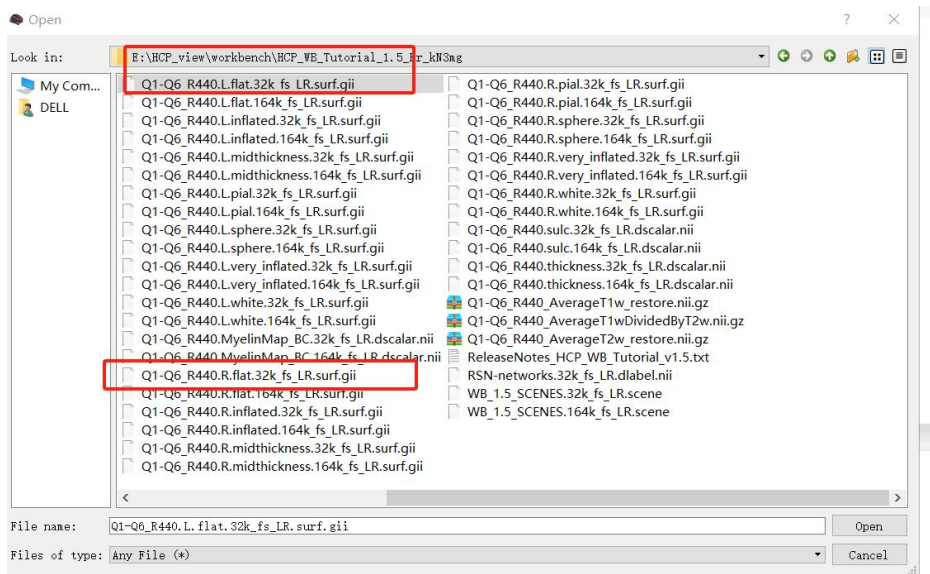
点击 Cancel

4.加载皮层模板

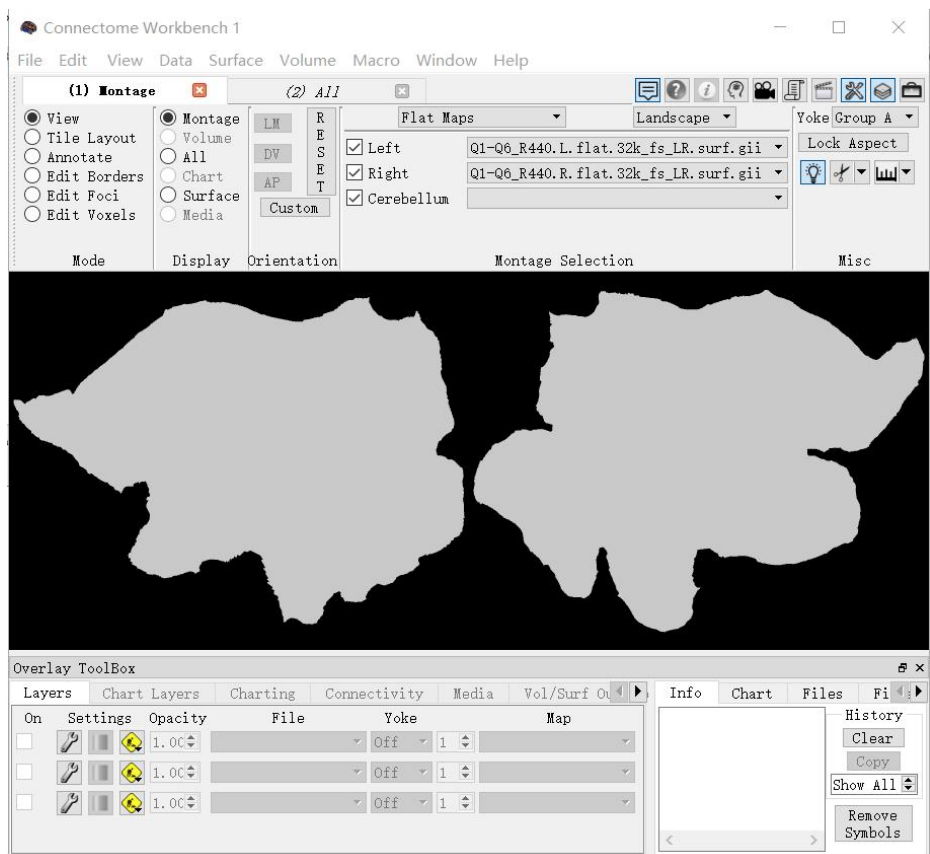
其中名字中带 inflated 的是未展开的，名字中带 flat 的是展开成平面的



点击 file，open file 载入皮层模板



得到以下结果



5.通过 Python 把模型权重写入.dtseries.nii

代码我已放在压缩包里，这里对一些步骤进行说明

(1) 加载模型，归一化权重

```
model = Semantic_Network(in_dim=4500, out_dim=19 * 768, h=512, n_blocks=3, norm_type='ln', act_first=False)
model.load_state_dict(torch.load('/data0/home/luyizhuo/NIPS2024实验材料/多个被试实验结果/sub03/pretrained_weights/semantic/BrainNetwork_30.pth'))
model.eval()
Lin0_par = model.lin0[0].weight.data.cpu().numpy().T # [512, 4500]

MLP1 = model.mlp[0][0].weight.data.cpu().numpy().T # [512, 512]
MLP2 = model.mlp[1][0].weight.data.cpu().numpy().T # [512, 512]
MLP3 = model.mlp[2][0].weight.data.cpu().numpy().T # [512, 512]

Lin1_1 = model.lin1[2].weight.data.cpu().numpy().T # [2048, 512]
Lin1_2 = model.lin1[5].weight.data.cpu().numpy().T
Lin1_3 = model.lin1[8].weight.data.cpu().numpy().T

Semantic = np.abs(np.mean((((Lin0_par @ MLP1) @ MLP2) @ MLP3) @ Lin1_1) @ Lin1_2) @ Lin1_3, axis=1))
# Semantic = np.abs(np.mean(Lin0_par, axis=1))
# print(np.mean(Semantic, axis=1).shape)
min_val = np.min(Semantic)
max_val = np.max(Semantic)

# 进行归一化处理
normalized_array = ((Semantic - min_val) / (max_val - min_val))
```

(2) 加载预处理 fMRI 数据时的 mask 文件，该文件的数据维度与原始 fMRI.dtseries.nii 的维度相同，所有元素取 0 或 1，取 1 说明该体素被筛选了出来

```
mask = np.load('/nfs/diskstation/DataStation/public_dataset/CC2017_for_Video_reconstruction/fMRI_in_fslr/sub03/activated_mask/mask_correct.npy')
mask_idx = np.nonzero(mask)[0]
```

(3) 创建新的.dtseries.nii 文件，把模型权重写入新文件

```
path_c = '/nfs/nica-datashop/CC2017_Purdue/Subject03/video_fmri_dataset/subject3/fmri/seg1/cifti/seg1_2_Atlas.dtseries.nii'
old_cifti = nib.load(path_c)
data_c = old_cifti.get_fdata()
data = data_c.copy()
data[:, 10, :] = 0

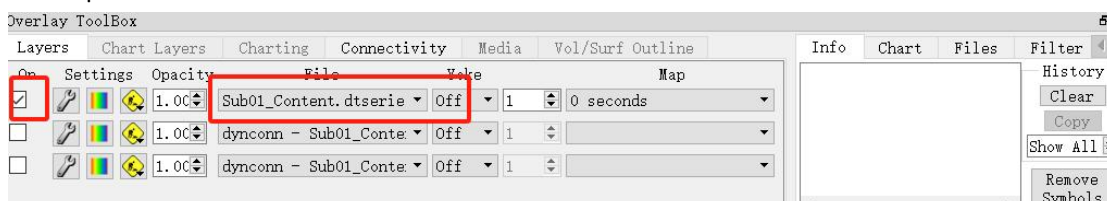
for j in range(4500):
    idx = mask_idx[j]
    data[:, 10, idx] = normalized_array[j]

clipped_img = nib.Cifti2Image(data, header=old_cifti.header, nifti_header=old_cifti.nifti_header, file_map=old_cifti.file_map)
new = clipped_img.get_fdata()
nib.save(clipped_img, '/data0/home/luyizhuo/NIPS2024实验材料/皮层可视化/sub03_Semantic.dtseries.nii')
```

6. 把权重的.dtseries.nii 文件加载进 work bench，绘制 voxel-wise 可视化图像



先用 open 加载，然后点击下方的 file 选择要加载的数据



7.选择color bar以及通过限制要展示的体素的百分比来提高图像的对比度

