SUVR a Centiloid

18F-Florbetaben PET beta-amyloid binding expressed in Centiloids

Modelo lineal

Segun Rowe et. al. la transformacion de SUVR_FBB a Centiloid sigue la relación,

$ CL = 153.4 \times SUVR_{FBB} - 154.9 $

Esto es sencillo de implementar pero antes hay que calibrar el metodo de obtencion de *SUVR* de la pipeline con las imagenes procedentes de GAAIN.

Procesando GAAIN

Basicamente descargamos las imagenes y los valores de centiloid calculados en GAAIN,

https://www.gaaindata.org/data/centiloid/FBBproject_E-25_MR.zip

https://www.gaaindata.org/data/centiloid/FBBproject_E-25_FBB_90110.zip

https://www.gaaindata.org/data/centiloid/FBBproject_SupplementaryTable.xlsx

Y hemos de compara los valores de centiloid obtenidos por nuestra pipeline con los valores obtenidos en GAAIN.

Voy a hacer un proyecto nuevo para esto y voy a copiar alli todos los archivos. Las imagenes vienen DICOM, asi que hay que convertirlas,

```
[osotolongo@detritus centiloid]$ tree MRDCM/
MRDCM/
├── 1008_MR
│   ├── 100.dcm
│   ├── 101.dcm
│   ├── 102.dcm
│   ├── 103.dcm
│   ├── 104.dcm
│   ├── 105.dcm
│   ├── 106.dcm
│   ├── 107.dcm
│   ├── 108.dcm
│   ├── 109.dcm
│   ├── 10.dcm
.........

[osotolongo@detritus centiloid]$ tree FBBDCM/
FBBDCM/
```

```
├── 1008_PET_FBB
│   ├── 10.dcm
│   ├── 11.dcm
│   ├── 12.dcm
│   ├── 13.dcm
│   ├── 14.dcm
│   ├── 15.dcm
│   ├── 16.dcm
│   ├── 17.dcm
│   ├── 18.dcm
│   ├── 19.dcm
│   ├── 1.dcm
.............
```

Alla vamos. Creo el csv del proyecto,

```
[osotolongo@detritus centiloid]$ ls MRDCM/ | sed 's/\(.*\)_MR/\1;sub/' >
centiloid.csv
```

A ver como convertimos,

```
[osotolongo@detritus centiloid]$ dcm2niix -z y -o tmp/ MRDCM/1008_MR/
Chris Rorden's dcm2niiX version v1.0.20180622 (JP2:OpenJPEG) (JP-LS:CharLS)
GCC5.5.0 (64-bit Linux)
Found 176 DICOM file(s)
Convert 176 DICOM as tmp/1008_MR_t1_mprage_sag_p2_iso_1.0_20161003101650_2
(256x256x176x1)
compress: "/usr/local/mricron/pigz_mricron" -n -f -6
"tmp/1008_MR_t1_mprage_sag_p2_iso_1.0_20161003101650_2.nii"
Conversion required 1.217848 seconds (0.450000 for core code).
[osotolongo@detritus centiloid]$ ls tmp/
1008_MR_t1_mprage_sag_p2_iso_1.0_20161003101650_2.json
1008_MR_t1_mprage_sag_p2_iso_1.0_20161003101650_2.nii.gz

[osotolongo@detritus centiloid]$ for x in MRDCM/*; do y=$(echo ${x} | sed
's/.*\/\(.*\)_.*/sub\1s0001/'); dcm2niix -z y -o tmp/ ${x}; t=$(ls
tmp/*.nii.gz); mv ${t} mri/${y}.nii.gz; mv ${t%.nii.gz}.json mri/${y}.json;
done

[osotolongo@detritus centiloid]$ ls mri
sub1008s0001.json    sub1015s0001.json    sub1022s0001.json
sub1026s0001.json    sub1030s0001.json     sub1034s0001.json
sub1038s0001.json    sub2017s0001.json    sub2032s0001.json
sub1008s0001.nii.gz  sub1015s0001.nii.gz  sub1022s0001.nii.gz
sub1026s0001.nii.gz  sub1030s0001.nii.gz  sub1034s0001.nii.gz
sub1038s0001.nii.gz  sub2017s0001.nii.gz  sub2032s0001.nii.gz
sub1009s0001.json    sub1018s0001.json    sub1023s0001.json
sub1028s0001.json    sub1031s0001.json     sub1036s0001.json
sub2002s0001.json    sub2029s0001.json
sub1009s0001.nii.gz  sub1018s0001.nii.gz  sub1023s0001.nii.gz
```

```
sub1028s0001.nii.gz  sub1031s0001.nii.gz  sub1036s0001.nii.gz
sub2002s0001.nii.gz  sub2029s0001.nii.gz
sub1010s0001.json    sub1019s0001.json    sub1024s0001.json
sub1029s0001.json    sub1032s0001.json     sub1037s0001.json
sub2005s0001.json    sub2030s0001.json
sub1010s0001.nii.gz  sub1019s0001.nii.gz  sub1024s0001.nii.gz
sub1029s0001.nii.gz  sub1032s0001.nii.gz  sub1037s0001.nii.gz
sub2005s0001.nii.gz  sub2030s0001.nii.gz

[osotolongo@detritus centiloid]$ dcm2niix -z y -o tmp/ FBBDCM/1008_PET_FBB/
Chris Rorden's dcm2niiX version v1.0.20180622 (JP2:OpenJPEG) (JP-LS:CharLS)
GCC5.5.0 (64-bit Linux)
Found 90 DICOM file(s)
Convert 90 DICOM as
tmp/1008_PET_FBB_Austin_18F_Neuro_Res_20160627143414_43180 (128x128x90x1)
compress: "/usr/local/mricron/pigz_mricron" -n -f -6
"tmp/1008_PET_FBB_Austin_18F_Neuro_Res_20160627143414_43180.nii"
Conversion required 1.233496 seconds (0.170000 for core code).
[osotolongo@detritus centiloid]$ ls tmp
1008_PET_FBB_Austin_18F_Neuro_Res_20160627143414_43180.json
1008_PET_FBB_Austin_18F_Neuro_Res_20160627143414_43180.nii.gz

[osotolongo@detritus centiloid]$ for x in FBBDCM/*; do y=$(echo ${x} | sed
's/.*\/\(.*\)_PET_FBB/sub\1s0001/'); dcm2niix -z y -o tmp/ ${x}; t=$(ls
tmp/*.nii.gz); mv ${t} fbb/${y}.nii.gz; mv ${t%.nii.gz}.json fbb/${y}.json;
done
[osotolongo@detritus centiloid]$ ls fbb
sub1008s0001.json    sub1015s0001.json    sub1022s0001.json
sub1026s0001.json    sub1030s0001.json     sub1034s0001.json
sub1038s0001.json    sub2017s0001.json    sub2032s0001.json
sub1008s0001.nii.gz  sub1015s0001.nii.gz  sub1022s0001.nii.gz
sub1026s0001.nii.gz  sub1030s0001.nii.gz  sub1034s0001.nii.gz
sub1038s0001.nii.gz  sub2017s0001.nii.gz  sub2032s0001.nii.gz
sub1009s0001.json    sub1018s0001.json    sub1023s0001.json
sub1028s0001.json    sub1031s0001.json     sub1036s0001.json
sub2002s0001.json    sub2029s0001.json
sub1009s0001.nii.gz  sub1018s0001.nii.gz  sub1023s0001.nii.gz
sub1028s0001.nii.gz  sub1031s0001.nii.gz  sub1036s0001.nii.gz
sub2002s0001.nii.gz  sub2029s0001.nii.gz
sub1010s0001.json    sub1019s0001.json    sub1024s0001.json
sub1029s0001.json    sub1032s0001.json     sub1037s0001.json
sub2005s0001.json    sub2030s0001.json
sub1010s0001.nii.gz  sub1019s0001.nii.gz  sub1024s0001.nii.gz
sub1029s0001.nii.gz  sub1032s0001.nii.gz  sub1037s0001.nii.gz
sub2005s0001.nii.gz  sub2030s0001.nii.gz
```

Preparamos y lanzamos FS,

```
[osotolongo@detritus centiloid]$ fsl2fs.pl centiloid

[osotolongo@detritus centiloid]$ precon.pl centiloid
```

```
Submitted batch job 15673
[osotolongo@detritus centiloid]$ squeue
             JOBID PARTITION     NAME     USER ST       TIME  NODES
NODELIST(REASON)
             15673     devel fs_recon osotolon PD       0:00      1
(Dependency)
             15648     devel fs_recon osotolon  R       0:05      1 brick01
             15649     devel fs_recon osotolon  R       0:05      1 brick01
             15650     devel fs_recon osotolon  R       0:05      1 brick01
             15651     devel fs_recon osotolon  R       0:05      1 brick01
             15652     devel fs_recon osotolon  R       0:05      1 brick01
             15653     devel fs_recon osotolon  R       0:05      1 brick01
             15654     devel fs_recon osotolon  R       0:05      1 brick01
             15655     devel fs_recon osotolon  R       0:05      1 brick01
             15656     devel fs_recon osotolon  R       0:05      1 brick01
             15657     devel fs_recon osotolon  R       0:05      1 brick01
             15658     devel fs_recon osotolon  R       0:05      1 brick01
             15659     devel fs_recon osotolon  R       0:05      1 brick01
             15660     devel fs_recon osotolon  R       0:05      1 brick01
             15661     devel fs_recon osotolon  R       0:05      1 brick01
             15662     devel fs_recon osotolon  R       0:05      1 brick01
             15663     devel fs_recon osotolon  R       0:05      1 brick01
             15664     devel fs_recon osotolon  R       0:02      1 brick01
             15665     devel fs_recon osotolon  R       0:02      1 brick01
             15666     devel fs_recon osotolon  R       0:02      1 brick01
             15667     devel fs_recon osotolon  R       0:02      1 brick01
             15668     devel fs_recon osotolon  R       0:02      1 brick01
             15669     devel fs_recon osotolon  R       0:02      1 brick01
             15670     devel fs_recon osotolon  R       0:02      1 brick01
             15671     devel fs_recon osotolon  R       0:02      1 brick01
             15672     devel fs_recon osotolon  R       0:02      1 brick01
```