PCP Quality Assessment Protocol - Group report

- QA protocol: qap_functional_spatial.
- Date and time: 2015-11-24, 13:24.
- Failed workflows: none.

PCP Quality Assessment Protocol - QAP Functional Spatial Reports

After all processing has been completed, the designated output directory for the `qap_functional_spatial.py` workflow will contain a set of pdf files that contain the relevant reports for the set of scans undergoing quality assessment. The set of output pdfs includes one pdf file per input scan, e.g.: `qap_functional_spatial_sub-01.pdf`, which contains the mean EPI plot and QC metrics for that scan. There will also be a group report pdf in that main output directory, e.g.: `qap_functional_spatial_group.pdf`, that contains summary metrics for the entire set of scans.

For the individual scan reports:

The Mean EPI Slice Mosaic

This plot in the report for the scan being assessed, e.g.:

`Mean EPI image (subject 1_session_1_scan_1)`

is the rendering of the axial slices from the 3D stack created by the workflow. This mean EPI was created by averaging the BOLD signal intensity values in each voxel over time. Hence, a 3-dimensional image was created from the 4-dimensional scan and was displayed as a slice mosaic. This image can be used to eyeball the quality of the overall signal in the scan, as it will be obvious if there were any problem areas where there was signal dropout resulting from a bad shim or other sources of signal distortion (such as tattoos which contain metallic or ferromagnetic compounds, or permanent makeup).

The Spatial Metrics computed on the Functional Scan

The metrics displayed in the Summary Report were computed using the

`qap_functional_spatial.py`

workflow and have been displayed as violin plots. The stars in these plots denote where the score for this particular scan falls in the distribution of all scores for scans that were included as inputs to this workflow.

The metrics computed are as follows:

1. bg_size - Background mask size
2. fg_size - Foreground mask size
3. bg_mean - Mean intensity of the background mask
4. fg_mean - Mean intensity of the foreground mask
5. bg_std - Standard deviation of the background mask
6. fg_std - Standard deviation of the foreground mask
7. efc - Entropy Focus Criterion
8. fber - Foreground to Background Energy Ratio
9. fwhm - Full-width half maximum smoothness of the voxels averaged across the three coordinate axes, and also for each axis [x,y,x]
10. ghost_x - Ghost to Signal Ratio
11. snr - Signal to Noise Ratio

All metrics are described in more detail in the Taxonomy of QA Measures section of the QAP documentation. Please refer to the QAP website for descriptions of these metrics.

For the group reports:

The violin plots included in the group report, e.g.: `QC measures (session_1)` are a graphical representation of the columnar values in the `qap_functional_spatial.csv` file that was created in the main output directory for the workflow. The scores for each metric described above were aggregated to create the distributions that were plotted in both the individual and group reports. Hence, the violin plots in the individual scan reports and the group reports are identical, except that the group reports do not contain any stars denoting individual scans. These group reports are intended to provide the user a means of visually inspecting the overall quality of the spatial data for that group of functional scans.