|  |  |  |
| --- | --- | --- |
| **Preprocessing step** | **DBI** | **dHCP** |
| Slice time correction | O | O |
| Discarding the first few slices | O | X\* |
| De-spiking | O | X |
| Bias-field correction | O | O |
| Intensity scaling | O | X |
| Spatial smoothing | X | X |
| Data censoring | O\*\* | X |
| Bandpass filtering | O\*\* | O\*\*\* |
| Nuisance regression | O\*\*, \*\*\*\* | O† |
| ICA-FIX | X | O |
| Detrending | X | O |
| Voxel-wise normalization | O | O |
| \* : Not mentioned, \*\* : Simultaneously applied, \*\*\* : Not included in dHCP preprocessing routine,\*\*\*\* : Only with motion parameters,† : Motion parameters + ICA-FIX noise components. |

**Supplementary File 1a.** Preprocessing steps for the DBI and dHCP datasets.

**Supplementary File 1b.** Age prediction performance in separate age groups of DBI dataset using different latent representations.

|  |  |  |
| --- | --- | --- |
| **Representation Method** | **Neonate (37-47 weeks)** | **Fetus (19-39 weeks)** |
| MAE | vs. VAE | MAE | vs. VAE |
| VAE | 1.30$\pm $0.02 |  | 2.89$\pm $0.02 |  |
| Cortical Parcel | 1.36$\pm $0.01 | *p*<10-6 | 2.73$\pm $0.03 | *p*<10-6 |
| IC50 | 1.45$\pm $0.03 | *p*<10-6 | 3.26$\pm $0.08 | *p*<10-6 |
| IC100 | 1.48$\pm $0.03 | *p*<10-6 | 3.01$\pm $0.05 | *p*<10-6 |
| IC200 | 1.37$\pm $0.02 | *p*<10-6 | 3.03$\pm $0.04 | *p*<10-6 |
| IC300 | 1.33$\pm $0.02 | *p*<10-6 | 3.06$\pm $0.04 | *p*<10-6 |
| Melodic ICA | 1.32$\pm $0.02 | *p*<10-6 | 2.98$\pm $0.03 | *p*<10-6 |