Inline Supplementary Methods 1

Let I_{ia}, I_{im} be the indicators that voxel i is labeled to be in the brain mask for the automatic and manual masks, respectively.

A voxel i is labeled to be a true positive (TP) when $I_{ia} = 1$ and $I_{im} = 1$, false positive (FP) when $I_{ia} = 1$ and $I_{im} = 0$, false negative (FN) when $I_{ia} = 0$ and $I_{im} = 1$, and true negative (TN) when $I_{ia} = 0$ and $I_{im} = 0$. The number of true positive voxels is defined as:

$$\#\mathrm{TP} = \sum_{i=1}^{V} (I_{ia} \times I_{im})$$

Sensitivity is defined as

$$\frac{\#\mathrm{TP}}{\#\mathrm{TP} + \mathrm{FN}} = \frac{\sum_{i=1}^{V} (I_{ia} \times I_{im})}{\sum_{i=1}^{V} I_{im}},$$

specificity is defined as

$$\frac{\#\mathrm{TN}}{\#\mathrm{TN} + \mathrm{FP}} = \frac{\sum_{i=1}^{V} \{(1 - I_{ia}) \times (1 - I_{im})\}}{\sum_{i=1}^{V} (1 - I_{im})},$$

overall accuracy is defined as:

$$\frac{\#\mathrm{TN} + \mathrm{TP}}{\#\mathrm{TN} + \mathrm{FN} + \mathrm{TP} + \mathrm{FP}} = \frac{\sum_{i=1}^{V} [(I_{ia} \times I_{im}) + \{(1 - I_{ia}) \times (1 - I_{im})\}]}{\sum_{i=1}^{V} I_{ia} + \sum_{i=1}^{V} I_{im}},$$

and the Dice Similarity Index (DSI) is defined as

$$\frac{2 \times \#\mathrm{TP}}{\#\mathrm{TN} + \mathrm{FN} + \mathrm{TP} + \mathrm{FP}} = \frac{2 \times \sum_{i=1}^{V} (I_{ia} \times I_{im})}{\sum_{i=1}^{V} I_{ia} + \sum_{i=1}^{V} I_{im}}.$$