Abstract

Alzheimers disease is terrible.

Introduction

Something about AD...

Materials and Methods

Imaging

Cortical thickness

Cross-sectional processing

Longitudinal processing

The ANTs longitudinal cortical thickness pipeline extends the ANTs cortical thickness pipeline to unbiased longitudinal studies. The pipeline first creates a shape and appearance average subject-specific template (SST) for each individual. It then rigidly aligns each time point to the SST to reduce the effect of coordinate system or interpolation bias. Subsequent processing segments the SST into six probabilistic tissues classes: cerebrospinal fluid (CSF), gray matter (GM), white matter (WM), deep gray matter (striatum + thalamus), brain stem, and cerebellum. This requires processing the SST through two parallel workflows. First, the SST proceeds through the standard ANTs cortical thickness pipeline which generates a brain extraction mask and the CSF posterior probability map. Second, using a data set of expert annotations [1], a class-leading multi-atlas joint label fusion step [2] is performed to create individualized probability maps for all tissue types. This final version of the SST enables unbiased mappings to the group template, subject-specific tissue segmentations, region of interest volumes and cortical thickness maps for each of the original time series images. The corresponding cortical labelings (generated using a multi-atlas label fusion approach and a selected cortical parcellation protocol) are then used to tabulate regional thickness and area values for statistical analysis. Other modalities are then mapped to the group template through these unbiased transformations, as in [3, 4]

Subject id	**Lesion count**	**Lesion load**	**Mean volume**	**[Min − Max]**
0	2	18	9 ± 1.4	[8-10]
1	3	3	1 ± 0	[1-1]
2	0	0	0	[0-0]
3	11	209	19 ± 18.4	[1-56]
4	3	130	43.3 ± 50.0	[12-101]
5	1	2	2	[2-2]
6	25	790	31.6 ± 29.2	[2-132]
7	24	767	32.0 ± 33.6	[2-166]
8	3	18	6 ± 7.8	[1-15]
9	21	508	24.2 ± 35.1	[1-166]
Total	272	9191	33.8 ± 55.4	[1-551]

Table 1: Sample table.

An equation:

$$F_1 = \frac{2 \cdot TP}{2 \cdot TP + FP + FN}.$$

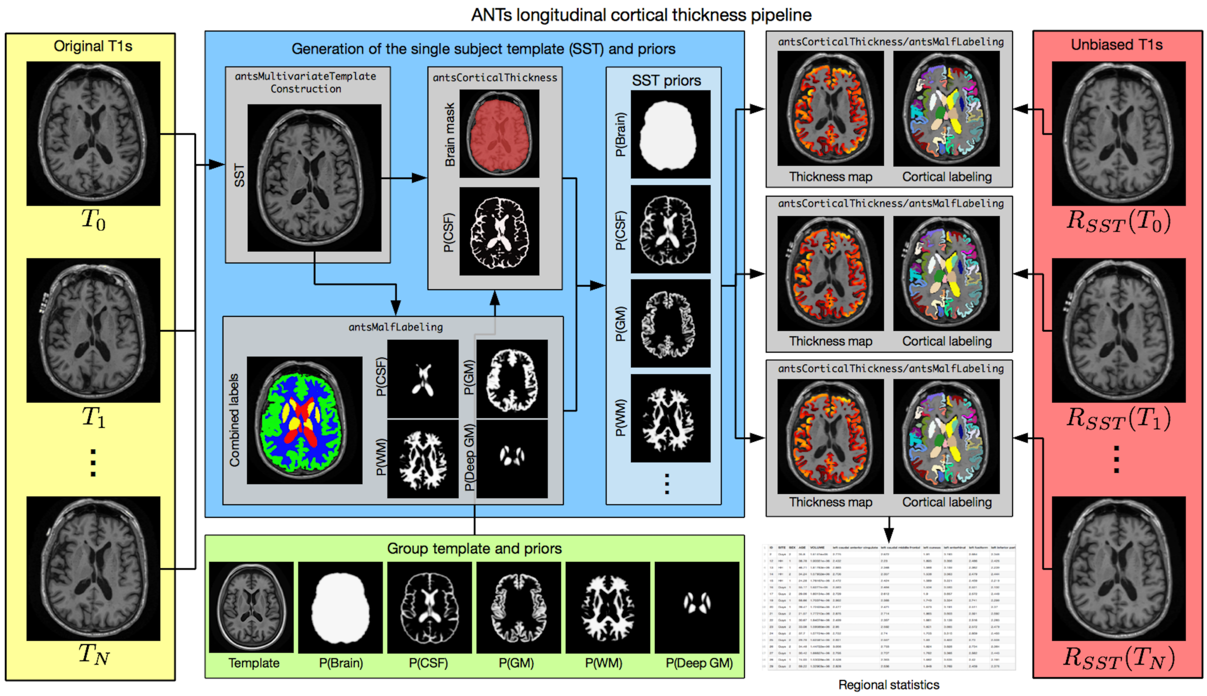

Figure 1: Oh, and here is an image of the longitudinal pipeline with a caption and a reference to the KellyKapowski paper [5].

Here is an example footnote.[1]

Results

Discussion

Subsection 1

And a sweet equation:

$$\exp^{-i\pi} = -1$$

[1] For comparison, the training data set of the MS Lesion Segmentation challenge associated with the international MICCAI 2008 conference has a mean lesion load of 204 ($\pm$ 752) mm^3 per lesion and the resolution is almost twice what is used in this study (i.e., $0.5 \times 0.5 \times 0.5$).

References

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