

AFIDs: a standardized framework for evaluating anatomical correspondence between primate brains

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Background & Previous Work

Evaluating correspondence between brain images

Anatomical Fiducials (AFIDs) Protocol

Region-Based

Voxel overlap

$A \cap B$

$A \cup B$

Point-Based

Distance

mm

striatum

pallidum

thalamus

Lau et al. (2019)

Overview: Translation of Human Protocol to Macaque

MNI2009bAsym

Locating homologous anatomical landmarks across species

NMTv1.3

32 AFIDs

32 AFIDs

AFIDs Protocol:

Human

Macaque

Workflow

Materials

Participants

Templates scans (N=5)

Single subject scans (N=8)

Database

PRIMatE Resource Exchange

Join us on Mattermost!

BrainWeb

8 raters recruited from the collaborative online neuroscience community

3DSlicer

32 AFIDs placed by each rater

Templates (x3 rounds)

Single subjects (x2 rounds)

Development

Validation

Application

1

Placement Protocol

32 AFIDs

Web application

AFIDs Validator

Compares rater placements to protocol

2

AFLE

AFIDs Localization Error

10 mm

5 mm

Rater mean

Individual rater

3

AFRE

AFIDs Registration Error

10 mm

5 mm

INIA19

NMTv1.3

Linear

Linear + non-linear

Poster website

Follow AFIDs

AFIDs Project website

BrainWeb website

RheMAP website

Results

AFLE (AFIDs Localization Error)

Min = 0.2 mm

Max = 0.66 mm

Mean = 0.42 mm

SD = 0.25 mm

AFRE (AFIDs Registration Error)

Min = 0.23 mm

Max = 1.45 mm

Mean = 0.68 mm

SD = 0.43 mm

Linear coregistration

Linear + non-linear coregistration

Conclusions & future directions

- Human AFIDs protocol has been successfully extended to macaque brain images.
- Future directions will further extend this work into single subject scans, inter-species comparison, and compare distance metrics (AFIDs) with more conventional voxel overlap metrics in assessing brain correspondence accuracy of linear and non-linear coregistrations.