Imagerie Médicale

Mini-projets

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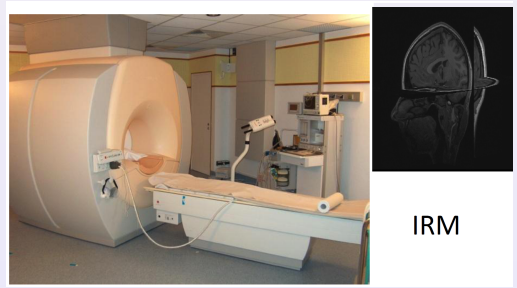
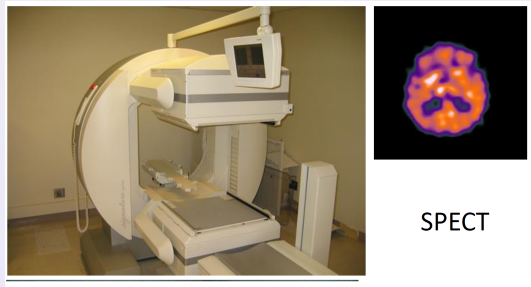
TEP

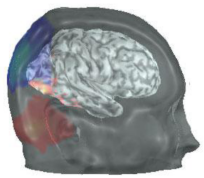


IRM



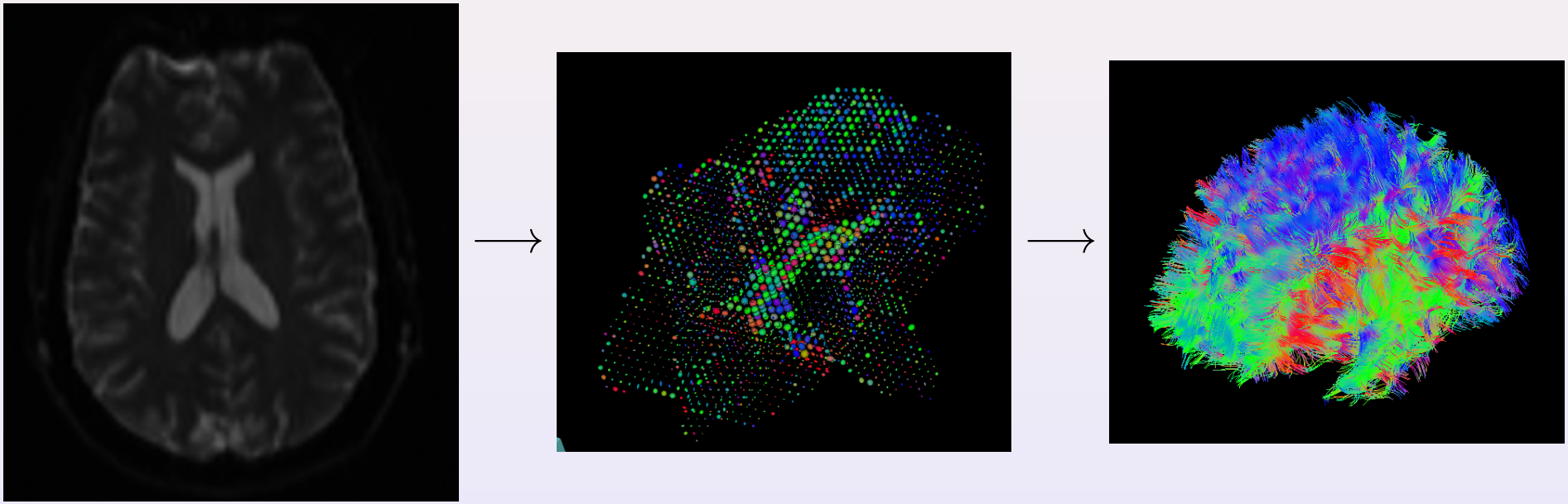
SPECT

EEG



MEG

1 : Tractographie



2 : Détection d'asymétries

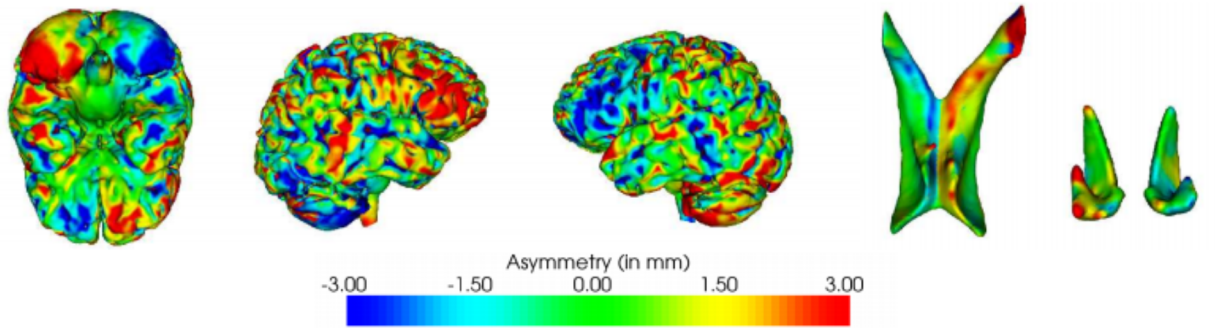


Fig. 3. Individual asymmetry mapping on a given subject. Left to right: brain cortex, lateral ventricles and caudate nuclei. Different views.

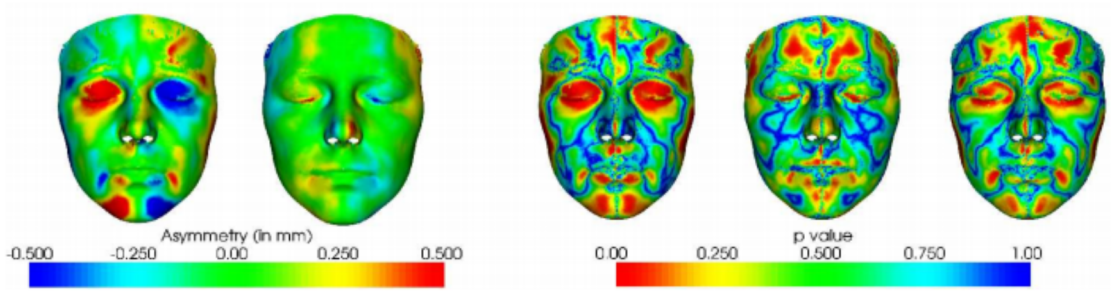


Fig. 4. Statistical analysis of asymmetry. Left to right: mean signed asymmetry maps on men/women, uncorrected p-value maps (using t-tests) of statistically significant asymmetry among men, among women, and comparison between men and women.

New algorithms to map asymmetries of 3D surfaces, B.Combès, S.Prima, 2009

DEMO MATLAB

3 : Correction d'inhomogénéités

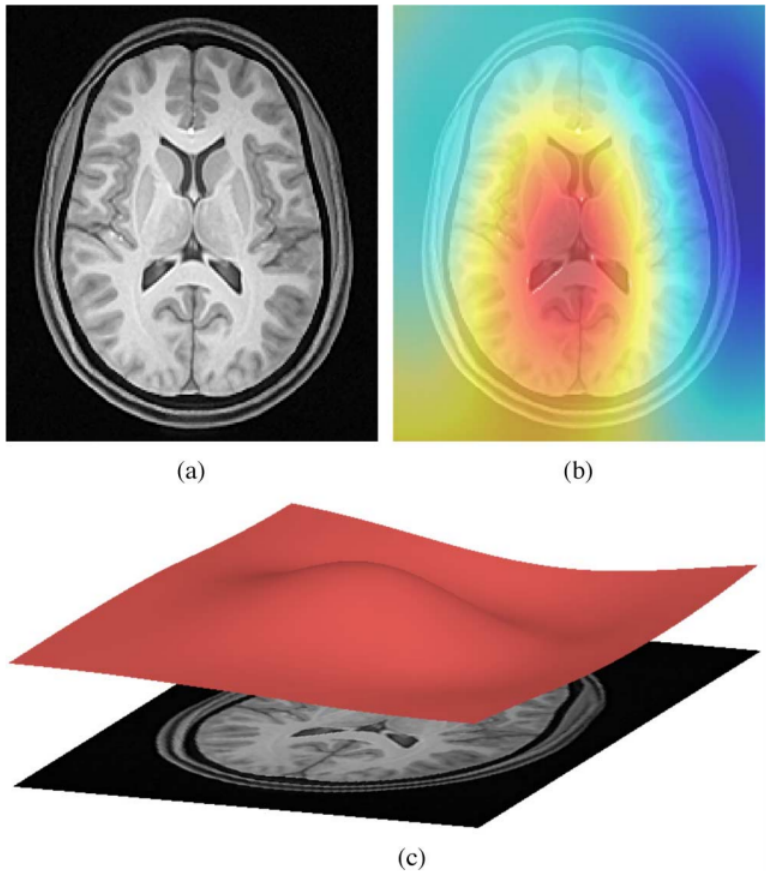


Fig. 1. (a) T1-weighted MR image exhibiting bias. (b) Several algorithms have been proposed to estimate the bias field which can then be used to "correct" the image. (c). Viewed as a surface, the low frequency modulation of the bias field is readily apparent.

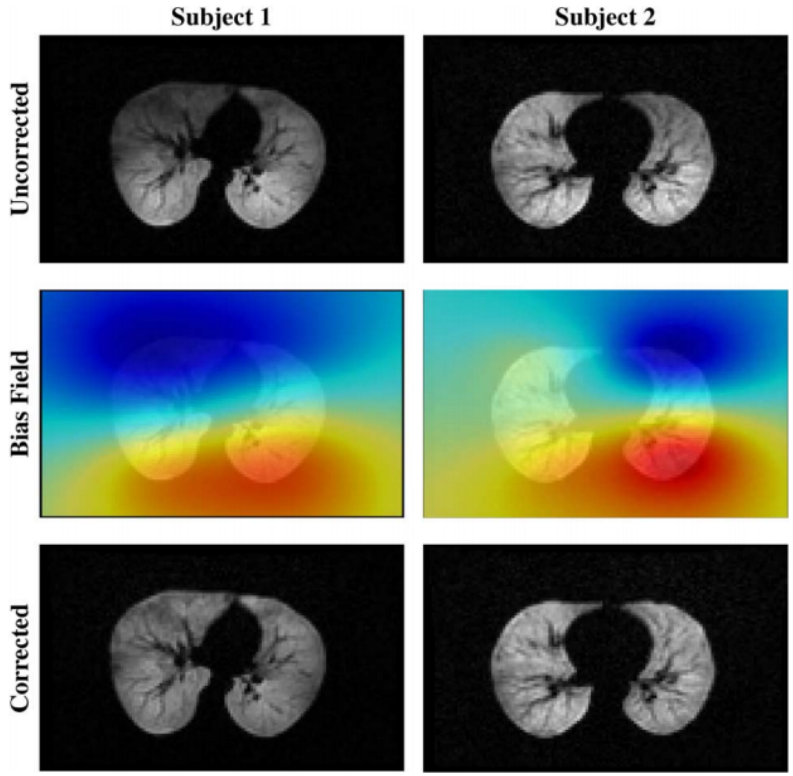


Fig. 6. Top row: Axial $^{3}\mathrm{He}$ lung MRI from two subjects evidencing bias field artifacts. Middle row: The calculated bias field. Bottom row: Corrected images.

N4ITK : Improved N3 Bias Correction, Nicholas J. Tustison et al., 2010

4 : Recalage non-linéaire : démons difféomorphes

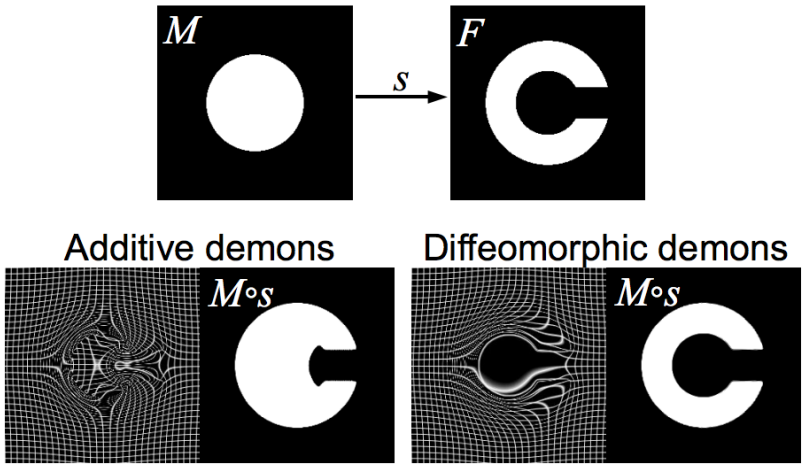


Figure 5: Classical Circle to C registration example. With the same set of parameters the additive demons fails to converge and shows foldings in the registration results whereas the diffeomorphic demons converges with a smooth invertible transformation.

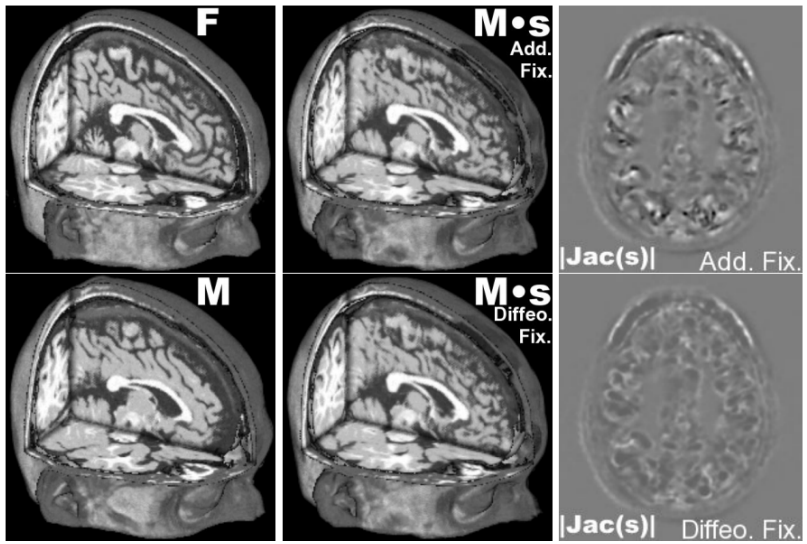


Figure 7: Registration of two synthetic T1 MR images of distinct anatomies. The focus is on the evaluation of our proposed update rule (diffeomorphic) with the most popular one (additive). For visually similar results, our algorithm provides smoother diffeomorphic transformations.

Diffeomorphic Demons : Efficient Non-parametric Image Registration, Tom Vercauteren et al., 2008

5 : Segmentation par Graph Cut