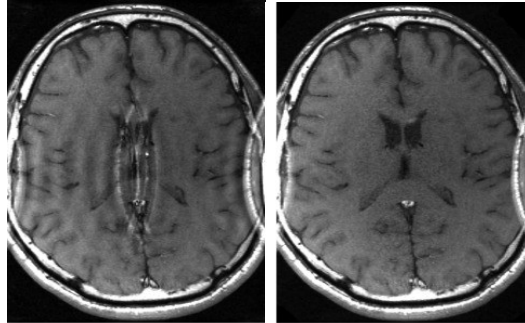


TGV Soft-SENSE for limited FOV MRI

Master's Thesis

Typical MR image reconstruction methods for sub-sampled data fail if the FOV in phase encoding direction is too small and back folding occur even for fully sampled data. Uecker et al. proposed an eigenvalue approach to estimate a set of coil profiles from such subsampled data which are then exploited in a soft-sense reconstruction to recover the original image (ESPIRiT).¹



SENSE/auto

ESPIRiT

Objective:

The objective of this thesis is to implement a soft-sense reconstruction based on TV and total generalized (TGV) variation for the reconstruction of accelerated limited field of view MRI data. TGV has been shown to improve the image quality compared to standard SENSE reconstruction by including prior knowledge of the image.² The performance of the implemented reconstruction should be evaluated for different acceleration factors and compared to the standard soft-sense reconstruction.

Qualifications:

- Interest on Biomedical Imaging
- Basic knowledge in image processing and optimization
- Programming experience in Matlab, Python, C++
- Interest to work in an interdisciplinary team

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1. Uecker, M., Lai, P., Murphy, M.J., Virtue, P., Elad, M., Pauly, J.M., Vasanawala, S.S., Lustig, M., 2014. ESPIRiT-an eigenvalue approach to autocalibrating parallel MRI: Where SENSE meets GRAPPA. *Magn. Reson. Med.* 71, 990–1001. doi:10.1002/mrm.24751
2. Knoll, F., Bredies, K., Pock, T., Stollberger, R., 2011. Second order total generalized variation (TGV) for MRI. *Magn. Reson. Med.* 65, 480–491. doi:10.1002/mrm.22595