1- Multi-modality imaging with structure-promoting regularisers

https://github.com/mehrhardt/Multi-Modality-Imaging-with-Structure-Promoting-Regularizers

https://arxiv.org/abs/2007.11689

Imaging with multiple modalities or multiple channels is becoming increasingly important for our modern society. A key tool for understanding and early diagnosis of cancer and dementia is PET-MR, a combined positron emission tomography and magnetic resonance imaging scanner which can simultaneously acquire functional and anatomical data. Similarly in remote sensing, while hyperspectral sensors may allow to characterise and distinguish materials, digital cameras offer high spatial resolution to delineate objects. In both of these examples, the imaging modalities can be considered individually or jointly. In this chapter we discuss mathematical approaches which allow to combine information from several imaging modalities so that multi-modality imaging can be more than just the sum of its components.

2- https://github.com/Diagonalizable/HelTomo/

HelTomo is a MATLAB toolbox that has been primarily created for working with X-ray Computed Tomography (CT) data measured in the Industrial Mathematics Computed Tomography Laboratory at the University of Helsinki. Its purpose is facilitate a fast and easy workflow from raw projection data to reconstructions, allowing researchers to test their CT algorithms on real, measured X-ray data.

Full use of the toolbox requires that the ASTRA Tomography Toolbox (https://www.astra-toolbox.com/) and the Spot Linear-Operator Toolbox (https://www.cs.ubc.ca/labs/scl/spot/) have been added to the MATLAB path. Many functions also require that the computer is equipped with a CUDA-enabled GPU. Computing CT reconstructions is a heavy task, and use of a GPU-based workstation is strongly recommended.

The HelTomo toolbox has been created by Alexander Meaney while working at the Department of Mathematics and Statistics at the University of Helsinki.

3- https://github.com/TomographicImaging/CIL

The Core Imaging Library (CIL) is an open-source Python framework for tomographic imaging with particular emphasis on reconstruction of challenging datasets. Conventional filtered backprojection reconstruction tends to be insufficient for highly noisy, incomplete, non-standard or multichannel data arising for example in dynamic, spectral and in situ tomography. CIL provides an extensive modular optimisation framework for prototyping reconstruction methods including sparsity and total variation regularisation, as well as tools for loading, preprocessing and visualising tomographic data.

4- https://tomopy.readthedocs.io/en/stable/

TomoPy is an open-source Python package for tomographic data processing and image reconstruction.

5- https://github.com/dkazanc/ToMoBAR

ToMoBAR is a Python and Matlab (not currently maintained) library of direct and model-based regularised iterative reconstruction algorithms with a plug-and-play capability. ToMoBAR offers you a selection of various data models and regularisers resulting in complex objectives for tomographic reconstruction. ToMoBAR can handle multi-GPU parallel reconstruction in Python and also device-to-device methods operating on CuPy arrays.

6- https://github.com/rehmanali1994/FullWaveformInversionUSCT

Full Waveform Inversion (FWI) for Transmission Ultrasound Computed Tomography with Transmitting and Receiving Linear Array Transducers based on the Angular Spectrum Method.

7- https://eidors3d.sourceforge.net/

Provide free software algorithms for forward and inverse modelling for Electrical Impedance Tomography (EIT) and Diffusion based Optical Tomography, in medical and industrial settings, and to share data and promote collaboration between groups working these fields.

8- https://www.fieldtriptoolbox.org/getting_started/

FieldTrip is the MATLAB software toolbox for MEG, EEG and iEEG analysis, which is released free of charge as open source software under the GNU general public license. FieldTrip is developed by members and collaborators of the Donders Institute for Brain, Cognition and Behaviour at Radboud University, Nijmegen, the Netherlands.

9- https://simnibs.github.io/simnibs/build/html/index.html

SimNIBS 4 is a free and open source software package for the Simulation of Non-invasive Brain Stimulation. It allows for realistic calculations of the electric field induced by transcranial magnetic stimulation (TMS) and transcranial electric stimulation (TES).

10- https://blog.fips.fi/tomography/eit/the-d-bar-method-for-electrical-impedance-tomography-simulated-data/

https://blog.fips.fi/tomography/eit/the-d-bar-method-for-electrical-impedance-tomography-experimental-data/

For data, the following links may be of interest:

1- https://github.com/dkazanc/TomoPhantom

TomoPhantom is a toolbox written in C language to generate customisable 2D-4D phantoms (with a temporal capability) and their analytical projection data (parallel-beam geometry) for various image processing (e.g. tomographic reconstruction, denoising, deblurring, segmentation, etc.) and machine/deep learning tasks (e.g. segmentation, classification, clustering, etc.).

2- https://www.fips.fi/HTCdata.php#anchor1

3- https://zenodo.org/records/6984868

…