

LEARNED STOCHASTIC PRIMAL DUAL METHOD WITH APPLICATIONS IN SUBSAMPLED AND LOW DOSE CT

MARTA BETCKE

joint work with Andreas Hauptmann, Won Tek Hong, Elliott Macneil, Sudhansh Peddabomma, Francesc Rullan

The learned methods promise to overcome limitations of model based regularisation functionals allowing to derive the relevant features from a training set of similar image data. A number of learned methods have been proposed, with approaches based on unrolling providing the best image reconstructions albeit at substantial training cost mostly precluding 3D applications. In this work we propose a learned stochastic primal dual method (LSPD) which takes inspiration from both stochastic primal dual hybrid gradient and learned primal dual methods. The stochasticity allows us to reduce the number of trainable coefficients making the method trainable on 3D data without extravagant hardware resources as well as a to train the model for a sampling distribution rather than a particular sampling draw. We demonstrate the performance of LSPD on subsampled and low dose X-ray CT problems.