

INVERTING NEURAL NETWORKS IN IMAGING AND GENERATIVE MODELLING

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Many imaging problems such as blind image deconvolution require the solution of nonlinear inverse problems. In this talk, we study suitable neural network architectures for the approximation of nonlinear forward problems, keeping in mind that we want to invert the forward problem. An interesting aspect of these architectures is that they will allow us to formulate a convex variational regularisation method for their inversion, where the data fidelity term is based on a tailored Bregman distance. We will discuss theoretical aspects of this regularisation method, propose provably convergent algorithms to solve the underlying optimisation problem and present numerical results for selected imaging problems and also discuss the impact on generative modelling with normalising flows.

This is joint work with Alexandra Valavanis from Queen Mary University of London.