Gaussian Processes for Nonlinear Spectral Unmixing of Hyperspectral Images

Stephen McLaughlin

In this talk I will discuss nonlinear unmixing of hyperspectral images using Gaussian processes. The underlying mixing model used assumes that the pixel reflectances result from a nonlinear function of the abundance vectors which is associated with pure spectral components with the spectral signatures of the pure components and the nonlinear function unknown. In the course of the talk I will develop a novel unsupervised algorithm. The first step of the method consists of the Bayesian estimation of the abundance vectors for all the image pixels and the nonlinear function relating the abundance vectors to the observations. The endmembers are subsequently estimated using Gaussian process regression. The performance of the unmixing strategy is evaluated with simulations conducted on synthetic and real data. Finally some suggestions of open problems and suggestions for further work will be made.