Robust Bayesian Tensor Completion via CP Decomposition

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The real-world tensor data are inevitably missing and corrupted with noise. Some models of the low-rank tensor factorization add an L1 norm or L2 norm to deal with the sparse or Gaussian noise. However, the real noise is usually complex. In this talk, I will introduce a new robust Bayesian tensor completion (BTC) method which could impute the missing data and remove the complex noise simultaneously. The observed tensor is assumed to be the summation of a low-rank tensor and the noise. The CANDECOMP/PARAFAC (CP) decomposition is proposed to extract the low-rank structure of the tensor. It is assumed that the noise follows a Mixture of Gaussian (MoG) distribution. A full Bayesian framework together with a Gibbs sampling algorithm is designed to estimate the model parameters. Extensive experiments including synthetic data and real-life applications reveal that the proposed MoG-BTC-CP outperforms the existing state-of-the-art tensor completion and denoising methods. This is a joint work with Xiaohang Wang (Zhuhai Fudan Innovation Institute), Weidong Yang (Fudan University) and Jun Su (Sun Yat-sen University).