

Expectation Propagation in Sparse Linear Models

The report presents an efficient and accurate method in machine learning—“Expectation Propagation in Sparse Linear Models”. “Expectation Propagation” (Thomas P Minka, 2001) is a method build on Bayesian framework and an extension from assumed density filtering(ADF). Meanwhile, in machine learning, linear models with sparsity-favouring prior is a rigorous area under research where error predictions are highly sought after. Assuming a sparse prior is good in the sense that if little knowledge of the model is known (which is often the case in real world circumstances), it makes sense to assume large degrees of freedom and start with wide range of candidates, and let the data do the selection part. In other words, assuming a sparse prior enables us to start from an over-parameterized model with large number of small components. We would then apply EP on the over-parameterized model to force the unwanted parameters close to zero to arrive at our approximated model. Furthermore, the report compares the efficiency and accuracy of EP to MCMC on some simulated examples in Sparse Linear models.