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How about a Bayesian M/EEG imaging method correcting for incomplete spatio-temporal priors?

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Abstract
In this contribution we present a hierarchical Bayesian model, sAquavit, to tackle the highly ill-posed problem that follows with MEG and EEG source imaging. Our model facilitates spatio-temporal patterns through the use of both spatial and temporal basis functions. While in contrast to most previous spatio-temporal inverse M/EEG models, the proposed model benefits of consisting of two source terms, namely, a spatio-temporal pattern term limiting the source configuration to a spatio-temporal subspace and a source correcting term to pick up source activity not covered by the spatio-temporal prior belief.
We have tested the model on both artificial data and real EEG data in order to demonstrate the efficacy of the model. The model was tested at different SNRs (-10.0,-5.2, -3.0, -1.0, 0, 0.8, 3.0 dB) using white noise. At all SNRs the sAquavit performs best in AUC measure, e.g. at SNR=0dB AUC is, 0.985 (sAquavit) and 0.857 (Bolstad et al., 2009).
Our results demonstrate that the sAquavit model is capable in balancing spatio-temporal prior guidance and source correction estimation to obtain superior estimates relative to current inverse methods.