Natural Reweighted Wake Sleep for Convolutional Networks

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The introduction Convolutional Neural Networks was a stepping-stone work in Machine Learning. CNNs through the reduction of the weights per layers with small kernel convolutions have enabled the processing of higher resolution images, larger datasets and, in recent years, to processing audio data, by exploiting the spatial or temporal structure in the input space of the data. In a previous work we introduced the Natural Reweighted Wake-Sleep, using the Fisher-Rao metric to speed up the convergence of the Reweighted Wake-Sleep training algorithm in HM and obtaining a better optimum.

We study the block-diagonal structure of the Fisher Information Matrix for CNNs and examine how the added computational complexity required for calculating this structure affects the training time of the algorithm. Finally, we present experiments for the natural training in these models.