



Figure 20.5: An illustration of the multi-prediction training process for a deep Boltzmann machine. Each row indicates a different example within a minibatch for the same training step. Each column represents a time step within the mean field inference process. For each example, we sample a subset of the data variables to serve as inputs to the inference process. These variables are shaded black to indicate conditioning. We then run the mean field inference process, with arrows indicating which variables influence which other variables in the process. In practical applications, we unroll mean field for several steps. In this illustration, we unroll for only two steps. Dashed arrows indicate how the process could be unrolled for more steps. The data variables that were not used as inputs to the inference process become targets, shaded in gray. We can view the inference process for each example as a recurrent network. We use gradient descent and back-propagation to train these recurrent networks to produce the correct targets given their inputs. This trains the mean field process for the MP-DBM to produce accurate estimates. Figure adapted from [Goodfellow *et al.* \(2013b\)](#).