Large Scale Machine Learning and Deep Learning
Review Questions 8

1. Assume we have a stacked autoencoder with three hidden layers $\mathtt{h}_1$, $\mathtt{h}_2$, and $\mathtt{h}_3$, in which each layer applies the following functions respectively, $\mathbf{h_1} = \mathtt{f}_1(\mathbf{x})$, $\mathbf{h_2} = \mathtt{f}_2(\mathbf{h}_1)$, and $\mathbf{h}_3 = \mathtt{f}_3(\mathbf{h}_2)$, and the output of the network will be $\mathbf{y} = \mathtt{f}_4(\mathbf{h}_3)$. Do you think if it is a good autoencoder if it generates $\mathtt{f}_4(\mathtt{f}_3(\mathtt{f}_2(\mathtt{f}_1(\mathbf{x})))) = \mathbf{x}$ for all input instances $\mathbf{x}$. How can we improve it?

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2. How does Gibbs sampling work? When do we need to use Gibbs sampling?

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3. What is a generative model? Can you name a type of generative autoencoder?

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4. How do you tie weights in a stacked autoencoder? What is the point of doing so?