

CSE 5526 - Autumn 2014

Introduction to Neural Networks

Homework #5

Due Tuesday, Dec. 9

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Problem 1. For a Boltzmann machine operating at temperature T , prove that neuron i flips from state x_i to $-x_i$ with the following probability:

$$P(x_i \rightarrow -x_i) = \frac{1}{1 + \exp\left(\frac{\Delta E_i}{2T}\right)}$$

where ΔE_i is the energy change resulting from such a flip. (HINT: consider the cases of $x_i = -1$ and $x_i = 1$ separately.)

Problem 2. Justify the following statement: An infinitely deep logistic belief net (shown below on the left and in Figure 11.9 in the textbook) is equivalent to a single RBM (shown below on the right and in Figure 11.8 in the textbook).

