CS 4850: Introduction to Machine Learning © Fall 2018

Homework 5: Entropy

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In this homework you will explore further the concept of entropy of a random variable as a function of its probability distribution. Recall that the entropy of a discrete random variable x with support on a set $\mathcal{X}$ is defined as:

$$H(x) \ := \ \sum_{\mathrm{x} \in \mathcal{X}} \mathbb{P}(x = \mathrm{x}) \log_2 \left(\frac{1}{\mathbb{P}(x = \mathrm{x})} \right).$$

Let $x \sim Bernoulli(p)$.

(a) Compute $H(x)$ for at least 100 values of $p \in [0, 1]$, and plot the corresponding $(p, H(x))$ pairs. Deliver your code and plot.

(b) What do you conclude from your plot?