CS 760: Machine Learning Spring 2024

Homework 6: Frequentists vs Bayesians

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Problem 6.1. Frequentist (MLE)

To find the MLE of $p*$, we first start with the likelihood function:

$$P(p*) = \prod_{i=1}^{n} (p^{x_i}(1-p)^{1-x_i})$$

Then we take the log of the likelihood function:

$$log(P(p^*)) = logp \sum_{i=1}^{n} x_i + \log(1-p) \sum_{i=1}^{n} (1-x_i)$$

Using our optimization 101 technique, we get the derivative and set it equal to zero:

$$p_{MLE} = \frac{1}{n} \sum_{i=1}^{n} x_i$$

Which we recognize to just be the mean.

Problem 6.2

Problem 6.3

(a)

(b)

Problem 6.4

(a)

(b)

Problem 6.5