CS 559: Quiz 2

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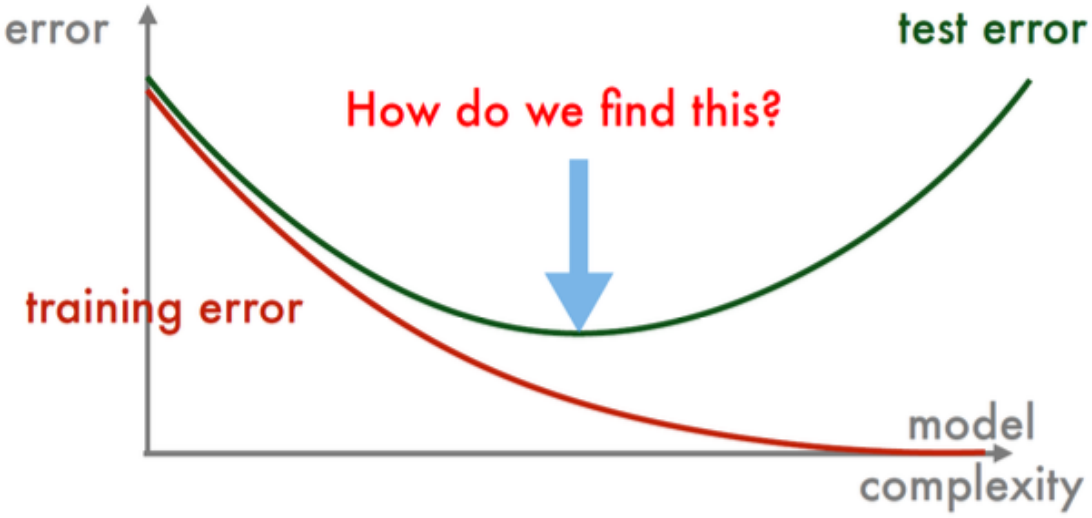
1. As the model complexity increases, the training errors tend to decrease

   True

2. As the model complexity increases, the test errors tend to decrease

   False

   Reason :



When a graph of test error Vs the model complexity is plotted, we can see that the test error tends to increase, contrary to the given statement.

3. MAP is a non-parametric approach for parameter estimation.

   False

   Reason: MAP assumes a uniform prior distribution of the parameters.Whereas the Non-parametric tests do not rely on any distribution, making MAP one of the Parametric estimation approaches.

4. K-NN is a non-parametric approach.

   True

5. Histogram estimation is a non-parametric method.

   True

6. Histogram estimation requires no human-set parameters.

   False

   Reason: The challenges face while using Histograms for estimation are :

- Undersmoothing: a condition where bias is small while the variance is large.
- Oversmoothing: a condition where bias is large and variance is small.

  To avoid under smoothing and over smoothing, and balance the bias and variance, we, humans must set the number of bins and make sure that they are of constant length.

7. PCA aims to maximize the reconstruction errors by projecting higher-dimension data to lower-dimension ones.

   False

   Reason: PCA aims to find a projection that MINIMIZES the reconstruction error and not to maximize it.

8. PCA can be treated as a subspace-selection approach.

   True

9. 1-NN and 3-NN always yield the same result.

   False

   Reason :

   1-NN and 3-NN don’t need to always yield the same results. The parameter k in kNN is often chosen based on experience or knowledge about the classification problem at hand to obtain better results.