CSP 571 Data Preparation and Analysis

Quiz - 4

Question 1

In a **support vector machine**, in order to allow for *non-linear decision boundaries*, the expansion of feature space with non-linear functions of the predictors is accomplished via a

- ○ a. margin
- ○ b. hyperplane
- ○ c. vector
- ◉ d. kernel

Question 2

The process of building a tree via recursive binary splitting of the predictor space in a top-down approach involves making a

- ○ a. sub-optimal choice.
- ◉ b. greedy choice.
- ○ c. gradient optimal choice.
- ○ d. globally optimal choice.

Question 3

In a **support vector classifier**, a *training* observation x_i that is on the correct side of the separating hyperplane but on the incorrect side of the margin will have a slack variable value of

- ○ a. $1 < \varepsilon_i$
- ○ b. $0 \le \varepsilon_i < 1$
- ◉ c. $0 < \varepsilon_i \le 1$
- ○ d. $\varepsilon_i \le 0$

Question 4

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Given a **hyperplane** which divides a p dimensional space into two halves, from which we can perform classification of an arbitrary point x, the hyperplane itself is an *affine subspace* of the below number of dimensions

- ◉ a. $p-1$
- ○ b. $p+1$
- ○ c. p
- ○ d. 0

Question 5

The representation of a **support vector machine** as $f(x) = \beta_0 + \sum_{i=1}^{n} \alpha_i K(x, x_i)$ will result in what value for α_i for *training* observations which are not support vectors

- ◉ a. 0
- ○ b. ∞
- ○ c. -1
- ○ d. 1

Question 6

Random forests improve upon bagging results by de-correlating accross bagged trees, via reduction of the number of

- ◉ a. predictors considered at each split.
- ○ b. branches considered at each split.
- ○ c. observations considered at each split.
- ○ d. nodes considered at each split.

Question 7

Improving regression tree results via bagging involves B regression trees being induced from bootstrap samples, and final predictions being the

- a. minimum of each tree's predicted value.
- b. sum of each tree's predicted value.
- c. average of each tree's predicted value.
- d. maximum of each tree's predicted value.

Question 8

Decision tree methods split the predictor space into a series of non-overlapping regions R_j, each of which maps to a

- a. internal node.
- b. chlorophyll node.
- c. leaf/terminal node.
- d. root node.

Question 9

When inducing a classification tree, a node that is more pure will have both Gini and Entropy values that are

- a. infinite compared to other nodes.
- b. lower than compared to other nodes.
- c. negative compared to other nodes.
- d. higher than compared to other nodes.

Question 10

In a **maximal margin classifier**, *training* data points which are directly related to the optimal separating hyperplane and would result in a different/changed hyperplane if they are altered are referred to as

- a. optimal vectors
- b. margin vectors
- c. kernel vectors
- d. support vectors