This quiz has been regraded; your new score reflects 2 questions that were affected.

Test4-MachineLearning

- Due Apr 18 at 4:47pm
- Points 28
- Questions 14
- Available Apr 18 at 3:52pm - Apr 23 at 9pm
- Time Limit 35 Minutes

Instructions

Choose the best answer.

Closed book test.

This quiz was locked Apr 23 at 9pm.

Attempt History

	Attempt	Time	Score	Regraded
LATEST	Attempt 1	22 minutes	24 out of 28	28 out of 28

Correct answers are hidden.

Score for this quiz: 28 out of 28
Submitted Apr 18 at 4:14pm
This attempt took 22 minutes.

Question 1
2 / 2 pts

Support Vector Machine is a ---------- type of machine learning.

- intelligent
- parametric
- non-parametric
- SVM

Question 2
2 / 2 pts

Support Vector Machine has primarily three components. Indicate the one below that applies best.

- Transformation of the attribute space to make data space linearly separable
- Selecting a relevant subset of training data as the model
- Simultaneous optimization of the primary and dual objective functions
- All the other three answers

Question 3
2 / 2 pts

Which one of the following algorithm is used to train an Artificial Neural Network?

- Machine learning
- Optimization
- Forward chaining
- Inferencing

Question 4
2 / 2 pts

Consider a *perceptron* being trained to add three numbers. With three input nodes the perceptron needs four parameters to learn, w0, w1, w2, and w3.

Consider the activation function of the perceptron being linear, i.e., the weighted sum itself is the output.

What is the expected learned parameter-vector, (w0, w1, w2, w3)?

- (0, 1, 1, 1)
- (1, 1, 1, 1)
- (1, 0, 1, 1)
- (1, 1, 1, 0)

Question 5
2 / 2 pts

	A1	A2	A3	A4	*y (prediction target or label)*
x1	a	1	0	0	*1*
x2	a	1	1	1	*1*
x3	b	1	0	0	*1*
x4	b	0	1	0	*0*
x5	b	0	0	1	*1*
x6	b	0	0	1	*0*
x7	a	0	1	0	*1*
x8	a	0	1	0	*1*
x9	c	0	0	1	*1*

From the above training data a decision tree is being made. Suppose the root node chosen is A2. Consider the branch for A2=0.

What is the weighted total entropy for the attribute A1 at this stage?

- [(2/3) log(2/3) + (1/3) log(1/3)]
- – [(3/6)[(1/3)log(1/3)+(2/3)log(2/3)] + (2/6)[log(2/2)+0log(0/2)]] + (1/6)[log(1/1)+0log(0/1)]]
- [(2/3) log(2/3) + (1/3) log(1/3)] + (1/6) 0]
- – [(1/2) 0 + (1/3) [(2/2) log (2/2) + (0/2) log (0/2)] + (1/6) [(1/1) log (1/1) + (0/1) log (0/1)]]

Question 6
2 / 2 pts

Can the Decision Tree learning algorithm be used to select the most important attribute to predict the label?

- No
- Yes
- Sometimes
- Depends on the problem

Question 7
2 / 2 pts

kNN algorithm requires----------

- Parametric modeling of data
- An efficient data organization to find nearest neigbors
- High quality input data
- Linearly separable data

Question 8
2 / 2 pts

Which one of the following relates best to the k-Means algorithm?

- Repeated iterations over attributes
- Computing density of each cluster
- Finding the medians of k clusters in an iteration
- Updating cluster membership of each data point in each iteration

Question 9
2 / 2 pts

Which of the following unsupervised learning algorithm is typically used for developing phylogeny tree of organisms?

- k-means algorithm
- Density-based clustering
- Hierarchical clustering
- Bi-clustering or Subspace modeling

Question 10
2 / 2 pts

Fact: A linear regression problem over two attributes needs to learn three parameters (w0, w1, w2) for two variables (x1, x2).

Below are some training data points. Find the three parameters (w0, w1, w2). [Hint: you do not need any algorithm or formula. Use your observation and simple arithmetic.]

(x1=7, x2=2) -> (y=5)

(x1=100, x2=3) -> (y=7)

(x1=50, x2=4) -> (y=9)

- (0, 1, 2)
- (1, 0, 2)
- (2, 0, 1)
- (2, 1, 0)

Question 11
Original Score: 0 / 2 pts Regraded Score: 2 / 2 pts

This question has been regraded.

A perceptron with two input (x1, x2) has three parameters (w0=1, w1=2, w2=1). It uses a step function as activation (>0 for True prediction and <=0 for False).

What is the inference for (x1= 2, x2= -3)

- T
- F
- Cannt be inferred
- Question has a mistake

Question 12
2 / 2 pts

Compute the a-priori entropy for the whole table.

Play Golf

		Yes	No	
	Sunny	3	2	5
Outlook	Cloudy	4	2	6
	Rain	1	7	8
		8	11	17

- -(5/17)*log(5/17) - (6/17)log(6/17) -(8/17)log(8/17)
- -(8/11)*log(8/11) - (11/8)log(11/8)
- (8/17)*log(8/17) - (11/17)log(11/17)
- -(8/17)*log(8/17) - (11/17)log(11/17)

Question 13

Original Score: 0 / 2 pts Regraded Score: 2 / 2 pts

This question has been regraded.

What is the information gain for the attribute Outlook where E is the entropy for the whole table, and e(Pt, Pf) is the entropy where Pt is the Probability of true instances and Pf is the Probability of false instances. [Note: Play Golf is the target label.]

		Play Golf		
		Yes	No	
	Sunny	3	2	5
Outlook	Cloudy	4	2	6

	Rain	**1**	**7**	**8**
		8	**11**	**17**

- E+[(5/17)e(3/5,2/5) +(6/17)e(4/6,2/6) +(8/17)e(1/8,7/8)]]
- E-[(5/17)e(3/2,2/3) +(6/17)e(4/2,2/4) +(8/17)e(1/7,7/1)]
- [(5/17)e(3/5,2/5) +(6/17)e(4/6,2/6) +(8/17)e(1/8,7/8)]-E
- None of the above

Question 14
2 / 2 pts

Consider F as a binary Boolean function, such that F(0,1) = F(1,0)=0, and F(0,0)=F(1,1)=1.

Is the function associative, i.e., F(a, F(b, c)) = F(F(a, b), c), for three Boolean variables a, b, and c?

- Yes
- No
- The question has a mistake.
- Cannot be inferred

Quiz Score: 28 out of 28