Fundamentals of Artificial Intelligence
MOOCs; July - Dec 2024

Assignment No. 11

10 Marks

Each question carries 01 Mark each. There are MORE than ONE correct options for some of the Questions. All correct options must be identified for the answer to be evaluated as correct.

Q1. Who proposed the original Support Vector Machine algorithm?

A. Patrick Winston.
B. Vladimir N. Vapnik.
C. Herbert Simon.
D. Tom M. Mitchell

Ans: Question based on Week 11 (Lecture 2) Videos

Q2. Intra-cluster cohesion measures how near the data points in a cluster are to the cluster centroid and is a reflection of _____.

A. Similarity.
B. Dissimilarity.
C. Compactness.
D. Isolation.

Ans: Question based on Week 11 (Lecture 3) Videos

Q3. Which of the following statements are correct for a Maximum Margin Classifier?

I. Best hyperplane is the one that represents the largest separation, or margin, between the two classes.
II. The linear classifier defined by the maximum-margin hyperplane is known as a maximum-margin classifier.

A. Statements I and II
B. Only Statement II
C. Only Statement I
D. None.

Ans: Question based on Week 11 (Lecture 2) Videos

Q4. Exclusive reliance on dot products enables to solve non-linear problems in a support vector machine because of the following:

I. Learning depends only on dot products of sample pairs.
II. Classification depends only on dot products of unknown with samples.

A. Only statement I.
B. Statements I and II.
C. Only statement II.

D. None of above.

Ans: Question based on Week 11 (Lecture 2) Videos

Q5. The Least Square Regression is a statistical procedure to find the best fit for a set of data points. Which of the following statements express the basic idea of the best fit or the Least-square regression line?

A. Minimizing the sum of the offsets or residuals of points from the plotted curve.

B. The intercept of the least-squares regression line describes some specific property of the data.

C. The slope of the regression line describes how much we expect the dependent variable to change, on average, for every unit change in the independent variable.

D. Least-squares regression line is the line that makes the sum of the squares of the vertical distances of the data points from the line as small as possible.

Ans: Question based on Week 11 (Lecture 1) Videos

Q6. Clustering is hard to evaluate, but very useful in practice. Cluster evaluation can be done using the following:

A. Compactness for intra-cluster cohesion.

B. Isolation for inter-cluster separation.

C. Comparison with the correct clusters.

D. Labelled data as ground truth for cluster evaluation through classification.

Ans: Question based on Week 11 (Lecture 3) Videos

Q7. What is feature scaling or standardization?

A. It basically helps to normalize the data within a particular range.

B. It is about using transforms on variables to make their distribution more gaussian.

C. It is a step of data pre-processing which is applied to features of data.

D. It basically helps to use the least-squares regression equation.

Ans: Question based on Week 11 (Lecture 1) Videos

Q8. Assertion: One of the rules of thumb for preparation of data when using ordinary *Least Squares Regression* is to remove collinearity.

Reason: Linear regression will over-fit the data when we have highly correlated input variables.

Mark the correct choice as

A. Both A and R are true and R is the correct explanation for A

B. Both A and R are true but R is not the correct explanation for A

C. A is True but R is False

D. A is false but R is True

Ans: Question based on Week 11 (Lecture 1) Videos

Q9. Assertion: A cluster is a collection of data items which are “similar” between them, and “dissimilar” to data items in other clusters.
Reason: In clustering problems, class labels are not specified; only the feature vectors representing different objects/instances/ records or situations are known.

Mark the correct choice as
A. Both A and R are true and R is the correct explanation for A
B. Both A and R are true but R is not the correct explanation for A
C. A is True but R is False
D. A is false but R is True

Ans: Question based on Week 11 (Lecture 3) Videos

Q10. Assertion: The kernel trick is an efficient way to transform data into higher dimensions.
Reason: The kernel trick allows us to project data from a training set which isn't linearly separable into a higher dimensional space where it becomes linearly separable.

Mark the correct choice as
A. Both A and R are true and R is the correct explanation for A
B. Both A and R are true but R is not the correct explanation for A
C. A is True but R is False
D. A is false but R is True

Ans: Question based on Week 11 (Lecture 3) Videos