Deep Learning

Assignment- Week 2

TYPE OF QUESTION: MCQ/MSQ

Number of questions: 10 **Total mark: 10 X 2 = 20**

QUESTION 1:

If different feature components are not statistically independent to each other then which one of the following is True?

a. Covariance matrix is identity matrix
b. Covariance matrix is identity matrix
c. Non diagonal elements of covariance matrix are non zero
d. Non diagonal elements of covariance matrix are non zero and mean is zero

Correct Answer: c

Detailed Solution:

please refer to the lectures of week 2.

QUESTION 2:

In which case decision surface between two classes is orthogonal to two surfaces?

a. Different components are statistically independent to each other and have different variance
b. Different components are statistically dependent to each other and have different variance
c. Different components are statistically independent to each other and have same variance
d. Different components are statistically dependent to each other and have same variance

Correct Answer: c.

Detailed Solution:

please refer to the lectures of week 2.

QUESTION 3:

What will be the nature of decision surface when the covariance matrices of different classes are identical but otherwise arbitrary?

a. Orthogonal bisector to two surfaces
b. Not Orthogonal to two surfaces
c. Orthogonal to two surfaces but not bisector
d. Arbitrary

Correct Answer: b

Detailed Solution:

please refer to the lectures of week 2.

QUESTION 4:

What type of classifier we get when covariance matrices of all classes are arbitrary?

a. Linear Classifier
b. Quadratic Classifier
c. Either a or b
d. Higher order polynomial classifier

Correct Answer: b

Detailed Solution:

please refer to the lectures of week 2.

QUESTION 5:

What is the direction of supporting hyper plane w.r.t. decision surface?

a. Parallel
b. Normal
c. At an inclination of 45
d. Arbitrary

Correct Answer: b

Detailed Solution:

please refer to the lectures of week 2.

QUESTION 6:

Let's say you want to use logistic regression for classifying 5 different class objects. How many logistic regression classifiers would you train for this purpose?

a. 1
b. 4
c. 5
d. 3

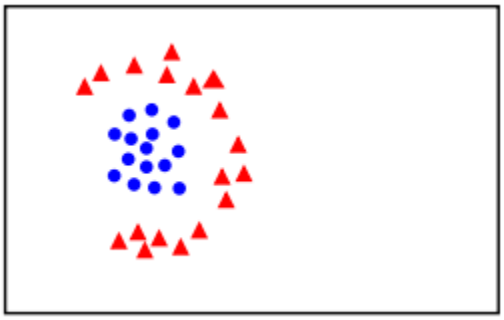
Correct Answer: c

Detailed Solution:

Please refer to the lectures of week 2.

QUESTION 7:

Which classifier do you use to classify below data points?



a. Logistic Regression
b. Linear Classifier
c. Either Logistic regression or Linear Classifier
d. None of the Above

Correct Answer: d

Detailed Solution:

Please refer to lecture note week 2

QUESTION 8:

You are given feature vectors x1 from class 1 and feature vectors x2 from class 2. The training set consists of the following points:

Class 1 points: {(11,11), (13,11), (8,10), (9,9), (7,7), (7,5), (15,3)}

Class 2 points: {(7,11), (15,9), (15,7), (13,5), (14,4), (9,3), (11,3)}

Classify the following two sample using K-nearest neighbor. (Using Manhattan distance as a distance function)

A=(6,11), B=(14,3)

a. A belongs to class 2 and B belongs to class 2 if K=1.
a. A belongs to class 2 and B belongs to class 2 if K=1.
b. A belongs to class 1 and B belongs to class 2 if K=1.
c. A belongs to class 1 and B belongs to class 2 if K=3.
d. A belongs to class 2 and B belongs to class 2 if K=3.

Correct Answer: c

Detailed Solution:

IF k=1 then, A=2 and B=1

IF k=3 then A=1 and B=2

QUESTION 9:

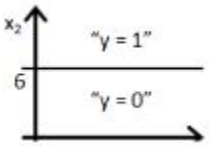
Suppose you are training a logistic regression classifier and you obtain the following hypothesis

$$h_\theta(x) = g(\theta_0 + \theta_1 x_1 + \theta_2 x_2)$$

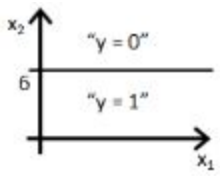
Where

$$\theta_0 = 6, \theta_1 = 0, \theta_2 = -1.$$

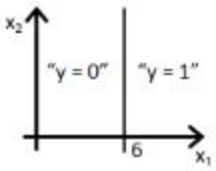
Which of the follo esent the decision boundary?



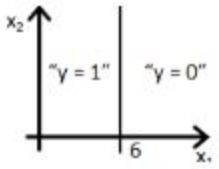
a.



b.



c.



d.

d.

Correct Answer: b

Detailed Solution:

$6+0*x_1-x_2=0$

=> $x_2=6$.

QUESTION 10:

You are given feature vectors x1 from class 1 and feature vectors x2 from class 2. The training set consists of the following points:

Class 1 points: {(11,11), (13,11), (8,10), (9,9), (7,7), (7,5), (15,3)}

Class 2 points: {(7,11), (15,9), (15,7), (13,5), (14,4), (9,3), (11,3)}

What will be the nature of decision boundary?

a. Linear
b. Quadratic
c. Cubic

d. None of the above.

Correct Answer: a

Detailed Solution:

$\boldsymbol{\mu_1} = \begin{bmatrix} 10 \\ 8 \end{bmatrix}$

$\boldsymbol{\mu_2} = \begin{bmatrix} 12 \\ 6 \end{bmatrix}$

$\boldsymbol{\Sigma_1} = \boldsymbol{\Sigma_2} = \boldsymbol{\Sigma} = \begin{bmatrix} 9.67 & -1.0 \\ -1.0 & 9.67 \end{bmatrix}$

So linear.

**************END*********