Quiz3 -- SVM, K-Means, NN

Due Nov 25 at 11:59pm   **Points** 50   **Questions** 14

Available Nov 6 at 12am - Dec 9 at 11:59pm   **Time Limit** None

Allowed Attempts Unlimited

Instructions

Dear students,

Please answer this quiz individually. You will not be able to view the answers. CANVAS frequently saves your answers so that you can come back to complete the rest of the quiz or change your answers before you finally hit the submit button. You have multiple attempts.

Please refer to the paper in the Classifications modules on Accuracy, precision, recall and f1-score for answering the question based on the confusion matrix. You have already seen this in your tutorials. This question needs a calculator and is a direct substitution in the formulae.   Keep scrolling all the way down in the paper to see all the formulae even if you see some unexpected empty pages in the paper. This question is important for your interviews.

The other problem solving questions are meant only to test your intuitive understanding. So there are no difficult calculations to make. The problems are created very simple so that the solution is directly inferrable from the provided simple data.

Canvas automatically saves your quiz answers each time frequently. So you can come back and redo the quiz anytime. Before quitting the quiz, please wait for more than a minute to ensure your current answers are saved and then you may exit and return to complete. So please do not hit the submit button until you have completed all questions.

There is one question which I have to grade manually. The due date is November 25th.

Best wishes and cheers,

:)

Jagan

This quiz was locked Dec 9 at 11:59pm.

Attempt History

	Attempt	Time	Score
KEPT	[Attempt 83](#)	6 minutes	50 out of 50
LATEST	[Attempt 83](#)	6 minutes	50 out of 50
	[Attempt 82](#)	less than 1 minute	5 out of 50 *
	[Attempt 81](#)	less than 1 minute	5 out of 50 *
	[Attempt 80](#)	less than 1 minute	0 out of 50 *
	[Attempt 79](#)	6 minutes	0 out of 50 *
	[Attempt 78](#)	14 minutes	5 out of 50 *
	[Attempt 77](#)	4 minutes	30 out of 50 *
	[Attempt 76](#)	less than 1 minute	5 out of 50 *
	[Attempt 75](#)	less than 1 minute	5 out of 50 *
	[Attempt 74](#)	4 minutes	20 out of 50 *
	[Attempt 73](#)	less than 1 minute	1 out of 50 *
	[Attempt 72](#)	less than 1 minute	0 out of 50 *
	[Attempt 71](#)	less than 1 minute	0 out of 50 *
	[Attempt 70](#)	less than 1 minute	0 out of 50 *
	[Attempt 69](#)	less than 1 minute	0 out of 50 *
	[Attempt 68](#)	less than 1 minute	0 out of 50 *
	[Attempt 67](#)	less than 1 minute	1 out of 50 *
	[Attempt 66](#)	less than 1 minute	0 out of 50 *
	[Attempt 65](#)	less than 1 minute	0 out of 50 *
	[Attempt 64](#)	less than 1 minute	0 out of 50 *
	[Attempt 63](#)	less than 1 minute	1 out of 50 *
	[Attempt 62](#)	10 minutes	2 out of 50 *
	[Attempt 61](#)	less than 1 minute	0 out of 50 *
	[Attempt 60](#)	less than 1 minute	0 out of 50 *
	[Attempt 59](#)	less than 1 minute	0 out of 50 *

Attempt	Time	Score
[Attempt 58](#)	less than 1 minute	1 out of 50 *
[Attempt 57](#)	less than 1 minute	0 out of 50 *
[Attempt 56](#)	2 minutes	1 out of 50 *
[Attempt 55](#)	less than 1 minute	0 out of 50 *
[Attempt 54](#)	2 minutes	0 out of 50 *
[Attempt 53](#)	less than 1 minute	0 out of 50 *
[Attempt 52](#)	less than 1 minute	0 out of 50 *
[Attempt 51](#)	less than 1 minute	0 out of 50 *
[Attempt 50](#)	less than 1 minute	0 out of 50 *
[Attempt 49](#)	less than 1 minute	0 out of 50 *
[Attempt 48](#)	9 minutes	0 out of 50 *
[Attempt 47](#)	less than 1 minute	0 out of 50 *
[Attempt 46](#)	less than 1 minute	0 out of 50 *
[Attempt 45](#)	less than 1 minute	0 out of 50 *
[Attempt 44](#)	less than 1 minute	0 out of 50 *
[Attempt 43](#)	less than 1 minute	0 out of 50 *
[Attempt 42](#)	less than 1 minute	0 out of 50 *
[Attempt 41](#)	less than 1 minute	0 out of 50 *
[Attempt 40](#)	less than 1 minute	0 out of 50 *
[Attempt 39](#)	less than 1 minute	0 out of 50 *
[Attempt 38](#)	less than 1 minute	0 out of 50 *
[Attempt 37](#)	less than 1 minute	0 out of 50 *
[Attempt 36](#)	less than 1 minute	0 out of 50 *
[Attempt 35](#)	less than 1 minute	0 out of 50 *
[Attempt 34](#)	less than 1 minute	0 out of 50 *
[Attempt 33](#)	less than 1 minute	0 out of 50 *
[Attempt 32](#)	less than 1 minute	0 out of 50 *
[Attempt 31](#)	less than 1 minute	0 out of 50 *

Attempt	Time	Score
Attempt 30	less than 1 minute	1 out of 50 *
Attempt 29	less than 1 minute	0 out of 50 *
Attempt 28	less than 1 minute	0 out of 50 *
Attempt 27	less than 1 minute	0 out of 50 *
Attempt 26	less than 1 minute	0 out of 50 *
Attempt 25	less than 1 minute	0 out of 50 *
Attempt 24	less than 1 minute	0 out of 50 *
Attempt 23	1 minute	0 out of 50 *
Attempt 22	less than 1 minute	0 out of 50 *
Attempt 21	less than 1 minute	0 out of 50 *
Attempt 20	less than 1 minute	0 out of 50 *
Attempt 19	less than 1 minute	0 out of 50 *
Attempt 18	less than 1 minute	0 out of 50 *
Attempt 17	less than 1 minute	0 out of 50 *
Attempt 16	less than 1 minute	0 out of 50 *
Attempt 15	3 minutes	0 out of 50 *
Attempt 14	4 minutes	0 out of 50 *
Attempt 13	less than 1 minute	0 out of 50 *
Attempt 12	less than 1 minute	1 out of 50 *
Attempt 11	2 minutes	1 out of 50 *
Attempt 10	less than 1 minute	2 out of 50 *
Attempt 9	less than 1 minute	0 out of 50 *
Attempt 8	less than 1 minute	1 out of 50 *
Attempt 7	1 minute	1 out of 50 *
Attempt 6	less than 1 minute	2 out of 50 *
Attempt 5	less than 1 minute	2 out of 50 *
Attempt 4	less than 1 minute	2 out of 50 *
Attempt 3	less than 1 minute	2 out of 50 *

Attempt	Time	Score
Attempt 2	less than 1 minute	2 out of 50 *
Attempt 1	57 minutes	14 out of 50 *

* Some questions not yet graded

Score for this attempt: **50** out of 50
Submitted Nov 8 at 2:42pm
This attempt took 6 minutes.

Question 1
2 / 2 pts

SVM cannot be used when points of both classes are scattered equally in same regions.

Correct!

○ True

⦿ False

Question 2
2 / 2 pts

If only a few points are misclassified in SVM around the support vector, then the method uses slack variables.

Correct!

⦿ True

○ False

Question 3
2 / 2 pts

K-Means Clustering strictly prohibits starting with initial random centroids too far away from the original clusters.

- ○ True

Correct!
- ⦿ False

Question 4   2 / 2 pts

Hierarchical clustering uses minimum distance between points in two clusters if the clusters are small and maximum distance between points in two clusters if the clusters are large.

- ○ True

Correct!
- ⦿ False

Question 5   2 / 2 pts

K-Means Clustering algorithm is guaranteed to stop.

Correct!
- ⦿ True

- ○ False

Question 6   2 / 2 pts

Deep neural networks use two basic capabilities. They are

| convolution | and | pooling | .

Answer 1:

Convolution

pooling

Answer 2:

pooling

convolution

Question 7   2 / 2 pts

Neural networks combine various intermediate | features | to

solve | linearly | non separable problems.

Answer 1:

features

lines

Answer 2:

linearly

linear

Question 8   2 / 2 pts

The activation function that is used in hidden layers is commonly

ReLU

and the regularization commonly used is

dropout

.

Answer 1:

Correct!

ReLU

orrect Answer

Relu

Answer 2:

Correct!

dropout

orrect Answer

drop out

orrect Answer

drop neurons

orrect Answer

drop some neurons

Question 9

2 / 2 pts

Hierarchical clustering works by starting with a   proximity   matrix

and initial points as clusters and then iteratively merging

clusters

.

Answer 1:

Correct!

proximity

Answer 2:

Correct!

clusters

Question 10

2 / 2 pts

SVM [kernel] method may take very long to execute.

However, if the points are well separated then [linear] SVM without slack variables will work well.

Answer 1:

Correct!

    kernel

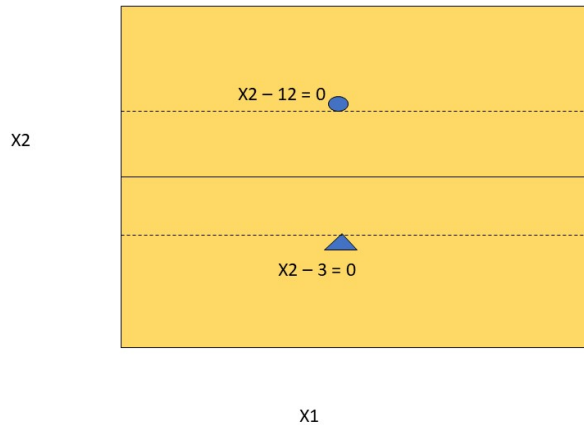**Answer 2:**

Correct!

    linear

Question 11

5 / 5 pts

Please answer the following question:

In the following picture for two dimension points on planes (X1, X2), the circle and triangle represent support vectors for a dataset of two classes. Given the equations for the hyperplanes X2 -12 = 0 and X2 - 3 = 0 for the circle and triangle, without much calculation find the missing value in the following equation of the decision boundary drawn in the middle.

The equation is X2 - _____?_____ = 0

X2

X2 − 12 = 0

X2 − 3 = 0

X1

7.5

orrect Answers   7.5

Question 12

10 / 10 pts

For the following Table Calculate the Precision, Recall and F-1 Score (using the paper on Accuracy, Precision, Recall and F-1 Score in Modules on Classification) from the matrix:

Precision = 0.3

F-1 Score = 0.4

	Predicted Positive	Predicted Negative
Actual Positive	TP = 300	FN=200

Actual Negative	FP = 700	TN=300

Answer 1:

0.3

orrect Answer

0.30

Answer 2:

0.4

orrect Answer

0.40

Question 13

5 / 5 pts

Explain in which situations F1 Score is desirable over Accuracy.

Your Answer:

Accuracy is the measure of all the correctly identified cases, and is mostly used when all the classes are equally important. However, there will be times in which we will want to consider false negatives as well as false positives, and that is where the F1-score is more desirable. The F1-score is more useful when you want a better measure of the incorrectly classified cases. The F1-score is also more useful when it comes to false negatives and false positives and when it comes to working with imbalanced class distributions in a confusion matrix. The F1-score is also a better measure to use if we want to seek a balance between the precision and recall scores.
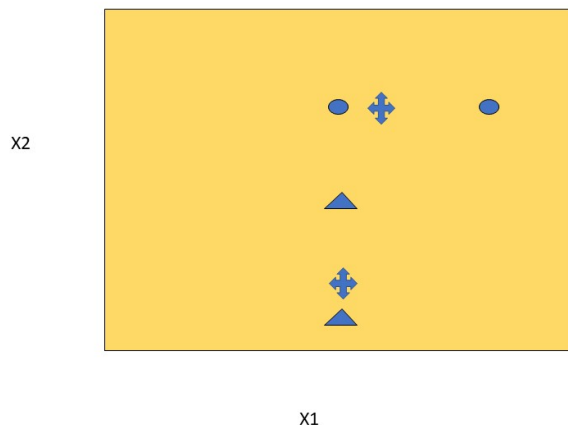
Question 14

10 / 10 pts

In the following diagram the circles are points (5, 25) and (15, 25). The triangles are (5, 1) and (5, 11). So the distance between the circle points is 10 points in the x1 direction and the distance between the triangle points is 10 points away in the x2 direction. The crosses are two initial centroids. (9, 25) and (5, 4). Using your intuition, predict the final location of the centroids when the KNN clustering algorithm stops given that (9, 25) is relatively closer to the circles than the triangles and (5, 4) is relatively closer to the triangles than the circles.

The final location of the centroids will be:

For circles: (10 , 25).

For triangles: (5, 6).

Answer 1:

Correct!   10

Answer 2:

Correct!   6

Quiz Score: **50** out of 50