Quiz Details

Quiz Instructions:

Show Question Details

Question 1 pts

Given the following confusion matrix, what is the precision for class Dragon?

Class \ Predict	Cat	Dog	Dragon
Cat	40	10	0
Dog	10	20	10
Dragon	0	0	30

- 3/4
- 1
- 1/4
- 1/2

Question 1 pts

What is `matrix.argmax(axis = 1)`, where `matrix = numpy.array([[1, 2, 3], [4, 5, 6]])`?

- [2, 2]
- [3, 3]
- [1, 1, 1]
- [2, 2, 2]

Question 1 pts

There are 4 documents, and 3 of these documents contain the token "Groot". In document 1, there are 10 tokens in total, and 5 of them are "Groot". What is the bag of words feature (without normalization) of document 1 feature "Groot"?

- 5
- 4
- 3
- 10

Question 1 pts

What is a valid simplification of `numpy.linalg.solve(X, X @ y)`, assuming the code runs without error (and numerical instability)?

- y
- X
- X @ y
- y @ X

Question 1 pts

The shape of `A` is (3, 2), the shape of `B` is (3, 3), and the shape of `C` is (4, 3). What is the shape of `A @ B @ C`?

- (Error)
- (3, 3)
- (4, 2)
- (2, 4)

Question 1 pts

If `x0` has two columns, and `x = sklearn.preprocessing.PolynomialFeatures(2).fit_transform(x0)` is used as the design matrix, how many weights (include coefficients and biases or intercepts) will a linear regression estimate?

- 6
- 5
- 4
- 2

Question 1 pts

`df` has 10 columns and 5 rows. After applying `p = PCA(3)` and `p.fit(df)`, what is the shape of `p.components_`? Note: the rows of `p.components_` are the principal components.

- (3, 10)
- (10, 3)
- (3, 5)
- (5, 3)

Question 1 pts

Given points `[[1], [2], [3], [4]]` and starting centroids `[0]` and `[7]`, what are the centroids after the first iteration of assigning points and updating centroids, using the iterative K-Means Clustering algorithm with Manhattan distance?

- [2, 4]
- [1.5, 3.5]
- [0, 7]
- [1, 3]

Question 1 pts

The gradient vector `dw` at `[w1, w2, w3, w4]` = `[-1, 1, 2, -2]` is `[2, -2, -1, 1]`, if gradient descent `w = w - alpha * dw` is used, which variable will increase by the largest amount in the next iteration?

- w2
- w1
- w3
- w4

Question 1 pts

Suppose `dxy = skimage.filters.sobel(img)` produces the `dxy` matrix in the following table. To highlight the edge pixels in the original image in green, `image[dxy > t] = [0, 255, 0]` is used, and 2 pixels are highlighted. Which value of `t` is used?

0	0	0	0
0	1	1	0
0	0.5	0.75	0
0	0	0	0

- 0.8
- 0.7
- 0.25
- 1

Question 1 pts

One-vs-one support vector machines are trained and produce the following the confusion matrix. How many training items are used in training the "0 vs 2" support vector machine?

Count	Predict 0	Predict 1	Predict 2
Class 0	10	20	10
Class 1	0	10	0
Class 2	10	0	10

- 60
- 40

- 10
- 70

Question 1 pts

The 3-fold cross validation accuracy for four different neural networks is summarized below. Which model is the most preferred one based on cross validation accuracy?

Network	Fold 1 accuracy	Fold 2 accuracy	Fold 3 accuracy
W	0.5	0.5	0.5
X	0.6	0.8	1
Y	0.7	0.8	0.9
Z	0.8	0.8	0.8

- Z
- Y
- X
- W

Question 1 pts

What is the optimal solution `[x1, x2]` to the linear program `max x1 + 2 * x2` subject to `x1 + x2 <= 1` and `x1 >= 0`, `x2 >= 0`?

- [0, 1]
- [1, 0]
- [0, 0]
- [1, 1]

Question 1 pts

Suppose the standard form of a linear program `max c @ x` subject to `A @ x <= b` and `x >= 0` has `len(c)` = `5`, `A.shape` = `(3, 5)`, and `len(b)` = `3`. What is the number of dual variables `len(y)`? Note: the dual problem is `min b @ y` subject to `A' @ y <= c` and `y >= 0` where `'` means transpose.

- 3
- 5
- 15
- 1

Question 1 pts

Suppose all the random vectors generated from a multivariate normal distribution are on the same line, using `numpy.random.multivariate_normal([0, 0], [[1, c], [c, 4]], 1000)`. What is the value of `c`?

- -2
- 0
- -1
- -4

Question 1 pts

Consider a Markov chain with the following transition matrix with three states `[0, 1, 2]`. What is the probability a sequence `[0, 0, 2]` is observed (given it starts with `0`)?

From \ To	0	1	2
0	1	0	0
1	0	0.5	0.5
2	0.5	0	0.5

- 0
- 0.5
- 0.25
- 1

Question 1 pts

For a logistic regression `lr`, if `lr.predict_proba(x)` for some item `x` is `[0.3, 0.5, 0.2]`, what is `lr.predict(x)` for the same `x`?

- 1
- 0
- 2
- 3

Question 1 pts

What is the complete linkage Manhattan distance between `c1 = [[5], [4], [0]]` and `c2 = [[2], [1]]`? Note: `c1` is a cluster with 3 points and `c2` is a cluster with 2 points.

- 4
- 3
- 2
- 1

Question 1 pts

Given the principal components `u1 = [0, 0, 1]`, `u2 = [1, 0, 0]`, `u3 = [0, 1, 0]`, and the PCA (principal component analysis) features of an item `x` is `y = [-1, 0, 1]`, what is `x`?

- [0, 1, -1]
- [-1, 0, 1]
- [1, 1, 1]
- [1, 0, -1]

Unanswered

UnansweredQuestion 1 pts

If you think any of the questions are not clear or incorrect, please explain here; otherwise, enter "none". Please do not leave the answer blank: