

Name: _____

Score: _____ / _____

Quiz #1

Part 1

In the context of regression, what is the role of the cost function in gradient descent?

- A.
To decide the type of regression (linear or logistic).
- B.
To measure the difference between predicted and actual values and guide the optimization.
- C.
To select appropriate features for the regression model.
- D.
To define the relationship between independent and dependent variables.

Answer Point Value: 1.0 points

Answer Key: B

For a convex cost function in regression, how does gradient descent behave?

- A.
It may get stuck in local minima and miss the global minimum.
- B.
It oscillates indefinitely without ever converging.
- C.
It avoids the minimum and tends to infinity.
- D.
It is guaranteed to find a local minimum which is also a global minimum.

Answer Point Value: 1.0 points

Answer Key: D

Which of the following best describes OLS?

- A.
Is primarily used for classification problems.
- B.
Minimizes the sum of the absolute differences between the observed and predicted values.
- C.
Focuses on maximizing the likelihood of the observed data.
- D.
Minimizes the sum of the squared differences between the observed and predicted values.

Answer Point Value: 1.0 points

Answer Key: D

In gradient descent, what does the learning rate control?

- A.
The size or magnitude of the step taken during each iteration.
- B.
The number of iterations needed to converge.
- C.
The direction of the step taken during each iteration.
- D.
The shape of the cost function.

Answer Point Value: 1.0 points

Answer Key: A

Let X be a continuous random variable over the real numbers. What do we know about the infinite sum $P(X = 1) + P(X = 2) + P(X = 3) + \dots$?

- A.
It is equal to 0.5
- B.
It is equal to 1.0
- C.
It is positive but less than one
- D.
It is equal to 0

Answer Point Value: 1.0 points

Answer Key: D

The L2 loss is more robust to outliers.

- ☐ True
- ☐ False

Answer Point Value: 1.0 points

Answer Key: False

Given the following Python code, what will be the output?

Attachments

```
import numpy as np
from sklearn.linear_model import LinearRegression

X = np.array([1, 2, 3]).reshape(-1, 1)
y = np.array([2, 2.8, 4.1])
model = LinearRegression().fit(X, y)

print(model.coef_)
```

- A.
The R-squared value of the model.
- B.
The y-intercept of the regression line.
- C.
The mean squared error of the model.
- D.
The slope of the regression line.

Answer Point Value: 1.0 points

Answer Key: D

Supervised Machine Learning requires:

- A.
Features and their associated Labels
- B.
Features without their associated Labels
- C.
Labels without their associated Features

Answer Point Value: 1.0 points

Answer Key: A

To find the optimum (minimum or the maximum) of a function, we set the gradient to zero because

- A.
None of the above
- B.
The value of the gradient at extrema of a function is always zero
- C.
Depends on the type of function we are using
- D.
Both A and B

Answer Point Value: 1.0 points

Answer Key: B

Given the following code, which method will return the coefficient of determination R^2 for the prediction?

Attachments

```
from sklearn.linear_model import LinearRegression
import numpy as np

X = np.array([1, 2, 3]).reshape(-1, 1)
y = np.array([2.2, 4.1, 6.1])
model = LinearRegression().fit(X, y)

result = model.____(X, y)
```

- A. calculate_r2()
- B. score()
- C. get_score()
- D. r_squared()

Answer Point Value: 1.0 points

Answer Key: B