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Introduction to Regression and Linear Regression

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Linear Regression Quiz

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1. What is regression analysis used for in data science and statistics? **1 / 1 point**

- To classify data into different categories or classes.
- To summarize and describe the main features of a dataset.
- (selected) To analyze the relationship between a dependent variable and one or more independent variables.
- To identify patterns and clusters in a dataset.

Correct
Correct! Regression analysis is used to analyze the relationship between a dependent variable and one or more independent variables.

2. What is the primary goal of linear regression? **1 / 1 point**

- (selected) To minimize the sum of squared errors between predicted and actual values.
- To classify data into different categories or classes.
- To identify patterns and clusters in a dataset.
- To summarize and describe the main features of a dataset.

Correct
Correct! The primary goal of linear regression is to minimize the sum of squared errors between predicted and actual values.

3. What is the best-fit straight line in linear regression? **1 / 1 point**

- To connect the first and last data points in the dataset.
- To pass through the mean of the independent and dependent variables.
- (selected) To minimize the sum of squared vertical distances between data points and the line.
- To intersect the x-axis at zero.

Correct
Correct! The best-fit straight line is the line that minimizes the sum of squared vertical distances (residuals) between data points and the line.

4. What is the Ordinary Least Squares (OLS) method used for in linear regression? **1 / 1 point**

- To find the optimal learning rate for the Gradient Descent algorithm.
- (selected) To find the coefficients of the best-fit straight line that minimize the sum of squared errors.
- To find the intercept of the best-fit straight line with the y-axis.
- To find the standard deviation of the dependent variable in the dataset.

Correct
Correct! The OLS method is used to find the coefficients of the best-fit straight line that minimize the sum of squared errors (residuals).

5. What is the optimization function (cost function) used in linear regression with Ordinary Least Squares (OLS)? **1 / 1 point**

- Mean Absolute Error (MAE)
- (selected) Mean Squared Error (MSE)
- Root Mean Squared Error (RMSE)
- R-squared (R2)

Correct
Correct! The optimization function used with OLS is the Mean Squared Error (MSE), which minimizes the sum of squared errors between predicted and actual values.

6. What is Gradient Descent used for in linear regression? **1 / 1 point**

- (selected) To find the coefficients of the best-fit straight line that minimize the cost function (MSE).
- To find the optimal learning rate for the OLS method.
- To find the intercept of the best-fit straight line with the y-axis.
- To find the optimal regularization parameter for Ridge or Lasso regression.

Correct
Correct! Gradient Descent is used to find the coefficients of the best-fit straight line that minimize the cost function (MSE) in linear regression.

7. What is the primary idea behind Gradient Descent in linear regression? **1 / 1 point**

- To minimize the number of iterations needed to find the best-fit straight line.
- To maximize the R-squared value of the best-fit straight line.
- (selected) To iteratively adjust the coefficients of the best-fit straight line to find the minimum of the cost function (MSE).
- To find the intercept of the best-fit straight line with the x-axis.

Correct
Correct! Gradient Descent iteratively adjusts the coefficients of the best-fit straight line to find the minimum of the cost function (MSE).

8. What is the learning rate in Gradient Descent? **1 / 1 point**

- The number of iterations the algorithm performs to find the best-fit straight line.
- The initial value of the cost function (MSE) before optimization.
- (selected) The rate at which the algorithm decreases the cost function (MSE) at each iteration.
- The rate at which the algorithm increases the cost function (MSE) at each iteration.

Correct
Correct! The learning rate is the rate at which the algorithm decreases the cost function (MSE) at each iteration.

9. What is the purpose of the fit() method in Scikit-learn's linear models for linear regression? **1 / 1 point**

- To fit the data to a polynomial regression model.
- (selected) To find the coefficients of the best-fit straight line using the input data and target values.
- To calculate the Mean Squared Error (MSE) of the model predictions.
- To perform feature scaling on the input data before regression.

Correct
Correct! The fit() method is used to find the coefficients of the best-fit straight line using the input data and target values in linear regression.

10. In Scikit-learn's linear models for linear regression, how can you make predictions using the trained model? **1 / 1 point**

- By using the transform() method.
- (selected) By using the predict() method with new input data.
- By using the fit() method again with new input data.
- By using the score() method with new input data.

Correct
Correct! You can make predictions using the predict() method with new input data in linear regression.