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Regularization

✔ Video: Regularization

9 min

✔ Reading: Regularization Demo

1h

✔ Reading: Regularization Case Study - CA Housing Price

1h

✔ Quiz: Regularization Quiz

Submitted

📅 Reading: Regularization Case Study

2h

💬 Discussion Prompt: Regularization Exploration Exercise

2h

Regularization Quiz

Review Learning Objectives

✔ Submit your assignment

Due Mar 3, 11:59 PM IST

✔ Receive grade

To Pass 60% or higher

✔ Congratulations! You passed!

Grade received 100%

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1. What is regularization used for in machine learning?

1 / 1 point

☐ To increase the complexity of the model and capture more noise in the data.

☒ To prevent overfitting and improve the generalization ability of the model.

☐ To add more features to the model and improve its performance.

☐ To improve the training performance of the model without considering its generalization ability.

✔ Correct

Correct! Regularization is used to prevent overfitting and improve the generalization ability of the model.
2. What is overfitting in the context of machine learning?

1 / 1 point

☒ When the model fits the training data too well and captures noise and random variations instead of general patterns.

☐ When the model performs well on the training data but poorly on the test data.

☐ When the model is too simple and fails to capture the relationship between variables.

☐ When the model's coefficients have high p-values.

✔ Correct

Correct! Overfitting is when the model fits the training data too well, capturing noise and random variations instead of general patterns.
3. What is the primary goal of Ridge regression?

1 / 1 point

☐ To set all model coefficients to zero, effectively removing irrelevant features.

☒ To add a penalty term to the cost function, which penalizes large coefficients and reduces model complexity.

☐ To select the most important features and remove others from the model.

☐ To add a regularization term to the cost function, which encourages large coefficients for important features.

✔ Correct

Correct! The primary goal of Ridge regression is to add a penalty term to the cost function, which penalizes large coefficients and reduces model complexity.
4. Which parameter in Ridge regression controls the strength of regularization?

1 / 1 point

☐ Learning rate

☐ Intercept term

☐ R-squared (R2)

☒ Alpha (λ) parameter

✔ Correct

Correct! The alpha (λ) parameter in Ridge regression controls the strength of regularization. Higher values of alpha result in stronger regularization.
5. Which parameter in Lasso regression controls the strength of regularization?

1 / 1 point

☐ Learning rate

☒ Alpha (λ) parameter

☐ R-squared (R2)

☐ Intercept term

✔ Correct

Correct! The alpha (λ) parameter in Lasso regression controls the strength of regularization. Higher values of alpha result in stronger regularization, leading to more coefficients being set to zero.
6. What is Elastic Net regularization used for?

1 / 1 point

☒ To add both L1 and L2 penalty terms to the cost function, combining the features of Ridge and Lasso regression.

☐ To add a penalty term to the cost function, which penalizes large coefficients and reduces model complexity.

☐ To set all model coefficients to zero, effectively removing irrelevant features.

☐ To perform feature scaling on the independent variables.

✔ Correct

Correct! Elastic Net regularization combines L1 and L2 penalty terms, providing a balance between Ridge and Lasso regression.
7. Which parameters in Elastic Net regularization control the strengths of L1 and L2 regularization, respectively?

1 / 1 point

☐ Learning rate and R-squared (R2)

☒ Alpha (λ) and L1 ratio parameters

☐ Intercept term and slope term

☐ Coefficient of determination (R2) and residual sum of squares (RSS)

✔ Correct

Correct! The alpha (λ) parameter controls the overall strength of regularization, while the L1 ratio parameter determines the balance between L1 and L2 regularization.
8. In Ridge regression, as the value of the alpha (λ) parameter increases:

1 / 1 point

☐ The strength of regularization decreases, and the model tends to overfit.

☒ The strength of regularization increases, and the model becomes more regularized.

☐ The model becomes more sensitive to outliers.

☐ The model becomes more complex.

✔ Correct

Correct! As the value of alpha increases in Ridge regression, the strength of regularization increases, and the model becomes more regularized, reducing the risk of overfitting.
9. What is the main difference between Ridge and Lasso regression concerning feature selection?

1 / 1 point

☒ Lasso regression can set some coefficients exactly to zero, performing feature selection.

☐ Ridge regression can set some coefficients exactly to zero, performing feature selection.

☐ Both Ridge and Lasso regression can perform feature selection, but the criteria for selection are different.

☐ Both Ridge and Lasso regression cannot perform feature selection.

✔ Correct

Correct! Lasso regression can set some coefficients to exactly zero, effectively performing feature selection.
10. What is the Elastic Net regularization method?

1 / 1 point

☐ A method that combines Ridge and Lasso regression, taking the best features from both methods.

☐ A method that performs L1 regularization on one subset of features and L2 regularization on another subset of features.

☒ A method that provides a balance between Ridge and Lasso regression by combining L1 and L2 penalty terms.

☐ A method that performs L1 regularization first and then L2 regularization as a second step.

✔ Correct

Correct! Elastic Net provides a balance between Ridge and Lasso regression by combining L1 and L2 penalty terms.

