

MACHINE LEARNING - 4

1. C
2. B
3. C
4. D
5. B
6. A, D
7. B,C
8. A,C
9. A, B

10. Explain how does the adjusted R-squared penalize the presence of unnecessary predictors in the model?

A variant of R-squared that has been changed to account for the number of predictors in the model is known as adjusted R-squared. When the additional term enhances the model more than would be predicted by chance, the adjusted R-squared rises. When a predictor enhances the model by less than anticipated, it falls. The corrected R-squared is typically positive rather than negative. It always falls short of the R-squared. The modified R-squared accounts for the additional variables, and it only rises if the new predictor improves the model above what would be predicted by chance. It will, however, fall when a predictor enhances the model less than would be expected by chance.

11. Differentiate between Ridge and Lasso Regression.

Lasso Regression is a regularization technique used in feature selection using a Shrinkage method also referred to as the penalized regression method. Lasso is short for **Least Absolute Shrinkage and Selection Operator**, which is used both for regularization and model selection. Similar to the lasso regression, ridge regression puts a similar constraint on the coefficients by introducing a penalty factor. However, while lasso regression takes the magnitude of the coefficients, ridge regression takes the square.

12. What is VIF? What is the suitable value of a VIF for a feature to be included in a regression modelling?

A variance inflation factor (VIF) is a measure of the amount of multicollinearity in regression analysis. Multicollinearity exists when there is a correlation between multiple independent variables in a multiple regression model. This can adversely affect the regression results. VIF starts at 1 and has no upper limit. VIF exceeding 5 or 10 indicates high Multicollinearity between this independent variable and the others.

13. Why do we need to scale the data before feeding it to the train the model?

We scale the data before feeding it to the model to make sure that the gradient descent progresses smoothly towards the minima and that the steps for gradient descent are updated at the same pace for all the features.

14. What are the different metrics which are used to check the goodness of fit in linear regression?
Root Mean Square Error (RMSE), Mean Squared Error (MSE) and Mean Absolute Error (MAE)
15. From the following confusion matrix calculate sensitivity, specificity, precision, recall and accuracy.

Actual/Predicted	True	False
True	1000	50
False	250	1200

$$\text{Precision} = \text{TP}/(\text{TP}+\text{FP}) = (1000)/(1000+250) = 0.8$$

$$\text{Sensitivity} = \text{TP}/(\text{TP}+\text{FN}) = (1000)/(1000+50) = 0.95238$$

$$\text{Specificity} = \text{TN}/(\text{TN}+\text{FP}) = (1200)/(1200+250) = 0.82758$$

$$\text{Recall} = \text{TP} / (\text{TP}+\text{FN}) = (1000) / (1000+50) = 0.95238$$

$$\text{Accuracy} = (\text{TN}+\text{TP})/(\text{TN}+\text{TP}+\text{FN}+\text{FP}) = (1200+1000)/(1200+1000+50+250) = 0.88$$