Regression Assignment - 3

February 22, 2024

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"""Q1. What is Ridge Regression, and how does it differ from ordinary least␣
 ↪squares regression?

    Ans: Ridge Regression is a type of linear regression that adds a penalty␣
 ↪term to the ordinary least squares regression.
         This penalty term shrinks the coefficients of the regression model,␣
 ↪reducing the impact of less important predictors and improving model␣
 ↪performance
         in situations where there are many predictors.
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"""Q2. What are the assumptions of Ridge Regression?

    Ans: Ridge regression assumes that the relationship between the dependent␣
 ↪variable and independent variables is linear, and that the errors are␣
 ↪normally distributed
         and have constant variance. Additionally, it assumes that the␣
 ↪independent variables are not highly correlated with each other.
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"""Q3. How do you select the value of the tuning parameter (lambda) in Ridge␣
 ↪Regression?

    Ans: The value of the tuning parameter (lambda) in Ridge Regression is␣
 ↪typically chosen using cross-validation. The data is split into several␣
 ↪subsets,
         and the model is trained on each subset while being evaluated on the␣
 ↪remaining data. The value of lambda that results in the best overall␣
 ↪performance is chosen.
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"""Q4. Can Ridge Regression be used for feature selection? If yes, how?

    Ans: Ridge regression can't perform feature selection, unlike Lasso␣
 ↪regression. Ridge regression shrinks the coefficients of all variables␣
 ↪towards zero,
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        but it doesn't set any coefficients to exactly zero. Thus, all␣
↪variables contribute to the model to some extent, and Ridge regression is␣
↪used when
        all variables are thought to be important.
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"""Q5. How does the Ridge Regression model perform in the presence of␣
↪multicollinearity?

   Ans: Ridge regression is designed to handle multicollinearity, which is a␣
↪situation where two or more independent variables are highly correlated with␣
↪each other.
        The Ridge regression model adds a penalty term to the loss function,␣
↪which shrinks the regression coefficients towards zero.
        This helps to reduce the impact of multicollinearity on the model's␣
↪performance.
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"""Q6. Can Ridge Regression handle both categorical and continuous independent␣
↪variables?

   Ans: Yes, Ridge Regression can handle both categorical and continuous␣
↪independent variables. In Ridge Regression, all variables are treated␣
↪equally,
        and the regularization penalty is applied to all variables regardless␣
↪of their type. Therefore, the model can handle a mix of categorical and␣
↪continuous variables.
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"""Q7. How do you interpret the coefficients of Ridge Regression?

   Ans: The coefficients of Ridge Regression represent the change in the␣
↪dependent variable for each unit change in the independent variable while␣
↪controlling
        for other variables. However, unlike in linear regression, the␣
↪coefficients in Ridge Regression are shrunk towards zero to reduce␣
↪overfitting.
        Thus, the magnitude of the coefficients should be interpreted in␣
↪relation to the value of the regularization parameter used in the model.
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"""Q8. Can Ridge Regression be used for time-series data analysis? If yes, how?

   Ans: Yes, Ridge Regression can be used for time-series data analysis. It␣
↪can be used to reduce the effects of multicollinearity and improve the␣
↪accuracy of predictions.
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        The regularization parameter can be tuned to balance the trade-off␣
 ↪between bias and variance.
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