Machine Learning Worksheet

|  |  |
| --- | --- |
|  | (A) |
|  | (A) |
|  | (B) |
|  | (B) |
|  | (C) |
|  | (A) |
|  | (D) |
|  | (D) |
|  | (A) |
|  | (B) |
|  | (B) |
|  | (B, C) |

Answer 13.

A good way to reduce overfitting is to regularize the model i.e. constrain it by reducing its degrees of freedom or reduce the degree of the polynomial. For linear regression regularization is generally achieved by constraining the weights of the model. There are 3 different commonly used regularization methods used (1) Ridge regression (2) Lasso regression (3) Elastic Net

Answer 14.

4 commonly used regularization techniques are

1. Ridge Regression : This method of regularization is used when the data is highly correlated, adding the sum of the squares of the weights to the cost function forces the model weights to be as small as possible.
2. Lasso Regression : Similar to the Ridge Regression, this method adds an L1 norm of the weight vector to the cost function. It tends to eliminate the weights of the least important features. Lasso regression automatically performs feature selection and outputs a sparse model.
3. Elastic Net : This is a middle ground between the ridge regression and lasso regression where the proportion of each norm is controlled by a mix ratio r. For r=0 elastic net is equivalent to ridge regression whereas for r=1 elastic net is equivalent to lasso regression
4. Early Stopping : This is an alternative way to regularize learning algorithms where training is stopped once the validation error reaches a certain minimum.

Answer 15.

The error in linear regression is the residual difference between the predicted values using the model weights and the target variables set aside for training. The error tells the learning algorithm how far off its prediction is from the actual values and hence how to adjust the weights in the next iteration so its closer to predicting the target variables correctly. Two commonly used errors in linear regression are (1) RMSE i.e. the root of the sum of the squares of the errors average (2) MSE i.e. the mean squared error