summary(wine\_data)

Type Alcohol Malic acid Ash Alcalinity of ash Magnesium Total phenols

1:59 Min. :11.03 Min. :0.740 Min. :1.360 Min. :10.60 Min. : 70.00 Min. :0.980

2:71 1st Qu.:12.36 1st Qu.:1.603 1st Qu.:2.210 1st Qu.:17.20 1st Qu.: 88.00 1st Qu.:1.742

3:48 Median :13.05 Median :1.865 Median :2.360 Median :19.50 Median : 98.00 Median :2.355

Mean :13.00 Mean :2.336 Mean :2.367 Mean :19.49 Mean : 99.74 Mean :2.295

3rd Qu.:13.68 3rd Qu.:3.083 3rd Qu.:2.558 3rd Qu.:21.50 3rd Qu.:107.00 3rd Qu.:2.800

Max. :14.83 Max. :5.800 Max. :3.230 Max. :30.00 Max. :162.00 Max. :3.880

Flavanoids Nonflavanoid Phenols Proanthocyanins Color Intensity Hue Od280/od315 of diluted wines

Min. :0.340 Min. :0.1300 Min. :0.410 Min. : 1.280 Min. :0.4800 Min. :1.270

1st Qu.:1.205 1st Qu.:0.2700 1st Qu.:1.250 1st Qu.: 3.220 1st Qu.:0.7825 1st Qu.:1.938

Median :2.135 Median :0.3400 Median :1.555 Median : 4.690 Median :0.9650 Median :2.780

Mean :2.029 Mean :0.3619 Mean :1.591 Mean : 5.058 Mean :0.9574 Mean :2.612

3rd Qu.:2.875 3rd Qu.:0.4375 3rd Qu.:1.950 3rd Qu.: 6.200 3rd Qu.:1.1200 3rd Qu.:3.170

Max. :5.080 Max. :0.6600 Max. :3.580 Max. :13.000 Max. :1.7100 Max. :4.000

Proline

Min. : 278.0

1st Qu.: 500.5

Median : 673.5

Mean : 746.9

3rd Qu.: 985.0

Max. :1680.0

Variables that contribute the most to the 1st PC

Flavanoids Total phenols Od280/od315 of diluted wines Hue

0.4555529 0.4234687 0.4166142 0.3392301

Nonflavanoid Phenols Proline Malic acid Magnesium

0.3215373 0.2968863 0.2774631 0.1482252

Alcohol Color Intensity

0.1387659 0.1214953

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| Confusion Matrix and Statistics  Reference  Prediction 1 2 3  1 17 0 0  2 0 20 0  3 0 1 14  Overall Statistics    Accuracy : 0.9808  95% CI : (0.8974, 0.9995)  No Information Rate : 0.4038  P-Value [Acc > NIR] : < 2.2e-16    Kappa : 0.9709    Mcnemar's Test P-Value : NA  Statistics by Class:  Class: 1 Class: 2 Class: 3  Sensitivity 1.0000 0.9524 1.0000  Specificity 1.0000 1.0000 0.9737  Pos Pred Value 1.0000 1.0000 0.9333  Neg Pred Value 1.0000 0.9687 1.0000  Prevalence 0.3269 0.4038 0.2692  Detection Rate 0.3269 0.3846 0.2692  Detection Prevalence 0.3269 0.3846 0.2885  Balanced Accuracy 1.0000 0.9762 0.9868  Confusion Matrix and Statistics for the first three principles  Reference  Prediction 1 2 3  1 17 0 0  2 0 20 1  3 0 1 13  Overall Statistics    Accuracy : 0.9615  95% CI : (0.8679, 0.9953)  No Information Rate : 0.4038  P-Value [Acc > NIR] : < 2.2e-16    Kappa : 0.9415    Mcnemar's Test P-Value : NA  Statistics by Class:  Class: 1 Class: 2 Class: 3  Sensitivity 1.0000 0.9524 0.9286  Specificity 1.0000 0.9677 0.9737  Pos Pred Value 1.0000 0.9524 0.9286  Neg Pred Value 1.0000 0.9677 0.9737  Prevalence 0.3269 0.4038 0.2692  Detection Rate 0.3269 0.3846 0.2500  Detection Prevalence 0.3269 0.4038 0.2692  Balanced Accuracy 1.0000 0.9601 0.9511  Confusion Matrix and Statistics after dropping the least contributing variable and  Running a classifier model  Reference  Prediction 1 2 3  1 17 0 0  2 0 20 1  3 0 1 13  Overall Statistics    Accuracy : 0.9615  95% CI : (0.8679, 0.9953)  No Information Rate : 0.4038  P-Value [Acc > NIR] : < 2.2e-16    Kappa : 0.9415    Mcnemar's Test P-Value : NA  Statistics by Class:  Class: 1 Class: 2 Class: 3  Sensitivity 1.0000 0.9524 0.9286  Specificity 1.0000 0.9677 0.9737  Pos Pred Value 1.0000 0.9524 0.9286  Neg Pred Value 1.0000 0.9677 0.9737  Prevalence 0.3269 0.4038 0.2692  Detection Rate 0.3269 0.3846 0.2500  Detection Prevalence 0.3269 0.4038 0.2692  Balanced Accuracy 1.0000 0.9601 0.9511  Reducing features did not significantly impact performance when using PCA. |
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