**Olatunde T. Mojisola***Data Analytics F24 Lab 04*

***Contributing variables  
  
 Flavanoids Total phenols Od280/od315 of diluted wines***

*0.422934297 0.394660845 0.376167411*

***Proanthocyanins Nonflavanoid Phenols Hue****0.313429488 0.298533103 0.296714564*

***Proline Malic acid Alcalinity of ash***

*0.286752227 0.245187580 0.239320405*

***Alcohol Magnesium Color Intensity***

*0.144329395 0.141992042 0.088616705*

***Ash***

*0.002051061* **Original Features Classification results** *Confusion Matrix and Statistics*

*Reference*

*Prediction 1 2 3*

*1 17 0 0*

*2 0 21 0*

*3 0 0 14*

*Overall Statistics*

*Accuracy : 1*

*95% CI : (0.9315, 1)*

*No Information Rate : 0.4038*

*P-Value [Acc > NIR] : < 2.2e-16*

*Kappa : 1*

*Mcnemar's Test P-Value : NA*

*Statistics by Class:*

*Class: 1 Class: 2 Class: 3*

*Sensitivity 1.0000 1.0000 1.0000*

*Specificity 1.0000 1.0000 1.0000*

*Pos Pred Value 1.0000 1.0000 1.0000*

*Neg Pred Value 1.0000 1.0000 1.0000*

*Prevalence 0.3269 0.4038 0.2692*

*Detection Rate 0.3269 0.4038 0.2692*

*Detection Prevalence 0.3269 0.4038 0.2692*

*Balanced Accuracy 1.0000 1.0000 1.0000***- First 3 PCs - Classification Results** *Confusion Matrix and Statistics*

*Reference*

*Prediction 1 2 3*

*1 16 1 0*

*2 1 20 0*

*3 0 0 14*

*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 0.9412 0.9524 1.0000*

*Specificity 0.9714 0.9677 1.0000*

*Pos Pred Value 0.9412 0.9524 1.0000*

*Neg Pred Value 0.9714 0.9677 1.0000*

*Prevalence 0.3269 0.4038 0.2692*

*Detection Rate 0.3077 0.3846 0.2692*

*Detection Prevalence 0.3269 0.4038 0.2692*

*Balanced Accuracy 0.9563 0.9601 1.0000*

**- Reduced Features (First 3 PCs) - Classification Results**  
 *Confusion Matrix and Statistics*

*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*

*Classification models comparison*

|  |  |  |
| --- | --- | --- |
| ***Model\_All*** | ***Model\_PCA*** | ***Model\_PCA\_Reduced*** |
| *$confusion\_matrix*  *Reference*  *Prediction 1 2 3*  *1 17 0 0*  *2 0 21 0*  *3 0 0 14*  *$precision*  *1 2 3*  *1 1 1*  *$recall*  *1 2 3*  *1 1 1*  *$f1*  *1 2 3*  *1 1 1*  *$macro\_f1*  *[1] 1* | *$confusion\_matrix*  *Reference*  *Prediction 1 2 3*  *1 16 1 0*  *2 1 20 0*  *3 0 0 14*  *$precision*  *1 2 3*  *0.9411765 0.9523810 1.0000000*  *$recall*  *1 2 3*  *0.9411765 0.9523810 1.0000000*  *$f1*  *1 2 3*  *0.9411765 0.9523810 1.0000000*  *$macro\_f1*  *[1] 0.9645191* | *$confusion\_matrix*  *Reference*  *Prediction 1 2 3*  *1 17 0 0*  *2 0 20 1*  *3 0 1 13*  *$precision*  *1 2 3*  *1.0000000 0.9523810 0.9285714*  *$recall*  *1 2 3*  *1.0000000 0.9523810 0.9285714*  *$f1*  *1 2 3*  *1.0000000 0.9523810 0.9285714*  *$macro\_f1*  *[1] 0.9603175* |