## 5 Classes - Stepwise

| Model | F1 Score | | | Matthews Correlation Coefficient Score | | | Processing Time |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Decision Tree | Initial Test | Repeated Stratified K-Fold Cross Validation | Repeated K-Fold Cross Validation | Initial Test | Repeated Stratified K-Fold Cross Validation | Repeated K-Fold Cross Validation | **3 mins 14 seconds** |
| **0.38** | **0.38** | **0.38** | **0.31** | **0.33** | **0.33** |
| Logistic Regression | Initial Test | Repeated Stratified K-Fold Cross Validation | Repeated K-Fold Cross Validation | Initial Test | Repeated Stratified K-Fold Cross Validation | Repeated K-Fold Cross Validation | **17 mins 9 seconds** |
| **0.41** | **0.40** | **0.40** | **0.40** | **0.43** | **0.43** |
| K Nearest Neighbors | Initial Test | Repeated Stratified K-Fold Cross Validation | Repeated K-Fold Cross Validation | Initial Test | Repeated Stratified K-Fold Cross Validation | Repeated K-Fold Cross Validation | **1 min 29 seconds** |
| **0.41** | **0.40** | **0.40** | **0.42** | **0.39** | **0.39** |

## 3 Class - Stepwise

| Model | F1 Score | | | Matthews Correlation Coefficient Score | | | Processing Time |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Decision Tree | Initial Test | Repeated Stratified K-Fold Cross Validation | Repeated K-Fold Cross Validation | Initial Test | Repeated Stratified K-Fold Cross Validation | Repeated K-Fold Cross Validation | **1 min 55 seconds** |
| **0.52** | **0.54** | **0.55** | **0.34** | **0.39** | **0.40** |
| Logistic Regression | Initial Test | Repeated Stratified K-Fold Cross Validation | Repeated K-Fold Cross Validation | Initial Test | Repeated Stratified K-Fold Cross Validation | Repeated K-Fold Cross Validation | **13 mins 4 seconds** |
| **0.60** | **0.60** | **0.59** | **0.58** | **0.56** | **0.56** |
| K Nearest Neighbors | Initial Test | Repeated Stratified K-Fold Cross Validation | Repeated K-Fold Cross Validation | Initial Test | Repeated Stratified K-Fold Cross Validation | Repeated K-Fold Cross Validation | **1 min 34 seconds** |
| **0.57** | **0.58** | **0.58** | **0.48** | **0.50** | **0.50** |

## 5 Classes - VIF Elimination

| Model | F1 Score | | | Matthews Correlation Coefficient Score | | | Processing Time |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Decision Tree | Initial Test | Repeated Stratified K-Fold Cross Validation | Repeated K-Fold Cross Validation | Initial Test | Repeated Stratified K-Fold Cross Validation | Repeated K-Fold Cross Validation | **2 mins 34 seconds** |
| **0.38** | **0.39** | **0.3** | **0.28** | **0.33** | **0.32** |
| Logistic Regression | Initial Test | Repeated Stratified K-Fold Cross Validation | Repeated K-Fold Cross Validation | Initial Test | Repeated Stratified K-Fold Cross Validation | Repeated K-Fold Cross Validation | **54 mins 4 seconds** |
| **0.40** | **0.41** | **0.41** | **0.36** | **0.43** | **0.43** |
| K Nearest Neighbors | Initial Test | Repeated Stratified K-Fold Cross Validation | Repeated K-Fold Cross Validation | Initial Test | Repeated Stratified K-Fold Cross Validation | Repeated K-Fold Cross Validation | **1 min 42 seconds** |
| **0.29** | **0.33** | **0.33** | **0.33** | **0.32** | **0.32** |

## 3 Classes - VIF Elimination

| Model | F1 Score | | | Matthews Correlation Coefficient Score | | | Processing Time |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Decision Tree | Initial Test | Repeated Stratified K-Fold Cross Validation | Repeated K-Fold Cross Validation | Initial Test | Repeated Stratified K-Fold Cross Validation | Repeated K-Fold Cross Validation | **2mins 45 secs** |
| **0.50** | **0.56** | **0.56** | **0.32** | **0.41** | **0.40** |
| Logistic Regression | Initial Test | Repeated Stratified K-Fold Cross Validation | Repeated K-Fold Cross Validation | Initial Test | Repeated Stratified K-Fold Cross Validation | Repeated K-Fold Cross Validation | **38 mins 6 seconds** |
| **0.57** | **0.57** | **0.58** | **0.53** | **0.52** | **0.52** |
| K Nearest Neighbors | Initial Test | Repeated Stratified K-Fold Cross Validation | Repeated K-Fold Cross Validation | Initial Test | Repeated Stratified K-Fold Cross Validation | Repeated K-Fold Cross Validation | **1 min 25 seconds** |
| **0.53** | **0.54** | **0.53** | **0.40** | **0.41** | **0.40** |

## Rank By Speed (Fastest to Lowest)

1. KNN VIF 3 Classes
2. KNN Stepwise 5 Classes
3. KNN Stepwise 3 Classes
4. KNN VIF 5 Classes
5. Decision Tree Stepwise 5 Classes
6. Decision Tree VIF 5 Classes
7. Decision Tree VIF 3 Classes
8. Decision Tree Stepwise 5 Classes
9. Logistic Stepwise 5 Classes
10. Logistic Stepwise 3 Classes
11. Logistic VIF 3 Classes
12. Logistic VIF 5 Classes

## Rank by F1 Score (Highest to Lowest)

1. Logistic Regression Stepwise 3 Classes
2. Logistic Regression VIF 3 Classes
3. KNN Stepwise 3 Classes
4. Decision Tree VIF 3 Classes
5. Decision Tree Stepwise 3 Classes
6. KNN VIF 3 Classes
7. Logistic Stepwise 5 Classes
8. KNN Stepwise 5 Classes
9. Logistic VIF 5 Classes
10. Decision Tree VIF 5 Classes
11. Decision Tree Stepwise 5 Classes
12. KNN VIF 5 Classes

## Rank by MCC Score (Highest to Lowest)

1. Logistic Stepwise 3 Classes
2. Logistic VIF 3 Classes
3. KNN Stepwise 3 Classes
4. KNN Stepwise 5 Classes
5. KNN VIF 3 Classes
6. Logistic Stepwise 5 Classes
7. Logistic VIF 5 Classes
8. Decision Tree Stepwise 3 Classes
9. Decision Tree VIF 3 Classes
10. KNN VIF 5 Classes
11. Decision Tree VIF 5 Classes
12. Decision Tree Stepwise 5 Classes