Cross Validation - 5 Features

**Classifier: KNN**

**Training Metrics and Times**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Split | Accuracy | Precision | Recall | F1-score | AUC-ROC |
| 1 | 0.91 | 0.93 | 0.89 | 0.91 | 0.91 |
| 2 | 0.91 | 0.93 | 0.89 | 0.91 | 0.91 |
| 3 | 0.91 | 0.93 | 0.89 | 0.91 | 0.91 |
| 4 | 0.91 | 0.93 | 0.89 | 0.91 | 0.91 |
| 5 | 0.91 | 0.93 | 0.89 | 0.91 | 0.91 |
| Mean | 0.91 | 0.93 | 0.89 | 0.91 | 0.91 |

**Testing Metrics and Times**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Split | Accuracy | Precision | Recall | F1-score | AUC-ROC |
| 1 | 0.84 | 0.86 | 0.81 | 0.84 | 0.84 |
| 2 | 0.84 | 0.86 | 0.82 | 0.84 | 0.84 |
| 3 | 0.84 | 0.86 | 0.82 | 0.84 | 0.84 |
| 4 | 0.84 | 0.86 | 0.81 | 0.84 | 0.84 |
| 5 | 0.84 | 0.86 | 0.81 | 0.83 | 0.84 |
| Mean | 0.84 | 0.86 | 0.81 | 0.84 | 0.84 |

**Classifier: Random Forest**

**Training Metrics and Times**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Split | Accuracy | Precision | Recall | F1-score | AUC-ROC |
| 1 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| 2 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| 3 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| 4 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| 5 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Mean | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Testing Metrics and Times**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Split | Accuracy | Precision | Recall | F1-score | AUC-ROC |
| 1 | 0.83 | 0.84 | 0.80 | 0.82 | 0.83 |
| 2 | 0.83 | 0.84 | 0.80 | 0.82 | 0.83 |
| 3 | 0.83 | 0.84 | 0.80 | 0.82 | 0.83 |
| 4 | 0.83 | 0.85 | 0.80 | 0.82 | 0.83 |
| 5 | 0.83 | 0.84 | 0.80 | 0.82 | 0.83 |
| Mean | 0.83 | 0.84 | 0.80 | 0.82 | 0.83 |

**Classifier: XGBoost**

**Training Metrics and Times**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Split | Accuracy | Precision | Recall | F1-score | AUC-ROC |
| 1 | 0.78 | 0.82 | 0.73 | 0.77 | 0.78 |
| 2 | 0.78 | 0.82 | 0.73 | 0.77 | 0.78 |
| 3 | 0.78 | 0.82 | 0.73 | 0.77 | 0.78 |
| 4 | 0.78 | 0.82 | 0.72 | 0.77 | 0.78 |
| 5 | 0.78 | 0.82 | 0.73 | 0.77 | 0.78 |
| Mean | 0.78 | 0.82 | 0.73 | 0.77 | 0.78 |

**Testing Metrics and Times**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Split | Accuracy | Precision | Recall | F1-score | AUC-ROC |
| 1 | 0.72 | 0.75 | 0.67 | 0.71 | 0.72 |
| 2 | 0.72 | 0.75 | 0.67 | 0.71 | 0.72 |
| 3 | 0.72 | 0.75 | 0.67 | 0.71 | 0.72 |
| 4 | 0.72 | 0.75 | 0.67 | 0.71 | 0.72 |
| 5 | 0.72 | 0.75 | 0.68 | 0.71 | 0.72 |
| Mean | 0.72 | 0.75 | 0.67 | 0.71 | 0.72 |

**Classifier: Decision Tree**

**Training Metrics and Times**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Split | Accuracy | Precision | Recall | F1-score | AUC-ROC |
| 1 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| 2 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| 3 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| 4 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| 5 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Mean | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Testing Metrics and Times**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Split | Accuracy | Precision | Recall | F1-score | AUC-ROC |
| 1 | 0.74 | 0.74 | 0.74 | 0.74 | 0.74 |
| 2 | 0.74 | 0.74 | 0.74 | 0.74 | 0.74 |
| 3 | 0.74 | 0.74 | 0.74 | 0.74 | 0.74 |
| 4 | 0.74 | 0.74 | 0.73 | 0.74 | 0.74 |
| 5 | 0.74 | 0.74 | 0.74 | 0.74 | 0.74 |
| Mean | 0.74 | 0.74 | 0.74 | 0.74 | 0.74 |

**Classifier: Extra Trees**

**Training Metrics and Times**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Split | Accuracy | Precision | Recall | F1-score | AUC-ROC |
| 1 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| 2 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| 3 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| 4 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| 5 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Mean | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Testing Metrics and Times**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Split | Accuracy | Precision | Recall | F1-score | AUC-ROC |
| 1 | 0.83 | 0.86 | 0.79 | 0.82 | 0.83 |
| 2 | 0.83 | 0.86 | 0.79 | 0.82 | 0.83 |
| 3 | 0.83 | 0.86 | 0.79 | 0.82 | 0.83 |
| 4 | 0.83 | 0.86 | 0.79 | 0.82 | 0.83 |
| 5 | 0.83 | 0.86 | 0.79 | 0.83 | 0.83 |
| Mean | 0.83 | 0.86 | 0.79 | 0.82 | 0.83 |

Cross Validation - 8 Features

**Classifier: KNN**

**Training Metrics and Times**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Split | Accuracy | Precision | Recall | F1-score | AUC-ROC |
| 1 | 0.98 | 0.99 | 0.97 | 0.98 | 0.98 |
| 2 | 0.98 | 0.99 | 0.97 | 0.98 | 0.98 |
| 3 | 0.98 | 0.99 | 0.97 | 0.98 | 0.98 |
| 4 | 0.98 | 0.99 | 0.97 | 0.98 | 0.98 |
| 5 | 0.98 | 0.99 | 0.97 | 0.98 | 0.98 |
| Mean | 0.98 | 0.99 | 0.97 | 0.98 | 0.98 |

**Testing Metrics and Times**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Split | Accuracy | Precision | Recall | F1-score | AUC-ROC |
| 1 | 0.95 | 0.96 | 0.94 | 0.95 | 0.95 |
| 2 | 0.95 | 0.96 | 0.94 | 0.95 | 0.95 |
| 3 | 0.96 | 0.96 | 0.95 | 0.95 | 0.96 |
| 4 | 0.95 | 0.96 | 0.94 | 0.95 | 0.95 |
| 5 | 0.95 | 0.97 | 0.94 | 0.95 | 0.95 |
| Mean | 0.95 | 0.96 | 0.94 | 0.95 | 0.95 |

**Classifier: Random Forest**

**Training Metrics and Times**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Split | Accuracy | Precision | Recall | F1-score | AUC-ROC |
| 1 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| 2 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| 3 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| 4 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| 5 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Mean | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Testing Metrics and Times**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Split | Accuracy | Precision | Recall | F1-score | AUC-ROC |
| 1 | 0.93 | 0.95 | 0.91 | 0.93 | 0.93 |
| 2 | 0.93 | 0.95 | 0.92 | 0.93 | 0.93 |
| 3 | 0.93 | 0.95 | 0.91 | 0.93 | 0.93 |
| 4 | 0.93 | 0.95 | 0.91 | 0.93 | 0.93 |
| 5 | 0.93 | 0.95 | 0.91 | 0.93 | 0.93 |
| Mean | 0.93 | 0.95 | 0.91 | 0.93 | 0.93 |

**Classifier: XGBoost**

**Training Metrics and Times**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Split | Accuracy | Precision | Recall | F1-score | AUC-ROC |
| 1 | 0.86 | 0.89 | 0.83 | 0.86 | 0.86 |
| 2 | 0.86 | 0.89 | 0.83 | 0.86 | 0.86 |
| 3 | 0.86 | 0.89 | 0.83 | 0.86 | 0.86 |
| 4 | 0.87 | 0.89 | 0.83 | 0.86 | 0.87 |
| 5 | 0.86 | 0.89 | 0.83 | 0.86 | 0.86 |
| Mean | 0.86 | 0.89 | 0.83 | 0.86 | 0.86 |

**Testing Metrics and Times**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Split | Accuracy | Precision | Recall | F1-score | AUC-ROC |
| 1 | 0.82 | 0.84 | 0.79 | 0.81 | 0.82 |
| 2 | 0.82 | 0.84 | 0.79 | 0.81 | 0.82 |
| 3 | 0.82 | 0.84 | 0.78 | 0.81 | 0.82 |
| 4 | 0.82 | 0.84 | 0.78 | 0.81 | 0.82 |
| 5 | 0.82 | 0.84 | 0.78 | 0.81 | 0.82 |
| Mean | 0.82 | 0.84 | 0.78 | 0.81 | 0.82 |

**Classifier: Decision Tree**

**Training Metrics and Times**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Split | Accuracy | Precision | Recall | F1-score | AUC-ROC |
| 1 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| 2 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| 3 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| 4 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| 5 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Mean | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Testing Metrics and Times**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Split | Accuracy | Precision | Recall | F1-score | AUC-ROC |
| 1 | 0.84 | 0.84 | 0.83 | 0.84 | 0.84 |
| 2 | 0.84 | 0.84 | 0.83 | 0.84 | 0.84 |
| 3 | 0.84 | 0.84 | 0.84 | 0.84 | 0.84 |
| 4 | 0.83 | 0.84 | 0.83 | 0.83 | 0.83 |
| 5 | 0.84 | 0.84 | 0.83 | 0.84 | 0.84 |
| Mean | 0.84 | 0.84 | 0.83 | 0.84 | 0.84 |

**Classifier: Extra Trees**

**Training Metrics and Times**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Split | Accuracy | Precision | Recall | F1-score | AUC-ROC |
| 1 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| 2 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| 3 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| 4 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| 5 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Mean | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Testing Metrics and Times**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Split | Accuracy | Precision | Recall | F1-score | AUC-ROC |
| 1 | 0.94 | 0.96 | 0.91 | 0.94 | 0.94 |
| 2 | 0.94 | 0.96 | 0.91 | 0.93 | 0.94 |
| 3 | 0.94 | 0.96 | 0.91 | 0.94 | 0.94 |
| 4 | 0.94 | 0.96 | 0.91 | 0.93 | 0.93 |
| 5 | 0.94 | 0.96 | 0.91 | 0.93 | 0.94 |
| Mean | 0.94 | 0.96 | 0.91 | 0.93 | 0.94 |

Cross Validation - 16 Features

**Classifier: KNN**

**Training Metrics and Times**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Split | Accuracy | Precision | Recall | F1-score | AUC-ROC |
| 1 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| 2 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| 3 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| 4 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| 5 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Mean | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Testing Metrics and Times**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Split | Accuracy | Precision | Recall | F1-score | AUC-ROC |
| 1 | 0.99 | 1.00 | 0.99 | 0.99 | 0.99 |
| 2 | 0.99 | 1.00 | 0.99 | 0.99 | 0.99 |
| 3 | 0.99 | 1.00 | 0.99 | 0.99 | 0.99 |
| 4 | 0.99 | 1.00 | 0.99 | 0.99 | 0.99 |
| 5 | 0.99 | 1.00 | 0.99 | 0.99 | 0.99 |
| Mean | 0.99 | 1.00 | 0.99 | 0.99 | 0.99 |

**Classifier: Random Forest**

**Training Metrics and Times**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Split | Accuracy | Precision | Recall | F1-score | AUC-ROC |
| 1 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| 2 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| 3 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| 4 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| 5 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Mean | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Testing Metrics and Times**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Split | Accuracy | Precision | Recall | F1-score | AUC-ROC |
| 1 | 0.98 | 0.99 | 0.97 | 0.98 | 0.98 |
| 2 | 0.98 | 0.99 | 0.97 | 0.98 | 0.98 |
| 3 | 0.98 | 0.99 | 0.97 | 0.98 | 0.98 |
| 4 | 0.98 | 0.99 | 0.97 | 0.98 | 0.98 |
| 5 | 0.98 | 0.99 | 0.97 | 0.98 | 0.98 |
| Mean | 0.98 | 0.99 | 0.97 | 0.98 | 0.98 |

**Classifier: XGBoost**

**Training Metrics and Times**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Split | Accuracy | Precision | Recall | F1-score | AUC-ROC |
| 1 | 0.95 | 0.97 | 0.94 | 0.95 | 0.95 |
| 2 | 0.95 | 0.97 | 0.94 | 0.95 | 0.95 |
| 3 | 0.95 | 0.97 | 0.94 | 0.95 | 0.95 |
| 4 | 0.95 | 0.97 | 0.94 | 0.95 | 0.95 |
| 5 | 0.95 | 0.97 | 0.94 | 0.95 | 0.95 |
| Mean | 0.95 | 0.97 | 0.94 | 0.95 | 0.95 |

**Testing Metrics and Times**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Split | Accuracy | Precision | Recall | F1-score | AUC-ROC |
| 1 | 0.92 | 0.94 | 0.90 | 0.92 | 0.92 |
| 2 | 0.92 | 0.94 | 0.90 | 0.92 | 0.92 |
| 3 | 0.92 | 0.94 | 0.90 | 0.92 | 0.92 |
| 4 | 0.92 | 0.94 | 0.90 | 0.92 | 0.92 |
| 5 | 0.92 | 0.94 | 0.90 | 0.92 | 0.92 |
| Mean | 0.92 | 0.94 | 0.90 | 0.92 | 0.92 |

**Classifier: Decision Tree**

**Training Metrics and Times**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Split | Accuracy | Precision | Recall | F1-score | AUC-ROC |
| 1 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| 2 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| 3 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| 4 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| 5 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Mean | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Testing Metrics and Times**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Split | Accuracy | Precision | Recall | F1-score | AUC-ROC |
| 1 | 0.90 | 0.90 | 0.89 | 0.90 | 0.90 |
| 2 | 0.90 | 0.90 | 0.89 | 0.89 | 0.90 |
| 3 | 0.90 | 0.90 | 0.90 | 0.90 | 0.90 |
| 4 | 0.90 | 0.90 | 0.89 | 0.90 | 0.90 |
| 5 | 0.90 | 0.90 | 0.89 | 0.90 | 0.90 |
| Mean | 0.90 | 0.90 | 0.89 | 0.90 | 0.90 |

**Classifier: Extra Trees**

**Training Metrics and Times**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Split | Accuracy | Precision | Recall | F1-score | AUC-ROC |
| 1 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| 2 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| 3 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| 4 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| 5 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Mean | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Testing Metrics and Times**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Split | Accuracy | Precision | Recall | F1-score | AUC-ROC |
| 1 | 0.99 | 0.99 | 0.98 | 0.99 | 0.99 |
| 2 | 0.99 | 1.00 | 0.98 | 0.99 | 0.99 |
| 3 | 0.99 | 1.00 | 0.98 | 0.99 | 0.99 |
| 4 | 0.99 | 1.00 | 0.98 | 0.99 | 0.99 |
| 5 | 0.99 | 1.00 | 0.98 | 0.99 | 0.99 |
| Mean | 0.99 | 1.00 | 0.98 | 0.99 | 0.99 |

Cross Validation - 22 Features

**Classifier: KNN**

**Training Metrics and Times**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Split | Accuracy | Precision | Recall | F1-score | AUC-ROC |
| 1 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| 2 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| 3 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| 4 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| 5 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Mean | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Testing Metrics and Times**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Split | Accuracy | Precision | Recall | F1-score | AUC-ROC |
| 1 | 1.00 | 1.00 | 0.99 | 1.00 | 1.00 |
| 2 | 1.00 | 1.00 | 0.99 | 1.00 | 1.00 |
| 3 | 1.00 | 1.00 | 0.99 | 1.00 | 1.00 |
| 4 | 1.00 | 1.00 | 0.99 | 1.00 | 1.00 |
| 5 | 1.00 | 1.00 | 0.99 | 1.00 | 1.00 |
| Mean | 1.00 | 1.00 | 0.99 | 1.00 | 1.00 |

**Classifier: Random Forest**

**Training Metrics and Times**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Split | Accuracy | Precision | Recall | F1-score | AUC-ROC |
| 1 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| 2 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| 3 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| 4 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| 5 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Mean | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Testing Metrics and Times**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Split | Accuracy | Precision | Recall | F1-score | AUC-ROC |
| 1 | 0.99 | 0.99 | 0.98 | 0.99 | 0.99 |
| 2 | 0.99 | 0.99 | 0.98 | 0.99 | 0.99 |
| 3 | 0.99 | 0.99 | 0.98 | 0.99 | 0.99 |
| 4 | 0.99 | 0.99 | 0.98 | 0.99 | 0.99 |
| 5 | 0.99 | 0.99 | 0.98 | 0.99 | 0.99 |
| Mean | 0.99 | 0.99 | 0.98 | 0.99 | 0.99 |

**Classifier: XGBoost**

**Training Metrics and Times**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Split | Accuracy | Precision | Recall | F1-score | AUC-ROC |
| 1 | 0.97 | 0.98 | 0.96 | 0.97 | 0.97 |
| 2 | 0.97 | 0.98 | 0.96 | 0.97 | 0.97 |
| 3 | 0.97 | 0.98 | 0.96 | 0.97 | 0.97 |
| 4 | 0.97 | 0.98 | 0.96 | 0.97 | 0.97 |
| 5 | 0.97 | 0.98 | 0.96 | 0.97 | 0.97 |
| Mean | 0.97 | 0.98 | 0.96 | 0.97 | 0.97 |

**Testing Metrics and Times**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Split | Accuracy | Precision | Recall | F1-score | AUC-ROC |
| 1 | 0.95 | 0.96 | 0.93 | 0.95 | 0.95 |
| 2 | 0.94 | 0.96 | 0.93 | 0.94 | 0.94 |
| 3 | 0.95 | 0.96 | 0.93 | 0.95 | 0.95 |
| 4 | 0.94 | 0.96 | 0.93 | 0.94 | 0.94 |
| 5 | 0.95 | 0.96 | 0.93 | 0.95 | 0.95 |
| Mean | 0.95 | 0.96 | 0.93 | 0.94 | 0.95 |

**Classifier: Decision Tree**

**Training Metrics and Times**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Split | Accuracy | Precision | Recall | F1-score | AUC-ROC |
| 1 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| 2 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| 3 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| 4 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| 5 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Mean | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Testing Metrics and Times**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Split | Accuracy | Precision | Recall | F1-score | AUC-ROC |
| 1 | 0.91 | 0.91 | 0.90 | 0.91 | 0.91 |
| 2 | 0.90 | 0.91 | 0.90 | 0.90 | 0.90 |
| 3 | 0.90 | 0.91 | 0.90 | 0.90 | 0.90 |
| 4 | 0.91 | 0.91 | 0.90 | 0.91 | 0.91 |
| 5 | 0.91 | 0.91 | 0.90 | 0.91 | 0.91 |
| Mean | 0.91 | 0.91 | 0.90 | 0.91 | 0.91 |

**Classifier: Extra Trees**

**Training Metrics and Times**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Split | Accuracy | Precision | Recall | F1-score | AUC-ROC |
| 1 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| 2 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| 3 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| 4 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| 5 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Mean | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Testing Metrics and Times**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Split | Accuracy | Precision | Recall | F1-score | AUC-ROC |
| 1 | 0.99 | 1.00 | 0.99 | 0.99 | 0.99 |
| 2 | 0.99 | 1.00 | 0.99 | 0.99 | 0.99 |
| 3 | 0.99 | 1.00 | 0.99 | 0.99 | 0.99 |
| 4 | 0.99 | 1.00 | 0.99 | 0.99 | 0.99 |
| 5 | 0.99 | 1.00 | 0.99 | 0.99 | 0.99 |
| Mean | 0.99 | 1.00 | 0.99 | 0.99 | 0.99 |

Cross Validation - 27 Features

**Classifier: KNN**

**Training Metrics and Times**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Split | Accuracy | Precision | Recall | F1-score | AUC-ROC |
| 1 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| 2 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| 3 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| 4 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| 5 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Mean | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Testing Metrics and Times**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Split | Accuracy | Precision | Recall | F1-score | AUC-ROC |
| 1 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| 2 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| 3 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| 4 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| 5 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Mean | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Classifier: Random Forest**

**Training Metrics and Times**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Split | Accuracy | Precision | Recall | F1-score | AUC-ROC |
| 1 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| 2 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| 3 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| 4 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| 5 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Mean | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Testing Metrics and Times**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Split | Accuracy | Precision | Recall | F1-score | AUC-ROC |
| 1 | 0.99 | 0.99 | 0.98 | 0.99 | 0.99 |
| 2 | 0.99 | 0.99 | 0.98 | 0.99 | 0.99 |
| 3 | 0.99 | 0.99 | 0.98 | 0.99 | 0.99 |
| 4 | 0.99 | 0.99 | 0.98 | 0.99 | 0.99 |
| 5 | 0.99 | 0.99 | 0.98 | 0.99 | 0.99 |
| Mean | 0.99 | 0.99 | 0.98 | 0.99 | 0.99 |

**Classifier: XGBoost**

**Training Metrics and Times**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Split | Accuracy | Precision | Recall | F1-score | AUC-ROC |
| 1 | 0.98 | 0.99 | 0.97 | 0.98 | 0.98 |
| 2 | 0.98 | 0.99 | 0.97 | 0.98 | 0.98 |
| 3 | 0.98 | 0.99 | 0.97 | 0.98 | 0.98 |
| 4 | 0.98 | 0.99 | 0.97 | 0.98 | 0.98 |
| 5 | 0.98 | 0.99 | 0.97 | 0.98 | 0.98 |
| Mean | 0.98 | 0.99 | 0.97 | 0.98 | 0.98 |

**Testing Metrics and Times**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Split | Accuracy | Precision | Recall | F1-score | AUC-ROC |
| 1 | 0.95 | 0.97 | 0.94 | 0.95 | 0.95 |
| 2 | 0.95 | 0.97 | 0.94 | 0.95 | 0.95 |
| 3 | 0.96 | 0.97 | 0.94 | 0.96 | 0.96 |
| 4 | 0.96 | 0.97 | 0.94 | 0.95 | 0.96 |
| 5 | 0.95 | 0.97 | 0.94 | 0.95 | 0.96 |
| Mean | 0.95 | 0.97 | 0.94 | 0.95 | 0.96 |

**Classifier: Decision Tree**

**Training Metrics and Times**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Split | Accuracy | Precision | Recall | F1-score | AUC-ROC |
| 1 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| 2 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| 3 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| 4 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| 5 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Mean | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Testing Metrics and Times**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Split | Accuracy | Precision | Recall | F1-score | AUC-ROC |
| 1 | 0.91 | 0.91 | 0.91 | 0.91 | 0.91 |
| 2 | 0.91 | 0.91 | 0.91 | 0.91 | 0.91 |
| 3 | 0.91 | 0.91 | 0.91 | 0.91 | 0.91 |
| 4 | 0.91 | 0.91 | 0.91 | 0.91 | 0.91 |
| 5 | 0.91 | 0.91 | 0.91 | 0.91 | 0.91 |
| Mean | 0.91 | 0.91 | 0.91 | 0.91 | 0.91 |

**Classifier: Extra Trees**

**Training Metrics and Times**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Split | Accuracy | Precision | Recall | F1-score | AUC-ROC |
| 1 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| 2 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| 3 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| 4 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| 5 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Mean | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Testing Metrics and Times**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Split | Accuracy | Precision | Recall | F1-score | AUC-ROC |
| 1 | 0.99 | 1.00 | 0.99 | 0.99 | 0.99 |
| 2 | 0.99 | 1.00 | 0.99 | 0.99 | 0.99 |
| 3 | 0.99 | 1.00 | 0.99 | 0.99 | 0.99 |
| 4 | 0.99 | 1.00 | 0.99 | 0.99 | 0.99 |
| 5 | 0.99 | 1.00 | 0.99 | 0.99 | 0.99 |
| Mean | 0.99 | 1.00 | 0.99 | 0.99 | 0.99 |

Cross Validation - 30 Features (All)

**Classifier: KNN**

**Training Metrics and Times**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Split | Accuracy | Precision | Recall | F1-score | AUC-ROC |
| 1 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| 2 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| 3 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| 4 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| 5 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Mean | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Testing Metrics and Times**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Split | Accuracy | Precision | Recall | F1-score | AUC-ROC |
| 1 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| 2 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| 3 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| 4 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| 5 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Mean | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Classifier: Random Forest**

**Training Metrics and Times**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Split | Accuracy | Precision | Recall | F1-score | AUC-ROC |
| 1 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| 2 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| 3 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| 4 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| 5 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Mean | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Testing Metrics and Times**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Split | Accuracy | Precision | Recall | F1-score | AUC-ROC |
| 1 | 0.99 | 0.99 | 0.98 | 0.99 | 0.99 |
| 2 | 0.99 | 0.99 | 0.98 | 0.99 | 0.99 |
| 3 | 0.99 | 0.99 | 0.98 | 0.99 | 0.99 |
| 4 | 0.99 | 0.99 | 0.98 | 0.99 | 0.99 |
| 5 | 0.99 | 0.99 | 0.98 | 0.99 | 0.99 |
| Mean | 0.99 | 0.99 | 0.98 | 0.99 | 0.99 |

**Classifier: XGBoost**

**Training Metrics and Times**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Split | Accuracy | Precision | Recall | F1-score | AUC-ROC |
| 1 | 0.98 | 0.99 | 0.97 | 0.98 | 0.98 |
| 2 | 0.98 | 0.99 | 0.97 | 0.98 | 0.98 |
| 3 | 0.98 | 0.99 | 0.97 | 0.98 | 0.98 |
| 4 | 0.98 | 0.99 | 0.97 | 0.98 | 0.98 |
| 5 | 0.98 | 0.99 | 0.97 | 0.98 | 0.98 |
| Mean | 0.98 | 0.99 | 0.97 | 0.98 | 0.98 |

**Testing Metrics and Times**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Split | Accuracy | Precision | Recall | F1-score | AUC-ROC |
| 1 | 0.96 | 0.97 | 0.95 | 0.96 | 0.96 |
| 2 | 0.96 | 0.97 | 0.95 | 0.96 | 0.96 |
| 3 | 0.96 | 0.97 | 0.95 | 0.96 | 0.96 |
| 4 | 0.96 | 0.97 | 0.95 | 0.96 | 0.96 |
| 5 | 0.96 | 0.97 | 0.95 | 0.96 | 0.96 |
| Mean | 0.96 | 0.97 | 0.95 | 0.96 | 0.96 |

**Classifier: Decision Tree**

**Training Metrics and Times**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Split | Accuracy | Precision | Recall | F1-score | AUC-ROC |
| 1 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| 2 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| 3 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| 4 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| 5 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Mean | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Testing Metrics and Times**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Split | Accuracy | Precision | Recall | F1-score | AUC-ROC |
| 1 | 0.91 | 0.91 | 0.91 | 0.91 | 0.91 |
| 2 | 0.91 | 0.91 | 0.91 | 0.91 | 0.91 |
| 3 | 0.91 | 0.91 | 0.90 | 0.91 | 0.91 |
| 4 | 0.91 | 0.91 | 0.91 | 0.91 | 0.91 |
| 5 | 0.91 | 0.91 | 0.91 | 0.91 | 0.91 |
| Mean | 0.91 | 0.91 | 0.91 | 0.91 | 0.91 |

**Classifier: Extra Trees**

**Training Metrics and Times**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Split | Accuracy | Precision | Recall | F1-score | AUC-ROC |
| 1 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| 2 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| 3 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| 4 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| 5 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Mean | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Testing Metrics and Times**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Split | Accuracy | Precision | Recall | F1-score | AUC-ROC |
| 1 | 0.99 | 1.00 | 0.99 | 0.99 | 0.99 |
| 2 | 0.99 | 1.00 | 0.99 | 0.99 | 0.99 |
| 3 | 0.99 | 1.00 | 0.99 | 0.99 | 0.99 |
| 4 | 0.99 | 1.00 | 0.99 | 0.99 | 0.99 |
| 5 | 0.99 | 1.00 | 0.99 | 0.99 | 0.99 |
| Mean | 0.99 | 1.00 | 0.99 | 0.99 | 0.99 |