Classification results of all features Binary class

BFCC features

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | BFCC | | | MFCC | | | GTCC | | | RASTA PLP | | | PLP | | |
| Parameter  / kernel | Without PCA | With PCA | AC | WPCA | PCA | AC | WPCA | PCA | AC | WPCA | PCA | AC | WPCA | PCA | AC |
| Polynomial | | | | | | | | | | | | | | | |
| Accuracy | 69.23 ± 0.19 | 67.01± 0.07 | 69.23 ± 0.19 | 78.68± 0.21 | 76.64± 0.56 | 78.68± 0.21 | 70.1±1.02 | 70.25±0.23 | 70.1±1.02 | 70.79±0.23 | 67.52±0.22 | 70.79±0.23 | 83.92±0.21 | 80.26±0.23 | 83.92±0.21 |
| Sensitivity | 91.88± 0.21 | 91.32± 01.2 | 91.88± 0.21 | 98.14± 0.18 | 98.41± 0.75 | 98.14± 0.18 | 95.54±0.32 | 92.57±0.56 | 95.54±0.32 | 98.65±0.82 | 97.17± 0.28 | 98.65±0.82 | 70.37± 0.75 | 64.05± 0.61 | 70.37± 0.75 |
| Specificity | 26.89± 0.28 | 23.73± 0.48 | 26.89± 0.28 | 43.52± 0.75 | 97.88± 0.48 | 43.52± 0.75 | 42.53±0.21 | 46.27±0.38 | 42.53±0.21 | 40.48± 0.61 | 34.63± 0.61 | 40.48± 0.61 | 96.47±0.82 | 95.30± 0.75 | 96.47±0.82 |
| Avg PR | 46± 0.21 | 43± 0.28 | 46± 0.21 | 61.18± 0.91 | 57.59± 0.44 | 61.18± 0.91 | 65.94±1.34 | 65.37±0.48 | 65.94±1.34 | 67.58±0.82 | 66.66± 0.28 | 67.58±0.82 | 76.93± 0.75 | 73.05± 0.28 | 76.93± 0.75 |
| F score | 41.1 ±0.34 | 36.1± 0.07 | 41.1 ±0.34 | 59.95± 0.61 | 53.88± 0.31 | 59.95± 0.61 | 57.8±0.85 | 60.0±0.01 | 57.8±0.85 | 57.21± 0.75 | 50.5±0.82 | 57.21± 0.75 | 86.62± 0.75 | 83.42±0.82 | 86.62± 0.75 |
| Linear | | | | | | | | | | | | | | | |
| Accuracy | 77.85 ± 0.08 | 77.03 ± 0.08 | 77.85 ± 0.08 | 84.43± 0.23 | 81.13± 0.95 | 84.43± 0.23 | 81.28±0.31 | 81.53±0.57 | 81.28±0.31 | 55.14± 0.75 | 52.10±0.31 | 55.14± 0.75 | 94.76±0.31 | 91.71± 0.75 | 94.76±0.31 |
| Sensitivity | 88.66± 0.21 | 86.84± 0.22 | 88.66± 0.21 | 91.54± 0.51 | 90.22± 0.27 | 91.54± 0.51 | 71.73±0.23 | 77.62±0.65 | 71.73±0.23 | 99.21±0.31 | 97.23±0.65 | 99.21±0.31 | 97.77±0.65 | 93.67±0.23 | 97.77±0.65 |
| Specificity | 59.81± 0.31 | 54.74± 0.44 | 59.81± 0.31 | 71.76± 0.66 | 64.94± 0.21 | 59.81± 0.31 | 80.85±1.2 | 78.73±0.82 | 80.85±1.2 | 61.82±0.82 | 51.62±0.65 | 61.82±0.82 | 51.63±0.82 | 89.90±0.23 | 51.63±0.82 |
| Average Precision | 60± 0.34 | 58± 0.34 | 60± 0.34 | 69.47± 0.21 | 63.82± 0.18 | 69.47± 0.21 | 74.25±2.11 | 74.98±0.88 | 74.25±2.11 | 51.11±0.55 | 47.90± 0.65 | 51.11±0.55 | 93.77± 0.65 | 89.53±0.21 | 93.77± 0.65 |
| F score | 67.4 ± 0.18 | 63.7 ± 0.18 | 67.4 ± 0.18 | 76.81± 0.93 | 71.25± 0.17 | 76.81± 0.93 | 80.61±0.21 | 80.44±0.55 | 80.61±0.21 | 12.7± 0.18 | 60.11±0.21 | 12.7± 0.18 | 92.72± 0.93 | 91.8± 0.18 | 92.72± 0.93 |
| Gaussian | | | | | | | | | | | | | | |  |
| Accuracy | 81.81 ± 0.07 | 82.18 ± 0.07 | 81.81 ± 0.07 | 94.07± 0.18 | 89.42± 0.12 | 94.07± 0.18 | 89.17± 0.35 | 86.41±0.45 | 89.17± 0.35 | 89.71± 0.21 | 83.31± 0.93 | 89.71± 0.21 | 96.34± 0.06 | 95.35± 0.33 | 96.34± 0.06 |
| Sensitivity | 90.95± 0.13 | 92.22± 0.61 | 90.95± 0.13 | 98.41± 0.21 | 94.31± 0.35 | 98.41± 0.21 | 89.60± 0.65 | 88.61±0.71 | 89.60± 0.65 | 95.55± 0.53 | 94.61±0.52 | 95.55± 0.53 | 96.96± 0.53 | 94.17±0.52 | 96.96± 0.53 |
| Specificity | 69.93± 0.28 | 68.03± 0.53 | 69.93± 0.28 | 37.88± 0.53 | 90.70± 0.65 | 37.88± 0.53 | 84.57± 0.06 | 84.04±0.14 | 84.57± 0.06 | 83.41±0.14 | 81.46± 0.33 | 83.41±0.14 | 95.77±0.14 | 92.97± 0.93 | 95.77±0.14 |
| Average Precision | 66± 0.06 | 66± 0.06 | 66± 0.06 | 87.42± 0.63 | 78.65± 0.75 | 87.42± 0.63 | 82.14± 0.28 | 81.04±0.18 | 82.14± 0.28 | 86.7± 0.21 | 86.88± 0.06 | 86.7± 0.21 | 95.23±0.52 | 91.51± 0.53 | 95.23±0.52 |
| F score | 73.6± 0.33 | 70± 0.33 | 73.6± 0.33 | 91.73± 0.85 | 84.62± 0.14 | 91.73± 0.85 | 86.41± 0.33 | 85.61±0.52 | 86.41± 0.33 | 88.61± 0.06 | 87.01±0.14 | 86.7± 0.21 | 95.23±0.52 | 93.75± 0.85 | 95.23±0.52 |
| KNN | | | | | | | | | | | | | | | |
| Accuracy | 81.46± 1.24 | 80.30± 0.24 | 81.46± 1.24 | 93.73± 0.22 | 90.01± 0.18 | 93.73± 0.22 | 88.20± 0.27 | 84.61±0.21 | 88.20± 0.27 | 90.18± 0.27 | 89.01± 0.22 | 90.18± 0.27 | 95.49± 0.22 | 92.55±0.35 | 95.49± 0.22 |
| Sensitivity | 91.88± 0.13 | 87.45± 0.53 | 87.45± 0.18 | 96.30± 0.11 | 94.71± 0.11 | 96.30± 0.11 | 89.10±0.20 | 89.10±0.32 | 89.10±0.20 | 94.61± 0.22 | 88.78± 0.22 | 94.61± 0.22 | 96.96± 0.22 | 93.41± 0.18 | 96.96± 0.22 |
| Specificity | 61.70± 0.14 | 67.08± .68 | 61.08± 0.52 | 89.17± 0.27 | 81.64±2.14 | 89.17± 0.27 | 87.23± 0.27 | 79.78±0.35 | 87.23± 0.27 | 85.36± 0.52 | 89.26± 0.27 | 85.36± 0.52 | 94.13± 0.18 | 93.49± 0.18 | 94.13± 0.18 |
| Average Precision | 64.25± 1.26 | 64.32± 1.26 | 65± 1.26 | 86.93± 0.18 | 79.81±0.12 | 86.93± 0.18 | 83.07±0.20 | 79.33±0.41 | 83.07±0.20 | 86.90±0.35 | 83.68±0.20 | 86.90±0.35 | 94.44± 0.22 | 91.78± 0.52 | 94.44± 0.22 |
| F score | 72.82± 0.18 | 70.4± 0.18 | 72.82± 0.18 | 91.11± 0.7 | 85.5±0.35 | 91.11± 0.7 | 87.77± 0.27 | 83.33±0.20 | 87.77± 0.27 | 89.31± 0.18 | 88.61± 0.27 | 89.31± 0.18 | 95.55± 0.52 | 92.8± 0.19 | 95.55± 0.52 |
| Random Forest | | | | | | | | | | | | | | | |
| Accuracy | 80.41± 0.07 | 80.30± 0.07 | 80.41± 0.07 | 93.06± 0.21 | 90.52±0.32 | 93.06± 0.21 | 84.81± 0.22 | 86.92±0.82 | 84.81± 0.22 | 90.42± 0.18 | 88.31± 0.18 | 90.42± 0.18 | 93.90± 0.18 | 91.59± 0.18 | 93.90± 0.18 |
| Sensitivity | 90.22± 0.03 | 90.22± 0.18 | 90.22± 0.03 | 97.88± 0.19 | 95.64±1.25 | 97.88± 0.19 | 89.10± 0.18 | 88.61±0.52 | 89.10± 0.18 | 94.61± 0.52 | 91.03±0.20 | 94.61± 0.52 | 96.45± 0.52 | 93.41± 0.19 | 96.45± 0.52 |
| Specificity | 66.45± 0.22 | 69.30± 0.51 | 66.45± 0.22 | 84.47± 0.85 | 81.41±0.89 | 84.47± 0.85 | 80.31± 0.22 | 85.10±0.17 | 80.31± 0.22 | 85.85± 0.27 | 85.36± 0.18 | 85.85± 0.27 | 91.54± 0.19 | 89.90± 0.27 | 91.54± 0.19 |
| Average Precision | 65± 0.28 | 645.11± 0.28 | 65± 0.28 | 86.45± 0.25 | 81.01±0.62 | 86.45± 0.25 | 79.59± 0.18 | 81.59±0.12 | 79.59± 0.18 | 97.15± 0.22 | 83.62.± 0.07 | 97.15± 0.22 | 92.76± 0.19 | 89.43.± 0.07 | 92.76± 0.19 |
| F score | 71.± 0.07 | 70.± 0.07 | 71.± 0.07 | 89.71± 0.17 | 86.10±0.32 | 89.71± 0.17 | 83.77± 0.18 | 86.31±0.24 | 83.77± 0.18 | 96.62± 0.18 | 87.51± 0.52 | 96.62± 0.18 | 94.00± 0.52 | 91.71± 0.19 | 94.00± 0.52 |