**Random Forest**

**For testing dataset:**

The confusion matrix:

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| 46753 | 507 | 6131 | 849 | 443 |
| 615 | 46709 | 536 | 624 | 450 |
| 720 | 555 | 46600 | 860 | 474 |
| 704 | 528 | 698 | 46578 | 431 |
| 580 | 537 | 658 | 737 | 47001 |

Using manual testing

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Expression | Accuracy | Precision | Specificity | Sensitivity |
| Happy | 95.80 | 85.49 | 96.07 | 94.69 |
| Sad | 98.26 | 95.45 | 98.90 | 95.64 |
| Sleepy | 95.76 | 94.64 | 85.31 | 98.67 |
| Surprised | 97.83 | 95.17 | 98.82 | 93.81 |
| Wink | 98.75 | 94.92 | 98.75 | 96.31 |

**For training dataset:**

**Confusion matrix for training dataset:**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| 187097 | 2078 | 2458 | 3173 | 1789 |
| 2672 | 187563 | 2181 | 2561 | 1849 |
| 2999 | 2232 | 186032 | 3242 | 2046 |
| 2986 | 2116 | 2693 | 187234 | 1792 |
| 2302 | 1969 | 2459 | 2914 | 186602 |

**ANN:**

Used 75 epochs and batch size = 20.

The accuracy by the end of the 75th epoch is 95.53

**For testing dataset:**

**The confusion matrix:**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| 46126 | 757 | 1029 | 744 | 509 |
| 853 | 46107 | 744 | 611 | 619 |
| 1465 | 1139 | 44546 | 1149 | 910 |
| 1036 | 810 | 846 | 45507 | 740 |
| 808 | 712 | 930 | 700 | 46363 |

**The result:**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Expression | Accuracy | Precision | Specificity | Sensitivity |
| Happy | 97.06 | 93.81 | 98.44 | 91.72 |
| Sad | 97.45 | 94.22 | 98.55 | 93.09 |
| Sleepy | 96.65 | 90.52 | 97.64 | 92.62 |
| Surprised | 97.29 | 92.98 | 98.25 | 93.42 |
| Wink | 97.58 | 93.63 | 98.39 | 94.34 |

**The training set:**

**The confusion matrix:**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| 189223 | 1964 | 2383 | 1784 | 1241 |
| 2272 | 189733 | 1645 | 1699 | 1477 |
| 3891 | 2742 | 184656 | 2916 | 2346 |
| 2592 | 2068 | 1910 | 188337 | 1914 |
| 2171 | 1706 | 2377 | 1810 | 188182 |