**RANDOM FOREST OUTPUT**

Accuracy: 0.9862429172417939

F1 Score: 0.8176042842174301

Classification Report:

precision recall f1-score support

0 1.00 0.99 0.99 681396

1 0.82 0.47 0.60 587

2 1.00 1.00 1.00 38408

3 0.99 0.99 0.99 3088

4 0.90 0.97 0.93 69037

5 0.96 0.98 0.97 1650

6 1.00 1.00 1.00 1739

7 1.00 0.99 0.99 2380

8 1.00 1.00 1.00 3

9 1.00 0.64 0.78 11

10 0.99 1.00 1.00 47641

11 0.99 0.52 0.68 1769

12 0.71 0.65 0.68 452

13 1.00 0.17 0.29 6

14 0.39 0.35 0.37 196

accuracy 0.99 848363

macro avg 0.92 0.78 0.82 848363

weighted avg 0.99 0.99 0.99 848363

Confusion Matrix:

[[673239 59 53 29 7647 56 2 10 0 0

293 6 2 0 0]

[ 310 277 0 0 0 0 0 0 0 0

0 0 0 0 0]

[ 51 0 38352 0 5 0 0 0 0 0

0 0 0 0 0]

[ 38 0 0 3045 0 5 0 0 0 0

0 0 0 0 0]

[ 1854 0 0 0 67180 0 0 0 0 0

2 0 1 0 0]

[ 37 0 0 1 0 1610 2 0 0 0

0 0 0 0 0]

[ 4 0 0 0 1 1 1733 0 0 0

0 0 0 0 0]

[ 25 0 0 0 0 0 0 2354 0 0

0 0 1 0 0]

[ 0 0 0 0 0 0 0 0 3 0

0 0 0 0 0]

[ 4 0 0 0 0 0 0 0 0 7

0 0 0 0 0]

[ 10 0 0 0 18 0 0 0 0 0

47613 0 0 0 0]

[ 856 0 0 0 0 0 0 0 0 0

0 913 0 0 0]

[ 47 0 0 0 0 0 1 0 0 0

1 0 296 0 107]

[ 5 0 0 0 0 0 0 0 0 0

0 0 0 1 0]

[ 11 0 0 0 0 0 0 0 0 0

1 0 115 0 69]]

Model saved as 'RandomForest\_model\_2.pkl'

**SVM OUTPUT**

LinearSVC Accuracy: 0.8884864144240142

LinearSVC F1 Score (macro): 0.3659519284720499

Classification Report:

precision recall f1-score support

0 0.94 0.93 0.94 681396

1 0.00 0.01 0.00 587

2 0.81 0.60 0.69 38408

3 0.64 0.85 0.73 3088

4 0.89 0.60 0.72 69037

5 0.22 0.76 0.35 1650

6 0.00 0.00 0.00 1739

7 0.65 0.49 0.56 2380

8 0.00 0.00 0.00 3

9 0.01 0.18 0.01 11

10 0.67 1.00 0.80 47641

11 0.84 0.51 0.63 1769

12 0.03 0.02 0.03 452

13 0.00 0.00 0.00 6

14 0.02 0.93 0.03 196

accuracy 0.89 848363

macro avg 0.38 0.46 0.37 848363

weighted avg 0.91 0.89 0.89 848363

Confusion Matrix:

[[635442 279 581 799 2857 3427 1092 625 1 276

23155 177 327 1496 10862]

[ 228 3 0 0 0 0 0 0 0 0

356 0 0 0 0]

[ 12268 0 23160 336 2494 92 0 0 0 0

2 0 56 0 0]

[ 298 0 2 2611 0 7 99 0 0 0

0 0 1 70 0]

[ 22385 0 4933 42 41464 204 0 0 0 7

0 0 0 0 2]

[ 309 2 1 2 0 1262 2 0 0 0

1 0 0 70 1]

[ 243 506 45 300 0 622 6 0 0 0

1 0 0 15 1]

[ 1206 0 0 0 0 0 6 1167 0 0

0 0 0 0 1]

[ 0 0 0 0 0 0 0 0 0 0

0 0 0 0 3]

[ 9 0 0 0 0 0 0 0 0 2

0 0 0 0 0]

[ 24 0 24 0 0 0 43 0 0 0

47547 0 0 0 3]

[ 861 0 0 0 0 0 0 0 0 0

6 902 0 0 0]

[ 61 0 0 0 0 0 0 17 0 0

1 1 11 0 361]

[ 6 0 0 0 0 0 0 0 0 0

0 0 0 0 0]

[ 14 0 0 0 0 0 0 0 0 0

0 0 0 0 182]]

Model saved as 'svm\_model 2.pkl'

**ANN OUTPUT**

ANN Accuracy: 0.9714968710328008

ANN F1 Score (macro): 0.6709483102525972

Classification Report:

precision recall f1-score support

0 0.97 1.00 0.98 681396

1 0.87 0.36 0.51 587

2 0.99 0.99 0.99 38408

3 0.97 0.96 0.97 3088

4 0.99 0.72 0.83 69037

5 0.86 0.96 0.91 1650

6 0.96 0.87 0.91 1739

7 0.92 0.99 0.96 2380

8 0.60 1.00 0.75 3

9 1.00 0.27 0.43 11

10 0.99 1.00 0.99 47641

11 1.00 0.51 0.67 1769

12 0.85 0.06 0.12 452

13 0.00 0.00 0.00 6

14 1.00 0.03 0.05 196

accuracy 0.97 848363

macro avg 0.86 0.65 0.67 848363

weighted avg 0.97 0.97 0.97 848363

Confusion Matrix:

[[679761 31 352 82 215 242 49 193 2 0

456 4 5 4 0]

[ 373 214 0 0 0 0 0 0 0 0

0 0 0 0 0]

[ 133 0 37907 0 368 0 0 0 0 0

0 0 0 0 0]

[ 116 0 2 2960 5 5 0 0 0 0

0 0 0 0 0]

[ 19485 0 47 1 49504 0 0 0 0 0

0 0 0 0 0]

[ 55 0 1 1 0 1582 11 0 0 0

0 0 0 0 0]

[ 215 0 0 0 0 14 1510 0 0 0

0 0 0 0 0]

[ 14 0 0 0 0 0 11 2355 0 0

0 0 0 0 0]

[ 0 0 0 0 0 0 0 0 3 0

0 0 0 0 0]

[ 7 0 0 1 0 0 0 0 0 3

0 0 0 0 0]

[ 183 0 4 0 6 0 0 0 0 0

47448 0 0 0 0]

[ 866 0 0 0 0 0 0 0 0 0

1 902 0 0 0]

[ 424 0 0 0 0 0 0 0 0 0

0 0 28 0 0]

[ 5 0 0 1 0 0 0 0 0 0

0 0 0 0 0]

[ 191 0 0 0 0 0 0 0 0 0

0 0 0 0 5]]

WARNING:absl:You are saving your model as an HDF5 file via `model.save()` or `keras.saving.save\_model(model)`. This file format is considered legacy. We recommend using instead the native Keras format, e.g. `model.save('my\_model.keras')` or `keras.saving.save\_model(model, 'my\_model.keras')`.

Model saved as 'ANN\_model\_2.h5'