

```

PS C:\Users\kamal\OneDrive\Desktop\DL Mini project> python sign_verify.py
2025-10-14 23:10:22.413907: I tensorflow/core/util/port.cc:153] oneDNN custom operations are on. You may see slightly different numerical results due to floating-
point round-off errors from different computation orders. To turn them off, set the environment variable `TF_ENABLE_ONEDNN_OPTS=0`.
2025-10-14 23:10:24.679529: I tensorflow/core/util/port.cc:153] oneDNN custom operations are on. You may see slightly different numerical results due to floating-
point round-off errors from different computation orders. To turn them off, set the environment variable `TF_ENABLE_ONEDNN_OPTS=0`.
Loading VGG16 model...
2025-10-14 23:10:30.123187: I tensorflow/core/platform/cpu_feature_guard.cc:210] This TensorFlow binary is optimized to use available CPU instructions in performa
nce-critical operations.
To enable the following instructions: SSE3 SSE4.1 SSE4.2 AVX AVX2 FMA, in other operations, rebuild TensorFlow with the appropriate compiler flags.
✅ Model loaded successfully

Extracting features for genuine signatures...
1/1 ██████████ 0s 465ms/step
1/1 ██████████ 0s 175ms/step
1/1 ██████████ 0s 205ms/step
1/1 ██████████ 0s 199ms/step
1/1 ██████████ 0s 214ms/step
1/1 ██████████ 0s 177ms/step

Extracting features for forged signatures...
1/1 ██████████ 0s 167ms/step
1/1 ██████████ 0s 200ms/step
1/1 ██████████ 0s 169ms/step
1/1 ██████████ 0s 243ms/step
1/1 ██████████ 0s 186ms/step
1/1 ██████████ 0s 163ms/step
1/1 ██████████ 0s 217ms/step
1/1 ██████████ 0s 175ms/step
1/1 ██████████ 0s 169ms/step
1/1 ██████████ 0s 181ms/step
1/1 ██████████ 0s 169ms/step

✅ Total signatures loaded: 240

Training classifier...

🔴 Model Accuracy: 95.83%

Classification Report:
      precision    recall  f1-score   support

   Forged         0.96      0.96      0.96        24
   Genuine         0.96      0.96      0.96        24

 accuracy          0.96          48

 accuracy          0.96          48

 accuracy          0.96          48

 accuracy          0.96          48

 accuracy          0.96          48
 macro avg         0.96      0.96      0.96          48
 weighted avg      0.96      0.96      0.96          48

 accuracy          0.96          48
 macro avg         0.96      0.96      0.96          48
 weighted avg      0.96      0.96      0.96          48

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 macro avg         0.96      0.96      0.96          48
 weighted avg      0.96      0.96      0.96          48

 accuracy          0.96          48
 macro avg         0.96      0.96      0.96          48
 weighted avg      0.96      0.96      0.96          48

Testing a single image...
1/1 ██████████ 0s 189ms/step
❌ NFI-00101014.png → Forged Signature

```