Using device: cuda

Starting augmentation process...

Augmented images for E already exist. Skipping augmentation.

Augmented images for S already exist. Skipping augmentation.

Augmented images for SB already exist. Skipping augmentation.

Data augmentation complete. Augmented images saved to: /opt/data/private/kashif/test/

Processing training images with quantum convolution...

Processing test images with quantum convolution...

Saving comparison images (original vs. quantum processed)...

2025-02-26 12:01:57.096088: I tensorflow/core/platform/cpu\_feature\_guard.cc:151] This TensorFlow binary is optimized with oneAPI Deep Neural Network Library (oneDNN) to use the following CPU instructions in performance-critical operations: AVX2 AVX512F FMA

To enable them in other operations, rebuild TensorFlow with the appropriate compiler flags.

2025-02-26 12:01:57.700534: I tensorflow/core/common\_runtime/gpu/gpu\_device.cc:1525] Created device /job:localhost/replica:0/task:0/device:GPU:0 with 22305 MB memory: -> device: 0, name: NVIDIA GeForce RTX 3090, pci bus id: 0000:3e:00.0, compute capability: 8.6

Training model...

Epoch 1/10

2025-02-26 12:01:59.898109: I tensorflow/stream\_executor/cuda/cuda\_dnn.cc:366] Loaded cuDNN version 8101

2025-02-26 12:02:01.240399: I tensorflow/core/platform/default/subprocess.cc:304] Start cannot spawn child process: No such file or directory

2025-02-26 12:02:02.825896: I tensorflow/stream\_executor/cuda/cuda\_blas.cc:1774] TensorFloat-32 will be used for the matrix multiplication. This will only be logged once.

6000/6000 - 28s - loss: 0.0336 - accuracy: 0.9883 - val\_loss: 0.0034 - val\_accuracy: 0.9991 - 28s/epoch - 5ms/step

Epoch 2/10

6000/6000 - 22s - loss: 0.0040 - accuracy: 0.9988 - val\_loss: 0.0013 - val\_accuracy: 0.9997 - 22s/epoch - 4ms/step

Epoch 3/10

6000/6000 - 23s - loss: 0.0028 - accuracy: 0.9992 - val\_loss: 0.0025 - val\_accuracy: 0.9995 - 23s/epoch - 4ms/step

Epoch 4/10

6000/6000 - 23s - loss: 0.0021 - accuracy: 0.9994 - val\_loss: 0.0043 - val\_accuracy: 0.9991 - 23s/epoch - 4ms/step

Epoch 5/10

6000/6000 - 23s - loss: 0.0018 - accuracy: 0.9995 - val\_loss: 0.0012 - val\_accuracy: 0.9997 - 23s/epoch - 4ms/step

Epoch 6/10

6000/6000 - 21s - loss: 0.0016 - accuracy: 0.9995 - val\_loss: 0.0027 - val\_accuracy: 0.9992 - 21s/epoch - 4ms/step

Epoch 7/10

6000/6000 - 22s - loss: 0.0015 - accuracy: 0.9996 - val\_loss: 7.5758e-04 - val\_accuracy: 0.9998 - 22s/epoch - 4ms/step

Epoch 8/10

6000/6000 - 21s - loss: 0.0016 - accuracy: 0.9996 - val\_loss: 8.9719e-04 - val\_accuracy: 0.9997 - 21s/epoch - 4ms/step

Epoch 9/10

6000/6000 - 21s - loss: 9.6686e-04 - accuracy: 0.9997 - val\_loss: 0.0019 - val\_accuracy: 0.9997 - 21s/epoch - 4ms/step

Epoch 10/10

6000/6000 - 21s - loss: 9.0741e-04 - accuracy: 0.9997 - val\_loss: 6.0148e-04 - val\_accuracy: 0.9999 - 21s/epoch - 4ms/step

Model saved to /opt/data/private/kashif/test/trained\_model.h5

Confusion matrix saved to /opt/data/private/kashif/test/confusion\_matrix.png