2025-08-11 12:24:52.666445: W tensorflow/core/common\_runtime/bfc\_allocator.cc:360] Garbage collection: deallocate free memory regions (i.e., allocations) so that we can re-allocate a larger region to avoid OOM due to memory fragmentation. If you see this message frequently, you are running near the threshold of the available device memory and re-allocation may incur great performance overhead. You may try smaller batch sizes to observe the performance impact. Set TF\_ENABLE\_GPU\_GARBAGE\_COLLECTION=false if you'd like to disable this feature.

Epoch 1: val\_loss improved from inf to 6.47147, saving model to D:/plants-app/fruit-classify-quality-detector\outputs\model\_weights\model\_best.keras

📊 Epoch 1 — Overall Train Accuracy: 0.5357 | Overall Val Accuracy: 0.5000

14/14 [==============================] - 11s 441ms/step - loss: 6.3437 - darkspots\_loss: 0.6628 - is\_organic\_loss: 0.7446 - quality\_grade\_loss: 1.3053 - shape\_irregularity\_loss: 1.3139 - shininess\_loss: 0.8197 - size\_loss: 1.4950 - darkspots\_accuracy: 0.5926 - darkspots\_auc: 0.6464 - is\_organic\_accuracy: 0.5370 - is\_organic\_auc: 0.4996 - quality\_grade\_accuracy: 0.3796 - quality\_grade\_auc: 0.4677 - shape\_irregularity\_accuracy: 0.3241 - shape\_irregularity\_auc: 0.5292 - shininess\_accuracy: 0.5000 - shininess\_auc: 0.4954 - size\_accuracy: 0.3148 - size\_auc: 0.4723 - val\_loss: 6.4715 - val\_darkspots\_loss: 0.8543 - val\_is\_organic\_loss: 0.5555 - val\_quality\_grade\_loss: 1.3776 - val\_shape\_irregularity\_loss: 1.0189 - val\_shininess\_loss: 0.5274 - val\_size\_loss: 2.1353 - val\_darkspots\_accuracy: 0.4167 - val\_darkspots\_auc: 0.3333 - val\_is\_organic\_accuracy: 0.7500 - val\_is\_organic\_auc: 0.9750 - val\_quality\_grade\_accuracy: 0.3333 - val\_quality\_grade\_auc: 0.4043 - val\_shape\_irregularity\_accuracy: 0.4167 - val\_shape\_irregularity\_auc: 0.7206 - val\_shininess\_accuracy: 0.8333 - val\_shininess\_auc: 0.8286 - val\_size\_accuracy: 0.1667 - val\_size\_auc: 0.4785

Epoch 2: val\_loss improved from 6.47147 to 5.91105, saving model to D:/plants-app/fruit-classify-quality-detector\outputs\model\_weights\model\_best.keras

📊 Epoch 2 — Overall Train Accuracy: 0.6220 | Overall Val Accuracy: 0.5417

14/14 [==============================] - 3s 193ms/step - loss: 4.3936 - darkspots\_loss: 0.4844 - is\_organic\_loss: 0.6062 - quality\_grade\_loss: 0.8202 - shape\_irregularity\_loss: 0.9627 - shininess\_loss: 0.6640 - size\_loss: 0.8536 - darkspots\_accuracy: 0.7500 - darkspots\_auc: 0.8600 - is\_organic\_accuracy: 0.6481 - is\_organic\_auc: 0.7023 - quality\_grade\_accuracy: 0.6204 - quality\_grade\_auc: 0.7872 - shape\_irregularity\_accuracy: 0.5463 - shape\_irregularity\_auc: 0.7407 - shininess\_accuracy: 0.6204 - shininess\_auc: 0.6634 - size\_accuracy: 0.6296 - size\_auc: 0.8106 - val\_loss: 5.9110 - val\_darkspots\_loss: 0.7577 - val\_is\_organic\_loss: 0.5024 - val\_quality\_grade\_loss: 1.2659 - val\_shape\_irregularity\_loss: 0.9809 - val\_shininess\_loss: 0.4793 - val\_size\_loss: 1.9224 - val\_darkspots\_accuracy: 0.5000 - val\_darkspots\_auc: 0.7407 - val\_is\_organic\_accuracy: 0.8333 - val\_is\_organic\_auc: 0.9000 - val\_quality\_grade\_accuracy: 0.4167 - val\_quality\_grade\_auc: 0.6682 - val\_shape\_irregularity\_accuracy: 0.5000 - val\_shape\_irregularity\_auc: 0.8933 - val\_shininess\_accuracy: 0.9167 - val\_shininess\_auc: 0.8429 - val\_size\_accuracy: 0.1667 - val\_size\_auc: 0.6022

Epoch 3: val\_loss improved from 5.91105 to 5.53943, saving model to D:/plants-app/fruit-classify-quality-detector\outputs\model\_weights\model\_best.keras

📊 Epoch 3 — Overall Train Accuracy: 0.6607 | Overall Val Accuracy: 0.5312

14/14 [==============================] - 3s 202ms/step - loss: 3.5241 - darkspots\_loss: 0.4322 - is\_organic\_loss: 0.5186 - quality\_grade\_loss: 0.6411 - shape\_irregularity\_loss: 0.6955 - shininess\_loss: 0.5338 - size\_loss: 0.7006 - darkspots\_accuracy: 0.8519 - darkspots\_auc: 0.8887 - is\_organic\_accuracy: 0.7222 - is\_organic\_auc: 0.7968 - quality\_grade\_accuracy: 0.7500 - quality\_grade\_auc: 0.8763 - shape\_irregularity\_accuracy: 0.7037 - shape\_irregularity\_auc: 0.8664 - shininess\_accuracy: 0.7315 - shininess\_auc: 0.8129 - size\_accuracy: 0.6667 - size\_auc: 0.8535 - val\_loss: 5.5394 - val\_darkspots\_loss: 0.7382 - val\_is\_organic\_loss: 0.5840 - val\_quality\_grade\_loss: 1.1975 - val\_shape\_irregularity\_loss: 0.9850 - val\_shininess\_loss: 0.4422 - val\_size\_loss: 1.5902 - val\_darkspots\_accuracy: 0.5000 - val\_darkspots\_auc: 0.9074 - val\_is\_organic\_accuracy: 0.7500 - val\_is\_organic\_auc: 0.9000 - val\_quality\_grade\_accuracy: 0.5000 - val\_quality\_grade\_auc: 0.8056 - val\_shape\_irregularity\_accuracy: 0.5000 - val\_shape\_irregularity\_auc: 0.9263 - val\_shininess\_accuracy: 0.7500 - val\_shininess\_auc: 0.9143 - val\_size\_accuracy: 0.2500 - val\_size\_auc: 0.6556

Epoch 4: val\_loss did not improve from 5.53943

📊 Epoch 4 — Overall Train Accuracy: 0.6667 | Overall Val Accuracy: 0.4792

14/14 [==============================] - 2s 178ms/step - loss: 2.9948 - darkspots\_loss: 0.3366 - is\_organic\_loss: 0.4844 - quality\_grade\_loss: 0.5914 - shape\_irregularity\_loss: 0.5269 - shininess\_loss: 0.4365 - size\_loss: 0.6167 - darkspots\_accuracy: 0.8796 - darkspots\_auc: 0.9511 - is\_organic\_accuracy: 0.7685 - is\_organic\_auc: 0.8406 - quality\_grade\_accuracy: 0.7500 - quality\_grade\_auc: 0.9058 - shape\_irregularity\_accuracy: 0.8611 - shape\_irregularity\_auc: 0.9453 - shininess\_accuracy: 0.8426 - shininess\_auc: 0.9127 - size\_accuracy: 0.7315 - size\_auc: 0.8873 - val\_loss: 5.8506 - val\_darkspots\_loss: 0.6791 - val\_is\_organic\_loss: 0.7550 - val\_quality\_grade\_loss: 1.4360 - val\_shape\_irregularity\_loss: 0.9491 - val\_shininess\_loss: 0.4606 - val\_size\_loss: 1.5684 - val\_darkspots\_accuracy: 0.5000 - val\_darkspots\_auc: 0.9630 - val\_is\_organic\_accuracy: 0.4167 - val\_is\_organic\_auc: 0.8000 - val\_quality\_grade\_accuracy: 0.5000 - val\_quality\_grade\_auc: 0.8503 - val\_shape\_irregularity\_accuracy: 0.5000 - val\_shape\_irregularity\_auc: 1.0000 - val\_shininess\_accuracy: 0.7500 - val\_shininess\_auc: 0.9143 - val\_size\_accuracy: 0.3333 - val\_size\_auc: 0.7017

Epoch 5: val\_loss did not improve from 5.53943

📊 Epoch 5 — Overall Train Accuracy: 0.6801 | Overall Val Accuracy: 0.4375

14/14 [==============================] - 2s 180ms/step - loss: 2.3515 - darkspots\_loss: 0.2377 - is\_organic\_loss: 0.4256 - quality\_grade\_loss: 0.4265 - shape\_irregularity\_loss: 0.4756 - shininess\_loss: 0.3211 - size\_loss: 0.4625 - darkspots\_accuracy: 0.9722 - darkspots\_auc: 0.9930 - is\_organic\_accuracy: 0.8333 - is\_organic\_auc: 0.9015 - quality\_grade\_accuracy: 0.8796 - quality\_grade\_auc: 0.9540 - shape\_irregularity\_accuracy: 0.8333 - shape\_irregularity\_auc: 0.9475 - shininess\_accuracy: 0.8704 - shininess\_auc: 0.9670 - size\_accuracy: 0.8519 - size\_auc: 0.9515 - val\_loss: 6.4028 - val\_darkspots\_loss: 0.6831 - val\_is\_organic\_loss: 0.8954 - val\_quality\_grade\_loss: 1.6906 - val\_shape\_irregularity\_loss: 1.1960 - val\_shininess\_loss: 0.5128 - val\_size\_loss: 1.4227 - val\_darkspots\_accuracy: 0.5000 - val\_darkspots\_auc: 0.9630 - val\_is\_organic\_accuracy: 0.3333 - val\_is\_organic\_auc: 0.7000 - val\_quality\_grade\_accuracy: 0.3333 - val\_quality\_grade\_auc: 0.8549 - val\_shape\_irregularity\_accuracy: 0.4167 - val\_shape\_irregularity\_auc: 1.0000 - val\_shininess\_accuracy: 0.7500 - val\_shininess\_auc: 0.9143 - val\_size\_accuracy: 0.3333 - val\_size\_auc: 0.7402

Epoch 6: val\_loss did not improve from 5.53943

📊 Epoch 6 — Overall Train Accuracy: 0.6696 | Overall Val Accuracy: 0.4583

14/14 [==============================] - 2s 181ms/step - loss: 2.3712 - darkspots\_loss: 0.2604 - is\_organic\_loss: 0.3756 - quality\_grade\_loss: 0.3924 - shape\_irregularity\_loss: 0.5021 - shininess\_loss: 0.3909 - size\_loss: 0.4473 - darkspots\_accuracy: 0.9444 - darkspots\_auc: 0.9746 - is\_organic\_accuracy: 0.8426 - is\_organic\_auc: 0.9288 - quality\_grade\_accuracy: 0.8796 - quality\_grade\_auc: 0.9617 - shape\_irregularity\_accuracy: 0.7963 - shape\_irregularity\_auc: 0.9370 - shininess\_accuracy: 0.8796 - shininess\_auc: 0.9132 - size\_accuracy: 0.8519 - size\_auc: 0.9462 - val\_loss: 6.5232 - val\_darkspots\_loss: 0.7887 - val\_is\_organic\_loss: 0.8919 - val\_quality\_grade\_loss: 1.9229 - val\_shape\_irregularity\_loss: 1.1156 - val\_shininess\_loss: 0.5303 - val\_size\_loss: 1.2714 - val\_darkspots\_accuracy: 0.5000 - val\_darkspots\_auc: 0.9444 - val\_is\_organic\_accuracy: 0.3333 - val\_is\_organic\_auc: 0.7500 - val\_quality\_grade\_accuracy: 0.3333 - val\_quality\_grade\_auc: 0.8488 - val\_shape\_irregularity\_accuracy: 0.4167 - val\_shape\_irregularity\_auc: 1.0000 - val\_shininess\_accuracy: 0.7500 - val\_shininess\_auc: 0.9143 - val\_size\_accuracy: 0.5000 - val\_size\_auc: 0.7883

Epoch 7: val\_loss did not improve from 5.53943

📊 Epoch 7 — Overall Train Accuracy: 0.6860 | Overall Val Accuracy: 0.4792

14/14 [==============================] - 2s 180ms/step - loss: 1.8796 - darkspots\_loss: 0.2343 - is\_organic\_loss: 0.3560 - quality\_grade\_loss: 0.2881 - shape\_irregularity\_loss: 0.3812 - shininess\_loss: 0.2743 - size\_loss: 0.3433 - darkspots\_accuracy: 0.9537 - darkspots\_auc: 0.9748 - is\_organic\_accuracy: 0.8333 - is\_organic\_auc: 0.9282 - quality\_grade\_accuracy: 0.9074 - quality\_grade\_auc: 0.9821 - shape\_irregularity\_accuracy: 0.8611 - shape\_irregularity\_auc: 0.9686 - shininess\_accuracy: 0.9352 - shininess\_auc: 0.9846 - size\_accuracy: 0.8519 - size\_auc: 0.9746 - val\_loss: 6.5532 - val\_darkspots\_loss: 0.7859 - val\_is\_organic\_loss: 0.9274 - val\_quality\_grade\_loss: 1.8086 - val\_shape\_irregularity\_loss: 1.1657 - val\_shininess\_loss: 0.5644 - val\_size\_loss: 1.2988 - val\_darkspots\_accuracy: 0.5000 - val\_darkspots\_auc: 0.8889 - val\_is\_organic\_accuracy: 0.3333 - val\_is\_organic\_auc: 0.7000 - val\_quality\_grade\_accuracy: 0.3333 - val\_quality\_grade\_auc: 0.8488 - val\_shape\_irregularity\_accuracy: 0.5833 - val\_shape\_irregularity\_auc: 1.0000 - val\_shininess\_accuracy: 0.7500 - val\_shininess\_auc: 0.9286 - val\_size\_accuracy: 0.5000 - val\_size\_auc: 0.7883

Epoch 8: val\_loss did not improve from 5.53943

Restoring model weights from the end of the best epoch: 3.

📊 Epoch 8 — Overall Train Accuracy: 0.6622 | Overall Val Accuracy: 0.5312

14/14 [==============================] - 3s 186ms/step - loss: 1.7547 - darkspots\_loss: 0.1820 - is\_organic\_loss: 0.3783 - quality\_grade\_loss: 0.3090 - shape\_irregularity\_loss: 0.2841 - shininess\_loss: 0.2748 - size\_loss: 0.3240 - darkspots\_accuracy: 0.9444 - darkspots\_auc: 0.9906 - is\_organic\_accuracy: 0.8333 - is\_organic\_auc: 0.9199 - quality\_grade\_accuracy: 0.8981 - quality\_grade\_auc: 0.9798 - shape\_irregularity\_accuracy: 0.9537 - shape\_irregularity\_auc: 0.9897 - shininess\_accuracy: 0.8889 - shininess\_auc: 0.9719 - size\_accuracy: 0.9167 - size\_auc: 0.9812 - val\_loss: 6.8062 - val\_darkspots\_loss: 0.7692 - val\_is\_organic\_loss: 0.9954 - val\_quality\_grade\_loss: 1.8533 - val\_shape\_irregularity\_loss: 1.1930 - val\_shininess\_loss: 0.6434 - val\_size\_loss: 1.3495 - val\_darkspots\_accuracy: 0.5000 - val\_darkspots\_auc: 0.9074 - val\_is\_organic\_accuracy: 0.4167 - val\_is\_organic\_auc: 0.6500 - val\_quality\_grade\_accuracy: 0.3333 - val\_quality\_grade\_auc: 0.8179 - val\_shape\_irregularity\_accuracy: 0.5000 - val\_shape\_irregularity\_auc: 1.0000 - val\_shininess\_accuracy: 0.5833 - val\_shininess\_auc: 0.9286 - val\_size\_accuracy: 0.5000 - val\_size\_auc: 0.7859

Epoch 8: early stopping

✅ Model saved to D:/plants-app/fruit-classify-quality-detector\outputs\model\_weights\model\_final.keras