开始将JPG图像转换为PT文件...

完成转换，共处理 0 张图像

使用设备: cpu

训练集大小: 2450, 测试集大小: 614

第 1 次随机搜索

选择优化器: AdamW, 学习率: 0.0001

C:\Users\Young\anaconda3\Lib\site-packages\torchvision\models\\_utils.py:208: UserWarning: The parameter 'pretrained' is deprecated since 0.13 and may be removed in the future, please use 'weights' instead.

warnings.warn(

C:\Users\Young\anaconda3\Lib\site-packages\torchvision\models\\_utils.py:223: UserWarning: Arguments other than a weight enum or `None` for 'weights' are deprecated since 0.13 and may be removed in the future. The current behavior is equivalent to passing `weights=DenseNet121\_Weights.IMAGENET1K\_V1`. You can also use `weights=DenseNet121\_Weights.DEFAULT` to get the most up-to-date weights.

warnings.warn(msg)

Epoch 0/9

----------

train Loss: 0.9902 Acc: 0.5171

val Loss: 0.9099 Acc: 0.6352

Epoch 1/9

----------

train Loss: 0.8405 Acc: 0.6869

val Loss: 0.7713 Acc: 0.7003

Epoch 2/9

----------

train Loss: 0.7328 Acc: 0.7506

val Loss: 0.6813 Acc: 0.7720

Epoch 3/9

----------

train Loss: 0.6531 Acc: 0.7918

val Loss: 0.6136 Acc: 0.8192

Epoch 4/9

----------

train Loss: 0.5982 Acc: 0.8114

val Loss: 0.5632 Acc: 0.8502

Epoch 5/9

----------

train Loss: 0.5552 Acc: 0.8343

val Loss: 0.5251 Acc: 0.8404

Epoch 6/9

----------

train Loss: 0.5246 Acc: 0.8445

val Loss: 0.4894 Acc: 0.8648

Epoch 7/9

----------

train Loss: 0.5092 Acc: 0.8478

val Loss: 0.4867 Acc: 0.8697

Epoch 8/9

----------

train Loss: 0.5033 Acc: 0.8502

val Loss: 0.4879 Acc: 0.8648

Epoch 9/9

----------

train Loss: 0.5041 Acc: 0.8531

val Loss: 0.4823 Acc: 0.8648

训练完成，耗时 19m 50s

最佳验证准确率: 0.869707

第 2 次随机搜索

选择优化器: SGD, 学习率: 0.01

Epoch 0/9

----------

train Loss: 0.6882 Acc: 0.7310

val Loss: 0.4502 Acc: 0.8518

Epoch 1/9

----------

train Loss: 0.4293 Acc: 0.8453

val Loss: 0.3589 Acc: 0.8632

Epoch 2/9

----------

train Loss: 0.3713 Acc: 0.8629

val Loss: 0.3976 Acc: 0.8485

Epoch 3/9

----------

train Loss: 0.3456 Acc: 0.8759

val Loss: 0.3211 Acc: 0.8795

Epoch 4/9

----------

train Loss: 0.3060 Acc: 0.8873

val Loss: 0.2782 Acc: 0.9055

Epoch 5/9

----------

train Loss: 0.3032 Acc: 0.8886

val Loss: 0.2648 Acc: 0.9072

Epoch 6/9

----------

train Loss: 0.2963 Acc: 0.8967

val Loss: 0.2643 Acc: 0.9007

Epoch 7/9

----------

train Loss: 0.2652 Acc: 0.9037

val Loss: 0.2535 Acc: 0.9055

Epoch 8/9

----------

train Loss: 0.2654 Acc: 0.9078

val Loss: 0.2516 Acc: 0.9072

Epoch 9/9

----------

train Loss: 0.2667 Acc: 0.9045

val Loss: 0.2526 Acc: 0.9169

训练完成，耗时 20m 39s

最佳验证准确率: 0.916938

第 3 次随机搜索

选择优化器: Adam, 学习率: 0.0001

Epoch 0/9

----------

train Loss: 1.0174 Acc: 0.4980

val Loss: 0.9224 Acc: 0.5961

Epoch 1/9

----------

train Loss: 0.8657 Acc: 0.6686

val Loss: 0.7962 Acc: 0.6726

Epoch 2/9

----------

train Loss: 0.7608 Acc: 0.7359

val Loss: 0.7037 Acc: 0.7573

Epoch 3/9

----------

train Loss: 0.6766 Acc: 0.7882

val Loss: 0.6323 Acc: 0.8029

Epoch 4/9

----------

train Loss: 0.6143 Acc: 0.8127

val Loss: 0.5815 Acc: 0.8322

Epoch 5/9

----------

train Loss: 0.5730 Acc: 0.8188

val Loss: 0.5389 Acc: 0.8436

Epoch 6/9

----------

train Loss: 0.5376 Acc: 0.8314

val Loss: 0.5051 Acc: 0.8583

Epoch 7/9

----------

train Loss: 0.5228 Acc: 0.8420

val Loss: 0.5001 Acc: 0.8599

Epoch 8/9

----------

train Loss: 0.5195 Acc: 0.8453

val Loss: 0.4981 Acc: 0.8599

Epoch 9/9

----------

train Loss: 0.5171 Acc: 0.8461

val Loss: 0.4965 Acc: 0.8550

训练完成，耗时 20m 39s

最佳验证准确率: 0.859935

第 4 次随机搜索

选择优化器: SGD, 学习率: 0.0001

Epoch 0/9

----------

train Loss: 1.1491 Acc: 0.3135

val Loss: 1.0939 Acc: 0.3958

Epoch 1/9

----------

train Loss: 1.0700 Acc: 0.4220

val Loss: 1.0534 Acc: 0.4479

Epoch 2/9

----------

train Loss: 1.0399 Acc: 0.4641

val Loss: 1.0267 Acc: 0.4691

Epoch 3/9

----------

train Loss: 1.0158 Acc: 0.4947

val Loss: 1.0049 Acc: 0.4951

Epoch 4/9

----------

train Loss: 0.9945 Acc: 0.5033

val Loss: 0.9824 Acc: 0.5163

Epoch 5/9

----------

train Loss: 0.9741 Acc: 0.5392

val Loss: 0.9623 Acc: 0.5391

Epoch 6/9

----------

train Loss: 0.9546 Acc: 0.5531

val Loss: 0.9427 Acc: 0.5570

Epoch 7/9

----------

train Loss: 0.9435 Acc: 0.5584

val Loss: 0.9402 Acc: 0.5668

Epoch 8/9

----------

train Loss: 0.9441 Acc: 0.5649

val Loss: 0.9398 Acc: 0.5684

Epoch 9/9

----------

train Loss: 0.9393 Acc: 0.5702

val Loss: 0.9385 Acc: 0.5684

训练完成，耗时 20m 38s

最佳验证准确率: 0.568404

第 5 次随机搜索

选择优化器: AdamW, 学习率: 0.0001

Epoch 0/9

----------

train Loss: 0.9816 Acc: 0.5245

val Loss: 0.9033 Acc: 0.6303

Epoch 1/9

----------

train Loss: 0.8394 Acc: 0.6751

val Loss: 0.7855 Acc: 0.7248

Epoch 2/9

----------

train Loss: 0.7417 Acc: 0.7245

val Loss: 0.6928 Acc: 0.7704

Epoch 3/9

----------

train Loss: 0.6707 Acc: 0.7722

val Loss: 0.6271 Acc: 0.7915

Epoch 4/9

----------

train Loss: 0.6143 Acc: 0.7894

val Loss: 0.5801 Acc: 0.8274

Epoch 5/9

----------

train Loss: 0.5751 Acc: 0.8127

val Loss: 0.5369 Acc: 0.8469

Epoch 6/9

----------

train Loss: 0.5376 Acc: 0.8314

val Loss: 0.5055 Acc: 0.8485

Epoch 7/9

----------

train Loss: 0.5199 Acc: 0.8282

val Loss: 0.5062 Acc: 0.8583

Epoch 8/9

----------

train Loss: 0.5139 Acc: 0.8400

val Loss: 0.4996 Acc: 0.8648

Epoch 9/9

----------

train Loss: 0.5140 Acc: 0.8359

val Loss: 0.4948 Acc: 0.8616

训练完成，耗时 20m 38s

最佳验证准确率: 0.864821

第 6 次随机搜索

选择优化器: AdamW, 学习率: 0.01

Epoch 0/9

----------

train Loss: 0.7430 Acc: 0.7327

val Loss: 0.2949 Acc: 0.8876

Epoch 1/9

----------

train Loss: 0.3281 Acc: 0.8727

val Loss: 0.3046 Acc: 0.8648

Epoch 2/9

----------

train Loss: 0.3189 Acc: 0.8743

val Loss: 0.3000 Acc: 0.8779

Epoch 3/9

----------

train Loss: 0.2924 Acc: 0.8824

val Loss: 0.2457 Acc: 0.9153

Epoch 4/9

----------

train Loss: 0.2869 Acc: 0.8927

val Loss: 0.2425 Acc: 0.9072

Epoch 5/9

----------

train Loss: 0.2271 Acc: 0.9094

val Loss: 0.2080 Acc: 0.9267

Epoch 6/9

----------

train Loss: 0.2638 Acc: 0.8980

val Loss: 0.2379 Acc: 0.9137

Epoch 7/9

----------

train Loss: 0.1658 Acc: 0.9384

val Loss: 0.2148 Acc: 0.9267

Epoch 8/9

----------

train Loss: 0.1618 Acc: 0.9396

val Loss: 0.2160 Acc: 0.9218

Epoch 9/9

----------

train Loss: 0.1599 Acc: 0.9363

val Loss: 0.2140 Acc: 0.9267

训练完成，耗时 20m 40s

最佳验证准确率: 0.926710

最佳验证准确率: 0.9267

最佳优化器: AdamW

最佳学习率: 0.01

评估结果:

准确率: 0.9267

精确率: 0.9257

召回率: 0.9267

F1分数: 0.9260