train: optimizer=SGD, learning\_rate=0.001, num\_layers=4, dropout\_rate=0.5

2024-03-25 18:19:23.611200: I metal\_plugin/src/device/metal\_device.cc:1154] Metal device set to: Apple M2

2024-03-25 18:19:23.611219: I metal\_plugin/src/device/metal\_device.cc:296] systemMemory: 8.00 GB

2024-03-25 18:19:23.611223: I metal\_plugin/src/device/metal\_device.cc:313] maxCacheSize: 2.67 GB

2024-03-25 18:19:23.611573: I tensorflow/core/common\_runtime/pluggable\_device/pluggable\_device\_factory.cc:306] Could not identify NUMA node of platform GPU ID 0, defaulting to 0. Your kernel may not have been built with NUMA support.

2024-03-25 18:19:23.611953: I tensorflow/core/common\_runtime/pluggable\_device/pluggable\_device\_factory.cc:272] Created TensorFlow device (/job:localhost/replica:0/task:0/device:GPU:0 with 0 MB memory) -> physical PluggableDevice (device: 0, name: METAL, pci bus id: <undefined>)

WARNING:absl:At this time, the v2.11+ optimizer `tf.keras.optimizers.SGD` runs slowly on M1/M2 Macs, please use the legacy Keras optimizer instead, located at `tf.keras.optimizers.legacy.SGD`.

Epoch 1/10

2024-03-25 18:19:24.387544: I tensorflow/core/grappler/optimizers/custom\_graph\_optimizer\_registry.cc:117] Plugin optimizer for device\_type GPU is enabled.

2024-03-25 18:19:24.438641: E tensorflow/core/grappler/optimizers/meta\_optimizer.cc:961] model\_pruner failed: INVALID\_ARGUMENT: Graph does not contain terminal node SGD/AssignVariableOp.

996/996 [==============================] - 127s 126ms/step - loss: 2.8851 - accuracy: 0.3451 - val\_loss: 1.4418 - val\_accuracy: 0.4629

Epoch 2/10

996/996 [==============================] - 51s 51ms/step - loss: 1.4374 - accuracy: 0.5306 - val\_loss: 1.2022 - val\_accuracy: 0.5100

Epoch 3/10

996/996 [==============================] - 92s 93ms/step - loss: 1.0030 - accuracy: 0.6613 - val\_loss: 0.9918 - val\_accuracy: 0.6140

Epoch 4/10

996/996 [==============================] - 68s 69ms/step - loss: 0.7731 - accuracy: 0.7386 - val\_loss: 1.1477 - val\_accuracy: 0.5863

Epoch 5/10

996/996 [==============================] - 95s 95ms/step - loss: 0.6535 - accuracy: 0.7903 - val\_loss: 1.0767 - val\_accuracy: 0.6335

Epoch 6/10

996/996 [==============================] - 997s 1s/step - loss: 0.5500 - accuracy: 0.8357 - val\_loss: 1.2879 - val\_accuracy: 0.6325

Epoch 7/10

996/996 [==============================] - 2211s 2s/step - loss: 0.7108 - accuracy: 0.8310 - val\_loss: 3.7900 - val\_accuracy: 0.5397

Epoch 8/10

996/996 [==============================] - 37s 37ms/step - loss: 1.8184 - accuracy: 0.7420 - val\_loss: 2.8466 - val\_accuracy: 0.5562

Epoch 9/10

996/996 [==============================] - 31s 31ms/step - loss: 9.0695 - accuracy: 0.6154 - val\_loss: 13.7693 - val\_accuracy: 0.4679

Epoch 10/10

996/996 [==============================] - 30s 30ms/step - loss: 38.1297 - accuracy: 0.5104 - val\_loss: 36.3948 - val\_accuracy: 0.5216

Finish training: best\_val\_acc = 0.6335341334342957

train: optimizer=SGD, learning\_rate=0.001, num\_layers=4, dropout\_rate=0.2

WARNING:absl:At this time, the v2.11+ optimizer `tf.keras.optimizers.SGD` runs slowly on M1/M2 Macs, please use the legacy Keras optimizer instead, located at `tf.keras.optimizers.legacy.SGD`.

Epoch 1/10

2024-03-25 19:21:43.933642: E tensorflow/core/grappler/optimizers/meta\_optimizer.cc:961] model\_pruner failed: INVALID\_ARGUMENT: Graph does not contain terminal node SGD/AssignVariableOp.

996/996 [==============================] - 31s 31ms/step - loss: 1.7983 - accuracy: 0.4035 - val\_loss: 1.3521 - val\_accuracy: 0.5045

Epoch 2/10

996/996 [==============================] - 30s 30ms/step - loss: 0.8863 - accuracy: 0.6471 - val\_loss: 0.9836 - val\_accuracy: 0.6089

Epoch 3/10

996/996 [==============================] - 32s 32ms/step - loss: 0.5225 - accuracy: 0.7984 - val\_loss: 0.7716 - val\_accuracy: 0.6757

Epoch 4/10

996/996 [==============================] - 30s 30ms/step - loss: 0.3007 - accuracy: 0.8910 - val\_loss: 0.7418 - val\_accuracy: 0.7159

Epoch 5/10

996/996 [==============================] - 30s 30ms/step - loss: 0.1438 - accuracy: 0.9632 - val\_loss: 0.6903 - val\_accuracy: 0.7304

Epoch 6/10

996/996 [==============================] - 30s 30ms/step - loss: 0.0611 - accuracy: 0.9959 - val\_loss: 0.6689 - val\_accuracy: 0.7631

Epoch 7/10

996/996 [==============================] - 30s 30ms/step - loss: 0.0291 - accuracy: 0.9995 - val\_loss: 0.5661 - val\_accuracy: 0.7992

Epoch 8/10

996/996 [==============================] - 30s 30ms/step - loss: 0.0174 - accuracy: 1.0000 - val\_loss: 0.5514 - val\_accuracy: 0.8077

Epoch 9/10

996/996 [==============================] - 30s 30ms/step - loss: 0.0127 - accuracy: 1.0000 - val\_loss: 0.5450 - val\_accuracy: 0.8107

Epoch 10/10

996/996 [==============================] - 30s 30ms/step - loss: 0.0100 - accuracy: 1.0000 - val\_loss: 0.5534 - val\_accuracy: 0.8067

Finish training: best\_val\_acc = 0.810742974281311

train: optimizer=SGD, learning\_rate=0.001, num\_layers=3, dropout\_rate=0.5

WARNING:absl:At this time, the v2.11+ optimizer `tf.keras.optimizers.SGD` runs slowly on M1/M2 Macs, please use the legacy Keras optimizer instead, located at `tf.keras.optimizers.legacy.SGD`.

Epoch 1/10

2024-03-25 19:26:48.048396: E tensorflow/core/grappler/optimizers/meta\_optimizer.cc:961] model\_pruner failed: INVALID\_ARGUMENT: Graph does not contain terminal node SGD/AssignVariableOp.

996/996 [==============================] - 32s 32ms/step - loss: 3.1718 - accuracy: 0.3509 - val\_loss: 1.4157 - val\_accuracy: 0.4372

Epoch 2/10

996/996 [==============================] - 31s 31ms/step - loss: 1.7230 - accuracy: 0.5145 - val\_loss: 1.4838 - val\_accuracy: 0.4930

Epoch 3/10

996/996 [==============================] - 31s 31ms/step - loss: 1.5515 - accuracy: 0.5947 - val\_loss: 2.6413 - val\_accuracy: 0.4448

Epoch 4/10

996/996 [==============================] - 31s 31ms/step - loss: 2.1669 - accuracy: 0.6031 - val\_loss: 3.8055 - val\_accuracy: 0.4629

Epoch 5/10

996/996 [==============================] - 32s 32ms/step - loss: 6.2750 - accuracy: 0.5567 - val\_loss: 11.8517 - val\_accuracy: 0.4347

Epoch 6/10

996/996 [==============================] - 37s 37ms/step - loss: 17.6940 - accuracy: 0.5348 - val\_loss: 36.6011 - val\_accuracy: 0.4859

Epoch 7/10

996/996 [==============================] - 35s 35ms/step - loss: 85.0473 - accuracy: 0.5002 - val\_loss: 224.3988 - val\_accuracy: 0.3539

Epoch 8/10

996/996 [==============================] - 36s 36ms/step - loss: 549.5744 - accuracy: 0.4787 - val\_loss: 1138.2358 - val\_accuracy: 0.4152

Epoch 9/10

996/996 [==============================] - 42s 42ms/step - loss: 20948.3203 - accuracy: 0.3927 - val\_loss: 35431.6016 - val\_accuracy: 0.2460

Epoch 10/10

996/996 [==============================] - 35s 35ms/step - loss: 288779.3125 - accuracy: 0.2658 - val\_loss: 118533.7734 - val\_accuracy: 0.2917

Finish training: best\_val\_acc = 0.49297189712524414

train: optimizer=SGD, learning\_rate=0.001, num\_layers=3, dropout\_rate=0.2

WARNING:absl:At this time, the v2.11+ optimizer `tf.keras.optimizers.SGD` runs slowly on M1/M2 Macs, please use the legacy Keras optimizer instead, located at `tf.keras.optimizers.legacy.SGD`.

Epoch 1/10

2024-03-25 19:32:30.841042: E tensorflow/core/grappler/optimizers/meta\_optimizer.cc:961] model\_pruner failed: INVALID\_ARGUMENT: Graph does not contain terminal node SGD/AssignVariableOp.

996/996 [==============================] - 38s 37ms/step - loss: 1.8908 - accuracy: 0.4124 - val\_loss: 1.2153 - val\_accuracy: 0.5251

Epoch 2/10

996/996 [==============================] - 34s 34ms/step - loss: 1.0100 - accuracy: 0.6226 - val\_loss: 1.3035 - val\_accuracy: 0.5206

Epoch 3/10

996/996 [==============================] - 34s 34ms/step - loss: 0.9106 - accuracy: 0.6829 - val\_loss: 1.4398 - val\_accuracy: 0.6104

Epoch 4/10

996/996 [==============================] - 36s 36ms/step - loss: 1.7608 - accuracy: 0.6380 - val\_loss: 6.9393 - val\_accuracy: 0.4157

Epoch 5/10

996/996 [==============================] - 37s 38ms/step - loss: 12.0824 - accuracy: 0.5061 - val\_loss: 27.9211 - val\_accuracy: 0.3745

Epoch 6/10

996/996 [==============================] - 38s 38ms/step - loss: 54.0226 - accuracy: 0.4659 - val\_loss: 182.3731 - val\_accuracy: 0.4132

Epoch 7/10

996/996 [==============================] - 38s 38ms/step - loss: 217.6731 - accuracy: 0.4628 - val\_loss: 336.2024 - val\_accuracy: 0.5070

Epoch 8/10

996/996 [==============================] - 38s 38ms/step - loss: 1639.0308 - accuracy: 0.4472 - val\_loss: 6386.4570 - val\_accuracy: 0.4523

Epoch 9/10

996/996 [==============================] - 37s 38ms/step - loss: nan - accuracy: 0.3508 - val\_loss: nan - val\_accuracy: 0.2555

Epoch 10/10

996/996 [==============================] - 39s 39ms/step - loss: nan - accuracy: 0.2496 - val\_loss: nan - val\_accuracy: 0.2555

Finish training: best\_val\_acc = 0.6104417443275452

train: optimizer=SGD, learning\_rate=0.001, num\_layers=2, dropout\_rate=0.5

WARNING:absl:At this time, the v2.11+ optimizer `tf.keras.optimizers.SGD` runs slowly on M1/M2 Macs, please use the legacy Keras optimizer instead, located at `tf.keras.optimizers.legacy.SGD`.

Epoch 1/10

2024-03-25 19:38:40.141430: E tensorflow/core/grappler/optimizers/meta\_optimizer.cc:961] model\_pruner failed: INVALID\_ARGUMENT: Graph does not contain terminal node SGD/AssignVariableOp.

996/996 [==============================] - 40s 39ms/step - loss: 3.6892 - accuracy: 0.3213 - val\_loss: 2.5579 - val\_accuracy: 0.3193

Epoch 2/10

996/996 [==============================] - 42s 42ms/step - loss: 2.2559 - accuracy: 0.4433 - val\_loss: 1.8417 - val\_accuracy: 0.4106

Epoch 3/10

996/996 [==============================] - 41s 41ms/step - loss: 2.2724 - accuracy: 0.4859 - val\_loss: 3.1870 - val\_accuracy: 0.4106

Epoch 4/10

996/996 [==============================] - 41s 42ms/step - loss: 3.1977 - accuracy: 0.5048 - val\_loss: 3.8393 - val\_accuracy: 0.4538

Epoch 5/10

996/996 [==============================] - 42s 42ms/step - loss: 5.5716 - accuracy: 0.5063 - val\_loss: 4.6738 - val\_accuracy: 0.5221

Epoch 6/10

996/996 [==============================] - 44s 44ms/step - loss: 13.6935 - accuracy: 0.4854 - val\_loss: 16.2062 - val\_accuracy: 0.4468

Epoch 7/10

996/996 [==============================] - 48s 48ms/step - loss: 48.1966 - accuracy: 0.4721 - val\_loss: 57.7651 - val\_accuracy: 0.4282

Epoch 8/10

996/996 [==============================] - 48s 48ms/step - loss: 324.8612 - accuracy: 0.4285 - val\_loss: 743.5887 - val\_accuracy: 0.2746

Epoch 9/10

996/996 [==============================] - 49s 50ms/step - loss: nan - accuracy: 0.3504 - val\_loss: nan - val\_accuracy: 0.2555

Epoch 10/10

996/996 [==============================] - 49s 49ms/step - loss: nan - accuracy: 0.2496 - val\_loss: nan - val\_accuracy: 0.2555

Finish training: best\_val\_acc = 0.522088348865509

train: optimizer=SGD, learning\_rate=0.001, num\_layers=2, dropout\_rate=0.2

WARNING:absl:At this time, the v2.11+ optimizer `tf.keras.optimizers.SGD` runs slowly on M1/M2 Macs, please use the legacy Keras optimizer instead, located at `tf.keras.optimizers.legacy.SGD`.

Epoch 1/10

2024-03-25 19:46:04.631798: E tensorflow/core/grappler/optimizers/meta\_optimizer.cc:961] model\_pruner failed: INVALID\_ARGUMENT: Graph does not contain terminal node SGD/AssignVariableOp.

996/996 [==============================] - 49s 49ms/step - loss: 2.0430 - accuracy: 0.3908 - val\_loss: 1.2759 - val\_accuracy: 0.5070

Epoch 2/10

996/996 [==============================] - 51s 51ms/step - loss: 1.4016 - accuracy: 0.5304 - val\_loss: 1.9222 - val\_accuracy: 0.4613

Epoch 3/10

996/996 [==============================] - 51s 51ms/step - loss: 2.0191 - accuracy: 0.5361 - val\_loss: 3.2049 - val\_accuracy: 0.4895

Epoch 4/10

996/996 [==============================] - 50s 50ms/step - loss: 5.7712 - accuracy: 0.4890 - val\_loss: 25.1307 - val\_accuracy: 0.3062

Epoch 5/10

996/996 [==============================] - 51s 51ms/step - loss: 23.6495 - accuracy: 0.4468 - val\_loss: 61.1969 - val\_accuracy: 0.4774

Epoch 6/10

996/996 [==============================] - 50s 50ms/step - loss: 73.7666 - accuracy: 0.4580 - val\_loss: 269.6643 - val\_accuracy: 0.3881

Epoch 7/10

996/996 [==============================] - 51s 51ms/step - loss: 541.3196 - accuracy: 0.4187 - val\_loss: 1892.2058 - val\_accuracy: 0.3343

Epoch 8/10

996/996 [==============================] - 49s 49ms/step - loss: 8500.1025 - accuracy: 0.3822 - val\_loss: 22634.8613 - val\_accuracy: 0.2575

Epoch 9/10

996/996 [==============================] - 50s 50ms/step - loss: nan - accuracy: 0.2709 - val\_loss: nan - val\_accuracy: 0.2555

Epoch 10/10

996/996 [==============================] - 51s 51ms/step - loss: nan - accuracy: 0.2496 - val\_loss: nan - val\_accuracy: 0.2555

Finish training: best\_val\_acc = 0.5070281028747559

train: optimizer=SGD, learning\_rate=0.01, num\_layers=4, dropout\_rate=0.5

WARNING:absl:At this time, the v2.11+ optimizer `tf.keras.optimizers.SGD` runs slowly on M1/M2 Macs, please use the legacy Keras optimizer instead, located at `tf.keras.optimizers.legacy.SGD`.

Epoch 1/10

2024-03-25 19:54:26.898190: E tensorflow/core/grappler/optimizers/meta\_optimizer.cc:961] model\_pruner failed: INVALID\_ARGUMENT: Graph does not contain terminal node SGD/AssignVariableOp.

996/996 [==============================] - 42s 41ms/step - loss: nan - accuracy: 0.2520 - val\_loss: nan - val\_accuracy: 0.2555

Epoch 2/10

996/996 [==============================] - 40s 40ms/step - loss: nan - accuracy: 0.2496 - val\_loss: nan - val\_accuracy: 0.2555

Epoch 3/10

996/996 [==============================] - 38s 38ms/step - loss: nan - accuracy: 0.2496 - val\_loss: nan - val\_accuracy: 0.2555

Epoch 4/10

996/996 [==============================] - 40s 40ms/step - loss: nan - accuracy: 0.2496 - val\_loss: nan - val\_accuracy: 0.2555

Epoch 5/10

996/996 [==============================] - 40s 40ms/step - loss: nan - accuracy: 0.2496 - val\_loss: nan - val\_accuracy: 0.2555

Epoch 6/10

996/996 [==============================] - 43s 43ms/step - loss: nan - accuracy: 0.2496 - val\_loss: nan - val\_accuracy: 0.2555

Epoch 7/10

996/996 [==============================] - 45s 45ms/step - loss: nan - accuracy: 0.2496 - val\_loss: nan - val\_accuracy: 0.2555

Epoch 8/10

996/996 [==============================] - 40s 40ms/step - loss: nan - accuracy: 0.2496 - val\_loss: nan - val\_accuracy: 0.2555

Epoch 9/10

996/996 [==============================] - 51s 51ms/step - loss: nan - accuracy: 0.2496 - val\_loss: nan - val\_accuracy: 0.2555

Epoch 10/10

996/996 [==============================] - 43s 43ms/step - loss: nan - accuracy: 0.2496 - val\_loss: nan - val\_accuracy: 0.2555

Finish training: best\_val\_acc = 0.25552210211753845

train: optimizer=SGD, learning\_rate=0.01, num\_layers=4, dropout\_rate=0.2

WARNING:absl:At this time, the v2.11+ optimizer `tf.keras.optimizers.SGD` runs slowly on M1/M2 Macs, please use the legacy Keras optimizer instead, located at `tf.keras.optimizers.legacy.SGD`.

Epoch 1/10

2024-03-25 20:01:29.954387: E tensorflow/core/grappler/optimizers/meta\_optimizer.cc:961] model\_pruner failed: INVALID\_ARGUMENT: Graph does not contain terminal node SGD/AssignVariableOp.

996/996 [==============================] - 44s 42ms/step - loss: 21.0796 - accuracy: 0.3156 - val\_loss: 142.6526 - val\_accuracy: 0.3328

Epoch 2/10

996/996 [==============================] - 43s 43ms/step - loss: nan - accuracy: 0.2703 - val\_loss: nan - val\_accuracy: 0.2555

Epoch 3/10

996/996 [==============================] - 40s 41ms/step - loss: nan - accuracy: 0.2496 - val\_loss: nan - val\_accuracy: 0.2555

Epoch 4/10

996/996 [==============================] - 47s 47ms/step - loss: nan - accuracy: 0.2496 - val\_loss: nan - val\_accuracy: 0.2555

Epoch 5/10

996/996 [==============================] - 46s 46ms/step - loss: nan - accuracy: 0.2496 - val\_loss: nan - val\_accuracy: 0.2555

Epoch 6/10

996/996 [==============================] - 41s 41ms/step - loss: nan - accuracy: 0.2496 - val\_loss: nan - val\_accuracy: 0.2555

Epoch 7/10

996/996 [==============================] - 41s 41ms/step - loss: nan - accuracy: 0.2496 - val\_loss: nan - val\_accuracy: 0.2555

Epoch 8/10

996/996 [==============================] - 45s 45ms/step - loss: nan - accuracy: 0.2496 - val\_loss: nan - val\_accuracy: 0.2555

Epoch 9/10

996/996 [==============================] - 41s 41ms/step - loss: nan - accuracy: 0.2496 - val\_loss: nan - val\_accuracy: 0.2555

Epoch 10/10

996/996 [==============================] - 45s 46ms/step - loss: nan - accuracy: 0.2496 - val\_loss: nan - val\_accuracy: 0.2555

Finish training: best\_val\_acc = 0.33283132314682007

train: optimizer=SGD, learning\_rate=0.01, num\_layers=3, dropout\_rate=0.5

WARNING:absl:At this time, the v2.11+ optimizer `tf.keras.optimizers.SGD` runs slowly on M1/M2 Macs, please use the legacy Keras optimizer instead, located at `tf.keras.optimizers.legacy.SGD`.

Epoch 1/10

2024-03-25 20:08:41.805200: E tensorflow/core/grappler/optimizers/meta\_optimizer.cc:961] model\_pruner failed: INVALID\_ARGUMENT: Graph does not contain terminal node SGD/AssignVariableOp.

996/996 [==============================] - 43s 43ms/step - loss: nan - accuracy: 0.2534 - val\_loss: nan - val\_accuracy: 0.2555

Epoch 2/10

996/996 [==============================] - 46s 46ms/step - loss: nan - accuracy: 0.2496 - val\_loss: nan - val\_accuracy: 0.2555

Epoch 3/10

996/996 [==============================] - 42s 43ms/step - loss: nan - accuracy: 0.2496 - val\_loss: nan - val\_accuracy: 0.2555

Epoch 4/10

996/996 [==============================] - 49s 49ms/step - loss: nan - accuracy: 0.2496 - val\_loss: nan - val\_accuracy: 0.2555

Epoch 5/10

996/996 [==============================] - 39s 40ms/step - loss: nan - accuracy: 0.2496 - val\_loss: nan - val\_accuracy: 0.2555

Epoch 6/10

996/996 [==============================] - 45s 45ms/step - loss: nan - accuracy: 0.2496 - val\_loss: nan - val\_accuracy: 0.2555

Epoch 7/10

996/996 [==============================] - 45s 45ms/step - loss: nan - accuracy: 0.2496 - val\_loss: nan - val\_accuracy: 0.2555

Epoch 8/10

996/996 [==============================] - 45s 45ms/step - loss: nan - accuracy: 0.2496 - val\_loss: nan - val\_accuracy: 0.2555

Epoch 9/10

996/996 [==============================] - 46s 46ms/step - loss: nan - accuracy: 0.2496 - val\_loss: nan - val\_accuracy: 0.2555

Epoch 10/10

996/996 [==============================] - 42s 42ms/step - loss: nan - accuracy: 0.2496 - val\_loss: nan - val\_accuracy: 0.2555

Finish training: best\_val\_acc = 0.25552210211753845

train: optimizer=SGD, learning\_rate=0.01, num\_layers=3, dropout\_rate=0.2

WARNING:absl:At this time, the v2.11+ optimizer `tf.keras.optimizers.SGD` runs slowly on M1/M2 Macs, please use the legacy Keras optimizer instead, located at `tf.keras.optimizers.legacy.SGD`.

Epoch 1/10

2024-03-25 20:16:04.473492: E tensorflow/core/grappler/optimizers/meta\_optimizer.cc:961] model\_pruner failed: INVALID\_ARGUMENT: Graph does not contain terminal node SGD/AssignVariableOp.

996/996 [==============================] - 60s 59ms/step - loss: nan - accuracy: 0.2714 - val\_loss: nan - val\_accuracy: 0.2555

Epoch 2/10

996/996 [==============================] - 60s 60ms/step - loss: nan - accuracy: 0.2496 - val\_loss: nan - val\_accuracy: 0.2555

Epoch 3/10

996/996 [==============================] - 44s 44ms/step - loss: nan - accuracy: 0.2496 - val\_loss: nan - val\_accuracy: 0.2555

Epoch 4/10

996/996 [==============================] - 43s 44ms/step - loss: nan - accuracy: 0.2496 - val\_loss: nan - val\_accuracy: 0.2555

Epoch 5/10

996/996 [==============================] - 45s 45ms/step - loss: nan - accuracy: 0.2496 - val\_loss: nan - val\_accuracy: 0.2555

Epoch 6/10

996/996 [==============================] - 49s 49ms/step - loss: nan - accuracy: 0.2496 - val\_loss: nan - val\_accuracy: 0.2555

Epoch 7/10

996/996 [==============================] - 49s 49ms/step - loss: nan - accuracy: 0.2496 - val\_loss: nan - val\_accuracy: 0.2555

Epoch 8/10

996/996 [==============================] - 47s 48ms/step - loss: nan - accuracy: 0.2496 - val\_loss: nan - val\_accuracy: 0.2555

Epoch 9/10

996/996 [==============================] - 48s 49ms/step - loss: nan - accuracy: 0.2496 - val\_loss: nan - val\_accuracy: 0.2555

Epoch 10/10

996/996 [==============================] - 48s 48ms/step - loss: nan - accuracy: 0.2496 - val\_loss: nan - val\_accuracy: 0.2555

Finish training: best\_val\_acc = 0.25552210211753845

train: optimizer=SGD, learning\_rate=0.01, num\_layers=2, dropout\_rate=0.5

WARNING:absl:At this time, the v2.11+ optimizer `tf.keras.optimizers.SGD` runs slowly on M1/M2 Macs, please use the legacy Keras optimizer instead, located at `tf.keras.optimizers.legacy.SGD`.

Epoch 1/10

2024-03-25 20:24:18.766331: E tensorflow/core/grappler/optimizers/meta\_optimizer.cc:961] model\_pruner failed: INVALID\_ARGUMENT: Graph does not contain terminal node SGD/AssignVariableOp.

996/996 [==============================] - 60s 59ms/step - loss: nan - accuracy: 0.2501 - val\_loss: nan - val\_accuracy: 0.2555

Epoch 2/10

996/996 [==============================] - 59s 59ms/step - loss: nan - accuracy: 0.2496 - val\_loss: nan - val\_accuracy: 0.2555

Epoch 3/10

996/996 [==============================] - 59s 59ms/step - loss: nan - accuracy: 0.2496 - val\_loss: nan - val\_accuracy: 0.2555

Epoch 4/10

996/996 [==============================] - 54s 54ms/step - loss: nan - accuracy: 0.2496 - val\_loss: nan - val\_accuracy: 0.2555

Epoch 5/10

996/996 [==============================] - 59s 59ms/step - loss: nan - accuracy: 0.2496 - val\_loss: nan - val\_accuracy: 0.2555

Epoch 6/10

996/996 [==============================] - 58s 58ms/step - loss: nan - accuracy: 0.2496 - val\_loss: nan - val\_accuracy: 0.2555

Epoch 7/10

996/996 [==============================] - 58s 58ms/step - loss: nan - accuracy: 0.2496 - val\_loss: nan - val\_accuracy: 0.2555

Epoch 8/10

996/996 [==============================] - 59s 59ms/step - loss: nan - accuracy: 0.2496 - val\_loss: nan - val\_accuracy: 0.2555

Epoch 9/10

996/996 [==============================] - 59s 59ms/step - loss: nan - accuracy: 0.2496 - val\_loss: nan - val\_accuracy: 0.2555

Epoch 10/10

996/996 [==============================] - 59s 59ms/step - loss: nan - accuracy: 0.2496 - val\_loss: nan - val\_accuracy: 0.2555

Finish training: best\_val\_acc = 0.25552210211753845

train: optimizer=SGD, learning\_rate=0.01, num\_layers=2, dropout\_rate=0.2

WARNING:absl:At this time, the v2.11+ optimizer `tf.keras.optimizers.SGD` runs slowly on M1/M2 Macs, please use the legacy Keras optimizer instead, located at `tf.keras.optimizers.legacy.SGD`.

Epoch 1/10

2024-03-25 20:34:01.697588: E tensorflow/core/grappler/optimizers/meta\_optimizer.cc:961] model\_pruner failed: INVALID\_ARGUMENT: Graph does not contain terminal node SGD/AssignVariableOp.

996/996 [==============================] - 60s 59ms/step - loss: nan - accuracy: 0.2590 - val\_loss: nan - val\_accuracy: 0.2555

Epoch 2/10

996/996 [==============================] - 59s 59ms/step - loss: nan - accuracy: 0.2496 - val\_loss: nan - val\_accuracy: 0.2555

Epoch 3/10

996/996 [==============================] - 58s 59ms/step - loss: nan - accuracy: 0.2496 - val\_loss: nan - val\_accuracy: 0.2555

Epoch 4/10

996/996 [==============================] - 60s 60ms/step - loss: nan - accuracy: 0.2496 - val\_loss: nan - val\_accuracy: 0.2555

Epoch 5/10

996/996 [==============================] - 57s 58ms/step - loss: nan - accuracy: 0.2496 - val\_loss: nan - val\_accuracy: 0.2555

Epoch 6/10

996/996 [==============================] - 58s 58ms/step - loss: nan - accuracy: 0.2496 - val\_loss: nan - val\_accuracy: 0.2555

Epoch 7/10

996/996 [==============================] - 57s 57ms/step - loss: nan - accuracy: 0.2496 - val\_loss: nan - val\_accuracy: 0.2555

Epoch 8/10

996/996 [==============================] - 49s 50ms/step - loss: nan - accuracy: 0.2496 - val\_loss: nan - val\_accuracy: 0.2555

Epoch 9/10

996/996 [==============================] - 47s 47ms/step - loss: nan - accuracy: 0.2496 - val\_loss: nan - val\_accuracy: 0.2555

Epoch 10/10

996/996 [==============================] - 47s 47ms/step - loss: nan - accuracy: 0.2496 - val\_loss: nan - val\_accuracy: 0.2555

Finish training: best\_val\_acc = 0.25552210211753845

train: optimizer=SGD, learning\_rate=0.1, num\_layers=4, dropout\_rate=0.5

WARNING:absl:At this time, the v2.11+ optimizer `tf.keras.optimizers.SGD` runs slowly on M1/M2 Macs, please use the legacy Keras optimizer instead, located at `tf.keras.optimizers.legacy.SGD`.

Epoch 1/10

2024-03-25 20:43:14.359799: E tensorflow/core/grappler/optimizers/meta\_optimizer.cc:961] model\_pruner failed: INVALID\_ARGUMENT: Graph does not contain terminal node SGD/AssignVariableOp.

996/996 [==============================] - 38s 38ms/step - loss: nan - accuracy: 0.2491 - val\_loss: nan - val\_accuracy: 0.2555

Epoch 2/10

996/996 [==============================] - 37s 37ms/step - loss: nan - accuracy: 0.2496 - val\_loss: nan - val\_accuracy: 0.2555

Epoch 3/10

996/996 [==============================] - 38s 38ms/step - loss: nan - accuracy: 0.2496 - val\_loss: nan - val\_accuracy: 0.2555

Epoch 4/10

996/996 [==============================] - 45s 45ms/step - loss: nan - accuracy: 0.2496 - val\_loss: nan - val\_accuracy: 0.2555

Epoch 5/10

996/996 [==============================] - 45s 45ms/step - loss: nan - accuracy: 0.2496 - val\_loss: nan - val\_accuracy: 0.2555

Epoch 6/10

996/996 [==============================] - 45s 45ms/step - loss: nan - accuracy: 0.2496 - val\_loss: nan - val\_accuracy: 0.2555

Epoch 7/10

996/996 [==============================] - 41s 41ms/step - loss: nan - accuracy: 0.2496 - val\_loss: nan - val\_accuracy: 0.2555

Epoch 8/10

996/996 [==============================] - 43s 43ms/step - loss: nan - accuracy: 0.2496 - val\_loss: nan - val\_accuracy: 0.2555

Epoch 9/10

996/996 [==============================] - 56s 56ms/step - loss: nan - accuracy: 0.2496 - val\_loss: nan - val\_accuracy: 0.2555

Epoch 10/10

996/996 [==============================] - 60s 60ms/step - loss: nan - accuracy: 0.2496 - val\_loss: nan - val\_accuracy: 0.2555

Finish training: best\_val\_acc = 0.25552210211753845

train: optimizer=SGD, learning\_rate=0.1, num\_layers=4, dropout\_rate=0.2

WARNING:absl:At this time, the v2.11+ optimizer `tf.keras.optimizers.SGD` runs slowly on M1/M2 Macs, please use the legacy Keras optimizer instead, located at `tf.keras.optimizers.legacy.SGD`.

Epoch 1/10

2024-03-25 20:50:42.877958: E tensorflow/core/grappler/optimizers/meta\_optimizer.cc:961] model\_pruner failed: INVALID\_ARGUMENT: Graph does not contain terminal node SGD/AssignVariableOp.

996/996 [==============================] - 43s 42ms/step - loss: nan - accuracy: 0.2503 - val\_loss: nan - val\_accuracy: 0.2555

Epoch 2/10

996/996 [==============================] - 39s 39ms/step - loss: nan - accuracy: 0.2496 - val\_loss: nan - val\_accuracy: 0.2555

Epoch 3/10

996/996 [==============================] - 37s 37ms/step - loss: nan - accuracy: 0.2496 - val\_loss: nan - val\_accuracy: 0.2555

Epoch 4/10

996/996 [==============================] - 36s 36ms/step - loss: nan - accuracy: 0.2496 - val\_loss: nan - val\_accuracy: 0.2555

Epoch 5/10

996/996 [==============================] - 37s 37ms/step - loss: nan - accuracy: 0.2496 - val\_loss: nan - val\_accuracy: 0.2555

Epoch 6/10

996/996 [==============================] - 37s 37ms/step - loss: nan - accuracy: 0.2496 - val\_loss: nan - val\_accuracy: 0.2555

Epoch 7/10

996/996 [==============================] - 37s 37ms/step - loss: nan - accuracy: 0.2496 - val\_loss: nan - val\_accuracy: 0.2555

Epoch 8/10

996/996 [==============================] - 37s 37ms/step - loss: nan - accuracy: 0.2496 - val\_loss: nan - val\_accuracy: 0.2555

Epoch 9/10

996/996 [==============================] - 38s 38ms/step - loss: nan - accuracy: 0.2496 - val\_loss: nan - val\_accuracy: 0.2555

Epoch 10/10

996/996 [==============================] - 40s 40ms/step - loss: nan - accuracy: 0.2496 - val\_loss: nan - val\_accuracy: 0.2555

Finish training: best\_val\_acc = 0.25552210211753845

train: optimizer=SGD, learning\_rate=0.1, num\_layers=3, dropout\_rate=0.5

WARNING:absl:At this time, the v2.11+ optimizer `tf.keras.optimizers.SGD` runs slowly on M1/M2 Macs, please use the legacy Keras optimizer instead, located at `tf.keras.optimizers.legacy.SGD`.

Epoch 1/10

2024-03-25 20:57:02.159221: E tensorflow/core/grappler/optimizers/meta\_optimizer.cc:961] model\_pruner failed: INVALID\_ARGUMENT: Graph does not contain terminal node SGD/AssignVariableOp.

996/996 [==============================] - 42s 42ms/step - loss: nan - accuracy: 0.2496 - val\_loss: nan - val\_accuracy: 0.2555

Epoch 2/10

996/996 [==============================] - 42s 42ms/step - loss: nan - accuracy: 0.2496 - val\_loss: nan - val\_accuracy: 0.2555

Epoch 3/10

996/996 [==============================] - 45s 45ms/step - loss: nan - accuracy: 0.2496 - val\_loss: nan - val\_accuracy: 0.2555

Epoch 4/10

996/996 [==============================] - 60s 60ms/step - loss: nan - accuracy: 0.2496 - val\_loss: nan - val\_accuracy: 0.2555

Epoch 5/10

996/996 [==============================] - 66s 66ms/step - loss: nan - accuracy: 0.2496 - val\_loss: nan - val\_accuracy: 0.2555

Epoch 6/10

996/996 [==============================] - 59s 59ms/step - loss: nan - accuracy: 0.2496 - val\_loss: nan - val\_accuracy: 0.2555

Epoch 7/10

996/996 [==============================] - 55s 55ms/step - loss: nan - accuracy: 0.2496 - val\_loss: nan - val\_accuracy: 0.2555

Epoch 8/10

996/996 [==============================] - 57s 57ms/step - loss: nan - accuracy: 0.2496 - val\_loss: nan - val\_accuracy: 0.2555

Epoch 9/10

996/996 [==============================] - 48s 48ms/step - loss: nan - accuracy: 0.2496 - val\_loss: nan - val\_accuracy: 0.2555

Epoch 10/10

996/996 [==============================] - 45s 45ms/step - loss: nan - accuracy: 0.2496 - val\_loss: nan - val\_accuracy: 0.2555

Finish training: best\_val\_acc = 0.25552210211753845

train: optimizer=SGD, learning\_rate=0.1, num\_layers=3, dropout\_rate=0.2

WARNING:absl:At this time, the v2.11+ optimizer `tf.keras.optimizers.SGD` runs slowly on M1/M2 Macs, please use the legacy Keras optimizer instead, located at `tf.keras.optimizers.legacy.SGD`.

Epoch 1/10

2024-03-25 21:05:41.191787: E tensorflow/core/grappler/optimizers/meta\_optimizer.cc:961] model\_pruner failed: INVALID\_ARGUMENT: Graph does not contain terminal node SGD/AssignVariableOp.

996/996 [==============================] - 48s 47ms/step - loss: nan - accuracy: 0.2498 - val\_loss: nan - val\_accuracy: 0.2555

Epoch 2/10

996/996 [==============================] - 54s 54ms/step - loss: nan - accuracy: 0.2496 - val\_loss: nan - val\_accuracy: 0.2555

Epoch 3/10

996/996 [==============================] - 53s 53ms/step - loss: nan - accuracy: 0.2496 - val\_loss: nan - val\_accuracy: 0.2555

Epoch 4/10

996/996 [==============================] - 53s 53ms/step - loss: nan - accuracy: 0.2496 - val\_loss: nan - val\_accuracy: 0.2555

Epoch 5/10

996/996 [==============================] - 51s 51ms/step - loss: nan - accuracy: 0.2496 - val\_loss: nan - val\_accuracy: 0.2555

Epoch 6/10

996/996 [==============================] - 65s 66ms/step - loss: nan - accuracy: 0.2496 - val\_loss: nan - val\_accuracy: 0.2555

Epoch 7/10

996/996 [==============================] - 71s 72ms/step - loss: nan - accuracy: 0.2496 - val\_loss: nan - val\_accuracy: 0.2555

Epoch 8/10

996/996 [==============================] - 72s 72ms/step - loss: nan - accuracy: 0.2496 - val\_loss: nan - val\_accuracy: 0.2555

Epoch 9/10

996/996 [==============================] - 57s 57ms/step - loss: nan - accuracy: 0.2496 - val\_loss: nan - val\_accuracy: 0.2555

Epoch 10/10

996/996 [==============================] - 62s 62ms/step - loss: nan - accuracy: 0.2496 - val\_loss: nan - val\_accuracy: 0.2555

Finish training: best\_val\_acc = 0.25552210211753845

train: optimizer=SGD, learning\_rate=0.1, num\_layers=2, dropout\_rate=0.5

WARNING:absl:At this time, the v2.11+ optimizer `tf.keras.optimizers.SGD` runs slowly on M1/M2 Macs, please use the legacy Keras optimizer instead, located at `tf.keras.optimizers.legacy.SGD`.

Epoch 1/10

2024-03-25 21:15:30.881891: E tensorflow/core/grappler/optimizers/meta\_optimizer.cc:961] model\_pruner failed: INVALID\_ARGUMENT: Graph does not contain terminal node SGD/AssignVariableOp.

996/996 [==============================] - 75s 74ms/step - loss: nan - accuracy: 0.2493 - val\_loss: nan - val\_accuracy: 0.2555

Epoch 2/10

996/996 [==============================] - 69s 70ms/step - loss: nan - accuracy: 0.2496 - val\_loss: nan - val\_accuracy: 0.2555

Epoch 3/10

996/996 [==============================] - 77s 77ms/step - loss: nan - accuracy: 0.2496 - val\_loss: nan - val\_accuracy: 0.2555

Epoch 4/10

996/996 [==============================] - 87s 87ms/step - loss: nan - accuracy: 0.2496 - val\_loss: nan - val\_accuracy: 0.2555

Epoch 5/10

996/996 [==============================] - 77s 77ms/step - loss: nan - accuracy: 0.2496 - val\_loss: nan - val\_accuracy: 0.2555

Epoch 6/10

996/996 [==============================] - 77s 78ms/step - loss: nan - accuracy: 0.2496 - val\_loss: nan - val\_accuracy: 0.2555

Epoch 7/10

996/996 [==============================] - 68s 68ms/step - loss: nan - accuracy: 0.2496 - val\_loss: nan - val\_accuracy: 0.2555

Epoch 8/10

996/996 [==============================] - 84s 84ms/step - loss: nan - accuracy: 0.2496 - val\_loss: nan - val\_accuracy: 0.2555

Epoch 9/10

996/996 [==============================] - 81s 81ms/step - loss: nan - accuracy: 0.2496 - val\_loss: nan - val\_accuracy: 0.2555

Epoch 10/10

996/996 [==============================] - 68s 68ms/step - loss: nan - accuracy: 0.2496 - val\_loss: nan - val\_accuracy: 0.2555

Finish training: best\_val\_acc = 0.25552210211753845

train: optimizer=SGD, learning\_rate=0.1, num\_layers=2, dropout\_rate=0.2

WARNING:absl:At this time, the v2.11+ optimizer `tf.keras.optimizers.SGD` runs slowly on M1/M2 Macs, please use the legacy Keras optimizer instead, located at `tf.keras.optimizers.legacy.SGD`.

Epoch 1/10

2024-03-25 21:28:13.156388: E tensorflow/core/grappler/optimizers/meta\_optimizer.cc:961] model\_pruner failed: INVALID\_ARGUMENT: Graph does not contain terminal node SGD/AssignVariableOp.

996/996 [==============================] - 56s 55ms/step - loss: nan - accuracy: 0.2492 - val\_loss: nan - val\_accuracy: 0.2555

Epoch 2/10

996/996 [==============================] - 49s 49ms/step - loss: nan - accuracy: 0.2496 - val\_loss: nan - val\_accuracy: 0.2555

Epoch 3/10

996/996 [==============================] - 57s 57ms/step - loss: nan - accuracy: 0.2496 - val\_loss: nan - val\_accuracy: 0.2555

Epoch 4/10

996/996 [==============================] - 54s 55ms/step - loss: nan - accuracy: 0.2496 - val\_loss: nan - val\_accuracy: 0.2555

Epoch 5/10

996/996 [==============================] - 57s 58ms/step - loss: nan - accuracy: 0.2496 - val\_loss: nan - val\_accuracy: 0.2555

Epoch 6/10

996/996 [==============================] - 52s 53ms/step - loss: nan - accuracy: 0.2496 - val\_loss: nan - val\_accuracy: 0.2555

Epoch 7/10

996/996 [==============================] - 74s 74ms/step - loss: nan - accuracy: 0.2496 - val\_loss: nan - val\_accuracy: 0.2555

Epoch 8/10

996/996 [==============================] - 80s 81ms/step - loss: nan - accuracy: 0.2496 - val\_loss: nan - val\_accuracy: 0.2555

Epoch 9/10

996/996 [==============================] - 74s 75ms/step - loss: nan - accuracy: 0.2496 - val\_loss: nan - val\_accuracy: 0.2555

Epoch 10/10

996/996 [==============================] - 82s 82ms/step - loss: nan - accuracy: 0.2496 - val\_loss: nan - val\_accuracy: 0.2555

Finish training: best\_val\_acc = 0.25552210211753845

train: optimizer=adam, learning\_rate=0.001, num\_layers=4, dropout\_rate=0.5

WARNING:absl:At this time, the v2.11+ optimizer `tf.keras.optimizers.SGD` runs slowly on M1/M2 Macs, please use the legacy Keras optimizer instead, located at `tf.keras.optimizers.legacy.SGD`.

Epoch 1/10

2024-03-25 21:38:50.675038: E tensorflow/core/grappler/optimizers/meta\_optimizer.cc:961] model\_pruner failed: INVALID\_ARGUMENT: Graph does not contain terminal node SGD/AssignVariableOp.

996/996 [==============================] - 55s 54ms/step - loss: 2.8430 - accuracy: 0.3438 - val\_loss: 1.5363 - val\_accuracy: 0.4357

Epoch 2/10

996/996 [==============================] - 49s 49ms/step - loss: 1.2970 - accuracy: 0.5576 - val\_loss: 1.3659 - val\_accuracy: 0.5025

Epoch 3/10

996/996 [==============================] - 50s 50ms/step - loss: 0.8645 - accuracy: 0.6824 - val\_loss: 1.1365 - val\_accuracy: 0.5823

Epoch 4/10

996/996 [==============================] - 53s 53ms/step - loss: 0.5611 - accuracy: 0.7898 - val\_loss: 0.8832 - val\_accuracy: 0.6370

Epoch 5/10

996/996 [==============================] - 50s 50ms/step - loss: 0.3473 - accuracy: 0.8721 - val\_loss: 1.2873 - val\_accuracy: 0.6220

Epoch 6/10

996/996 [==============================] - 48s 48ms/step - loss: 0.1895 - accuracy: 0.9309 - val\_loss: 0.8288 - val\_accuracy: 0.6832

Epoch 7/10

996/996 [==============================] - 51s 51ms/step - loss: 0.0728 - accuracy: 0.9792 - val\_loss: 0.8256 - val\_accuracy: 0.6958

Epoch 8/10

996/996 [==============================] - 54s 54ms/step - loss: 0.0222 - accuracy: 0.9984 - val\_loss: 0.7700 - val\_accuracy: 0.7269

Epoch 9/10

996/996 [==============================] - 47s 47ms/step - loss: 0.0086 - accuracy: 1.0000 - val\_loss: 0.7712 - val\_accuracy: 0.7244

Epoch 10/10

996/996 [==============================] - 45s 45ms/step - loss: 0.0058 - accuracy: 1.0000 - val\_loss: 0.7800 - val\_accuracy: 0.7284

Finish training: best\_val\_acc = 0.7284136414527893

train: optimizer=adam, learning\_rate=0.001, num\_layers=4, dropout\_rate=0.2

WARNING:absl:At this time, the v2.11+ optimizer `tf.keras.optimizers.SGD` runs slowly on M1/M2 Macs, please use the legacy Keras optimizer instead, located at `tf.keras.optimizers.legacy.SGD`.

Epoch 1/10

2024-03-25 21:47:11.845305: E tensorflow/core/grappler/optimizers/meta\_optimizer.cc:961] model\_pruner failed: INVALID\_ARGUMENT: Graph does not contain terminal node SGD/AssignVariableOp.

996/996 [==============================] - 44s 43ms/step - loss: 1.8206 - accuracy: 0.4030 - val\_loss: 1.2177 - val\_accuracy: 0.5136

Epoch 2/10

996/996 [==============================] - 42s 43ms/step - loss: 0.8791 - accuracy: 0.6519 - val\_loss: 0.9902 - val\_accuracy: 0.5863

Epoch 3/10

996/996 [==============================] - 43s 43ms/step - loss: 0.5299 - accuracy: 0.7917 - val\_loss: 0.7928 - val\_accuracy: 0.6762

Epoch 4/10

996/996 [==============================] - 43s 43ms/step - loss: 0.3004 - accuracy: 0.8923 - val\_loss: 0.7930 - val\_accuracy: 0.7113

Epoch 5/10

996/996 [==============================] - 43s 43ms/step - loss: 0.1502 - accuracy: 0.9598 - val\_loss: 0.7490 - val\_accuracy: 0.7314

Epoch 6/10

996/996 [==============================] - 49s 49ms/step - loss: 0.0669 - accuracy: 0.9933 - val\_loss: 0.6323 - val\_accuracy: 0.7626

Epoch 7/10

996/996 [==============================] - 53s 54ms/step - loss: 0.0312 - accuracy: 0.9996 - val\_loss: 0.6245 - val\_accuracy: 0.7806

Epoch 8/10

996/996 [==============================] - 63s 63ms/step - loss: 0.0188 - accuracy: 1.0000 - val\_loss: 0.6037 - val\_accuracy: 0.7861

Epoch 9/10

996/996 [==============================] - 67s 67ms/step - loss: 0.0135 - accuracy: 1.0000 - val\_loss: 0.6184 - val\_accuracy: 0.7851

Epoch 10/10

996/996 [==============================] - 57s 57ms/step - loss: 0.0106 - accuracy: 1.0000 - val\_loss: 0.6216 - val\_accuracy: 0.7846

Finish training: best\_val\_acc = 0.7861445546150208

train: optimizer=adam, learning\_rate=0.001, num\_layers=3, dropout\_rate=0.5

WARNING:absl:At this time, the v2.11+ optimizer `tf.keras.optimizers.SGD` runs slowly on M1/M2 Macs, please use the legacy Keras optimizer instead, located at `tf.keras.optimizers.legacy.SGD`.

Epoch 1/10

2024-03-25 21:55:37.242655: E tensorflow/core/grappler/optimizers/meta\_optimizer.cc:961] model\_pruner failed: INVALID\_ARGUMENT: Graph does not contain terminal node SGD/AssignVariableOp.

996/996 [==============================] - 59s 58ms/step - loss: 3.2153 - accuracy: 0.3407 - val\_loss: 1.6012 - val\_accuracy: 0.4187

Epoch 2/10

996/996 [==============================] - 55s 56ms/step - loss: 1.6834 - accuracy: 0.5129 - val\_loss: 1.5397 - val\_accuracy: 0.4880

Epoch 3/10

996/996 [==============================] - 61s 61ms/step - loss: 1.5346 - accuracy: 0.5836 - val\_loss: 2.0140 - val\_accuracy: 0.5176

Epoch 4/10

996/996 [==============================] - 76s 76ms/step - loss: 1.9606 - accuracy: 0.6216 - val\_loss: 2.9632 - val\_accuracy: 0.4814

Epoch 5/10

996/996 [==============================] - 56s 57ms/step - loss: 4.0181 - accuracy: 0.5884 - val\_loss: 12.0573 - val\_accuracy: 0.4116

Epoch 6/10

996/996 [==============================] - 49s 49ms/step - loss: 15.4412 - accuracy: 0.5374 - val\_loss: 16.3859 - val\_accuracy: 0.5211

Epoch 7/10

996/996 [==============================] - 50s 51ms/step - loss: 57.3738 - accuracy: 0.5095 - val\_loss: 204.9929 - val\_accuracy: 0.3765

Epoch 8/10

996/996 [==============================] - 56s 56ms/step - loss: 341.4218 - accuracy: 0.4772 - val\_loss: 339.7904 - val\_accuracy: 0.4603

Epoch 9/10

996/996 [==============================] - 57s 58ms/step - loss: 6333.3096 - accuracy: 0.4230 - val\_loss: 65718.2500 - val\_accuracy: 0.2856

Epoch 10/10

996/996 [==============================] - 58s 58ms/step - loss: nan - accuracy: 0.2600 - val\_loss: nan - val\_accuracy: 0.2555

Finish training: best\_val\_acc = 0.5210843086242676

train: optimizer=adam, learning\_rate=0.001, num\_layers=3, dropout\_rate=0.2

WARNING:absl:At this time, the v2.11+ optimizer `tf.keras.optimizers.SGD` runs slowly on M1/M2 Macs, please use the legacy Keras optimizer instead, located at `tf.keras.optimizers.legacy.SGD`.

Epoch 1/10

2024-03-25 22:05:15.480117: E tensorflow/core/grappler/optimizers/meta\_optimizer.cc:961] model\_pruner failed: INVALID\_ARGUMENT: Graph does not contain terminal node SGD/AssignVariableOp.

996/996 [==============================] - 55s 54ms/step - loss: 1.8775 - accuracy: 0.4197 - val\_loss: 1.4619 - val\_accuracy: 0.4960

Epoch 2/10

996/996 [==============================] - 63s 63ms/step - loss: 1.0263 - accuracy: 0.6222 - val\_loss: 1.4953 - val\_accuracy: 0.5562

Epoch 3/10

996/996 [==============================] - 55s 56ms/step - loss: 0.9009 - accuracy: 0.6891 - val\_loss: 2.3382 - val\_accuracy: 0.5251

Epoch 4/10

996/996 [==============================] - 59s 60ms/step - loss: 1.1858 - accuracy: 0.6937 - val\_loss: 7.0127 - val\_accuracy: 0.4593

Epoch 5/10

996/996 [==============================] - 57s 57ms/step - loss: 7.5096 - accuracy: 0.5255 - val\_loss: 93.9288 - val\_accuracy: 0.2696

Epoch 6/10

996/996 [==============================] - 57s 57ms/step - loss: 42.9685 - accuracy: 0.4782 - val\_loss: 38.5679 - val\_accuracy: 0.4639

Epoch 7/10

996/996 [==============================] - 50s 50ms/step - loss: 106.5300 - accuracy: 0.5006 - val\_loss: 288.2025 - val\_accuracy: 0.4222

Epoch 8/10

996/996 [==============================] - 55s 55ms/step - loss: 710.5673 - accuracy: 0.4673 - val\_loss: 3063.8774 - val\_accuracy: 0.3710

Epoch 9/10

996/996 [==============================] - 56s 57ms/step - loss: 5439.5415 - accuracy: 0.3866 - val\_loss: 7284.2568 - val\_accuracy: 0.3082

Epoch 10/10

996/996 [==============================] - 57s 57ms/step - loss: 13088.7217 - accuracy: 0.4041 - val\_loss: 446584.2812 - val\_accuracy: 0.2450

Finish training: best\_val\_acc = 0.5562248826026917

train: optimizer=adam, learning\_rate=0.001, num\_layers=2, dropout\_rate=0.5

WARNING:absl:At this time, the v2.11+ optimizer `tf.keras.optimizers.SGD` runs slowly on M1/M2 Macs, please use the legacy Keras optimizer instead, located at `tf.keras.optimizers.legacy.SGD`.

Epoch 1/10

2024-03-25 22:14:40.215975: E tensorflow/core/grappler/optimizers/meta\_optimizer.cc:961] model\_pruner failed: INVALID\_ARGUMENT: Graph does not contain terminal node SGD/AssignVariableOp.

996/996 [==============================] - 57s 56ms/step - loss: 3.8272 - accuracy: 0.3160 - val\_loss: 2.0377 - val\_accuracy: 0.3891

Epoch 2/10

996/996 [==============================] - 57s 58ms/step - loss: 2.3830 - accuracy: 0.4360 - val\_loss: 1.7817 - val\_accuracy: 0.4408

Epoch 3/10

996/996 [==============================] - 52s 52ms/step - loss: 2.4073 - accuracy: 0.4816 - val\_loss: 1.5090 - val\_accuracy: 0.5080

Epoch 4/10

996/996 [==============================] - 48s 48ms/step - loss: 3.3077 - accuracy: 0.5035 - val\_loss: 3.0292 - val\_accuracy: 0.4578

Epoch 5/10

996/996 [==============================] - 47s 48ms/step - loss: 7.2859 - accuracy: 0.4933 - val\_loss: 7.4008 - val\_accuracy: 0.4408

Epoch 6/10

996/996 [==============================] - 49s 49ms/step - loss: 21.7690 - accuracy: 0.4806 - val\_loss: 24.3895 - val\_accuracy: 0.4322

Epoch 7/10

996/996 [==============================] - 48s 49ms/step - loss: 98.4165 - accuracy: 0.4521 - val\_loss: 111.3549 - val\_accuracy: 0.4232

Epoch 8/10

996/996 [==============================] - 49s 49ms/step - loss: 1390.6455 - accuracy: 0.3815 - val\_loss: 10698.3945 - val\_accuracy: 0.2565

Epoch 9/10

996/996 [==============================] - 48s 48ms/step - loss: nan - accuracy: 0.2639 - val\_loss: nan - val\_accuracy: 0.2555

Epoch 10/10

996/996 [==============================] - 47s 47ms/step - loss: nan - accuracy: 0.2496 - val\_loss: nan - val\_accuracy: 0.2555

Finish training: best\_val\_acc = 0.5080321431159973

train: optimizer=adam, learning\_rate=0.001, num\_layers=2, dropout\_rate=0.2

WARNING:absl:At this time, the v2.11+ optimizer `tf.keras.optimizers.SGD` runs slowly on M1/M2 Macs, please use the legacy Keras optimizer instead, located at `tf.keras.optimizers.legacy.SGD`.

Epoch 1/10

2024-03-25 22:23:02.702926: E tensorflow/core/grappler/optimizers/meta\_optimizer.cc:961] model\_pruner failed: INVALID\_ARGUMENT: Graph does not contain terminal node SGD/AssignVariableOp.

996/996 [==============================] - 48s 48ms/step - loss: 2.1014 - accuracy: 0.3761 - val\_loss: 1.4214 - val\_accuracy: 0.4699

Epoch 2/10

996/996 [==============================] - 51s 51ms/step - loss: 1.3209 - accuracy: 0.5372 - val\_loss: 1.3247 - val\_accuracy: 0.4925

Epoch 3/10

996/996 [==============================] - 50s 50ms/step - loss: 1.8930 - accuracy: 0.5306 - val\_loss: 3.5624 - val\_accuracy: 0.4869

Epoch 4/10

996/996 [==============================] - 49s 49ms/step - loss: 8.2529 - accuracy: 0.4511 - val\_loss: 19.8168 - val\_accuracy: 0.3624

Epoch 5/10

996/996 [==============================] - 48s 49ms/step - loss: 27.7898 - accuracy: 0.4477 - val\_loss: 112.9208 - val\_accuracy: 0.4056

Epoch 6/10

996/996 [==============================] - 48s 48ms/step - loss: 95.3980 - accuracy: 0.4507 - val\_loss: 119.3762 - val\_accuracy: 0.5005

Epoch 7/10

996/996 [==============================] - 49s 49ms/step - loss: 1101.0764 - accuracy: 0.4158 - val\_loss: 2377.7419 - val\_accuracy: 0.4006

Epoch 8/10

996/996 [==============================] - 49s 49ms/step - loss: 19523.2227 - accuracy: 0.3431 - val\_loss: 29009.4883 - val\_accuracy: 0.3153

Epoch 9/10

996/996 [==============================] - 48s 49ms/step - loss: nan - accuracy: 0.2917 - val\_loss: nan - val\_accuracy: 0.2555

Epoch 10/10

996/996 [==============================] - 48s 48ms/step - loss: nan - accuracy: 0.2496 - val\_loss: nan - val\_accuracy: 0.2555

Finish training: best\_val\_acc = 0.5005019903182983

train: optimizer=adam, learning\_rate=0.01, num\_layers=4, dropout\_rate=0.5

WARNING:absl:At this time, the v2.11+ optimizer `tf.keras.optimizers.SGD` runs slowly on M1/M2 Macs, please use the legacy Keras optimizer instead, located at `tf.keras.optimizers.legacy.SGD`.

Epoch 1/10

2024-03-25 22:31:09.971408: E tensorflow/core/grappler/optimizers/meta\_optimizer.cc:961] model\_pruner failed: INVALID\_ARGUMENT: Graph does not contain terminal node SGD/AssignVariableOp.

996/996 [==============================] - 37s 37ms/step - loss: nan - accuracy: 0.2542 - val\_loss: nan - val\_accuracy: 0.2555

Epoch 2/10

996/996 [==============================] - 36s 36ms/step - loss: nan - accuracy: 0.2496 - val\_loss: nan - val\_accuracy: 0.2555

Epoch 3/10

996/996 [==============================] - 35s 36ms/step - loss: nan - accuracy: 0.2496 - val\_loss: nan - val\_accuracy: 0.2555

Epoch 4/10

996/996 [==============================] - 35s 36ms/step - loss: nan - accuracy: 0.2496 - val\_loss: nan - val\_accuracy: 0.2555

Epoch 5/10

996/996 [==============================] - 36s 36ms/step - loss: nan - accuracy: 0.2496 - val\_loss: nan - val\_accuracy: 0.2555

Epoch 6/10

996/996 [==============================] - 36s 36ms/step - loss: nan - accuracy: 0.2496 - val\_loss: nan - val\_accuracy: 0.2555

Epoch 7/10

996/996 [==============================] - 36s 36ms/step - loss: nan - accuracy: 0.2496 - val\_loss: nan - val\_accuracy: 0.2555

Epoch 8/10

996/996 [==============================] - 36s 36ms/step - loss: nan - accuracy: 0.2496 - val\_loss: nan - val\_accuracy: 0.2555

Epoch 9/10

996/996 [==============================] - 36s 36ms/step - loss: nan - accuracy: 0.2496 - val\_loss: nan - val\_accuracy: 0.2555

Epoch 10/10

996/996 [==============================] - 36s 36ms/step - loss: nan - accuracy: 0.2496 - val\_loss: nan - val\_accuracy: 0.2555

Finish training: best\_val\_acc = 0.25552210211753845

train: optimizer=adam, learning\_rate=0.01, num\_layers=4, dropout\_rate=0.2

WARNING:absl:At this time, the v2.11+ optimizer `tf.keras.optimizers.SGD` runs slowly on M1/M2 Macs, please use the legacy Keras optimizer instead, located at `tf.keras.optimizers.legacy.SGD`.

Epoch 1/10

2024-03-25 22:37:08.991719: E tensorflow/core/grappler/optimizers/meta\_optimizer.cc:961] model\_pruner failed: INVALID\_ARGUMENT: Graph does not contain terminal node SGD/AssignVariableOp.

996/996 [==============================] - 39s 38ms/step - loss: 19.1486 - accuracy: 0.3106 - val\_loss: 56.2584 - val\_accuracy: 0.3519

Epoch 2/10

996/996 [==============================] - 38s 38ms/step - loss: nan - accuracy: 0.2634 - val\_loss: nan - val\_accuracy: 0.2555

Epoch 3/10

996/996 [==============================] - 37s 37ms/step - loss: nan - accuracy: 0.2496 - val\_loss: nan - val\_accuracy: 0.2555

Epoch 4/10

996/996 [==============================] - 36s 36ms/step - loss: nan - accuracy: 0.2496 - val\_loss: nan - val\_accuracy: 0.2555

Epoch 5/10

996/996 [==============================] - 35s 35ms/step - loss: nan - accuracy: 0.2496 - val\_loss: nan - val\_accuracy: 0.2555

Epoch 6/10

996/996 [==============================] - 36s 36ms/step - loss: nan - accuracy: 0.2496 - val\_loss: nan - val\_accuracy: 0.2555

Epoch 7/10

996/996 [==============================] - 36s 36ms/step - loss: nan - accuracy: 0.2496 - val\_loss: nan - val\_accuracy: 0.2555

Epoch 8/10

996/996 [==============================] - 36s 36ms/step - loss: nan - accuracy: 0.2496 - val\_loss: nan - val\_accuracy: 0.2555

Epoch 9/10

996/996 [==============================] - 36s 36ms/step - loss: nan - accuracy: 0.2496 - val\_loss: nan - val\_accuracy: 0.2555

Epoch 10/10

996/996 [==============================] - 36s 36ms/step - loss: nan - accuracy: 0.2496 - val\_loss: nan - val\_accuracy: 0.2555

Finish training: best\_val\_acc = 0.3519076406955719

train: optimizer=adam, learning\_rate=0.01, num\_layers=3, dropout\_rate=0.5

WARNING:absl:At this time, the v2.11+ optimizer `tf.keras.optimizers.SGD` runs slowly on M1/M2 Macs, please use the legacy Keras optimizer instead, located at `tf.keras.optimizers.legacy.SGD`.

Epoch 1/10

2024-03-25 22:43:11.867623: E tensorflow/core/grappler/optimizers/meta\_optimizer.cc:961] model\_pruner failed: INVALID\_ARGUMENT: Graph does not contain terminal node SGD/AssignVariableOp.

996/996 [==============================] - 40s 40ms/step - loss: nan - accuracy: 0.2495 - val\_loss: nan - val\_accuracy: 0.2555

Epoch 2/10

996/996 [==============================] - 39s 39ms/step - loss: nan - accuracy: 0.2496 - val\_loss: nan - val\_accuracy: 0.2555

Epoch 3/10

996/996 [==============================] - 39s 39ms/step - loss: nan - accuracy: 0.2496 - val\_loss: nan - val\_accuracy: 0.2555

Epoch 4/10

996/996 [==============================] - 39s 39ms/step - loss: nan - accuracy: 0.2496 - val\_loss: nan - val\_accuracy: 0.2555

Epoch 5/10

996/996 [==============================] - 39s 40ms/step - loss: nan - accuracy: 0.2496 - val\_loss: nan - val\_accuracy: 0.2555

Epoch 6/10

996/996 [==============================] - 39s 39ms/step - loss: nan - accuracy: 0.2496 - val\_loss: nan - val\_accuracy: 0.2555

Epoch 7/10

996/996 [==============================] - 39s 39ms/step - loss: nan - accuracy: 0.2496 - val\_loss: nan - val\_accuracy: 0.2555

Epoch 8/10

996/996 [==============================] - 39s 39ms/step - loss: nan - accuracy: 0.2496 - val\_loss: nan - val\_accuracy: 0.2555

Epoch 9/10

996/996 [==============================] - 39s 39ms/step - loss: nan - accuracy: 0.2496 - val\_loss: nan - val\_accuracy: 0.2555

Epoch 10/10

996/996 [==============================] - 39s 39ms/step - loss: nan - accuracy: 0.2496 - val\_loss: nan - val\_accuracy: 0.2555

Finish training: best\_val\_acc = 0.25552210211753845

train: optimizer=adam, learning\_rate=0.01, num\_layers=3, dropout\_rate=0.2

WARNING:absl:At this time, the v2.11+ optimizer `tf.keras.optimizers.SGD` runs slowly on M1/M2 Macs, please use the legacy Keras optimizer instead, located at `tf.keras.optimizers.legacy.SGD`.

Epoch 1/10

2024-03-25 22:49:43.587462: E tensorflow/core/grappler/optimizers/meta\_optimizer.cc:961] model\_pruner failed: INVALID\_ARGUMENT: Graph does not contain terminal node SGD/AssignVariableOp.

996/996 [==============================] - 41s 40ms/step - loss: nan - accuracy: 0.2738 - val\_loss: nan - val\_accuracy: 0.2555

Epoch 2/10

996/996 [==============================] - 40s 40ms/step - loss: nan - accuracy: 0.2496 - val\_loss: nan - val\_accuracy: 0.2555

Epoch 3/10

996/996 [==============================] - 39s 40ms/step - loss: nan - accuracy: 0.2496 - val\_loss: nan - val\_accuracy: 0.2555

Epoch 4/10

996/996 [==============================] - 39s 39ms/step - loss: nan - accuracy: 0.2496 - val\_loss: nan - val\_accuracy: 0.2555

Epoch 5/10

996/996 [==============================] - 39s 39ms/step - loss: nan - accuracy: 0.2496 - val\_loss: nan - val\_accuracy: 0.2555

Epoch 6/10

996/996 [==============================] - 39s 39ms/step - loss: nan - accuracy: 0.2496 - val\_loss: nan - val\_accuracy: 0.2555

Epoch 7/10

996/996 [==============================] - 39s 39ms/step - loss: nan - accuracy: 0.2496 - val\_loss: nan - val\_accuracy: 0.2555

Epoch 8/10

996/996 [==============================] - 39s 40ms/step - loss: nan - accuracy: 0.2496 - val\_loss: nan - val\_accuracy: 0.2555

Epoch 9/10

996/996 [==============================] - 40s 40ms/step - loss: nan - accuracy: 0.2496 - val\_loss: nan - val\_accuracy: 0.2555

Epoch 10/10

996/996 [==============================] - 40s 40ms/step - loss: nan - accuracy: 0.2496 - val\_loss: nan - val\_accuracy: 0.2555

Finish training: best\_val\_acc = 0.25552210211753845

train: optimizer=adam, learning\_rate=0.01, num\_layers=2, dropout\_rate=0.5

WARNING:absl:At this time, the v2.11+ optimizer `tf.keras.optimizers.SGD` runs slowly on M1/M2 Macs, please use the legacy Keras optimizer instead, located at `tf.keras.optimizers.legacy.SGD`.

Epoch 1/10

2024-03-25 22:56:19.050880: E tensorflow/core/grappler/optimizers/meta\_optimizer.cc:961] model\_pruner failed: INVALID\_ARGUMENT: Graph does not contain terminal node SGD/AssignVariableOp.

996/996 [==============================] - 50s 50ms/step - loss: nan - accuracy: 0.2498 - val\_loss: nan - val\_accuracy: 0.2555

Epoch 2/10

996/996 [==============================] - 57s 57ms/step - loss: nan - accuracy: 0.2496 - val\_loss: nan - val\_accuracy: 0.2555

Epoch 3/10

996/996 [==============================] - 70s 70ms/step - loss: nan - accuracy: 0.2496 - val\_loss: nan - val\_accuracy: 0.2555

Epoch 4/10

996/996 [==============================] - 51s 51ms/step - loss: nan - accuracy: 0.2496 - val\_loss: nan - val\_accuracy: 0.2555

Epoch 5/10

996/996 [==============================] - 49s 49ms/step - loss: nan - accuracy: 0.2496 - val\_loss: nan - val\_accuracy: 0.2555

Epoch 6/10

996/996 [==============================] - 49s 49ms/step - loss: nan - accuracy: 0.2496 - val\_loss: nan - val\_accuracy: 0.2555

Epoch 7/10

996/996 [==============================] - 49s 49ms/step - loss: nan - accuracy: 0.2496 - val\_loss: nan - val\_accuracy: 0.2555

Epoch 8/10

996/996 [==============================] - 50s 50ms/step - loss: nan - accuracy: 0.2496 - val\_loss: nan - val\_accuracy: 0.2555

Epoch 9/10

996/996 [==============================] - 49s 49ms/step - loss: nan - accuracy: 0.2496 - val\_loss: nan - val\_accuracy: 0.2555

Epoch 10/10

996/996 [==============================] - 49s 49ms/step - loss: nan - accuracy: 0.2496 - val\_loss: nan - val\_accuracy: 0.2555

Finish training: best\_val\_acc = 0.25552210211753845

train: optimizer=adam, learning\_rate=0.01, num\_layers=2, dropout\_rate=0.2

WARNING:absl:At this time, the v2.11+ optimizer `tf.keras.optimizers.SGD` runs slowly on M1/M2 Macs, please use the legacy Keras optimizer instead, located at `tf.keras.optimizers.legacy.SGD`.

Epoch 1/10

2024-03-25 23:05:01.187092: E tensorflow/core/grappler/optimizers/meta\_optimizer.cc:961] model\_pruner failed: INVALID\_ARGUMENT: Graph does not contain terminal node SGD/AssignVariableOp.

996/996 [==============================] - 50s 50ms/step - loss: nan - accuracy: 0.2562 - val\_loss: nan - val\_accuracy: 0.2555

Epoch 2/10

996/996 [==============================] - 49s 49ms/step - loss: nan - accuracy: 0.2496 - val\_loss: nan - val\_accuracy: 0.2555

Epoch 3/10

996/996 [==============================] - 49s 49ms/step - loss: nan - accuracy: 0.2496 - val\_loss: nan - val\_accuracy: 0.2555

Epoch 4/10

996/996 [==============================] - 52s 53ms/step - loss: nan - accuracy: 0.2496 - val\_loss: nan - val\_accuracy: 0.2555

Epoch 5/10

996/996 [==============================] - 51s 51ms/step - loss: nan - accuracy: 0.2496 - val\_loss: nan - val\_accuracy: 0.2555

Epoch 6/10

996/996 [==============================] - 49s 49ms/step - loss: nan - accuracy: 0.2496 - val\_loss: nan - val\_accuracy: 0.2555

Epoch 7/10

996/996 [==============================] - 49s 49ms/step - loss: nan - accuracy: 0.2496 - val\_loss: nan - val\_accuracy: 0.2555

Epoch 8/10

996/996 [==============================] - 49s 49ms/step - loss: nan - accuracy: 0.2496 - val\_loss: nan - val\_accuracy: 0.2555

Epoch 9/10

996/996 [==============================] - 48s 49ms/step - loss: nan - accuracy: 0.2496 - val\_loss: nan - val\_accuracy: 0.2555

Epoch 10/10

996/996 [==============================] - 48s 49ms/step - loss: nan - accuracy: 0.2496 - val\_loss: nan - val\_accuracy: 0.2555

Finish training: best\_val\_acc = 0.25552210211753845

train: optimizer=adam, learning\_rate=0.1, num\_layers=4, dropout\_rate=0.5

WARNING:absl:At this time, the v2.11+ optimizer `tf.keras.optimizers.SGD` runs slowly on M1/M2 Macs, please use the legacy Keras optimizer instead, located at `tf.keras.optimizers.legacy.SGD`.

Epoch 1/10

2024-03-25 23:13:16.550635: E tensorflow/core/grappler/optimizers/meta\_optimizer.cc:961] model\_pruner failed: INVALID\_ARGUMENT: Graph does not contain terminal node SGD/AssignVariableOp.

996/996 [==============================] - 39s 39ms/step - loss: nan - accuracy: 0.2488 - val\_loss: nan - val\_accuracy: 0.2555

Epoch 2/10

996/996 [==============================] - 38s 38ms/step - loss: nan - accuracy: 0.2496 - val\_loss: nan - val\_accuracy: 0.2555

Epoch 3/10

996/996 [==============================] - 38s 38ms/step - loss: nan - accuracy: 0.2496 - val\_loss: nan - val\_accuracy: 0.2555

Epoch 4/10

996/996 [==============================] - 38s 38ms/step - loss: nan - accuracy: 0.2496 - val\_loss: nan - val\_accuracy: 0.2555

Epoch 5/10

996/996 [==============================] - 38s 38ms/step - loss: nan - accuracy: 0.2496 - val\_loss: nan - val\_accuracy: 0.2555

Epoch 6/10

996/996 [==============================] - 38s 38ms/step - loss: nan - accuracy: 0.2496 - val\_loss: nan - val\_accuracy: 0.2555

Epoch 7/10

996/996 [==============================] - 38s 38ms/step - loss: nan - accuracy: 0.2496 - val\_loss: nan - val\_accuracy: 0.2555

Epoch 8/10

996/996 [==============================] - 38s 38ms/step - loss: nan - accuracy: 0.2496 - val\_loss: nan - val\_accuracy: 0.2555

Epoch 9/10

996/996 [==============================] - 38s 38ms/step - loss: nan - accuracy: 0.2496 - val\_loss: nan - val\_accuracy: 0.2555

Epoch 10/10

996/996 [==============================] - 38s 38ms/step - loss: nan - accuracy: 0.2496 - val\_loss: nan - val\_accuracy: 0.2555

Finish training: best\_val\_acc = 0.25552210211753845

train: optimizer=adam, learning\_rate=0.1, num\_layers=4, dropout\_rate=0.2

WARNING:absl:At this time, the v2.11+ optimizer `tf.keras.optimizers.SGD` runs slowly on M1/M2 Macs, please use the legacy Keras optimizer instead, located at `tf.keras.optimizers.legacy.SGD`.

Epoch 1/10

2024-03-25 23:19:37.055633: E tensorflow/core/grappler/optimizers/meta\_optimizer.cc:961] model\_pruner failed: INVALID\_ARGUMENT: Graph does not contain terminal node SGD/AssignVariableOp.

996/996 [==============================] - 40s 39ms/step - loss: nan - accuracy: 0.2502 - val\_loss: nan - val\_accuracy: 0.2555

Epoch 2/10

996/996 [==============================] - 38s 38ms/step - loss: nan - accuracy: 0.2496 - val\_loss: nan - val\_accuracy: 0.2555

Epoch 3/10

996/996 [==============================] - 38s 38ms/step - loss: nan - accuracy: 0.2496 - val\_loss: nan - val\_accuracy: 0.2555

Epoch 4/10

996/996 [==============================] - 38s 38ms/step - loss: nan - accuracy: 0.2496 - val\_loss: nan - val\_accuracy: 0.2555

Epoch 5/10

996/996 [==============================] - 39s 39ms/step - loss: nan - accuracy: 0.2496 - val\_loss: nan - val\_accuracy: 0.2555

Epoch 6/10

996/996 [==============================] - 38s 39ms/step - loss: nan - accuracy: 0.2496 - val\_loss: nan - val\_accuracy: 0.2555

Epoch 7/10

996/996 [==============================] - 39s 39ms/step - loss: nan - accuracy: 0.2496 - val\_loss: nan - val\_accuracy: 0.2555

Epoch 8/10

996/996 [==============================] - 39s 39ms/step - loss: nan - accuracy: 0.2496 - val\_loss: nan - val\_accuracy: 0.2555

Epoch 9/10

996/996 [==============================] - 38s 38ms/step - loss: nan - accuracy: 0.2496 - val\_loss: nan - val\_accuracy: 0.2555

Epoch 10/10

996/996 [==============================] - 38s 38ms/step - loss: nan - accuracy: 0.2496 - val\_loss: nan - val\_accuracy: 0.2555

Finish training: best\_val\_acc = 0.25552210211753845

train: optimizer=adam, learning\_rate=0.1, num\_layers=3, dropout\_rate=0.5

WARNING:absl:At this time, the v2.11+ optimizer `tf.keras.optimizers.SGD` runs slowly on M1/M2 Macs, please use the legacy Keras optimizer instead, located at `tf.keras.optimizers.legacy.SGD`.

Epoch 1/10

2024-03-25 23:26:01.890830: E tensorflow/core/grappler/optimizers/meta\_optimizer.cc:961] model\_pruner failed: INVALID\_ARGUMENT: Graph does not contain terminal node SGD/AssignVariableOp.

996/996 [==============================] - 42s 42ms/step - loss: nan - accuracy: 0.2496 - val\_loss: nan - val\_accuracy: 0.2555

Epoch 2/10

996/996 [==============================] - 41s 42ms/step - loss: nan - accuracy: 0.2496 - val\_loss: nan - val\_accuracy: 0.2555

Epoch 3/10

996/996 [==============================] - 41s 42ms/step - loss: nan - accuracy: 0.2496 - val\_loss: nan - val\_accuracy: 0.2555

Epoch 4/10

996/996 [==============================] - 42s 42ms/step - loss: nan - accuracy: 0.2496 - val\_loss: nan - val\_accuracy: 0.2555

Epoch 5/10

996/996 [==============================] - 41s 42ms/step - loss: nan - accuracy: 0.2496 - val\_loss: nan - val\_accuracy: 0.2555

Epoch 6/10

996/996 [==============================] - 42s 42ms/step - loss: nan - accuracy: 0.2496 - val\_loss: nan - val\_accuracy: 0.2555

Epoch 7/10

996/996 [==============================] - 41s 42ms/step - loss: nan - accuracy: 0.2496 - val\_loss: nan - val\_accuracy: 0.2555

Epoch 8/10

996/996 [==============================] - 41s 41ms/step - loss: nan - accuracy: 0.2496 - val\_loss: nan - val\_accuracy: 0.2555

Epoch 9/10

996/996 [==============================] - 42s 42ms/step - loss: nan - accuracy: 0.2496 - val\_loss: nan - val\_accuracy: 0.2555

Epoch 10/10

996/996 [==============================] - 41s 42ms/step - loss: nan - accuracy: 0.2496 - val\_loss: nan - val\_accuracy: 0.2555

Finish training: best\_val\_acc = 0.25552210211753845

train: optimizer=adam, learning\_rate=0.1, num\_layers=3, dropout\_rate=0.2

WARNING:absl:At this time, the v2.11+ optimizer `tf.keras.optimizers.SGD` runs slowly on M1/M2 Macs, please use the legacy Keras optimizer instead, located at `tf.keras.optimizers.legacy.SGD`.

Epoch 1/10

2024-03-25 23:32:56.976326: E tensorflow/core/grappler/optimizers/meta\_optimizer.cc:961] model\_pruner failed: INVALID\_ARGUMENT: Graph does not contain terminal node SGD/AssignVariableOp.

996/996 [==============================] - 43s 42ms/step - loss: nan - accuracy: 0.2488 - val\_loss: nan - val\_accuracy: 0.2555

Epoch 2/10

996/996 [==============================] - 42s 42ms/step - loss: nan - accuracy: 0.2496 - val\_loss: nan - val\_accuracy: 0.2555

Epoch 3/10

996/996 [==============================] - 42s 42ms/step - loss: nan - accuracy: 0.2496 - val\_loss: nan - val\_accuracy: 0.2555

Epoch 4/10

996/996 [==============================] - 42s 42ms/step - loss: nan - accuracy: 0.2496 - val\_loss: nan - val\_accuracy: 0.2555

Epoch 5/10

996/996 [==============================] - 66s 66ms/step - loss: nan - accuracy: 0.2496 - val\_loss: nan - val\_accuracy: 0.2555

Epoch 6/10

996/996 [==============================] - 45s 45ms/step - loss: nan - accuracy: 0.2496 - val\_loss: nan - val\_accuracy: 0.2555

Epoch 7/10

996/996 [==============================] - 42s 42ms/step - loss: nan - accuracy: 0.2496 - val\_loss: nan - val\_accuracy: 0.2555

Epoch 8/10

996/996 [==============================] - 42s 42ms/step - loss: nan - accuracy: 0.2496 - val\_loss: nan - val\_accuracy: 0.2555

Epoch 9/10

996/996 [==============================] - 42s 42ms/step - loss: nan - accuracy: 0.2496 - val\_loss: nan - val\_accuracy: 0.2555

Epoch 10/10

996/996 [==============================] - 42s 42ms/step - loss: nan - accuracy: 0.2496 - val\_loss: nan - val\_accuracy: 0.2555

Finish training: best\_val\_acc = 0.25552210211753845

train: optimizer=adam, learning\_rate=0.1, num\_layers=2, dropout\_rate=0.5

WARNING:absl:At this time, the v2.11+ optimizer `tf.keras.optimizers.SGD` runs slowly on M1/M2 Macs, please use the legacy Keras optimizer instead, located at `tf.keras.optimizers.legacy.SGD`.

Epoch 1/10

2024-03-25 23:40:23.660109: E tensorflow/core/grappler/optimizers/meta\_optimizer.cc:961] model\_pruner failed: INVALID\_ARGUMENT: Graph does not contain terminal node SGD/AssignVariableOp.

996/996 [==============================] - 50s 50ms/step - loss: nan - accuracy: 0.2488 - val\_loss: nan - val\_accuracy: 0.2555

Epoch 2/10

996/996 [==============================] - 50s 50ms/step - loss: nan - accuracy: 0.2496 - val\_loss: nan - val\_accuracy: 0.2555

Epoch 3/10

996/996 [==============================] - 50s 50ms/step - loss: nan - accuracy: 0.2496 - val\_loss: nan - val\_accuracy: 0.2555

Epoch 4/10

996/996 [==============================] - 50s 50ms/step - loss: nan - accuracy: 0.2496 - val\_loss: nan - val\_accuracy: 0.2555

Epoch 5/10

996/996 [==============================] - 50s 50ms/step - loss: nan - accuracy: 0.2496 - val\_loss: nan - val\_accuracy: 0.2555

Epoch 6/10

996/996 [==============================] - 50s 50ms/step - loss: nan - accuracy: 0.2496 - val\_loss: nan - val\_accuracy: 0.2555

Epoch 7/10

996/996 [==============================] - 50s 50ms/step - loss: nan - accuracy: 0.2496 - val\_loss: nan - val\_accuracy: 0.2555

Epoch 8/10

996/996 [==============================] - 50s 50ms/step - loss: nan - accuracy: 0.2496 - val\_loss: nan - val\_accuracy: 0.2555

Epoch 9/10

996/996 [==============================] - 50s 50ms/step - loss: nan - accuracy: 0.2496 - val\_loss: nan - val\_accuracy: 0.2555

Epoch 10/10

996/996 [==============================] - 50s 50ms/step - loss: nan - accuracy: 0.2496 - val\_loss: nan - val\_accuracy: 0.2555

Finish training: best\_val\_acc = 0.25552210211753845

train: optimizer=adam, learning\_rate=0.1, num\_layers=2, dropout\_rate=0.2

WARNING:absl:At this time, the v2.11+ optimizer `tf.keras.optimizers.SGD` runs slowly on M1/M2 Macs, please use the legacy Keras optimizer instead, located at `tf.keras.optimizers.legacy.SGD`.

Epoch 1/10

2024-03-25 23:48:41.877080: E tensorflow/core/grappler/optimizers/meta\_optimizer.cc:961] model\_pruner failed: INVALID\_ARGUMENT: Graph does not contain terminal node SGD/AssignVariableOp.

996/996 [==============================] - 51s 51ms/step - loss: nan - accuracy: 0.2500 - val\_loss: nan - val\_accuracy: 0.2555

Epoch 2/10

996/996 [==============================] - 50s 50ms/step - loss: nan - accuracy: 0.2496 - val\_loss: nan - val\_accuracy: 0.2555

Epoch 3/10

996/996 [==============================] - 50s 50ms/step - loss: nan - accuracy: 0.2496 - val\_loss: nan - val\_accuracy: 0.2555

Epoch 4/10

996/996 [==============================] - 50s 50ms/step - loss: nan - accuracy: 0.2496 - val\_loss: nan - val\_accuracy: 0.2555

Epoch 5/10

996/996 [==============================] - 50s 50ms/step - loss: nan - accuracy: 0.2496 - val\_loss: nan - val\_accuracy: 0.2555

Epoch 6/10

996/996 [==============================] - 50s 50ms/step - loss: nan - accuracy: 0.2496 - val\_loss: nan - val\_accuracy: 0.2555

Epoch 7/10

996/996 [==============================] - 50s 50ms/step - loss: nan - accuracy: 0.2496 - val\_loss: nan - val\_accuracy: 0.2555

Epoch 8/10

996/996 [==============================] - 50s 50ms/step - loss: nan - accuracy: 0.2496 - val\_loss: nan - val\_accuracy: 0.2555

Epoch 9/10

996/996 [==============================] - 50s 50ms/step - loss: nan - accuracy: 0.2496 - val\_loss: nan - val\_accuracy: 0.2555

Epoch 10/10

996/996 [==============================] - 50s 50ms/step - loss: nan - accuracy: 0.2496 - val\_loss: nan - val\_accuracy: 0.2555

Finish training: best\_val\_acc = 0.25552210211753845

Optimizer: SGD, Learning Rate: 0.001, Number of Layers: 4, Dropout Rate: 0.5, Best Validation Accuracy: 0.6335341334342957

Optimizer: SGD, Learning Rate: 0.001, Number of Layers: 4, Dropout Rate: 0.2, Best Validation Accuracy: 0.810742974281311

Optimizer: SGD, Learning Rate: 0.001, Number of Layers: 3, Dropout Rate: 0.5, Best Validation Accuracy: 0.49297189712524414

Optimizer: SGD, Learning Rate: 0.001, Number of Layers: 3, Dropout Rate: 0.2, Best Validation Accuracy: 0.6104417443275452

Optimizer: SGD, Learning Rate: 0.001, Number of Layers: 2, Dropout Rate: 0.5, Best Validation Accuracy: 0.522088348865509

Optimizer: SGD, Learning Rate: 0.001, Number of Layers: 2, Dropout Rate: 0.2, Best Validation Accuracy: 0.5070281028747559

Optimizer: SGD, Learning Rate: 0.01, Number of Layers: 4, Dropout Rate: 0.5, Best Validation Accuracy: 0.25552210211753845

Optimizer: SGD, Learning Rate: 0.01, Number of Layers: 4, Dropout Rate: 0.2, Best Validation Accuracy: 0.33283132314682007

Optimizer: SGD, Learning Rate: 0.01, Number of Layers: 3, Dropout Rate: 0.5, Best Validation Accuracy: 0.25552210211753845

Optimizer: SGD, Learning Rate: 0.01, Number of Layers: 3, Dropout Rate: 0.2, Best Validation Accuracy: 0.25552210211753845

Optimizer: SGD, Learning Rate: 0.01, Number of Layers: 2, Dropout Rate: 0.5, Best Validation Accuracy: 0.25552210211753845

Optimizer: SGD, Learning Rate: 0.01, Number of Layers: 2, Dropout Rate: 0.2, Best Validation Accuracy: 0.25552210211753845

Optimizer: SGD, Learning Rate: 0.1, Number of Layers: 4, Dropout Rate: 0.5, Best Validation Accuracy: 0.25552210211753845

Optimizer: SGD, Learning Rate: 0.1, Number of Layers: 4, Dropout Rate: 0.2, Best Validation Accuracy: 0.25552210211753845

Optimizer: SGD, Learning Rate: 0.1, Number of Layers: 3, Dropout Rate: 0.5, Best Validation Accuracy: 0.25552210211753845

Optimizer: SGD, Learning Rate: 0.1, Number of Layers: 3, Dropout Rate: 0.2, Best Validation Accuracy: 0.25552210211753845

Optimizer: SGD, Learning Rate: 0.1, Number of Layers: 2, Dropout Rate: 0.5, Best Validation Accuracy: 0.25552210211753845

Optimizer: SGD, Learning Rate: 0.1, Number of Layers: 2, Dropout Rate: 0.2, Best Validation Accuracy: 0.25552210211753845

Optimizer: adam, Learning Rate: 0.001, Number of Layers: 4, Dropout Rate: 0.5, Best Validation Accuracy: 0.7284136414527893

Optimizer: adam, Learning Rate: 0.001, Number of Layers: 4, Dropout Rate: 0.2, Best Validation Accuracy: 0.7861445546150208

Optimizer: adam, Learning Rate: 0.001, Number of Layers: 3, Dropout Rate: 0.5, Best Validation Accuracy: 0.5210843086242676

Optimizer: adam, Learning Rate: 0.001, Number of Layers: 3, Dropout Rate: 0.2, Best Validation Accuracy: 0.5562248826026917

Optimizer: adam, Learning Rate: 0.001, Number of Layers: 2, Dropout Rate: 0.5, Best Validation Accuracy: 0.5080321431159973

Optimizer: adam, Learning Rate: 0.001, Number of Layers: 2, Dropout Rate: 0.2, Best Validation Accuracy: 0.5005019903182983

Optimizer: adam, Learning Rate: 0.01, Number of Layers: 4, Dropout Rate: 0.5, Best Validation Accuracy: 0.25552210211753845

Optimizer: adam, Learning Rate: 0.01, Number of Layers: 4, Dropout Rate: 0.2, Best Validation Accuracy: 0.3519076406955719

Optimizer: adam, Learning Rate: 0.01, Number of Layers: 3, Dropout Rate: 0.5, Best Validation Accuracy: 0.25552210211753845

Optimizer: adam, Learning Rate: 0.01, Number of Layers: 3, Dropout Rate: 0.2, Best Validation Accuracy: 0.25552210211753845

Optimizer: adam, Learning Rate: 0.01, Number of Layers: 2, Dropout Rate: 0.5, Best Validation Accuracy: 0.25552210211753845

Optimizer: adam, Learning Rate: 0.01, Number of Layers: 2, Dropout Rate: 0.2, Best Validation Accuracy: 0.25552210211753845

Optimizer: adam, Learning Rate: 0.1, Number of Layers: 4, Dropout Rate: 0.5, Best Validation Accuracy: 0.25552210211753845

Optimizer: adam, Learning Rate: 0.1, Number of Layers: 4, Dropout Rate: 0.2, Best Validation Accuracy: 0.25552210211753845

Optimizer: adam, Learning Rate: 0.1, Number of Layers: 3, Dropout Rate: 0.5, Best Validation Accuracy: 0.25552210211753845

Optimizer: adam, Learning Rate: 0.1, Number of Layers: 3, Dropout Rate: 0.2, Best Validation Accuracy: 0.25552210211753845

Optimizer: adam, Learning Rate: 0.1, Number of Layers: 2, Dropout Rate: 0.5, Best Validation Accuracy: 0.25552210211753845

Optimizer: adam, Learning Rate: 0.1, Number of Layers: 2, Dropout Rate: 0.2, Best Validation Accuracy: 0.25552210211753845

best model： ('SGD', 0.001, 4, 0.2, 0.810742974281311)

WARNING:absl:At this time, the v2.11+ optimizer `tf.keras.optimizers.SGD` runs slowly on M1/M2 Macs, please use the legacy Keras optimizer instead, located at `tf.keras.optimizers.legacy.SGD`.

Model: "sequential\_36"

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Layer (type) Output Shape Param #

=================================================================

conv2d\_108 (Conv2D) (None, 38, 38, 256) 49408

batch\_normalization\_216 (B (None, 38, 38, 256) 1024

atchNormalization)

max\_pooling2d\_108 (MaxPool (None, 12, 12, 256) 0

ing2D)

batch\_normalization\_217 (B (None, 12, 12, 256) 1024

atchNormalization)

conv2d\_109 (Conv2D) (None, 10, 10, 512) 1180160

batch\_normalization\_218 (B (None, 10, 10, 512) 2048

atchNormalization)

max\_pooling2d\_109 (MaxPool (None, 10, 10, 512) 0

ing2D)

batch\_normalization\_219 (B (None, 10, 10, 512) 2048

atchNormalization)

conv2d\_110 (Conv2D) (None, 8, 8, 512) 2359808

batch\_normalization\_220 (B (None, 8, 8, 512) 2048

atchNormalization)

max\_pooling2d\_110 (MaxPool (None, 8, 8, 512) 0

ing2D)

batch\_normalization\_221 (B (None, 8, 8, 512) 2048

atchNormalization)

conv2d\_111 (Conv2D) (None, 6, 6, 512) 2359808

batch\_normalization\_222 (B (None, 6, 6, 512) 2048

atchNormalization)

max\_pooling2d\_111 (MaxPool (None, 6, 6, 512) 0

ing2D)

batch\_normalization\_223 (B (None, 6, 6, 512) 2048

atchNormalization)

flatten\_36 (Flatten) (None, 18432) 0

dense\_108 (Dense) (None, 1024) 18875392

dropout\_72 (Dropout) (None, 1024) 0

dense\_109 (Dense) (None, 1024) 1049600

dropout\_73 (Dropout) (None, 1024) 0

dense\_110 (Dense) (None, 4) 4100

=================================================================

Total params: 25892612 (98.77 MB)

Trainable params: 25885444 (98.75 MB)

Non-trainable params: 7168 (28.00 KB)

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Epoch 1/10

2024-03-25 23:57:02.206158: E tensorflow/core/grappler/optimizers/meta\_optimizer.cc:961] model\_pruner failed: INVALID\_ARGUMENT: Graph does not contain terminal node SGD/AssignVariableOp.

996/996 [==============================] - 42s 41ms/step - loss: 1.7782 - accuracy: 0.4168 - val\_loss: 1.1642 - val\_accuracy: 0.5221

Epoch 2/10

996/996 [==============================] - 43s 43ms/step - loss: 0.8638 - accuracy: 0.6545 - val\_loss: 0.8747 - val\_accuracy: 0.6461

Epoch 3/10

996/996 [==============================] - 43s 43ms/step - loss: 0.5238 - accuracy: 0.7969 - val\_loss: 0.7953 - val\_accuracy: 0.6943

Epoch 4/10

996/996 [==============================] - 43s 43ms/step - loss: 0.3018 - accuracy: 0.8922 - val\_loss: 0.7730 - val\_accuracy: 0.6938

Epoch 5/10

996/996 [==============================] - 43s 43ms/step - loss: 0.1520 - accuracy: 0.9557 - val\_loss: 0.7849 - val\_accuracy: 0.7194

Epoch 6/10

996/996 [==============================] - 42s 43ms/step - loss: 0.0694 - accuracy: 0.9916 - val\_loss: 0.6177 - val\_accuracy: 0.7786

Epoch 7/10

996/996 [==============================] - 42s 43ms/step - loss: 0.0310 - accuracy: 0.9994 - val\_loss: 0.5640 - val\_accuracy: 0.7937

Epoch 8/10

996/996 [==============================] - 42s 42ms/step - loss: 0.0182 - accuracy: 1.0000 - val\_loss: 0.5637 - val\_accuracy: 0.7932

Epoch 9/10

996/996 [==============================] - 42s 42ms/step - loss: 0.0130 - accuracy: 1.0000 - val\_loss: 0.5577 - val\_accuracy: 0.8002

Epoch 10/10

996/996 [==============================] - 42s 42ms/step - loss: 0.0103 - accuracy: 1.0000 - val\_loss: 0.5596 - val\_accuracy: 0.8017

996/996 [==============================] - 42s 42ms/step - loss: 0.0085 - accuracy: 1.0000 - val\_loss: 0.5557 - val\_accuracy: 0.7987

374/374 [==============================] - 6s 15ms/step - loss: 0.4149 - accuracy: 0.8497

374/374 [==============================] - 5s 13ms/step

2024-03-26 00:04:58.811 Python[1571:72362] WARNING: Secure coding is not enabled for restorable state! Enable secure coding by implementing NSApplicationDelegate.applicationSupportsSecureRestorableState: and returning YES.

precision recall f1-score support

EOSINOPHIL 0.78 0.78 0.78 781

LYMPHOCYTE 0.90 0.91 0.90 764

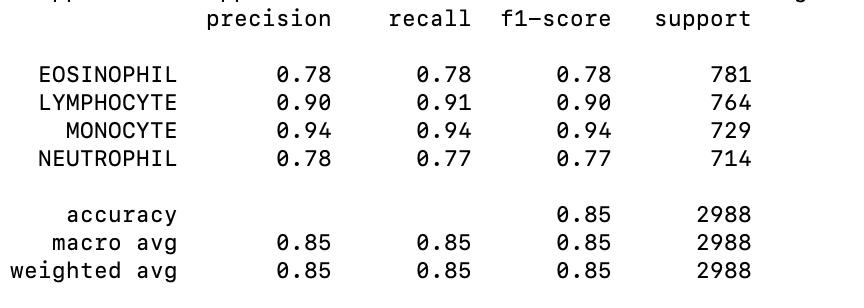
MONOCYTE 0.94 0.94 0.94 729

NEUTROPHIL 0.78 0.77 0.77 714

accuracy 0.85 2988

macro avg 0.85 0.85 0.85 2988

weighted avg 0.85 0.85 0.85 2988



Accuracy of the Model: 85.0%

