```
Modelo base: vgg16_base
<tensorflow.python.keras.engine.training.Model object at 0x7f570c7f8a58>
Adam
Epoch 1/10
218/218 [==============================] - 20s 91ms/step - loss: 7.4150 - accuracy: 0.4871 - val_loss: 6.4017 - val_accuracy: 0.5427
Epoch 2/10
218/218 [==============================] - 20s 91ms/step - loss: 6.0771 - accuracy: 0.5715 - val_loss: 5.4640 - val_accuracy: 0.6087
Epoch 3/10
218/218 [==============================] - 20s 90ms/step - loss: 5.3781 - accuracy: 0.6201 - val_loss: 5.0983 - val_accuracy: 0.6353
Epoch 4/10
218/218 [==============================] - 20s 91ms/step - loss: 5.0845 - accuracy: 0.6346 - val_loss: 4.8710 - val_accuracy: 0.6500
Epoch 5/10
218/218 [==============================] - 20s 90ms/step - loss: 4.9520 - accuracy: 0.6454 - val_loss: 4.7318 - val_accuracy: 0.6573
Epoch 6/10
218/218 [==============================] - 20s 90ms/step - loss: 4.7269 - accuracy: 0.6623 - val_loss: 4.4206 - val_accuracy: 0.6767
Epoch 7/10
218/218 [==============================] - 20s 90ms/step - loss: 4.4326 - accuracy: 0.6770 - val_loss: 4.2540 - val_accuracy: 0.6953
Epoch 8/10
218/218 [==============================] - 20s 90ms/step - loss: 4.3962 - accuracy: 0.6853 - val_loss: 4.0806 - val_accuracy: 0.7033
Epoch 9/10
218/218 [==============================] - 20s 90ms/step - loss: 4.1771 - accuracy: 0.6963 - val_loss: 4.0139 - val_accuracy: 0.7167
Epoch 10/10
218/218 [==============================] - 20s 90ms/step - loss: 4.1914 - accuracy: 0.7002 - val_loss: 4.5152 - val_accuracy: 0.6907
```
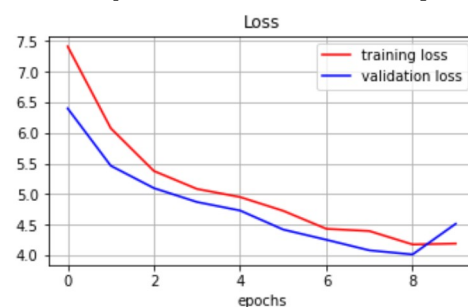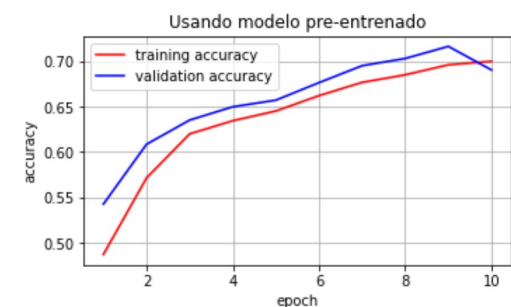


```
10/10 [==============================] - 3s 312ms/step - loss: 4.6368 - accuracy: 0.6740
----------------------------------------------------------------------------------------------
<tensorflow.python.keras.engine.training.Model object at 0x7f570c7f8a58>
Epoch 1/10
218/218 [==============================] - 20s 91ms/step - loss: 8.7374 - accuracy: 0.4017 - val_loss: 7.7496 - val_accuracy: 0.4687
Epoch 2/10
218/218 [==============================] - 20s 90ms/step - loss: 7.2704 - accuracy: 0.5055 - val_loss: 6.7700 - val_accuracy: 0.5427
Epoch 3/10
218/218 [==============================] - 20s 91ms/step - loss: 6.6396 - accuracy: 0.5545 - val_loss: 6.5054 - val_accuracy: 0.5673
Epoch 4/10
218/218 [==============================] - 20s 91ms/step - loss: 6.4575 - accuracy: 0.5702 - val_loss: 6.4676 - val_accuracy: 0.5707
Epoch 5/10
218/218 [==============================] - 20s 91ms/step - loss: 6.4589 - accuracy: 0.5742 - val_loss: 6.4539 - val_accuracy: 0.5740
Epoch 6/10
218/218 [==============================] - 20s 91ms/step - loss: 6.4208 - accuracy: 0.5756 - val_loss: 6.4168 - val_accuracy: 0.5740
Epoch 7/10
218/218 [==============================] - 20s 90ms/step - loss: 6.3656 - accuracy: 0.5786 - val_loss: 6.3951 - val_accuracy: 0.5767
```
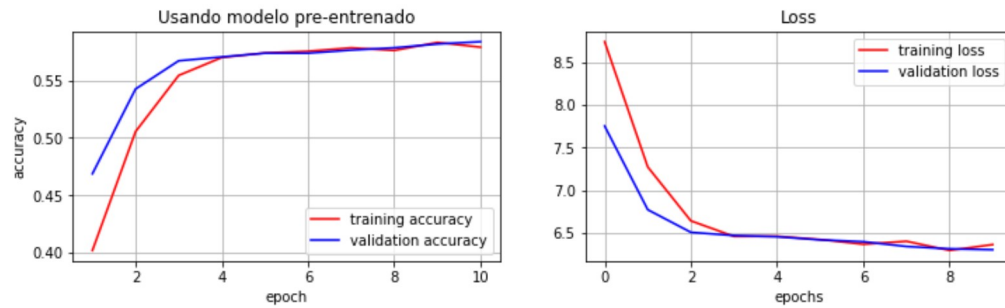
```
Epoch 8/10
218/218 [==============================] - 20s 90ms/step - loss: 6.4003 - accuracy: 0.5763 - val_loss: 6.3396 - val_accuracy: 0.5787
Epoch 9/10
218/218 [==============================] - 20s 90ms/step - loss: 6.2932 - accuracy: 0.5834 - val_loss: 6.3122 - val_accuracy: 0.5820
Epoch 10/10
218/218 [==============================] - 20s 90ms/step - loss: 6.3617 - accuracy: 0.5792 - val_loss: 6.3015 - val_accuracy: 0.5840
```



```
10/10 [==============================] - 3s 311ms/step - loss: 6.3006 - accuracy: 0.5847
---------------------------------------------------------------------------------------------
<tensorflow.python.keras.engine.training.Model object at 0x7f570c7f8a58>
SGD
Epoch 1/10
218/218 [==============================] - 20s 91ms/step - loss: 6.4999 - accuracy: 0.5734 - val_loss: 6.4860 - val_accuracy: 0.5747
Epoch 2/10
218/218 [==============================] - 20s 90ms/step - loss: 6.4954 - accuracy: 0.5741 - val_loss: 6.4860 - val_accuracy: 0.5747
Epoch 3/10
218/218 [==============================] - 20s 90ms/step - loss: 6.4713 - accuracy: 0.5756 - val_loss: 6.4860 - val_accuracy: 0.5747
Epoch 4/10
218/218 [==============================] - ETA: 0s - loss: 6.4757 - accuracy: 0.5753Restoring model weights from the end of the best epoch.
218/218 [==============================] - 20s 90ms/step - loss: 6.4757 - accuracy: 0.5753 - val_loss: 6.4860 - val_accuracy: 0.5747
Epoch 00004: early stopping
```
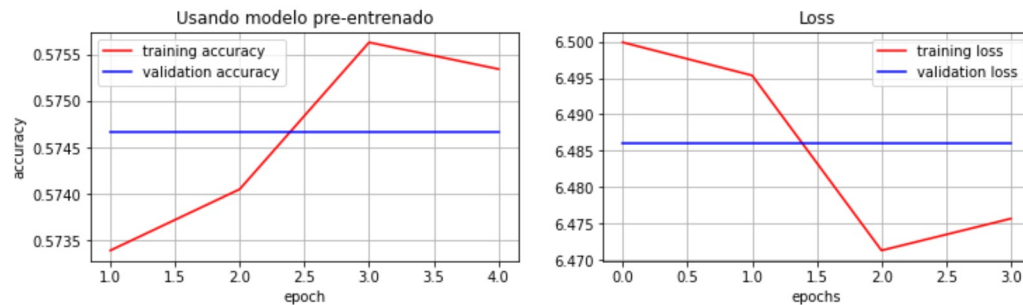


```
10/10 [==============================] - 3s 311ms/step - loss: 6.4962 - accuracy: 0.5740
---------------------------------------------------------------------------------------------
Modelo base: InceptionV3_base
<tensorflow.python.keras.engine.training.Model object at 0x7f5704d5e748>
Adam
Epoch 1/10
218/218 [==============================] - 13s 58ms/step - loss: 6.4886 - accuracy: 0.5743 - val_loss: 6.4860 - val_accuracy: 0.5747
Epoch 2/10
218/218 [==============================] - 12s 53ms/step - loss: 6.4954 - accuracy: 0.5741 - val_loss: 6.4860 - val_accuracy: 0.5747
```

```
Epoch 3/10
218/218 [==============================] - 11s 53ms/step - loss: 6.4779 - accuracy: 0.5752 - val_loss: 6.4860 - val_accuracy: 0.5747
Epoch 4/10
218/218 [==============================] - 12s 53ms/step - loss: 6.9995 - accuracy: 0.5398 - val_loss: 6.3570 - val_accuracy: 0.5707
Epoch 5/10
218/218 [==============================] - 12s 54ms/step - loss: 6.1953 - accuracy: 0.5883 - val_loss: 6.2509 - val_accuracy: 0.5880
Epoch 6/10
218/218 [==============================] - 12s 53ms/step - loss: 6.3579 - accuracy: 0.5801 - val_loss: 6.3682 - val_accuracy: 0.5813
Epoch 7/10
218/218 [==============================] - 12s 54ms/step - loss: 6.3449 - accuracy: 0.5828 - val_loss: 6.2249 - val_accuracy: 0.5907
Epoch 8/10
218/218 [==============================] - 12s 54ms/step - loss: 6.4224 - accuracy: 0.5769 - val_loss: 6.1062 - val_accuracy: 0.5960
Epoch 9/10
218/218 [==============================] - 12s 53ms/step - loss: 6.4978 - accuracy: 0.5682 - val_loss: 7.4234 - val_accuracy: 0.5047
Epoch 10/10
218/218 [==============================] - 12s 53ms/step - loss: 6.3930 - accuracy: 0.5779 - val_loss: 6.2852 - val_accuracy: 0.5867
```
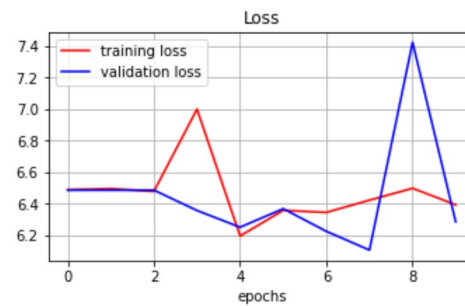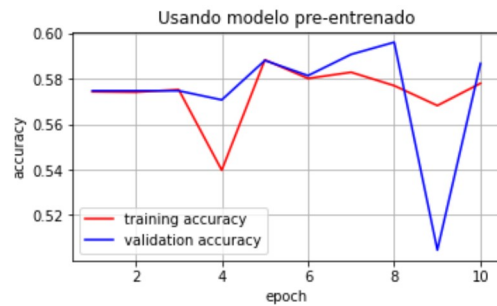


```
10/10 [==============================] - 1s 142ms/step - loss: 6.3058 - accuracy: 0.5853
------------------------------------------------------------------------------------------
<tensorflow.python.keras.engine.training.Model object at 0x7f5704d5e748>
Epoch 1/10
218/218 [==============================] - 13s 58ms/step - loss: 6.3343 - accuracy: 0.5763 - val_loss: 6.2790 - val_accuracy: 0.5840
Epoch 2/10
218/218 [==============================] - 12s 54ms/step - loss: 6.1992 - accuracy: 0.5854 - val_loss: 5.9274 - val_accuracy: 0.6000
Epoch 3/10
218/218 [==============================] - 12s 53ms/step - loss: 6.1307 - accuracy: 0.5885 - val_loss: 6.5003 - val_accuracy: 0.5593
Epoch 4/10
218/218 [==============================] - 12s 53ms/step - loss: 6.1875 - accuracy: 0.5821 - val_loss: 5.9525 - val_accuracy: 0.5993
Epoch 5/10
218/218 [==============================] - 12s 54ms/step - loss: 6.0420 - accuracy: 0.5930 - val_loss: 5.7864 - val_accuracy: 0.6140
Epoch 6/10
218/218 [==============================] - 12s 53ms/step - loss: 5.9424 - accuracy: 0.6012 - val_loss: 6.0330 - val_accuracy: 0.5993
Epoch 7/10
218/218 [==============================] - 12s 54ms/step - loss: 6.0775 - accuracy: 0.5970 - val_loss: 5.7183 - val_accuracy: 0.6153
Epoch 8/10
218/218 [==============================] - 12s 53ms/step - loss: 5.8975 - accuracy: 0.6058 - val_loss: 5.5811 - val_accuracy: 0.6247
Epoch 9/10
218/218 [==============================] - 12s 53ms/step - loss: 6.0276 - accuracy: 0.5985 - val_loss: 5.6331 - val_accuracy: 0.6227
Epoch 10/10
218/218 [==============================] - 12s 53ms/step - loss: 5.7994 - accuracy: 0.6137 - val_loss: 5.7268 - val_accuracy: 0.6213
```
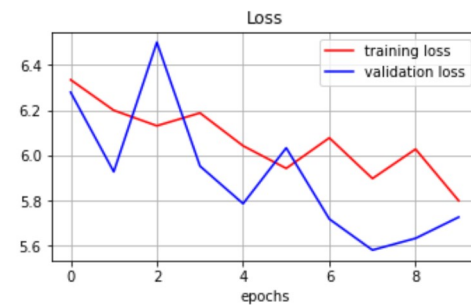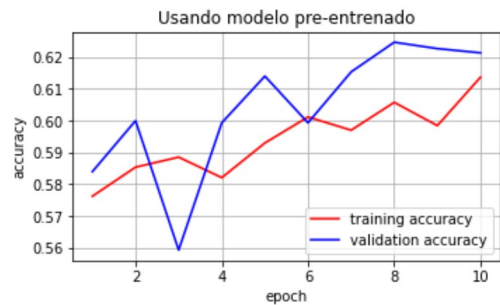
```
10/10 [==============================] - 1s 142ms/step - loss: 5.9555 - accuracy: 0.6033
-----------------------------------------------------------------------------------------------
<tensorflow.python.keras.engine.training.Model object at 0x7f5704d5e748>
SGD
Epoch 1/10
218/218 [==============================] - 13s 58ms/step - loss: 8.8535 - accuracy: 0.4260 - val_loss: 8.8642 - val_accuracy: 0.4253
Epoch 2/10
218/218 [==============================] - 12s 53ms/step - loss: 8.8769 - accuracy: 0.4245 - val_loss: 8.8642 - val_accuracy: 0.4253
Epoch 3/10
218/218 [==============================] - 11s 53ms/step - loss: 8.8525 - accuracy: 0.4261 - val_loss: 8.8642 - val_accuracy: 0.4253
Epoch 4/10
217/218 [=============================>.] - ETA: 0s - loss: 8.8733 - accuracy: 0.4247Restoring model weights from the end of the best epoch.
218/218 [==============================] - 12s 53ms/step - loss: 8.8680 - accuracy: 0.4251 - val_loss: 8.8642 - val_accuracy: 0.4253
Epoch 00004: early stopping
```
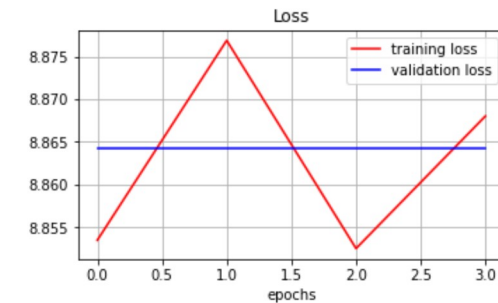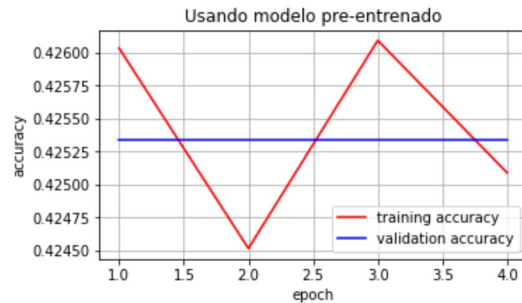


```
10/10 [==============================] - 1s 142ms/step - loss: 8.8539 - accuracy: 0.4260
-----------------------------------------------------------------------------------------------
Modelo base: resnet_base
<tensorflow.python.keras.engine.training.Model object at 0x7f56eba09dd8>
Adam
Epoch 1/10
218/218 [==============================] - 24s 109ms/step - loss: 8.8645 - accuracy: 0.4253 - val_loss: 8.8642 - val_accuracy: 0.4253
Epoch 2/10
218/218 [==============================] - 22s 102ms/step - loss: 8.8570 - accuracy: 0.4258 - val_loss: 8.8642 - val_accuracy: 0.4253
Epoch 3/10
218/218 [==============================] - 22s 102ms/step - loss: 8.8481 - accuracy: 0.4264 - val_loss: 8.8642 - val_accuracy: 0.4253
Epoch 4/10
218/218 [==============================] - ETA: 0s - loss: 8.8813 - accuracy: 0.4242Restoring model weights from the end of the best epoch.
218/218 [==============================] - 22s 103ms/step - loss: 8.8813 - accuracy: 0.4242 - val_loss: 8.8642 - val_accuracy: 0.4253
Epoch 00004: early stopping
```
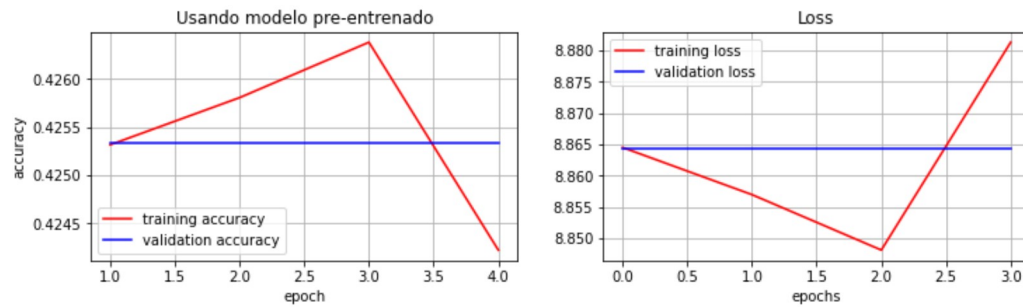
```
10/10 [==============================] - 3s 315ms/step - loss: 8.8539 - accuracy: 0.4260
------------------------------------------------------------------------------------------------
<tensorflow.python.keras.engine.training.Model object at 0x7f56eba09dd8>
Epoch 1/10
218/218 [==============================] - 24s 109ms/step - loss: 8.8645 - accuracy: 0.4253 - val_loss: 8.8641 - val_accuracy: 0.4253
Epoch 2/10
218/218 [==============================] - 22s 102ms/step - loss: 8.8569 - accuracy: 0.4258 - val_loss: 8.8641 - val_accuracy: 0.4253
Epoch 3/10
218/218 [==============================] - 22s 102ms/step - loss: 8.8747 - accuracy: 0.4247 - val_loss: 8.8641 - val_accuracy: 0.4253
Epoch 4/10
218/218 [==============================] - ETA: 0s - loss: 8.8348 - accuracy: 0.4272Restoring model weights from the end of the best epoch.
218/218 [==============================] - 22s 103ms/step - loss: 8.8348 - accuracy: 0.4272 - val_loss: 8.8641 - val_accuracy: 0.4253
Epoch 00004: early stopping
```
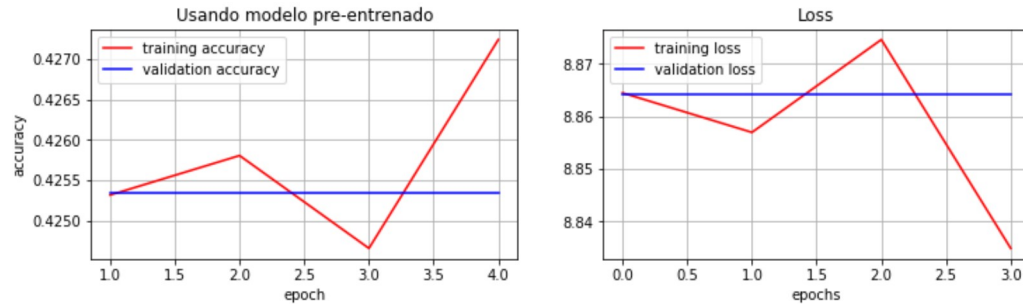


```
10/10 [==============================] - 3s 314ms/step - loss: 8.8539 - accuracy: 0.4260
------------------------------------------------------------------------------------------------
<tensorflow.python.keras.engine.training.Model object at 0x7f56eba09dd8>
SGD
Epoch 1/10
218/218 [==============================] - 24s 109ms/step - loss: 8.8620 - accuracy: 0.4255 - val_loss: 8.8642 - val_accuracy: 0.4253
Epoch 2/10
218/218 [==============================] - 22s 102ms/step - loss: 8.8503 - accuracy: 0.4262 - val_loss: 8.8642 - val_accuracy: 0.4253
Epoch 3/10
218/218 [==============================] - 22s 102ms/step - loss: 8.8680 - accuracy: 0.4251 - val_loss: 8.8642 - val_accuracy: 0.4253
Epoch 4/10
218/218 [==============================] - ETA: 0s - loss: 8.8437 - accuracy: 0.4267Restoring model weights from the end of the best epoch.
218/218 [==============================] - 22s 102ms/step - loss: 8.8437 - accuracy: 0.4267 - val_loss: 8.8642 - val_accuracy: 0.4253
Epoch 00004: early stopping
```
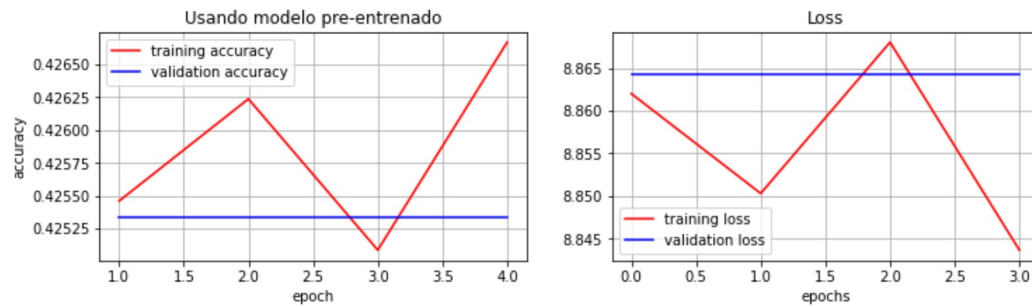
```
10/10 [==============================] - 3s 314ms/step - loss: 8.8539 - accuracy: 0.4260
------------------------------------------------------------------------------------------
Modelo base: vgg19_base
<tensorflow.python.keras.engine.training.Model object at 0x7f56eb91efd0>
Adam
Epoch 1/10
218/218 [==============================] - 23s 107ms/step - loss: 7.5910 - accuracy: 0.4699 - val_loss: 6.7713 - val_accuracy: 0.5193
Epoch 2/10
218/218 [==============================] - 23s 106ms/step - loss: 6.6132 - accuracy: 0.5336 - val_loss: 6.3368 - val_accuracy: 0.5440
Epoch 3/10
218/218 [==============================] - 23s 106ms/step - loss: 6.1947 - accuracy: 0.5634 - val_loss: 5.9348 - val_accuracy: 0.5747
Epoch 4/10
218/218 [==============================] - 23s 106ms/step - loss: 5.9134 - accuracy: 0.5825 - val_loss: 5.7429 - val_accuracy: 0.5873
Epoch 5/10
218/218 [==============================] - 23s 106ms/step - loss: 5.7175 - accuracy: 0.5937 - val_loss: 5.6629 - val_accuracy: 0.6000
Epoch 6/10
218/218 [==============================] - 23s 106ms/step - loss: 5.4914 - accuracy: 0.6118 - val_loss: 5.5338 - val_accuracy: 0.6133
Epoch 7/10
218/218 [==============================] - 23s 106ms/step - loss: 5.4157 - accuracy: 0.6226 - val_loss: 5.4498 - val_accuracy: 0.6227
Epoch 8/10
218/218 [==============================] - 23s 106ms/step - loss: 5.3051 - accuracy: 0.6319 - val_loss: 5.3165 - val_accuracy: 0.6240
Epoch 9/10
218/218 [==============================] - 23s 106ms/step - loss: 5.1758 - accuracy: 0.6399 - val_loss: 5.2587 - val_accuracy: 0.6280
Epoch 10/10
218/218 [==============================] - 23s 106ms/step - loss: 5.1833 - accuracy: 0.6395 - val_loss: 5.2288 - val_accuracy: 0.6327
```
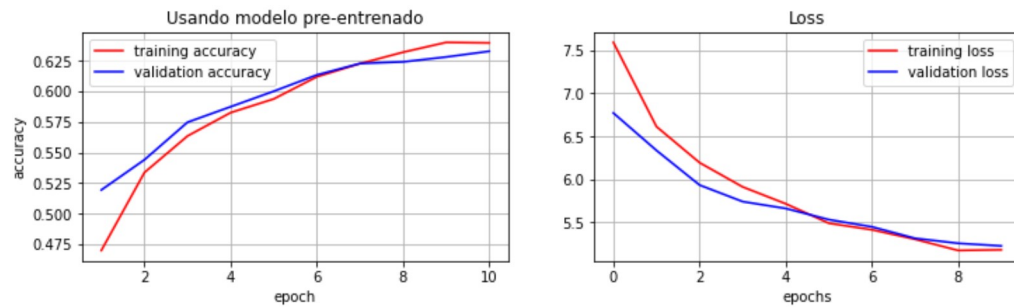


```
10/10 [==============================] - 4s 365ms/step - loss: 5.1655 - accuracy: 0.6333
------------------------------------------------------------------------------------------
<tensorflow.python.keras.engine.training.Model object at 0x7f56eb91efd0>
Epoch 1/10
```

```
218/218 [==============================] - 23s 107ms/step - loss: 6.3388 - accuracy: 0.5754 - val_loss: 6.3261 - val_accuracy: 0.5767
Epoch 2/10
218/218 [==============================] - 23s 106ms/step - loss: 6.1500 - accuracy: 0.5894 - val_loss: 6.1683 - val_accuracy: 0.5860
Epoch 3/10
218/218 [==============================] - 23s 106ms/step - loss: 5.8233 - accuracy: 0.6043 - val_loss: 5.8268 - val_accuracy: 0.5973
Epoch 4/10
218/218 [==============================] - 23s 106ms/step - loss: 5.4857 - accuracy: 0.6237 - val_loss: 5.3035 - val_accuracy: 0.6387
Epoch 5/10
218/218 [==============================] - 23s 106ms/step - loss: 5.1244 - accuracy: 0.6421 - val_loss: 4.7944 - val_accuracy: 0.6647
Epoch 6/10
218/218 [==============================] - 23s 106ms/step - loss: 4.7549 - accuracy: 0.6652 - val_loss: 4.3967 - val_accuracy: 0.6867
Epoch 7/10
218/218 [==============================] - 23s 106ms/step - loss: 4.3676 - accuracy: 0.6890 - val_loss: 4.2613 - val_accuracy: 0.7000
Epoch 8/10
218/218 [==============================] - 23s 106ms/step - loss: 4.1776 - accuracy: 0.7018 - val_loss: 3.8291 - val_accuracy: 0.7313
Epoch 9/10
218/218 [==============================] - 23s 106ms/step - loss: 3.8179 - accuracy: 0.7263 - val_loss: 3.7040 - val_accuracy: 0.7427
Epoch 10/10
218/218 [==============================] - 23s 106ms/step - loss: 3.6181 - accuracy: 0.7410 - val_loss: 3.6258 - val_accuracy: 0.7500
```
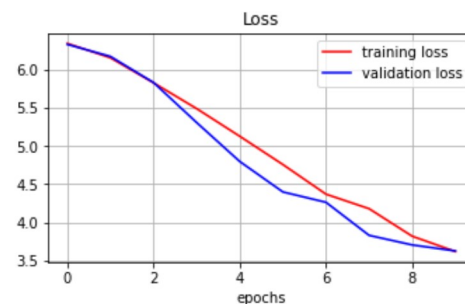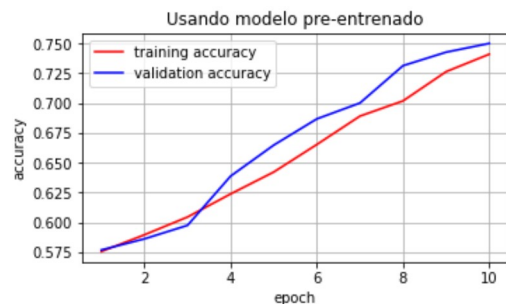


```
10/10 [==============================] - 4s 365ms/step - loss: 3.8318 - accuracy: 0.7320
--------------------------------------------------------------------------------------------
<tensorflow.python.keras.engine.training.Model object at 0x7f56eb91efd0>
SGD
Epoch 1/10
218/218 [==============================] - 23s 107ms/step - loss: 4.5981 - accuracy: 0.6998 - val_loss: 3.7633 - val_accuracy: 0.7553
Epoch 2/10
218/218 [==============================] - 23s 106ms/step - loss: 3.3587 - accuracy: 0.7807 - val_loss: 2.8187 - val_accuracy: 0.8153
Epoch 3/10
218/218 [==============================] - 23s 106ms/step - loss: 5.2163 - accuracy: 0.6604 - val_loss: 5.3269 - val_accuracy: 0.6547
Epoch 4/10
218/218 [==============================] - 23s 106ms/step - loss: 3.7466 - accuracy: 0.7565 - val_loss: 2.4938 - val_accuracy: 0.8380
Epoch 5/10
218/218 [==============================] - 23s 106ms/step - loss: 4.2978 - accuracy: 0.7183 - val_loss: 6.4453 - val_accuracy: 0.5773
Epoch 6/10
218/218 [==============================] - 23s 106ms/step - loss: 6.4232 - accuracy: 0.5788 - val_loss: 6.4047 - val_accuracy: 0.5800
Epoch 7/10
218/218 [==============================] - ETA: 0s - loss: 4.1589 - accuracy: 0.7278Restoring model weights from the end of the best epoch.
218/218 [==============================] - 23s 106ms/step - loss: 4.1589 - accuracy: 0.7278 - val_loss: 2.8696 - val_accuracy: 0.8120
Epoch 00007: early stopping
```
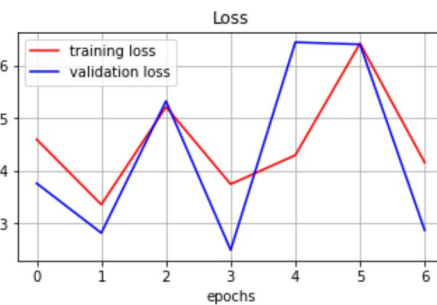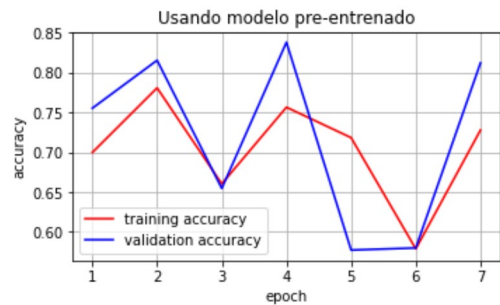
```
10/10 [==============================] - 4s 365ms/step - loss: 2.6393 - accuracy: 0.8273
-----------------------------------------------------------------------------------------
Modelo base: resnet50_base
<tensorflow.python.keras.engine.training.Model object at 0x7f56eaf1eeb8>
Adam
Epoch 1/10
218/218 [==============================] - 14s 66ms/step - loss: 3.0509 - accuracy: 0.6872 - val_loss: 2.5020 - val_accuracy: 0.7520
Epoch 2/10
218/218 [==============================] - 14s 62ms/step - loss: 2.0219 - accuracy: 0.7702 - val_loss: 1.9857 - val_accuracy: 0.7893
Epoch 3/10
218/218 [==============================] - 13s 62ms/step - loss: 1.8810 - accuracy: 0.8017 - val_loss: 2.2402 - val_accuracy: 0.7760
Epoch 4/10
218/218 [==============================] - 14s 62ms/step - loss: 1.8396 - accuracy: 0.8037 - val_loss: 1.7150 - val_accuracy: 0.8287
Epoch 5/10
218/218 [==============================] - 14s 62ms/step - loss: 1.5383 - accuracy: 0.8286 - val_loss: 1.6770 - val_accuracy: 0.8327
Epoch 6/10
218/218 [==============================] - 14s 62ms/step - loss: 1.9142 - accuracy: 0.8044 - val_loss: 4.6232 - val_accuracy: 0.6380
Epoch 7/10
218/218 [==============================] - 14s 62ms/step - loss: 2.4114 - accuracy: 0.7824 - val_loss: 1.5706 - val_accuracy: 0.8393
Epoch 8/10
218/218 [==============================] - 13s 62ms/step - loss: 1.5610 - accuracy: 0.8391 - val_loss: 1.6122 - val_accuracy: 0.8380
Epoch 9/10
218/218 [==============================] - 14s 62ms/step - loss: 1.4988 - accuracy: 0.8411 - val_loss: 1.5372 - val_accuracy: 0.8420
Epoch 10/10
218/218 [==============================] - 14s 62ms/step - loss: 1.4856 - accuracy: 0.8451 - val_loss: 1.4934 - val_accuracy: 0.8507
```
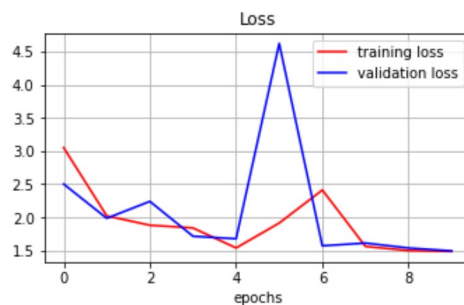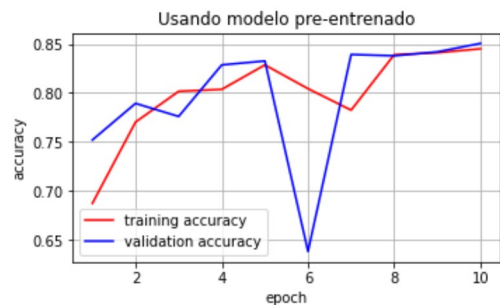


```
10/10 [==============================] - 2s 191ms/step - loss: 1.4921 - accuracy: 0.8473
-----------------------------------------------------------------------------------------
<tensorflow.python.keras.engine.training.Model object at 0x7f56eaf1eeb8>
Epoch 1/10
```

```
218/218 [==============================] - 14s 66ms/step - loss: 2.8191 - accuracy: 0.7222 - val_loss: 2.5855 - val_accuracy: 0.7460
Epoch 2/10
218/218 [==============================] - 14s 62ms/step - loss: 2.4801 - accuracy: 0.7599 - val_loss: 2.1264 - val_accuracy: 0.7867
Epoch 3/10
218/218 [==============================] - 14s 62ms/step - loss: 2.0424 - accuracy: 0.7886 - val_loss: 1.9524 - val_accuracy: 0.8027
Epoch 4/10
218/218 [==============================] - 14s 62ms/step - loss: 1.8331 - accuracy: 0.8088 - val_loss: 1.8098 - val_accuracy: 0.8160
Epoch 5/10
218/218 [==============================] - 14s 62ms/step - loss: 1.6065 - accuracy: 0.8328 - val_loss: 1.6161 - val_accuracy: 0.8407
Epoch 6/10
218/218 [==============================] - 14s 63ms/step - loss: 1.4210 - accuracy: 0.8456 - val_loss: 1.5770 - val_accuracy: 0.8340
Epoch 7/10
218/218 [==============================] - 14s 62ms/step - loss: 1.2656 - accuracy: 0.8617 - val_loss: 1.4031 - val_accuracy: 0.8547
Epoch 8/10
218/218 [==============================] - 14s 62ms/step - loss: 1.1400 - accuracy: 0.8721 - val_loss: 1.3803 - val_accuracy: 0.8480
Epoch 9/10
218/218 [==============================] - 14s 62ms/step - loss: 1.1048 - accuracy: 0.8751 - val_loss: 1.2510 - val_accuracy: 0.8573
Epoch 10/10
218/218 [==============================] - 13s 62ms/step - loss: 1.0480 - accuracy: 0.8827 - val_loss: 1.2585 - val_accuracy: 0.8680
```
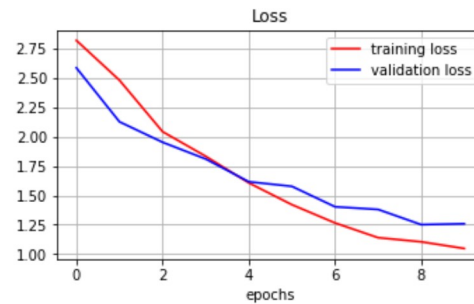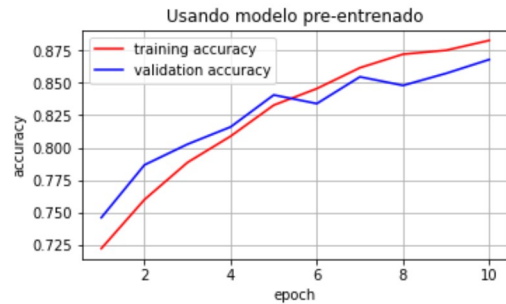


```
10/10 [==============================] - 2s 192ms/step - loss: 1.1977 - accuracy: 0.8747
------------------------------------------------------------------------------------------------
<tensorflow.python.keras.engine.training.Model object at 0x7f56eaf1eeb8>
SGD
Epoch 1/10
218/218 [==============================] - 14s 66ms/step - loss: 8.8512 - accuracy: 0.4255 - val_loss: 8.8642 - val_accuracy: 0.4253
Epoch 2/10
218/218 [==============================] - 13s 62ms/step - loss: 8.8547 - accuracy: 0.4259 - val_loss: 8.8642 - val_accuracy: 0.4253
Epoch 3/10
218/218 [==============================] - 14s 62ms/step - loss: 8.8636 - accuracy: 0.4254 - val_loss: 8.8642 - val_accuracy: 0.4253
Epoch 4/10
218/218 [==============================] - ETA: 0s - loss: 8.8636 - accuracy: 0.4254Restoring model weights from the end of the best epoch.
218/218 [==============================] - 14s 62ms/step - loss: 8.8636 - accuracy: 0.4254 - val_loss: 8.8642 - val_accuracy: 0.4253
Epoch 00004: early stopping
```
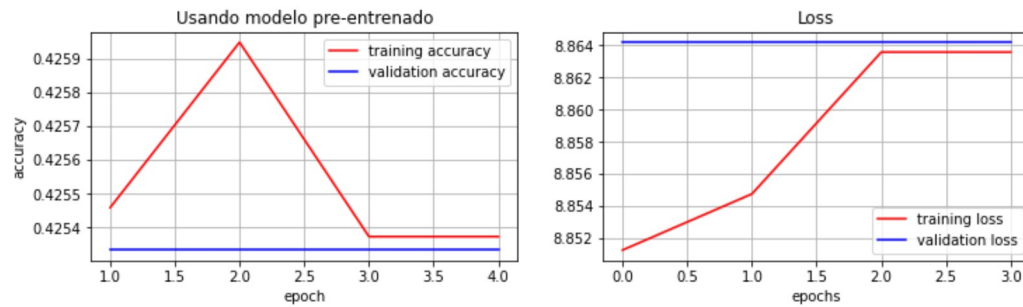
```
10/10 [==============================] - 2s 192ms/step - loss: 8.8436 - accuracy: 0.4267
-------------------------------------------------------------------------------------------
Modelo base: DenseNet201_base
<tensorflow.python.keras.engine.training.Model object at 0x7f56c89e43c8>
Adam
Epoch 1/10
218/218 [==============================] - 24s 112ms/step - loss: 7.9467 - accuracy: 0.4143 - val_loss: 7.8583 - val_accuracy: 0.4273
Epoch 2/10
218/218 [==============================] - 22s 100ms/step - loss: 7.3358 - accuracy: 0.4617 - val_loss: 6.6385 - val_accuracy: 0.5527
Epoch 3/10
218/218 [==============================] - 22s 100ms/step - loss: 6.6656 - accuracy: 0.5560 - val_loss: 6.5762 - val_accuracy: 0.5633
Epoch 4/10
218/218 [==============================] - 21s 98ms/step - loss: 6.6830 - accuracy: 0.5567 - val_loss: 6.5799 - val_accuracy: 0.5633
Epoch 5/10
218/218 [==============================] - 22s 100ms/step - loss: 6.6275 - accuracy: 0.5601 - val_loss: 6.5742 - val_accuracy: 0.5640
Epoch 6/10
218/218 [==============================] - 22s 100ms/step - loss: 6.6494 - accuracy: 0.5584 - val_loss: 6.5713 - val_accuracy: 0.5640
Epoch 7/10
218/218 [==============================] - 22s 100ms/step - loss: 6.6683 - accuracy: 0.5578 - val_loss: 6.5637 - val_accuracy: 0.5633
Epoch 8/10
218/218 [==============================] - 22s 100ms/step - loss: 6.6028 - accuracy: 0.5619 - val_loss: 6.5542 - val_accuracy: 0.5633
Epoch 9/10
218/218 [==============================] - 22s 99ms/step - loss: 6.6230 - accuracy: 0.5607 - val_loss: 6.5731 - val_accuracy: 0.5647
Epoch 10/10
218/218 [==============================] - 22s 100ms/step - loss: 6.6965 - accuracy: 0.5555 - val_loss: 6.5634 - val_accuracy: 0.5640
```
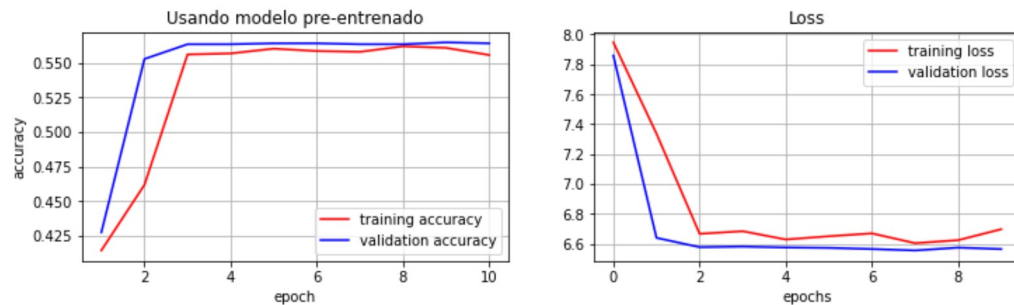


```
10/10 [==============================] - 3s 295ms/step - loss: 6.5738 - accuracy: 0.5607
-------------------------------------------------------------------------------------------
<tensorflow.python.keras.engine.training.Model object at 0x7f56c89e43c8>
Epoch 1/10
```

```
218/218 [==============================] - 24s 112ms/step - loss: 8.8625 - accuracy: 0.4253 - val_loss: 8.8569 - val_accuracy: 0.4253
Epoch 2/10
218/218 [==============================] - 22s 101ms/step - loss: 8.8615 - accuracy: 0.4254 - val_loss: 8.8372 - val_accuracy: 0.4253
Epoch 3/10
218/218 [==============================] - 22s 99ms/step - loss: 8.8796 - accuracy: 0.4242 - val_loss: 8.8561 - val_accuracy: 0.4253
Epoch 4/10
218/218 [==============================] - 22s 99ms/step - loss: 8.8530 - accuracy: 0.4259 - val_loss: 8.8561 - val_accuracy: 0.4253
Epoch 5/10
218/218 [==============================] - ETA: 0s - loss: 8.8843 - accuracy: 0.4237Restoring model weights from the end of the best epoch.
218/218 [==============================] - 22s 101ms/step - loss: 8.8843 - accuracy: 0.4237 - val_loss: 8.8554 - val_accuracy: 0.4253
Epoch 00005: early stopping
```
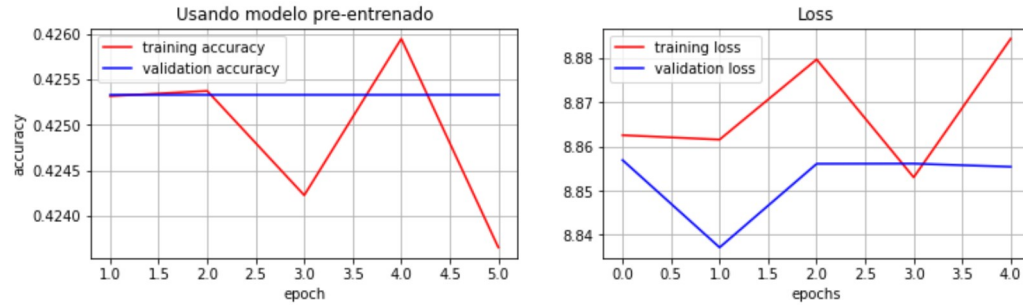


```
10/10 [==============================] - 3s 295ms/step - loss: 8.8548 - accuracy: 0.4253
------------------------------------------------------------------------------------------
<tensorflow.python.keras.engine.training.Model object at 0x7f56c89e43c8>
SGD
Epoch 1/10
218/218 [==============================] - 24s 112ms/step - loss: 8.8536 - accuracy: 0.4259 - val_loss: 8.8642 - val_accuracy: 0.4253
Epoch 2/10
218/218 [==============================] - 22s 99ms/step - loss: 8.8592 - accuracy: 0.4257 - val_loss: 8.8642 - val_accuracy: 0.4253
Epoch 3/10
218/218 [==============================] - 22s 99ms/step - loss: 8.8614 - accuracy: 0.4255 - val_loss: 8.8642 - val_accuracy: 0.4253
Epoch 4/10
218/218 [==============================] - ETA: 0s - loss: 8.8636 - accuracy: 0.4254Restoring model weights from the end of the best epoch.
218/218 [==============================] - 22s 100ms/step - loss: 8.8636 - accuracy: 0.4254 - val_loss: 8.8642 - val_accuracy: 0.4253
Epoch 00004: early stopping
```
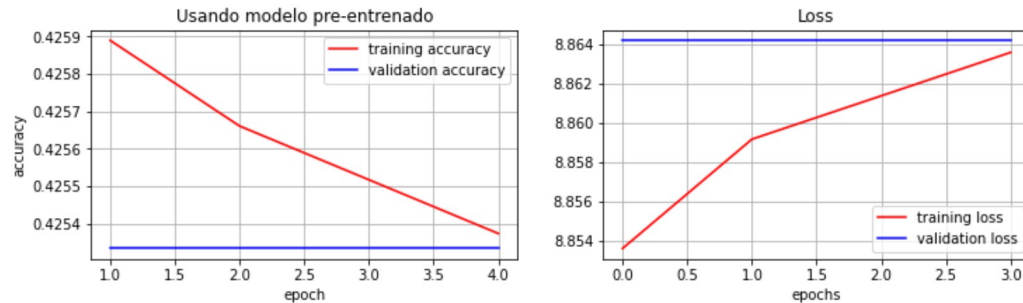


```
10/10 [==============================] - 3s 294ms/step - loss: 8.8539 - accuracy: 0.4260
------------------------------------------------------------------------------------------
Modelo base: MobileNet_base
<tensorflow.python.keras.engine.training.Model object at 0x7f577018c828>
```

```
Adam
Epoch 1/10
218/218 [==============================] - 6s 28ms/step - loss: 4.8235 - accuracy: 0.4485 - val_loss: 4.4807 - val_accuracy: 0.4653
Epoch 2/10
218/218 [==============================] - 6s 26ms/step - loss: 4.3594 - accuracy: 0.4726 - val_loss: 4.6879 - val_accuracy: 0.4667
Epoch 3/10
218/218 [==============================] - 6s 26ms/step - loss: 3.9217 - accuracy: 0.5009 - val_loss: 3.6265 - val_accuracy: 0.5160
Epoch 4/10
218/218 [==============================] - 6s 26ms/step - loss: 3.5549 - accuracy: 0.5301 - val_loss: 3.4811 - val_accuracy: 0.5127
Epoch 5/10
218/218 [==============================] - 6s 26ms/step - loss: 4.1125 - accuracy: 0.5357 - val_loss: 4.2967 - val_accuracy: 0.5687
Epoch 6/10
218/218 [==============================] - 6s 26ms/step - loss: 3.7354 - accuracy: 0.5613 - val_loss: 3.4310 - val_accuracy: 0.5520
Epoch 7/10
218/218 [==============================] - 6s 26ms/step - loss: 3.3100 - accuracy: 0.5581 - val_loss: 3.2204 - val_accuracy: 0.5560
Epoch 8/10
218/218 [==============================] - 6s 26ms/step - loss: 4.1413 - accuracy: 0.5811 - val_loss: 4.0006 - val_accuracy: 0.5820
Epoch 9/10
218/218 [==============================] - 6s 26ms/step - loss: 3.5302 - accuracy: 0.5766 - val_loss: 3.1408 - val_accuracy: 0.5687
Epoch 10/10
218/218 [==============================] - 6s 26ms/step - loss: 2.9838 - accuracy: 0.5801 - val_loss: 2.9089 - val_accuracy: 0.5713
```
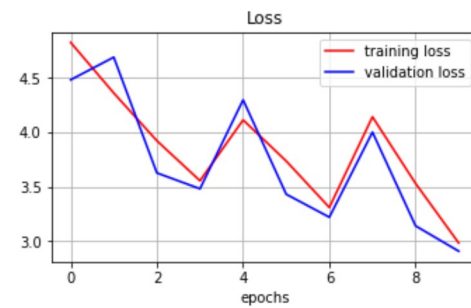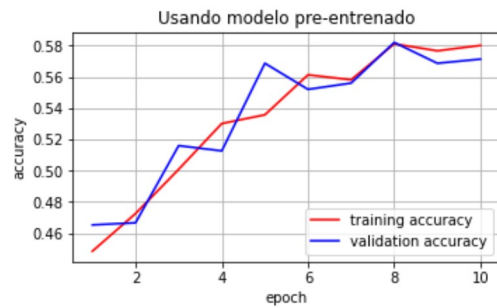


```
10/10 [==============================] - 1s 79ms/step - loss: 3.1835 - accuracy: 0.5533
-------------------------------------------------------------------------------------------
<tensorflow.python.keras.engine.training.Model object at 0x7f577018c828>
Epoch 1/10
218/218 [==============================] - 6s 28ms/step - loss: 4.2312 - accuracy: 0.5601 - val_loss: 3.9950 - val_accuracy: 0.5613
Epoch 2/10
218/218 [==============================] - 6s 26ms/step - loss: 4.0885 - accuracy: 0.5619 - val_loss: 3.8739 - val_accuracy: 0.5887
Epoch 3/10
218/218 [==============================] - 6s 26ms/step - loss: 3.8094 - accuracy: 0.5814 - val_loss: 3.5011 - val_accuracy: 0.5827
Epoch 4/10
218/218 [==============================] - 6s 26ms/step - loss: 3.4521 - accuracy: 0.6007 - val_loss: 3.5381 - val_accuracy: 0.6160
Epoch 5/10
218/218 [==============================] - 6s 26ms/step - loss: 3.1711 - accuracy: 0.6220 - val_loss: 3.0265 - val_accuracy: 0.6273
Epoch 6/10
218/218 [==============================] - 6s 26ms/step - loss: 2.8793 - accuracy: 0.6402 - val_loss: 2.8256 - val_accuracy: 0.6347
Epoch 7/10
218/218 [==============================] - 6s 26ms/step - loss: 2.7252 - accuracy: 0.6491 - val_loss: 2.6561 - val_accuracy: 0.6420
Epoch 8/10
218/218 [==============================] - 6s 26ms/step - loss: 2.4667 - accuracy: 0.6528 - val_loss: 2.4452 - val_accuracy: 0.6413
Epoch 9/10
```

```
218/218 [==============================] - 6s 26ms/step - loss: 2.3024 - accuracy: 0.6692 - val_loss: 2.3304 - val_accuracy: 0.6500
Epoch 10/10
218/218 [==============================] - 6s 26ms/step - loss: 2.2481 - accuracy: 0.6728 - val_loss: 2.3894 - val_accuracy: 0.6473
```
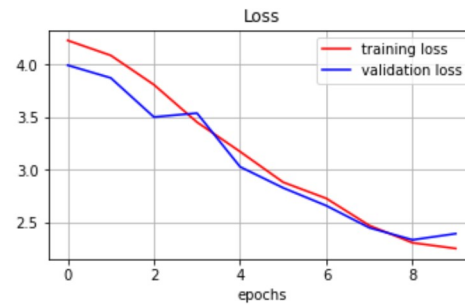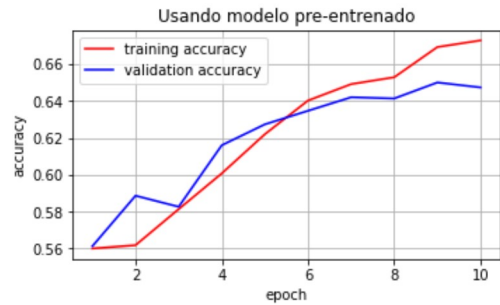


```
10/10 [==============================] - 1s 79ms/step - loss: 2.1411 - accuracy: 0.6580
-----------------------------------------------------------------------------------------
<tensorflow.python.keras.engine.training.Model object at 0x7f577018c828>
SGD
Epoch 1/10
218/218 [==============================] - 6s 28ms/step - loss: 6.4831 - accuracy: 0.5744 - val_loss: 6.4860 - val_accuracy: 0.5747
Epoch 2/10
218/218 [==============================] - 6s 26ms/step - loss: 6.4735 - accuracy: 0.5755 - val_loss: 6.4860 - val_accuracy: 0.5747
Epoch 3/10
218/218 [==============================] - 6s 26ms/step - loss: 6.4997 - accuracy: 0.5738 - val_loss: 6.4860 - val_accuracy: 0.5747
Epoch 4/10
217/218 [=============================>.] - ETA: 0s - loss: 6.4726 - accuracy: 0.5755Restoring model weights from the end of the best epoch.
218/218 [==============================] - 6s 26ms/step - loss: 6.4779 - accuracy: 0.5752 - val_loss: 6.4860 - val_accuracy: 0.5747
Epoch 00004: early stopping
```
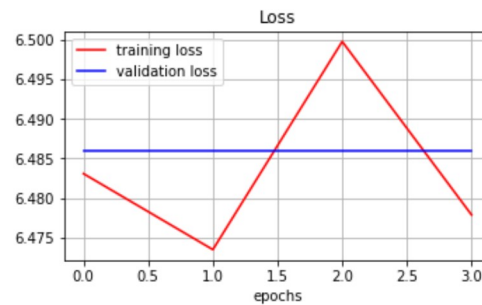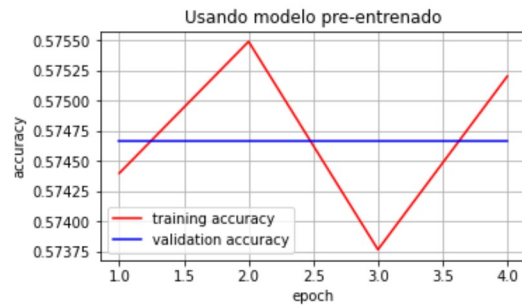


```
10/10 [==============================] - 1s 80ms/step - loss: 6.4962 - accuracy: 0.5740
-----------------------------------------------------------------------------------------
Modelo base: MobileNetV2_base
<tensorflow.python.keras.engine.training.Model object at 0x7f57766f5dd8>
Adam
Epoch 1/10
218/218 [==============================] - 7s 33ms/step - loss: 2.6974 - accuracy: 0.5473 - val_loss: 2.2370 - val_accuracy: 0.5853
Epoch 2/10
218/218 [==============================] - 6s 29ms/step - loss: 3.2141 - accuracy: 0.5156 - val_loss: 2.4503 - val_accuracy: 0.5600
Epoch 3/10
218/218 [==============================] - 6s 29ms/step - loss: 2.4766 - accuracy: 0.5796 - val_loss: 2.5356 - val_accuracy: 0.6087
Epoch 4/10
```
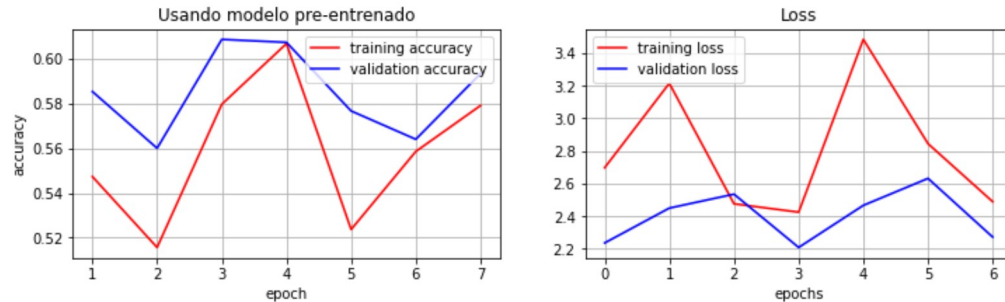
```
218/218 [==============================] - 6s 29ms/step - loss: 2.4254 - accuracy: 0.6068 - val_loss: 2.2095 - val_accuracy: 0.6073
Epoch 5/10
218/218 [==============================] - 6s 29ms/step - loss: 3.4828 - accuracy: 0.5237 - val_loss: 2.4670 - val_accuracy: 0.5767
Epoch 6/10
218/218 [==============================] - 6s 29ms/step - loss: 2.8446 - accuracy: 0.5586 - val_loss: 2.6320 - val_accuracy: 0.5640
Epoch 7/10
217/218 [=============================>.] - ETA: 0s - loss: 2.4921 - accuracy: 0.5790Restoring model weights from the end of the best epoch.
218/218 [==============================] - 6s 30ms/step - loss: 2.4895 - accuracy: 0.5791 - val_loss: 2.2730 - val_accuracy: 0.5933
Epoch 00007: early stopping
```



```
10/10 [==============================] - 1s 88ms/step - loss: 2.2996 - accuracy: 0.6213
-----------------------------------------------------------------------------------------
<tensorflow.python.keras.engine.training.Model object at 0x7f57766f5dd8>
Epoch 1/10
218/218 [==============================] - 7s 32ms/step - loss: 4.1665 - accuracy: 0.5274 - val_loss: 2.8426 - val_accuracy: 0.5600
Epoch 2/10
218/218 [==============================] - 6s 29ms/step - loss: 2.5911 - accuracy: 0.5771 - val_loss: 2.4608 - val_accuracy: 0.5687
Epoch 3/10
218/218 [==============================] - 6s 29ms/step - loss: 2.1355 - accuracy: 0.5907 - val_loss: 1.9706 - val_accuracy: 0.5953
Epoch 4/10
218/218 [==============================] - 6s 29ms/step - loss: 1.8474 - accuracy: 0.6161 - val_loss: 1.7877 - val_accuracy: 0.6173
Epoch 5/10
218/218 [==============================] - 6s 29ms/step - loss: 1.5925 - accuracy: 0.6263 - val_loss: 1.5078 - val_accuracy: 0.6307
Epoch 6/10
218/218 [==============================] - 6s 29ms/step - loss: 1.4805 - accuracy: 0.6322 - val_loss: 1.6331 - val_accuracy: 0.6260
Epoch 7/10
218/218 [==============================] - 6s 29ms/step - loss: 1.3972 - accuracy: 0.6442 - val_loss: 1.2421 - val_accuracy: 0.6473
Epoch 8/10
218/218 [==============================] - 6s 29ms/step - loss: 1.2577 - accuracy: 0.6523 - val_loss: 1.2137 - val_accuracy: 0.6533
Epoch 9/10
218/218 [==============================] - 6s 29ms/step - loss: 1.2057 - accuracy: 0.6567 - val_loss: 1.2480 - val_accuracy: 0.6400
Epoch 10/10
218/218 [==============================] - 6s 29ms/step - loss: 1.1565 - accuracy: 0.6708 - val_loss: 1.1212 - val_accuracy: 0.6560
```
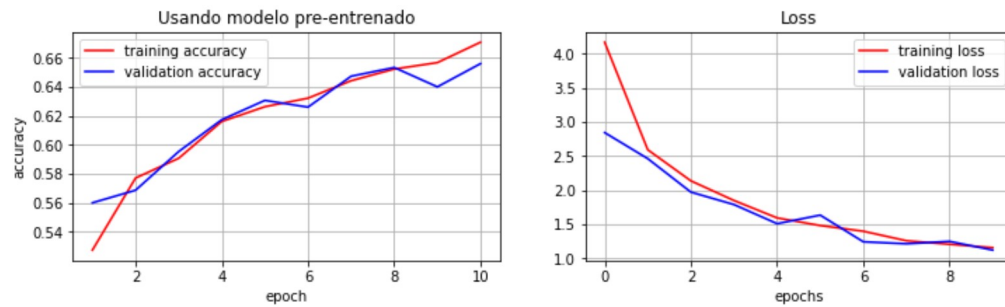
```
10/10 [==============================] - 1s 87ms/step - loss: 1.2557 - accuracy: 0.6687
-----------------------------------------------------------------------------------------
<tensorflow.python.keras.engine.training.Model object at 0x7f57766f5dd8>
SGD
Epoch 1/10
218/218 [==============================] - 7s 32ms/step - loss: 6.4785 - accuracy: 0.5745 - val_loss: 6.4860 - val_accuracy: 0.5747
Epoch 2/10
218/218 [==============================] - 6s 29ms/step - loss: 6.4800 - accuracy: 0.5751 - val_loss: 6.4860 - val_accuracy: 0.5747
Epoch 3/10
218/218 [==============================] - 6s 29ms/step - loss: 6.4888 - accuracy: 0.5745 - val_loss: 6.4860 - val_accuracy: 0.5747
Epoch 4/10
217/218 [=============================>.] - ETA: 0s - loss: 6.4880 - accuracy: 0.5745Restoring model weights from the end of the best epoch.
218/218 [==============================] - 6s 29ms/step - loss: 6.4976 - accuracy: 0.5739 - val_loss: 6.4860 - val_accuracy: 0.5747
Epoch 00004: early stopping
```
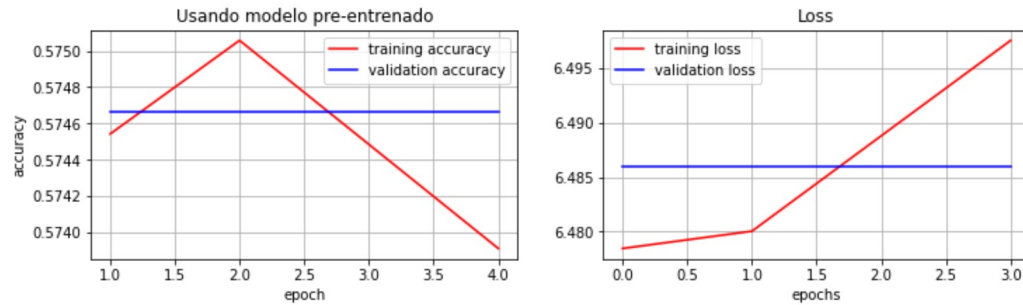


```
10/10 [==============================] - 1s 88ms/step - loss: 6.4962 - accuracy: 0.5740
-----------------------------------------------------------------------------------------
```