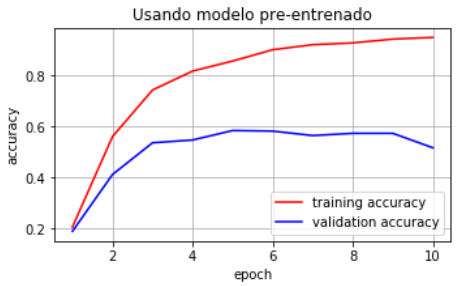
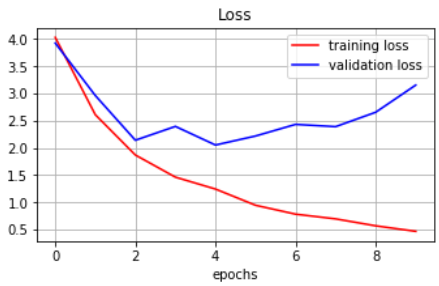
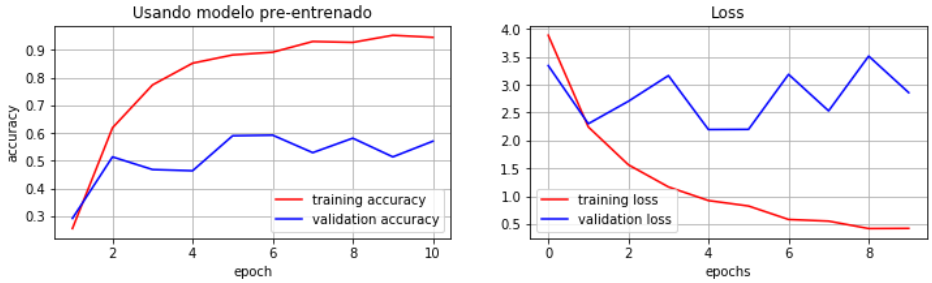
```
WARNING:tensorflow:From /usr/local/lib/python3.6/dist-packages/keras/backend/tensorflow_backend.py:2041: The name tf.nn.fuse

WARNING:tensorflow:From /usr/local/lib/python3.6/dist-packages/keras/backend/tensorflow_backend.py:148: The name tf.placehol

Downloading data from https://github.com/fchollet/deep-learning-models/releases/download/v0.4/xception_weights_tf_dim_orderi
83689472/83683744 [==============================] - 1s 0us/step
============================================================
Experimento Xception 1
experimento = Experimento Xception 1
model = <keras.engine.training.Model object at 0x7fa1edeb8550>
samples_per_class = 30
number_of_classes = 102
optimizador = rmsprop
clasificador = XCEPTION-1
batch_size = 128
epochs = 10
run_experiment = True
------------------------------------------------------------
Creando sub-conjunto de datos con  102  clases y  30 muestras por clase
number_of_classes: 102
Sub-conjunto con 102 clases creado.
Cantidad de muestras: 3060
Creando datos de train, validate y test ...
Datos de train, validate y test creados.

Split de Entrenamiento, Validación y prueba: 2142, 459, 459
Número de clases: 102
Número de muestras: 30
Usando rmsprop
Train on 2142 samples, validate on 459 samples
Epoch 1/10
2142/2142 [==============================] - 8s 4ms/step - loss: 4.0282 - acc: 0.2063 - val_loss: 3.9236 - val_acc: 0.1895
Epoch 2/10
2142/2142 [==============================] - 3s 1ms/step - loss: 2.6083 - acc: 0.5602 - val_loss: 2.9603 - val_acc: 0.4118
Epoch 3/10
2142/2142 [==============================] - 3s 1ms/step - loss: 1.8674 - acc: 0.7423 - val_loss: 2.1388 - val_acc: 0.5359
Epoch 4/10
2142/2142 [==============================] - 3s 1ms/step - loss: 1.4605 - acc: 0.8165 - val_loss: 2.3932 - val_acc: 0.5468
Epoch 5/10
2142/2142 [==============================] - 3s 1ms/step - loss: 1.2419 - acc: 0.8557 - val_loss: 2.0508 - val_acc: 0.5839
Epoch 6/10
2142/2142 [==============================] - 3s 1ms/step - loss: 0.9441 - acc: 0.9001 - val_loss: 2.2164 - val_acc: 0.5817
Epoch 7/10
2142/2142 [==============================] - 3s 1ms/step - loss: 0.7804 - acc: 0.9197 - val_loss: 2.4302 - val_acc: 0.5643
Epoch 8/10
2142/2142 [==============================] - 3s 1ms/step - loss: 0.6940 - acc: 0.9267 - val_loss: 2.3885 - val_acc: 0.5730
Epoch 9/10
2142/2142 [==============================] - 3s 1ms/step - loss: 0.5662 - acc: 0.9416 - val_loss: 2.6529 - val_acc: 0.5730
Epoch 10/10
2142/2142 [==============================] - 3s 1ms/step - loss: 0.4650 - acc: 0.9482 - val_loss: 3.1522 - val_acc: 0.5163
```



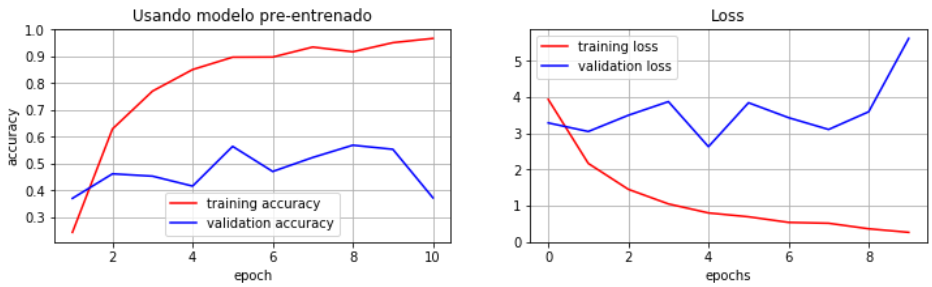



```
Exactitud en subconjunto de test:
Test loss: 2.8406230873531766
Test accuracy: 0.5555555558152708

Exactitud en todo el dataset:
Test loss: 3.387607666798559
Test accuracy: 0.48135593214473027
============================================================
Experimento Xception 2
experimento = Experimento Xception 2
model = <keras.engine.training.Model object at 0x7fa1edeb8550>
samples_per_class = 30
number_of_classes = 102
optimizador = rmsprop
clasificador = XCEPTION-2
batch_size = 128
epochs = 10
run_experiment = True
------------------------------------------------------------
Número de clases: 102
Número de muestras: 30
Usando rmsprop
Train on 2142 samples, validate on 459 samples
Epoch 1/10
2142/2142 [==============================] - 8s 4ms/step - loss: 3.8859 - acc: 0.2554 - val_loss: 3.3426 - val_acc: 0.2919
Epoch 2/10
2142/2142 [==============================] - 3s 1ms/step - loss: 2.2426 - acc: 0.6190 - val_loss: 2.3000 - val_acc: 0.5142
Epoch 3/10
2142/2142 [==============================] - 3s 1ms/step - loss: 1.5645 - acc: 0.7740 - val_loss: 2.7026 - val_acc: 0.4684
Epoch 4/10
2142/2142 [==============================] - 3s 1ms/step - loss: 1.1674 - acc: 0.8525 - val_loss: 3.1628 - val_acc: 0.4641
```

```
Epoch 5/10
2142/2142 [==============================] - 3s 1ms/step - loss: 0.9229 - acc: 0.8824 - val_loss: 2.1956 - val_acc: 0.5904
Epoch 6/10
2142/2142 [==============================] - 3s 1ms/step - loss: 0.8252 - acc: 0.8922 - val_loss: 2.1989 - val_acc: 0.5926
Epoch 7/10
2142/2142 [==============================] - 3s 1ms/step - loss: 0.5836 - acc: 0.9309 - val_loss: 3.1852 - val_acc: 0.5294
Epoch 8/10
2142/2142 [==============================] - 3s 1ms/step - loss: 0.5542 - acc: 0.9276 - val_loss: 2.5306 - val_acc: 0.5817
Epoch 9/10
2142/2142 [==============================] - 3s 1ms/step - loss: 0.4212 - acc: 0.9533 - val_loss: 3.5123 - val_acc: 0.5142
Epoch 10/10
2142/2142 [==============================] - 3s 1ms/step - loss: 0.4243 - acc: 0.9458 - val_loss: 2.8574 - val_acc: 0.5708
```

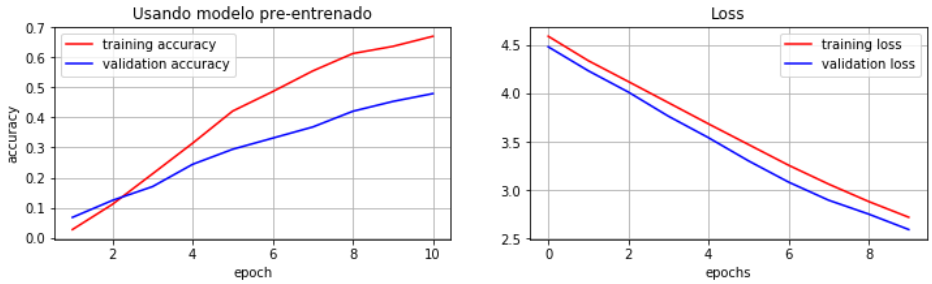



```
Exactitud en subconjunto de test:
Test loss: 2.832921081378829
Test accuracy: 0.6078431377743324

Exactitud en todo el dataset:
Test loss: 2.789888727912761
Test accuracy: 0.5474029523613285
============================================================
Experimento Xception 3
experimento = Experimento Xception 3
model = <keras.engine.training.Model object at 0x7fa1edeb8550>
samples_per_class = 30
number_of_classes = 102
optimizador = rmsprop
clasificador = XCEPTION-3
batch_size = 128
epochs = 10
run_experiment = True
------------------------------------------------------------
Número de clases: 102
Número de muestras: 30
Usando rmsprop
Train on 2142 samples, validate on 459 samples
Epoch 1/10
2142/2142 [==============================] - 8s 4ms/step - loss: 3.9349 - acc: 0.2437 - val_loss: 3.2862 - val_acc: 0.3704
Epoch 2/10
2142/2142 [==============================] - 3s 1ms/step - loss: 2.1669 - acc: 0.6293 - val_loss: 3.0484 - val_acc: 0.4619
Epoch 3/10
2142/2142 [==============================] - 3s 1ms/step - loss: 1.4517 - acc: 0.7703 - val_loss: 3.4971 - val_acc: 0.4532
Epoch 4/10
2142/2142 [==============================] - 3s 1ms/step - loss: 1.0491 - acc: 0.8506 - val_loss: 3.8738 - val_acc: 0.4161
Epoch 5/10
2142/2142 [==============================] - 3s 1ms/step - loss: 0.7998 - acc: 0.8968 - val_loss: 2.6292 - val_acc: 0.5643
Epoch 6/10
2142/2142 [==============================] - 3s 1ms/step - loss: 0.6936 - acc: 0.8973 - val_loss: 3.8433 - val_acc: 0.4706
Epoch 7/10
2142/2142 [==============================] - 3s 1ms/step - loss: 0.5386 - acc: 0.9346 - val_loss: 3.4304 - val_acc: 0.5229
Epoch 8/10
2142/2142 [==============================] - 3s 1ms/step - loss: 0.5149 - acc: 0.9169 - val_loss: 3.1044 - val_acc: 0.5686
Epoch 9/10
2142/2142 [==============================] - 3s 1ms/step - loss: 0.3619 - acc: 0.9510 - val_loss: 3.5936 - val_acc: 0.5534
Epoch 10/10
2142/2142 [==============================] - 3s 1ms/step - loss: 0.2640 - acc: 0.9669 - val_loss: 5.6193 - val_acc: 0.3725
```

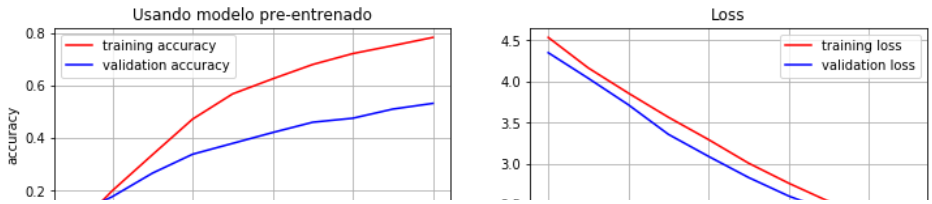


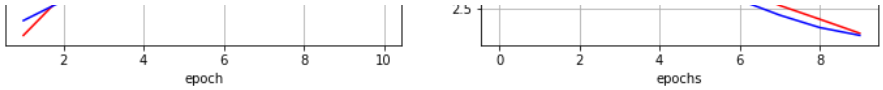

```
Exactitud en subconjunto de test:
Test loss: 5.4703104438864845
Test accuracy: 0.4095860567747378

Exactitud en todo el dataset:
Test loss: 5.712895982199643
Test accuracy: 0.3414980863762267
============================================================
Experimento Xception 4
experimento = Experimento Xception 4
model = <keras.engine.training.Model object at 0x7fa1edeb8550>
samples_per_class = 30
number_of_classes = 102
optimizador = Adam
```

```
optimizador = Adam
clasificador = XCEPTION-1
batch_size = 128
epochs = 10
run_experiment = True
------------------------------------------------------------
Número de clases: 102
Número de muestras: 30
Usando Adam
Train on 2142 samples, validate on 459 samples
Epoch 1/10
2142/2142 [==============================] - 9s 4ms/step - loss: 4.5889 - acc: 0.0271 - val_loss: 4.4802 - val_acc: 0.0675
Epoch 2/10
2142/2142 [==============================] - 3s 1ms/step - loss: 4.3370 - acc: 0.1111 - val_loss: 4.2328 - val_acc: 0.1242
Epoch 3/10
2142/2142 [==============================] - 3s 1ms/step - loss: 4.1212 - acc: 0.2124 - val_loss: 4.0129 - val_acc: 0.1699
Epoch 4/10
2142/2142 [==============================] - 3s 1ms/step - loss: 3.9034 - acc: 0.3142 - val_loss: 3.7638 - val_acc: 0.2440
Epoch 5/10
2142/2142 [==============================] - 3s 1ms/step - loss: 3.6850 - acc: 0.4211 - val_loss: 3.5424 - val_acc: 0.2941
Epoch 6/10
2142/2142 [==============================] - 3s 1ms/step - loss: 3.4716 - acc: 0.4860 - val_loss: 3.3030 - val_acc: 0.3312
Epoch 7/10
2142/2142 [==============================] - 3s 1ms/step - loss: 3.2581 - acc: 0.5546 - val_loss: 3.0839 - val_acc: 0.3682
Epoch 8/10
2142/2142 [==============================] - 3s 1ms/step - loss: 3.0632 - acc: 0.6125 - val_loss: 2.8971 - val_acc: 0.4205
Epoch 9/10
2142/2142 [==============================] - 3s 1ms/step - loss: 2.8834 - acc: 0.6363 - val_loss: 2.7536 - val_acc: 0.4532
Epoch 10/10
2142/2142 [==============================] - 3s 1ms/step - loss: 2.7210 - acc: 0.6699 - val_loss: 2.5942 - val_acc: 0.4793
```

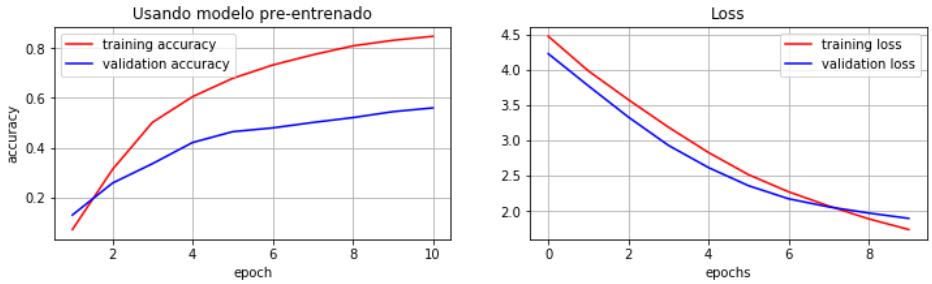



```
Exactitud en subconjunto de test:
Test loss: 2.4439830229433013
Test accuracy: 0.5141612203032883

Exactitud en todo el dataset:
Test loss: 2.863385774517007
Test accuracy: 0.42066703115153536
============================================================
Experimento Xception 5
experimento = Experimento Xception 5
model = <keras.engine.training.Model object at 0x7fa1edeb8550>
samples_per_class = 30
number_of_classes = 102
optimizador = Adam
clasificador = XCEPTION-2
batch_size = 128
epochs = 10
run_experiment = True
------------------------------------------------------------
Número de clases: 102
Número de muestras: 30
Usando Adam
Train on 2142 samples, validate on 459 samples
Epoch 1/10
2142/2142 [==============================] - 10s 5ms/step - loss: 4.5327 - acc: 0.0439 - val_loss: 4.3468 - val_acc: 0.1002
Epoch 2/10
2142/2142 [==============================] - 3s 1ms/step - loss: 4.1615 - acc: 0.1993 - val_loss: 4.0357 - val_acc: 0.1765
Epoch 3/10
2142/2142 [==============================] - 3s 1ms/step - loss: 3.8556 - acc: 0.3361 - val_loss: 3.7143 - val_acc: 0.2658
Epoch 4/10
2142/2142 [==============================] - 3s 1ms/step - loss: 3.5622 - acc: 0.4715 - val_loss: 3.3545 - val_acc: 0.3377
Epoch 5/10
2142/2142 [==============================] - 3s 1ms/step - loss: 3.2913 - acc: 0.5677 - val_loss: 3.0872 - val_acc: 0.3791
Epoch 6/10
2142/2142 [==============================] - 3s 1ms/step - loss: 3.0046 - acc: 0.6251 - val_loss: 2.8303 - val_acc: 0.4205
Epoch 7/10
2142/2142 [==============================] - 3s 1ms/step - loss: 2.7614 - acc: 0.6797 - val_loss: 2.6053 - val_acc: 0.4597
Epoch 8/10
2142/2142 [==============================] - 3s 1ms/step - loss: 2.5393 - acc: 0.7213 - val_loss: 2.4216 - val_acc: 0.4749
Epoch 9/10
2142/2142 [==============================] - 3s 1ms/step - loss: 2.3716 - acc: 0.7516 - val_loss: 2.2702 - val_acc: 0.5098
Epoch 10/10
2142/2142 [==============================] - 3s 1ms/step - loss: 2.2008 - acc: 0.7829 - val_loss: 2.1755 - val_acc: 0.5316
```






```
Exactitud en subconjunto de test:
Test loss: 2.0441257571862415
Test accuracy: 0.544662309627907

Exactitud en todo el dataset:
Test loss: 2.3847224702236756
Test accuracy: 0.49764898847920963
============================================================
Experimento Xception 6
experimento = Experimento Xception 6
model = <keras.engine.training.Model object at 0x7fa1edeb8550>
samples_per_class = 30
number_of_classes = 102
optimizador = Adam
clasificador = XCEPTION-3
batch_size = 128
epochs = 10
run_experiment = True
------------------------------------------------------------
Número de clases: 102
Número de muestras: 30
Usando Adam
Train on 2142 samples, validate on 459 samples
Epoch 1/10
2142/2142 [==============================] - 11s 5ms/step - loss: 4.4776 - acc: 0.0700 - val_loss: 4.2299 - val_acc: 0.1285
Epoch 2/10
2142/2142 [==============================] - 3s 1ms/step - loss: 3.9871 - acc: 0.3119 - val_loss: 3.7747 - val_acc: 0.2571
Epoch 3/10
2142/2142 [==============================] - 3s 1ms/step - loss: 3.5776 - acc: 0.5019 - val_loss: 3.3309 - val_acc: 0.3355
Epoch 4/10
2142/2142 [==============================] - 3s 1ms/step - loss: 3.1876 - acc: 0.6050 - val_loss: 2.9296 - val_acc: 0.4205
Epoch 5/10
2142/2142 [==============================] - 3s 1ms/step - loss: 2.8281 - acc: 0.6788 - val_loss: 2.6143 - val_acc: 0.4641
Epoch 6/10
2142/2142 [==============================] - 3s 1ms/step - loss: 2.5134 - acc: 0.7325 - val_loss: 2.3570 - val_acc: 0.4793
Epoch 7/10
2142/2142 [==============================] - 3s 1ms/step - loss: 2.2700 - acc: 0.7736 - val_loss: 2.1710 - val_acc: 0.5011
Epoch 8/10
2142/2142 [==============================] - 3s 1ms/step - loss: 2.0696 - acc: 0.8095 - val_loss: 2.0564 - val_acc: 0.5207
Epoch 9/10
2142/2142 [==============================] - 3s 1ms/step - loss: 1.8864 - acc: 0.8319 - val_loss: 1.9683 - val_acc: 0.5447
Epoch 10/10
2142/2142 [==============================] - 3s 1ms/step - loss: 1.7345 - acc: 0.8483 - val_loss: 1.8929 - val_acc: 0.5599
```




```
Exactitud en subconjunto de test:
Test loss: 1.791096232815246
Test accuracy: 0.5860566452048184

Exactitud en todo el dataset:
Test loss: 2.129315763281759
Test accuracy: 0.5388737015088052
```

Resultados XCEPTION

Lote 1

[Ver PDF con el output de pruebas del lote 1]

Las gráficas usando **rmsprop** muestran un overfitting mientras que con **Adam** parececieran que se puede mejorar con mas epocas, usaremos estos datos para el próximo lote de pruebas.

Experimento	Muestras*Clase	Optimizador	Clasificador	Batch Size	epocas	Tiempo Entrenamiento	Exac. Test	Exact. Full	Loss Test	Loss Full
XCEPTION-1	30	rmsprop	XCEPTION-1	128	10	35	56%	48%	2.84	3.39
XCEPTION-2	30	rmsprop	XCEPTION-2	128	10	35	**61%**	**55%**	**2.83**	**2.79**
XCEPTION-3	30	rmsprop	XCEPTION-3	128	10	35	41%	34%	5.47	5.71