# train

Found 49198 images belonging to 2 classes.

Found 6080 images belonging to 2 classes.

Model: "res\_net\_type\_i"

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Layer (type) Output Shape Param #

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

conv2d (Conv2D) multiple 1600

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

batch\_normalization (BatchNo multiple 256

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

max\_pooling2d (MaxPooling2D) multiple 0

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

sequential (Sequential) (None, 313, 1, 64) 398912

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

sequential\_2 (Sequential) (None, 20, 1, 64) 398912

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

sequential\_4 (Sequential) (None, 2, 1, 64) 398912

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

sequential\_6 (Sequential) (None, 1, 1, 64) 398912

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

global\_average\_pooling2d (Gl multiple 0

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

dense (Dense) multiple 130

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

Total params: 1,597,634

Trainable params: 1,594,946

Non-trainable params: 2,688

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Epoch 1/300

1537/1537 [==============================] - 89s 58ms/step - loss: 0.7130 - accuracy: 0.5261 - val\_loss: 0.6823 - val\_accuracy: 0.5692

Epoch 2/300

1537/1537 [==============================] - 88s 57ms/step - loss: 0.6608 - accuracy: 0.6070 - val\_loss: 0.6531 - val\_accuracy: 0.6146

Epoch 3/300

1537/1537 [==============================] - 88s 57ms/step - loss: 0.5927 - accuracy: 0.6896 - val\_loss: 0.6015 - val\_accuracy: 0.6870

Epoch 4/300

1537/1537 [==============================] - 91s 60ms/step - loss: 0.5056 - accuracy: 0.7590 - val\_loss: 0.5843 - val\_accuracy: 0.7051

Epoch 5/300

1537/1537 [==============================] - 92s 60ms/step - loss: 0.4279 - accuracy: 0.8066 - val\_loss: 0.5769 - val\_accuracy: 0.7186

Epoch 6/300

1537/1537 [==============================] - 93s 60ms/step - loss: 0.3483 - accuracy: 0.8491 - val\_loss: 0.6458 - val\_accuracy: 0.7058

Epoch 7/300

1537/1537 [==============================] - 89s 58ms/step - loss: 0.2745 - accuracy: 0.8868 - val\_loss: 0.6837 - val\_accuracy: 0.7160

Epoch 8/300

1537/1537 [==============================] - 89s 58ms/step - loss: 0.2126 - accuracy: 0.9166 - val\_loss: 0.7378 - val\_accuracy: 0.7164

Epoch 9/300

1537/1537 [==============================] - 88s 58ms/step - loss: 0.1769 - accuracy: 0.9324 - val\_loss: 0.7574 - val\_accuracy: 0.7133

Epoch 10/300

1537/1537 [==============================] - 89s 58ms/step - loss: 0.1463 - accuracy: 0.9460 - val\_loss: 0.8507 - val\_accuracy: 0.7125

Epoch 11/300

1537/1537 [==============================] - 88s 57ms/step - loss: 0.1315 - accuracy: 0.9518 - val\_loss: 0.8041 - val\_accuracy: 0.7240

Epoch 12/300

1537/1537 [==============================] - 88s 58ms/step - loss: 0.1169 - accuracy: 0.9577 - val\_loss: 0.8700 - val\_accuracy: 0.7260

Epoch 13/300

1537/1537 [==============================] - 88s 57ms/step - loss: 0.1010 - accuracy: 0.9643 - val\_loss: 0.9408 - val\_accuracy: 0.7155

Epoch 14/300

1537/1537 [==============================] - 88s 57ms/step - loss: 0.0954 - accuracy: 0.9659 - val\_loss: 0.9043 - val\_accuracy: 0.7206

Epoch 15/300

1537/1537 [==============================] - 89s 58ms/step - loss: 0.0855 - accuracy: 0.9698 - val\_loss: 0.9946 - val\_accuracy: 0.7184

Epoch 16/300

1537/1537 [==============================] - 89s 58ms/step - loss: 0.0787 - accuracy: 0.9724 - val\_loss: 0.9270 - val\_accuracy: 0.7247

Epoch 17/300

1537/1537 [==============================] - 90s 58ms/step - loss: 0.0765 - accuracy: 0.9739 - val\_loss: 0.9423 - val\_accuracy: 0.7211

Epoch 18/300

1537/1537 [==============================] - 89s 58ms/step - loss: 0.0748 - accuracy: 0.9748 - val\_loss: 0.9936 - val\_accuracy: 0.7201

Epoch 19/300

1537/1537 [==============================] - 90s 58ms/step - loss: 0.0653 - accuracy: 0.9779 - val\_loss: 1.0399 - val\_accuracy: 0.7199

Epoch 20/300

1537/1537 [==============================] - 92s 60ms/step - loss: 0.0659 - accuracy: 0.9782 - val\_loss: 1.0415 - val\_accuracy: 0.7113

Epoch 21/300

1537/1537 [==============================] - 92s 60ms/step - loss: 0.0569 - accuracy: 0.9814 - val\_loss: 1.0477 - val\_accuracy: 0.7214

Epoch 22/300

1537/1537 [==============================] - 91s 59ms/step - loss: 0.0561 - accuracy: 0.9816 - val\_loss: 1.0756 - val\_accuracy: 0.7145

Epoch 23/300

1537/1537 [==============================] - 92s 60ms/step - loss: 0.0551 - accuracy: 0.9817 - val\_loss: 1.0870 - val\_accuracy: 0.7186

Epoch 24/300

1537/1537 [==============================] - 93s 60ms/step - loss: 0.0507 - accuracy: 0.9829 - val\_loss: 1.0508 - val\_accuracy: 0.7214

Epoch 25/300

1537/1537 [==============================] - 89s 58ms/step - loss: 0.0473 - accuracy: 0.9848 - val\_loss: 1.0902 - val\_accuracy: 0.7196

Epoch 26/300

1537/1537 [==============================] - 90s 58ms/step - loss: 0.0495 - accuracy: 0.9842 - val\_loss: 1.0841 - val\_accuracy: 0.7173

Epoch 27/300

1537/1537 [==============================] - 90s 59ms/step - loss: 0.0440 - accuracy: 0.9857 - val\_loss: 1.2047 - val\_accuracy: 0.7076

Epoch 28/300

1537/1537 [==============================] - 87s 56ms/step - loss: 0.0461 - accuracy: 0.9857 - val\_loss: 1.0604 - val\_accuracy: 0.7280

Epoch 29/300

1537/1537 [==============================] - 87s 57ms/step - loss: 0.0430 - accuracy: 0.9860 - val\_loss: 1.0691 - val\_accuracy: 0.7319

Epoch 30/300

1537/1537 [==============================] - 89s 58ms/step - loss: 0.0408 - accuracy: 0.9868 - val\_loss: 1.1547 - val\_accuracy: 0.7266

Epoch 31/300

1537/1537 [==============================] - 87s 57ms/step - loss: 0.0390 - accuracy: 0.9878 - val\_loss: 1.1968 - val\_accuracy: 0.7209

Epoch 32/300

1537/1537 [==============================] - 87s 57ms/step - loss: 0.0417 - accuracy: 0.9871 - val\_loss: 1.0907 - val\_accuracy: 0.7235

Epoch 33/300

1537/1537 [==============================] - 88s 57ms/step - loss: 0.0362 - accuracy: 0.9891 - val\_loss: 1.1152 - val\_accuracy: 0.7296

Epoch 34/300

1537/1537 [==============================] - 86s 56ms/step - loss: 0.0348 - accuracy: 0.9887 - val\_loss: 1.1804 - val\_accuracy: 0.7301

Epoch 35/300

1537/1537 [==============================] - 85s 55ms/step - loss: 0.0354 - accuracy: 0.9889 - val\_loss: 1.1478 - val\_accuracy: 0.7248

Epoch 36/300

1537/1537 [==============================] - 86s 56ms/step - loss: 0.0323 - accuracy: 0.9900 - val\_loss: 1.1379 - val\_accuracy: 0.7247

Epoch 37/300

1537/1537 [==============================] - 85s 55ms/step - loss: 0.0277 - accuracy: 0.9915 - val\_loss: 1.1469 - val\_accuracy: 0.7176

Epoch 38/300

1537/1537 [==============================] - 85s 55ms/step - loss: 0.0312 - accuracy: 0.9901 - val\_loss: 1.1249 - val\_accuracy: 0.7209

Epoch 39/300

1537/1537 [==============================] - 85s 55ms/step - loss: 0.0296 - accuracy: 0.9906 - val\_loss: 1.1895 - val\_accuracy: 0.7173

Epoch 40/300

1537/1537 [==============================] - 85s 55ms/step - loss: 0.0296 - accuracy: 0.9909 - val\_loss: 1.1943 - val\_accuracy: 0.7232

Epoch 41/300

1537/1537 [==============================] - 85s 55ms/step - loss: 0.0279 - accuracy: 0.9916 - val\_loss: 1.2276 - val\_accuracy: 0.7280

Epoch 42/300

1537/1537 [==============================] - 85s 55ms/step - loss: 0.0244 - accuracy: 0.9923 - val\_loss: 1.3216 - val\_accuracy: 0.7247

Epoch 43/300

1537/1537 [==============================] - 85s 55ms/step - loss: 0.0263 - accuracy: 0.9919 - val\_loss: 1.2473 - val\_accuracy: 0.7204

Epoch 44/300

1537/1537 [==============================] - 85s 55ms/step - loss: 0.0294 - accuracy: 0.9907 - val\_loss: 1.2619 - val\_accuracy: 0.7240

Epoch 45/300

1537/1537 [==============================] - 85s 55ms/step - loss: 0.0240 - accuracy: 0.9929 - val\_loss: 1.3306 - val\_accuracy: 0.7288

Epoch 46/300

1537/1537 [==============================] - 85s 55ms/step - loss: 0.0255 - accuracy: 0.9922 - val\_loss: 1.2564 - val\_accuracy: 0.7194

Epoch 47/300

1537/1537 [==============================] - 85s 55ms/step - loss: 0.0248 - accuracy: 0.9927 - val\_loss: 1.2487 - val\_accuracy: 0.7199

Epoch 48/300

1537/1537 [==============================] - 85s 55ms/step - loss: 0.0236 - accuracy: 0.9928 - val\_loss: 1.2970 - val\_accuracy: 0.7199

Epoch 49/300

1537/1537 [==============================] - 85s 55ms/step - loss: 0.0240 - accuracy: 0.9924 - val\_loss: 1.2965 - val\_accuracy: 0.7222

Process finished with exit code 0

# test

Found 6144 images belonging to 2 classes.

########################################

loss & acc

[1.0923875570297241, 0.72265625]

########################################

........................................

y\_prob

[[0.9982418 0.00175825]

[0.93386424 0.06613581]

[0.9540621 0.04593788]

...

[0.00562179 0.99437815]

[0.5180525 0.4819475 ]

[0.00177617 0.99822384]]

........................................

----------------------------------------

y\_prob.shape

(6144, 2)

----------------------------------------

........................................

label\_test

[[1. 0.]

[1. 0.]

[1. 0.]

...

[0. 1.]

[0. 1.]

[0. 1.]]

........................................

----------------------------------------

label\_test.shape

(6144, 2)

----------------------------------------

########################################

n\_classes

2

########################################

########################################

fpr

{0: array([0. , 0. , 0. , ..., 0.99641927, 0.99641927,

1. ]), 1: array([0. , 0. , 0. , ..., 0.9905599, 0.9905599,

1. ])}

########################################

########################################

tpr

{0: array([0.00000000e+00, 9.76562500e-04, 2.92968750e-03, ...,

9.99674479e-01, 1.00000000e+00, 1.00000000e+00]), 1: array([0.00000000e+00, 3.25520833e-04, 1.30208333e-03, ...,

9.99674479e-01, 1.00000000e+00, 1.00000000e+00])}

########################################

########################################

cnn\_roc\_auc

{0: 0.7901979552374946, 1: 0.7901981671651204}

########################################

Process finished with exit code 0