> library(keras)

> library(tensorflow)

> library(reticulate)

>

>

> train <- 'C:/Users/Petro/Desktop/Petro\_/Nitro\_2021/trimestre\_3/Proyecto de\_T2/dataset2-master/dataset2-master/images/TRAIN'

> test <- 'C:/Users/Petro/Desktop/Petro\_/Nitro\_2021/trimestre\_3/Proyecto de\_T2/dataset2-master/dataset2-master/images/TEST\_SIMPLE'

> validation <- 'C:/Users/Petro/Desktop/Petro\_/Nitro\_2021/trimestre\_3/Proyecto de\_T2/dataset2-master/dataset2-master/images/TEST'

>

>

>

> pixel <- 150

>

> model <- keras\_model\_sequential() %>%

+ layer\_conv\_2d(filters = 32, kernel\_size = c(3, 3), padding = "same", activation = "relu",

+ input\_shape = c(pixel, pixel, 3)) %>%

+ layer\_max\_pooling\_2d(pool\_size = c(2, 2)) %>%

+

+ layer\_conv\_2d(filters = 64, kernel\_size = c(3, 3), padding = "same", activation = "relu") %>%

+ layer\_max\_pooling\_2d(pool\_size = c(2, 2)) %>%

+ layer\_conv\_2d(filters = 128, kernel\_size = c(3, 3), padding = "same", activation = "relu") %>%

+ layer\_max\_pooling\_2d(pool\_size = c(2, 2)) %>%

+ layer\_conv\_2d(filters = 128, kernel\_size = c(3, 3), padding = "same", activation = "relu") %>%

+ layer\_max\_pooling\_2d(pool\_size = c(2, 2)) %>%

+

+ layer\_flatten() %>%

+ layer\_dense(units = 512, activation = "relu") %>%

+ layer\_dense(units = 2, activation = "sigmoid")

>

> summary(model)

Model: "sequential\_6"

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Layer (type) Output Shape Param #

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

conv2d\_27 (Conv2D) (None, 150, 150, 32) 896

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max\_pooling2d\_27 (MaxPooling2D) (None, 75, 75, 32) 0

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conv2d\_26 (Conv2D) (None, 75, 75, 64) 18496

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max\_pooling2d\_26 (MaxPooling2D) (None, 37, 37, 64) 0

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conv2d\_25 (Conv2D) (None, 37, 37, 128) 73856

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max\_pooling2d\_25 (MaxPooling2D) (None, 18, 18, 128) 0

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conv2d\_24 (Conv2D) (None, 18, 18, 128) 147584

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max\_pooling2d\_24 (MaxPooling2D) (None, 9, 9, 128) 0

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flatten\_6 (Flatten) (None, 10368) 0

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dense\_13 (Dense) (None, 512) 5308928

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dense\_12 (Dense) (None, 2) 1026

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

Total params: 5,550,786

Trainable params: 5,550,786

Non-trainable params: 0

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>

> model %>% compile(loss = "categorical\_crossentropy",

+ optimizer = optimizer\_rmsprop(lr = 1e-4),

+ metrics = c("acc"))

Warning message:

In backcompat\_fix\_rename\_lr\_to\_learning\_rate(...) :

the `lr` argument has been renamed to `learning\_rate`.

> datagen <- image\_data\_generator(rescale = 1/255)

>

>

> train\_generator <- flow\_images\_from\_directory(train,

+ datagen,

+ target\_size = c(pixel, pixel),

+ classes = c('EOSINOPHIL', 'NEUTROPHIL'),

+ batch\_size = 50,

+ class\_mode = "categorical")

Found 4996 images belonging to 2 classes.

>

>

> test\_generator <- flow\_images\_from\_directory(test,

+ datagen,

+ target\_size = c(pixel, pixel),

+ classes = c('EOSINOPHIL', 'NEUTROPHIL'),

+ batch\_size = 11,

+ class\_mode = "categorical")

Found 61 images belonging to 2 classes.

>

>

>

> validation\_generator <- flow\_images\_from\_directory(validation,

+ datagen,

+ target\_size = c(pixel, pixel),

+ classes = c('EOSINOPHIL', 'NEUTROPHIL'),

+ batch\_size = 50,

+ class\_mode = "categorical")

Found 1247 images belonging to 2 classes.

>

>

>

> history <- model %>% fit\_generator(train\_generator,

+ steps\_per\_epoch = 100,

+ epochs = 10,

+ validation\_data = validation\_generator,

+ validation\_steps = 25)

Epoch 1/10

100/100 [==============================] - 279s 3s/step - loss: 0.6943 - acc: 0.4980 - val\_loss: 0.6932 - val\_acc: 0.4996

Epoch 2/10

100/100 [==============================] - 204s 2s/step - loss: 0.6908 - acc: 0.5344 - val\_loss: 0.7009 - val\_acc: 0.5004

Epoch 3/10

100/100 [==============================] - 199s 2s/step - loss: 0.6766 - acc: 0.5781 - val\_loss: 0.7001 - val\_acc: 0.5261

Epoch 4/10

100/100 [==============================] - 200s 2s/step - loss: 0.6420 - acc: 0.6373 - val\_loss: 0.6917 - val\_acc: 0.5196

Epoch 5/10

100/100 [==============================] - 197s 2s/step - loss: 0.6071 - acc: 0.6823 - val\_loss: 0.5911 - val\_acc: 0.6969

Epoch 6/10

100/100 [==============================] - 201s 2s/step - loss: 0.5745 - acc: 0.7074 - val\_loss: 0.5457 - val\_acc: 0.7506

Epoch 7/10

100/100 [==============================] - 200s 2s/step - loss: 0.5312 - acc: 0.7324 - val\_loss: 0.5077 - val\_acc: 0.7498

Epoch 8/10

100/100 [==============================] - 206s 2s/step - loss: 0.4936 - acc: 0.7472 - val\_loss: 0.6048 - val\_acc: 0.6271

Epoch 9/10

100/100 [==============================] - 205s 2s/step - loss: 0.4563 - acc: 0.7694 - val\_loss: 0.4361 - val\_acc: 0.7755

Epoch 10/10

100/100 [==============================] - 203s 2s/step - loss: 0.4269 - acc: 0.7908 - val\_loss: 0.4070 - val\_acc: 0.7803

> plot(history)

`geom\_smooth()` using formula 'y ~ x'

>

> model %>% evaluate\_generator(validation\_generator, steps = 25)

$loss

[1] 0.407126

$acc

[1] 0.7802727



