```
# To mount the drive
from google.colab import drive
drive.mount('/content/gdrive')
```

```
Mounted at /content/gdrive
```

```
from keras.models import Sequential
from keras.layers import Conv2D
from keras.layers import MaxPooling2D
from keras.layers import Flatten
from keras.layers import Dense, Dropout, BatchNormalization
from tensorflow.keras.regularizers import l2

classifier = Sequential()

# first convolutional layer
classifier.add(Conv2D(32, 5, 5, input_shape = (256, 256, 3),
activation = 'relu',kernel_regularizer=l2(l2=0.01)))
classifier.add(BatchNormalization())

# first pooling layer
classifier.add(MaxPooling2D(pool_size=(2,2)))
classifier.add(Dropout(0.4))

# second convolutional layer
classifier.add(Conv2D(64, 5,5 ,activation = 'relu',
kernel_regularizer= l2(l2=0.01)))
classifier.add(BatchNormalization())

# second pooling layer
classifier.add(MaxPooling2D(pool_size=(2,2)))
classifier.add(Dropout(0.4))

#Flattening layer
classifier.add(Flatten())

# Full connections
classifier.add(Dense(32, activation='relu'))
classifier.add(Dropout(0.4))
classifier.add(Dense(1, activation='sigmoid'))

classifier.compile(optimizer='adam', loss='binary_crossentropy',
metrics=['accuracy'])

# generate more images
from keras.preprocessing.image import ImageDataGenerator

train_datagen = ImageDataGenerator(rescale = 1./255,
                                   shear_range = 0.2,
                                   zoom_range = 0.2,
                                   horizontal_flip =True)

test_datagen = ImageDataGenerator(rescale = 1./255)
```

```
training_set =
train_datagen.flow_from_directory('/content/gdrive/MyDrive/data/train'
,
                                                  target_size = (256,
256),
                                                  batch_size = 16,
                                                  class_mode =
'binary')
```

```
Found 40 images belonging to 2 classes.
```

```
test_set =
test_datagen.flow_from_directory('/content/gdrive/MyDrive/data/test',
                                                target_size = (256, 256),
                                                batch_size = 16,
                                                class_mode = 'binary')
```

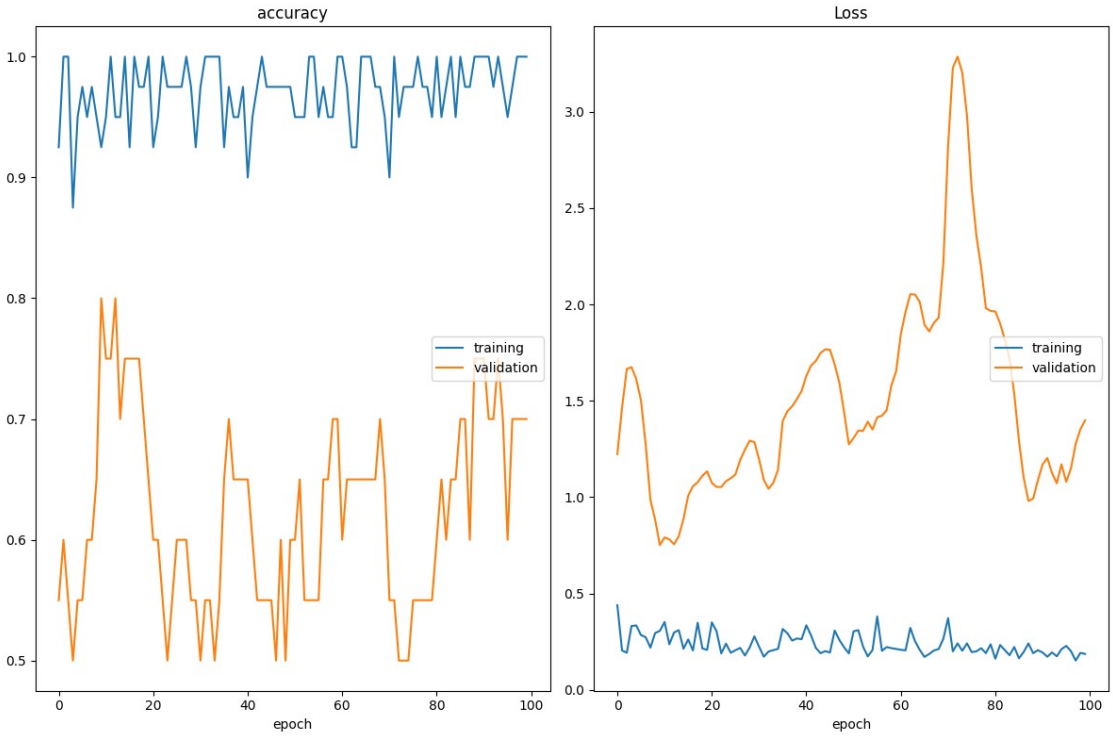
```
Found 20 images belonging to 2 classes.
```

```
pip install livelossplot
```

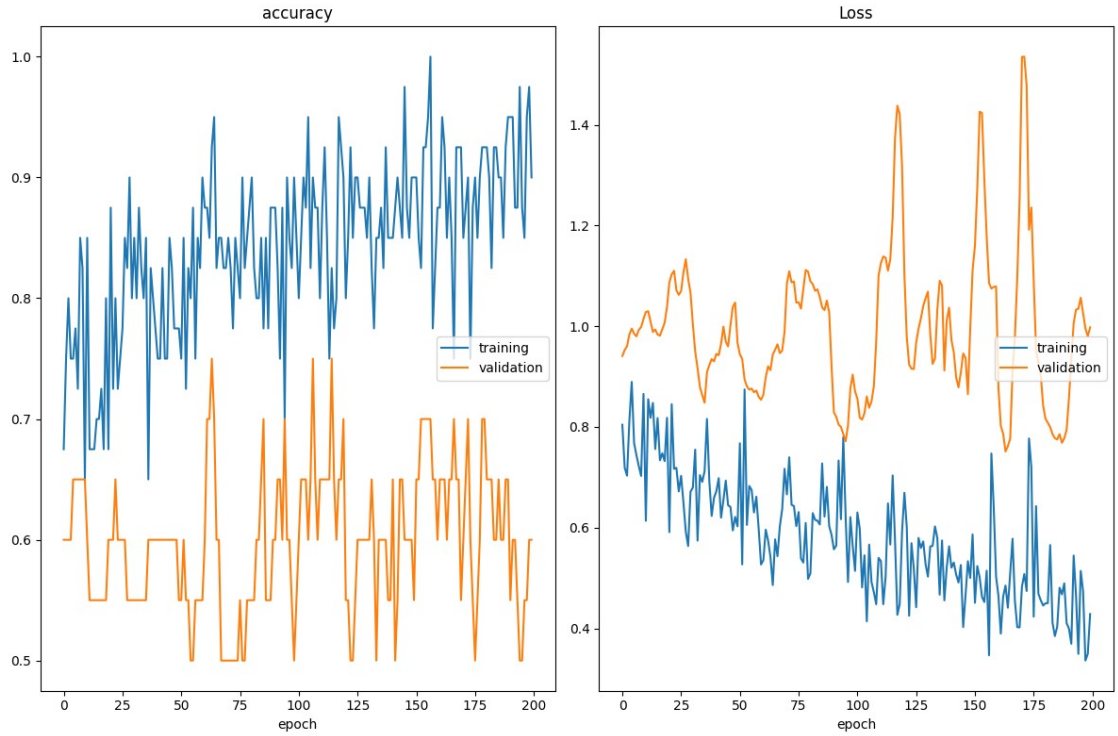
```
Looking in indexes: https://pypi.org/simple, https://us-
python.pkg.dev/colab-wheels/public/simple/
Requirement already satisfied: livelossplot in
/usr/local/lib/python3.10/dist-packages (0.5.5)
Requirement already satisfied: matplotlib in
/usr/local/lib/python3.10/dist-packages (from livelossplot) (3.7.1)
Requirement already satisfied: bokeh in
/usr/local/lib/python3.10/dist-packages (from livelossplot) (2.4.3)
Requirement already satisfied: Jinja2>=2.9 in
/usr/local/lib/python3.10/dist-packages (from bokeh->livelossplot)
(3.1.2)
Requirement already satisfied: numpy>=1.11.3 in
/usr/local/lib/python3.10/dist-packages (from bokeh->livelossplot)
(1.22.4)
Requirement already satisfied: packaging>=16.8 in
/usr/local/lib/python3.10/dist-packages (from bokeh->livelossplot)
(23.1)
Requirement already satisfied: pillow>=7.1.0 in
/usr/local/lib/python3.10/dist-packages (from bokeh->livelossplot)
(8.4.0)
Requirement already satisfied: PyYAML>=3.10 in
/usr/local/lib/python3.10/dist-packages (from bokeh->livelossplot)
(6.0)
Requirement already satisfied: tornado>=5.1 in
/usr/local/lib/python3.10/dist-packages (from bokeh->livelossplot)
(6.3.1)
Requirement already satisfied: typing-extensions>=3.10.0 in
/usr/local/lib/python3.10/dist-packages (from bokeh->livelossplot)
(4.5.0)
Requirement already satisfied: contourpy>=1.0.1 in
```

```
/usr/local/lib/python3.10/dist-packages (from matplotlib-
>livelossplot) (1.0.7)
Requirement already satisfied: cycler>=0.10 in
/usr/local/lib/python3.10/dist-packages (from matplotlib-
>livelossplot) (0.11.0)
Requirement already satisfied: fonttools>=4.22.0 in
/usr/local/lib/python3.10/dist-packages (from matplotlib-
>livelossplot) (4.39.3)
Requirement already satisfied: kiwisolver>=1.0.1 in
/usr/local/lib/python3.10/dist-packages (from matplotlib-
>livelossplot) (1.4.4)
Requirement already satisfied: pyparsing>=2.3.1 in
/usr/local/lib/python3.10/dist-packages (from matplotlib-
>livelossplot) (3.0.9)
Requirement already satisfied: python-dateutil>=2.7 in
/usr/local/lib/python3.10/dist-packages (from matplotlib-
>livelossplot) (2.8.2)
Requirement already satisfied: MarkupSafe>=2.0 in
/usr/local/lib/python3.10/dist-packages (from Jinja2>=2.9->bokeh-
>livelossplot) (2.1.2)
Requirement already satisfied: six>=1.5 in
/usr/local/lib/python3.10/dist-packages (from python-dateutil>=2.7-
>matplotlib->livelossplot) (1.16.0)
```

```
from livelossplot import PlotLossesKerasTF

classifier.fit(training_set, epochs = 100, validation_data=test_set,
callbacks=[PlotLossesKerasTF()])
```



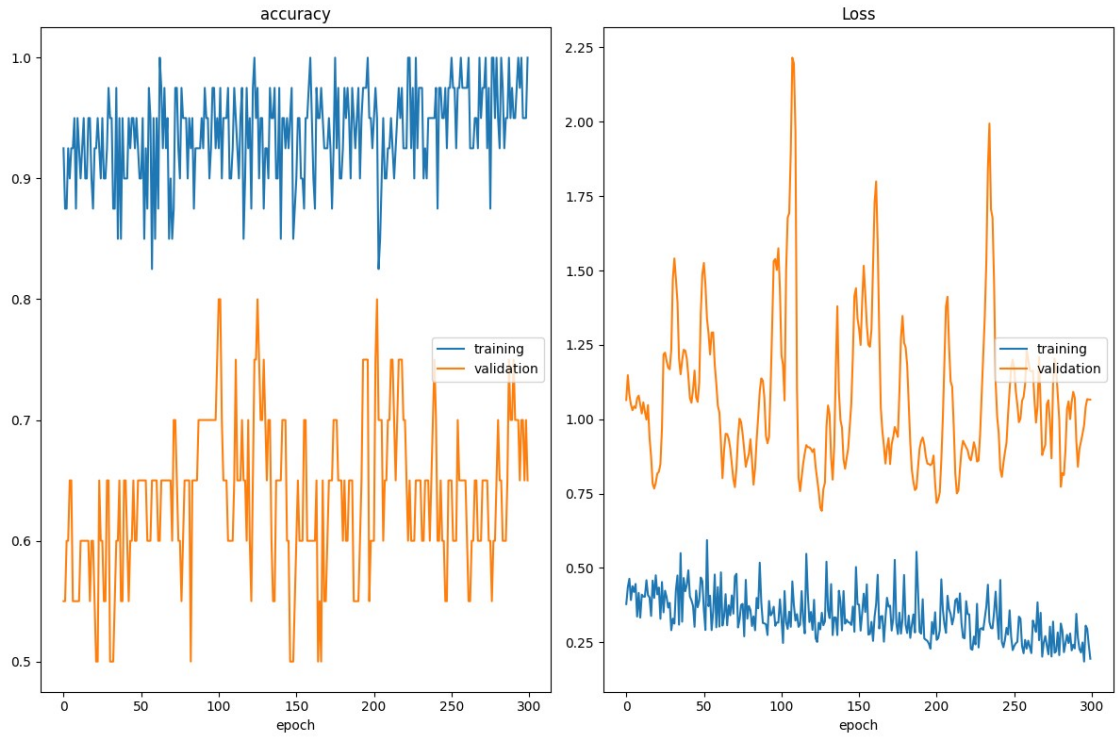
```
accuracy
	training         	(min:    0.875, max:    1.000, cur:
1.000)
	validation       	(min:    0.500, max:    0.800, cur:
0.700)
Loss
	training         	(min:    0.152, max:    0.439, cur:
0.187)
	validation       	(min:    0.751, max:    3.285, cur:
1.398)
 3/3 [==============================] - 2s 728ms/step - loss: 0.1866 -
accuracy: 1.0000 - val_loss: 1.3981 - val_accuracy: 0.7000

<keras.callbacks.History at 0x7fce5c5839d0>

classifier.fit(training_set, epochs = 200, validation_data=test_set,
callbacks=[PlotLossesKerasTF()])
```




```
accuracy
	training         	(min:    0.650, max:    1.000, cur:
0.900)
	validation       	(min:    0.500, max:    0.750, cur:
0.600)
Loss
	training         	(min:    0.336, max:    0.889, cur:
0.429)
	validation       	(min:    0.751, max:    1.535, cur:
0.998)
```

```
 3/3 [==============================] - 1s 541ms/step - loss: 0.4285 -
accuracy: 0.9000 - val_loss: 0.9978 - val_accuracy: 0.6000

<keras.callbacks.History at 0x7fce8aabab00>
```

```
classifier.fit(training_set, epochs = 300, validation_data=test_set,
callbacks=[PlotLossesKerasTF()])
```




```
accuracy
	training         	(min:    0.825, max:    1.000, cur:
1.000)
	validation       	(min:    0.500, max:    0.800, cur:
0.650)
Loss
	training         	(min:    0.185, max:    0.594, cur:
0.195)
	validation       	(min:    0.692, max:    2.215, cur:
1.066)
 3/3 [==============================] - 1s 493ms/step - loss: 0.1948 -
accuracy: 1.0000 - val_loss: 1.0660 - val_accuracy: 0.6500

<keras.callbacks.History at 0x7fce76fd7820>
```

```
import numpy as np
# from keras.preprocessing import image
from tensorflow.keras.preprocessing import image

test_image =
image.load_img('/content/gdrive/MyDrive/data/test/cats/104.jpg',target
```

```
_size=(256,256))
test_image = image.img_to_array(test_image)
test_image = np.expand_dims(test_image,axis=0)
result = classifier.predict(test_image)

if result[0][0]>=0.5:
    prediction= 'Cat'
    print('Result is',result[0][0])
else:
    prediction = 'Dog'
    print('Result is',result[0][0])

print(prediction)
```

```
1/1 [==============================] - 0s 21ms/step
Result is 1.0
Cat
```

```
import numpy as np
# from keras.preprocessing import image
from tensorflow.keras.preprocessing import image

test_image =
image.load_img('/content/gdrive/MyDrive/data/test/dogs/103.jpg',target
_size=(256,256))
test_image = image.img_to_array(test_image)
test_image = np.expand_dims(test_image,axis=0)
result = classifier.predict(test_image)

if result[0][0]>=0.5:
    prediction= 'Cat'
    print('Result is',result[0][0])
else:
    prediction = 'Dog'
    print('Result is',result[0][0])

print(prediction)
```

```
1/1 [==============================] - 0s 21ms/step
Result is 1.0
Cat
```

```
import numpy as np
# from keras.preprocessing import image
from tensorflow.keras.preprocessing import image

test_image =
image.load_img('/content/gdrive/MyDrive/data/test/dogs/109.jpg',target
_size=(256,256))
test_image = image.img_to_array(test_image)
```

```
test_image = np.expand_dims(test_image,axis=0)
result = classifier.predict(test_image)

if result[0][0]>=0.5:
    prediction= 'Cat'
    print('Result is',result[0][0])
else:
    prediction = 'Dog'
    print('Result is',result[0][0])

print(prediction)
```

```
1/1 [==============================] - 0s 22ms/step
Result is 0.0
Dog
```