

```
In [1]: #!unzip dank_data-master.zip  
#!pip install tensorflow_addons
```

```
In [2]: import glob  
import pandas as pd  
import warnings  
warnings.filterwarnings("ignore")  
from tensorflow.keras.preprocessing.image import ImageDataGenerator  
from tensorflow.keras.layers import Dense, Input, Conv2D, MaxPool2D, Activation, Dropout, Flatten, Embedding, LSTM, concatenate  
from tensorflow.keras.models import Model  
import tensorflow as tf  
import numpy as np  
import tensorflow_addons as tfa  
import logging  
from tensorflow.keras.preprocessing.text import Tokenizer  
from sklearn.preprocessing import LabelEncoder  
from sklearn.preprocessing import StandardScaler  
from tensorflow.keras.applications.resnet50 import ResNet50  
from tensorflow.keras.applications.resnet50 import preprocess_input  
from tensorflow.keras.callbacks import LearningRateScheduler  
from tensorflow.keras.callbacks import ReduceLROnPlateau  
from tensorflow.keras.callbacks import ModelCheckpoint  
from tensorflow.keras.callbacks import EarlyStopping  
from sklearn.metrics import confusion_matrix, accuracy_score, f1_score  
import seaborn as sns  
import matplotlib.pyplot as plt
```

```
In [3]: training='/content/dank_data-master/data/training/*'  
test='/content/dank_data-master/data/test/*'  
validation='/content/dank_data-master/data/validation/*'
```

```
In [4]: training = glob.glob(training)  
test = glob.glob(test)  
validation = glob.glob(validation)
```

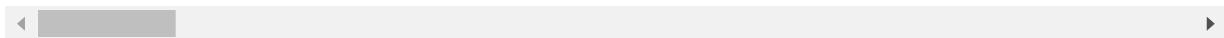
```
In [5]: final_dank=pd.read_csv('/content/dank_data-master/data/final_dank.csv')  
train_labels = [fn.split('/')[-1].split('.')[0].strip() for fn in training]  
validation_labels = [fn.split('/')[-1].split('.')[0].strip() for fn in validation]  
test_labels = [fn.split('/')[-1].split('.')[0].strip() for fn in test]
```

```
In [6]: for labels in train_labels:
    if labels==train_labels[0]:
        train_data =final_dank[final_dank['id']==labels]
    else :
        train_data =train_data.append(final_dank[final_dank['id']==labels],sort=False)
    for labels in validation_labels:
        if labels==validation_labels[0]:
            val_data =final_dank[final_dank['id']==labels]
        else :
            val_data =val_data.append(final_dank[final_dank['id']==labels],sort=False)
    for labels in test_labels:
        if labels==test_labels[0]:
            test_data =final_dank[final_dank['id']==labels]
        else :
            test_data =test_data.append(final_dank[final_dank['id']==labels],sort=False)
print(train_data.shape)
print(test_data.shape)
print(val_data.shape)
train_data.head(5)
```

(3405, 68)  
(1719, 68)  
(1688, 68)

Out[6]:

	Unnamed: 0	level_0	index	author	awards	processed_words	created_utc	dowr
27060	48660	50940.0	50940.0	FreezeY7	[]	['gamer', 'xbox', 'xbox', 'playstat']	1.584235e+09	0
29398	52076	54537.0	54537.0	sraff57	[]	['wait', 'metowi3i', 'stick', 'know', 'rule', ...]	1.584217e+09	0
53584	96576	1088.0	32741.0	sdrisc2692	[]	['reddit', 'mobil', 'reddit', 'mobil', 'mind']	1.584914e+09	0
27044	48639	50917.0	50917.0	meeeeeeeeph	[]	['meme', 'youtub', 'break', 'real', 'genuin', ...]	1.584235e+09	0
14024	29120	30519.0	30519.0	pronoob--	[]	['corona', '>final', 'report', 'test', 'dengu', ...]	1.584364e+09	0



```
In [7]: def file_extension(x):
    return x+".jpg"
train_data['id'] = train_data['id'].apply(file_extension)
val_data['id'] = val_data['id'].apply(file_extension)
test_data['id'] = test_data['id'].apply(file_extension)
```

```
In [8]: def numeric_to_string(x):
    if (x==1.0):
        return 'Not_dank'
    elif (x==0.0):
        return 'Dank'
train_data['dank_level_new'] = train_data['dank_level'].apply(numeric_to_string)
val_data['dank_level_new'] = val_data['dank_level'].apply(numeric_to_string)
test_data['dank_level_new'] = test_data['dank_level'].apply(numeric_to_string)
```

In [9]:

```
logger = logging.getLogger()
logger.disabled = False
train_datagen = ImageDataGenerator(zoom_range=0.3, rotation_range=50,
                                   width_shift_range=0.2, height_shift_range=
0.2, shear_range=0.2,
                                   horizontal_flip=True, fill_mode='nearest')
train_generator = train_datagen.flow_from_dataframe(
    dataframe=train_data,
    directory="/content/dank_data-master/data/training/",
    x_col="id",
    y_col="dank_level_new",
    subset="training",
    batch_size=30,
    seed=42,
    class_mode="binary",
    target_size= (156,156))
predict_datagen = ImageDataGenerator(preprocessing_function=preprocess_input
)
train_prediction_generator = predict_datagen.flow_from_dataframe(
    dataframe=train_data,
    directory="/content/dank_data-master/data/training/",
    x_col="id",
    y_col="dank_level_new",
    batch_size=30,
    seed=42,
    class_mode="binary",
    shuffle=False,
    target_size= (156,156))
validation_prediction_generator = predict_datagen.flow_from_dataframe(
    dataframe=val_data,
    directory="/content/dank_data-master/data/validation/",
    x_col="id",
    y_col="dank_level_new",
    batch_size=30,
    seed=42,
    shuffle=False,
    class_mode="binary",
    target_size= (156,156))
test_prediction_generator = predict_datagen.flow_from_dataframe(
    dataframe=test_data,
    directory="/content/dank_data-master/data/test/",
    x_col="id",
    y_col="dank_level_new",
    batch_size=30,
    seed=42,
    shuffle=False,
    class_mode="binary",
    target_size= (156,156))
```

Found 3405 validated image filenames belonging to 2 classes.

Found 3405 validated image filenames belonging to 2 classes.

Found 1688 validated image filenames belonging to 2 classes.

Found 1719 validated image filenames belonging to 2 classes.

```
In [10]: IMAGE_SIZE = [156,156]
ResNet50 = ResNet50(input_shape=IMAGE_SIZE + [3], weights='imagenet', include_
top=False)
```

```
Downloading data from https://storage.googleapis.com/tensorflow/keras-applica
tions/resnet/resnet50_weights_tf_dim_ordering_tf_kernels_notop.h5
94773248/94765736 [=====] - 1s 0us/step
```

```
In [11]: for layer in ResNet50.layers:
    layer.trainable = False
```

```
In [12]: #Flatten
flatten = Flatten(data_format='channels_last',name='Flatten')(ResNet50.output)

#FC Layer
FC1 = Dense(units=512,activation='relu',kernel_initializer=tf.keras.initializers.glorot_normal(seed=32),name='FC1')(flatten)
x = Dropout(0.3)(FC1)
#FC Layer
FC2 = Dense(units=256,activation='relu',kernel_initializer=tf.keras.initializers.glorot_normal(seed=33),name='FC2')(x)
x = Dropout(0.3)(FC2)
#FC Layer
FC3 = Dense(units=128,activation='relu',kernel_initializer=tf.keras.initializers.glorot_normal(seed=33),name='FC3')(x)
x = Dropout(0.3)(FC3)
#FC Layer
FC4 = Dense(units=64,activation='relu',kernel_initializer=tf.keras.initializers.glorot_normal(seed=33),name='FC4')(x)
x = Dropout(0.3)(FC4)

#output Layer
Out = Dense(units=1,activation='sigmoid',kernel_initializer=tf.keras.initializers.glorot_normal(seed=3),name='Output')(x)

model = Model(inputs=ResNet50.input, outputs=Out)
model.summary()
```

Model: "model"

Layer (type)	Output Shape	Param #	Connected to
input_1 (InputLayer)	[None, 156, 156, 3]	0	
conv1_pad (ZeroPadding2D) [0]	(None, 162, 162, 3)	0	input_1[0]
conv1_conv (Conv2D) [0]	(None, 78, 78, 64)	9472	conv1_pad[0]
conv1_bn (BatchNormalization) [0][0]	(None, 78, 78, 64)	256	conv1_conv
conv1_relu (Activation) [0]	(None, 78, 78, 64)	0	conv1_bn[0]
pool1_pad (ZeroPadding2D) [0][0]	(None, 80, 80, 64)	0	conv1_relu
pool1_pool (MaxPooling2D) [0]	(None, 39, 39, 64)	0	pool1_pad[0]
conv2_block1_1_conv (Conv2D) [0][0]	(None, 39, 39, 64)	4160	pool1_pool
conv2_block1_1_bn (BatchNormali conv2_block1_1_conv[0][0]	(None, 39, 39, 64)	256	conv2_block1
conv2_block1_1_relu (Activation conv2_block1_1_bn[0][0]	(None, 39, 39, 64)	0	conv2_block1
conv2_block1_2_conv (Conv2D) conv2_block1_1_relu[0][0]	(None, 39, 39, 64)	36928	conv2_block1
conv2_block1_2_bn (BatchNormali conv2_block1_2_conv[0][0]	(None, 39, 39, 64)	256	conv2_block1
conv2_block1_2_relu (Activation conv2_block1_2_bn[0][0]	(None, 39, 39, 64)	0	conv2_block1

conv2_block1_0_conv (Conv2D) [0][0]	(None, 39, 39, 256)	16640	pool1_pool
conv2_block1_3_conv (Conv2D) [0][0]	(None, 39, 39, 256)	16640	conv2_block1_2_relu[0][0]
conv2_block1_0_bn (BatchNormali _0_conv[0][0]	(None, 39, 39, 256)	1024	conv2_block1_0_conv[0][0]
conv2_block1_3_bn (BatchNormali _3_conv[0][0]	(None, 39, 39, 256)	1024	conv2_block1_3_conv[0][0]
conv2_block1_add (Add) _0_bn[0][0]	(None, 39, 39, 256)	0	conv2_block1_0_bn[0][0]
conv2_block1_out (Activation) _add[0][0]	(None, 39, 39, 256)	0	conv2_block1_out[0][0]
conv2_block2_1_conv (Conv2D) _out[0][0]	(None, 39, 39, 64)	16448	conv2_block1_out[0][0]
conv2_block2_1_bn (BatchNormali _1_conv[0][0]	(None, 39, 39, 64)	256	conv2_block2_1_conv[0][0]
conv2_block2_1_relu (Activation _1_bn[0][0]	(None, 39, 39, 64)	0	conv2_block2_1_bn[0][0]
conv2_block2_2_conv (Conv2D) _1_relu[0][0]	(None, 39, 39, 64)	36928	conv2_block2_1_relu[0][0]
conv2_block2_2_bn (BatchNormali _2_conv[0][0]	(None, 39, 39, 64)	256	conv2_block2_2_conv[0][0]
conv2_block2_2_relu (Activation _2_bn[0][0]	(None, 39, 39, 64)	0	conv2_block2_2_bn[0][0]
conv2_block2_3_conv (Conv2D) _2_relu[0][0]	(None, 39, 39, 256)	16640	conv2_block2_2_relu[0][0]
conv2_block2_3_bn (BatchNormali _3_conv[0][0]	(None, 39, 39, 256)	1024	conv2_block2_3_conv[0][0]

conv2_block2_add (Add) _out[0][0]	(None, 39, 39, 256) 0	conv2_block1 conv2_block2
conv2_block2_out (Activation) _add[0][0]	(None, 39, 39, 256) 0	conv2_block2
conv2_block3_1_conv (Conv2D) _out[0][0]	(None, 39, 39, 64) 16448	conv2_block2
conv2_block3_1_bn (BatchNormali _1_conv[0][0]	(None, 39, 39, 64) 256	conv2_block3
conv2_block3_1_relu (Activation _1_bn[0][0]	(None, 39, 39, 64) 0	conv2_block3
conv2_block3_2_conv (Conv2D) _1_relu[0][0]	(None, 39, 39, 64) 36928	conv2_block3
conv2_block3_2_bn (BatchNormali _2_conv[0][0]	(None, 39, 39, 64) 256	conv2_block3
conv2_block3_2_relu (Activation _2_bn[0][0]	(None, 39, 39, 64) 0	conv2_block3
conv2_block3_3_conv (Conv2D) _2_relu[0][0]	(None, 39, 39, 256) 16640	conv2_block3
conv2_block3_3_bn (BatchNormali _3_conv[0][0]	(None, 39, 39, 256) 1024	conv2_block3
conv2_block3_add (Add) _out[0][0]	(None, 39, 39, 256) 0	conv2_block2 conv2_block3
conv2_block3_out (Activation) _add[0][0]	(None, 39, 39, 256) 0	conv2_block3
conv3_block1_1_conv (Conv2D) _out[0][0]	(None, 20, 20, 128) 32896	conv2_block3

conv3_block1_1_bn (BatchNormali (None, 20, 20, 128) 512		conv3_block1
_1_conv[0][0]		
conv3_block1_1_relu (Activation (None, 20, 20, 128) 0		conv3_block1
_1_bn[0][0]		
conv3_block1_2_conv (Conv2D) (None, 20, 20, 128) 147584		conv3_block1
_1_relu[0][0]		
conv3_block1_2_bn (BatchNormali (None, 20, 20, 128) 512		conv3_block1
_2_conv[0][0]		
conv3_block1_2_relu (Activation (None, 20, 20, 128) 0		conv3_block1
_2_bn[0][0]		
conv3_block1_0_conv (Conv2D) (None, 20, 20, 512) 131584		conv2_block3
_out[0][0]		
conv3_block1_3_conv (Conv2D) (None, 20, 20, 512) 66048		conv3_block1
_2_relu[0][0]		
conv3_block1_0_bn (BatchNormali (None, 20, 20, 512) 2048		conv3_block1
_0_conv[0][0]		
conv3_block1_3_bn (BatchNormali (None, 20, 20, 512) 2048		conv3_block1
_3_conv[0][0]		
conv3_block1_add (Add) (None, 20, 20, 512) 0		conv3_block1
_0_bn[0][0]		
conv3_block1_3_bn[0][0]		conv3_block1
conv3_block1_out (Activation) (None, 20, 20, 512) 0		conv3_block1
_add[0][0]		
conv3_block2_1_conv (Conv2D) (None, 20, 20, 128) 65664		conv3_block1
_out[0][0]		
conv3_block2_1_bn (BatchNormali (None, 20, 20, 128) 512		conv3_block2
_1_conv[0][0]		
conv3_block2_1_relu (Activation (None, 20, 20, 128) 0		conv3_block2
_1_bn[0][0]		

conv3_block2_2_conv (Conv2D) (None, 20, 20, 128) 147584	conv3_block2_1_relu[0][0]	
conv3_block2_2_bn (BatchNormali (None, 20, 20, 128) 512	conv3_block2_2_conv[0][0]	
conv3_block2_2_relu (Activation (None, 20, 20, 128) 0	conv3_block2_2_bn[0][0]	
conv3_block2_3_conv (Conv2D) (None, 20, 20, 512) 66048	conv3_block2_2_relu[0][0]	
conv3_block2_3_bn (BatchNormali (None, 20, 20, 512) 2048	conv3_block2_3_conv[0][0]	
conv3_block2_add (Add) (None, 20, 20, 512) 0	conv3_block1_out[0][0]	conv3_block2_3_bn[0][0]
conv3_block2_out (Activation) (None, 20, 20, 512) 0	conv3_block2_add[0][0]	
conv3_block3_1_conv (Conv2D) (None, 20, 20, 128) 65664	conv3_block2_out[0][0]	
conv3_block3_1_bn (BatchNormali (None, 20, 20, 128) 512	conv3_block3_1_conv[0][0]	
conv3_block3_1_relu (Activation (None, 20, 20, 128) 0	conv3_block3_1_bn[0][0]	
conv3_block3_2_conv (Conv2D) (None, 20, 20, 128) 147584	conv3_block3_1_relu[0][0]	
conv3_block3_2_bn (BatchNormali (None, 20, 20, 128) 512	conv3_block3_2_conv[0][0]	
conv3_block3_2_relu (Activation (None, 20, 20, 128) 0	conv3_block3_2_bn[0][0]	
conv3_block3_3_conv (Conv2D) (None, 20, 20, 512) 66048	conv3_block3_2_relu[0][0]	

conv3_block3_3_bn (BatchNormali (None, 20, 20, 512) 2048 _3_conv[0][0]		conv3_block3
conv3_block3_add (Add) _out[0][0]	(None, 20, 20, 512) 0	conv3_block2 conv3_block3
conv3_block3_out (Activation) _add[0][0]	(None, 20, 20, 512) 0	conv3_block3
conv3_block4_1_conv (Conv2D) _out[0][0]	(None, 20, 20, 128) 65664	conv3_block3
conv3_block4_1_bn (BatchNormali (None, 20, 20, 128) 512 _1_conv[0][0]		conv3_block4
conv3_block4_1_relu (Activation (None, 20, 20, 128) 0 _1_bn[0][0]		conv3_block4
conv3_block4_2_conv (Conv2D) _1_relu[0][0]	(None, 20, 20, 128) 147584	conv3_block4
conv3_block4_2_bn (BatchNormali (None, 20, 20, 128) 512 _2_conv[0][0]		conv3_block4
conv3_block4_2_relu (Activation (None, 20, 20, 128) 0 _2_bn[0][0]		conv3_block4
conv3_block4_3_conv (Conv2D) _2_relu[0][0]	(None, 20, 20, 512) 66048	conv3_block4
conv3_block4_3_bn (BatchNormali (None, 20, 20, 512) 2048 _3_conv[0][0]		conv3_block4
conv3_block4_add (Add) _out[0][0]	(None, 20, 20, 512) 0	conv3_block3 conv3_block4
conv3_block4_out (Activation) _add[0][0]	(None, 20, 20, 512) 0	conv3_block4

conv4_block1_1_conv (Conv2D) (None, 10, 10, 256) 131328	conv3_block4
out[0][0]	
conv4_block1_1_bn (BatchNormali (None, 10, 10, 256) 1024	conv4_block1
_1_conv[0][0]	
conv4_block1_1_relu (Activation (None, 10, 10, 256) 0	conv4_block1
_1_bn[0][0]	
conv4_block1_2_conv (Conv2D) (None, 10, 10, 256) 590080	conv4_block1
_1_relu[0][0]	
conv4_block1_2_bn (BatchNormali (None, 10, 10, 256) 1024	conv4_block1
_2_conv[0][0]	
conv4_block1_2_relu (Activation (None, 10, 10, 256) 0	conv4_block1
_2_bn[0][0]	
conv4_block1_0_conv (Conv2D) (None, 10, 10, 1024) 525312	conv3_block4
_out[0][0]	
conv4_block1_3_conv (Conv2D) (None, 10, 10, 1024) 263168	conv4_block1
_2_relu[0][0]	
conv4_block1_0_bn (BatchNormali (None, 10, 10, 1024) 4096	conv4_block1
_0_conv[0][0]	
conv4_block1_3_bn (BatchNormali (None, 10, 10, 1024) 4096	conv4_block1
_3_conv[0][0]	
conv4_block1_add (Add) (None, 10, 10, 1024) 0	conv4_block1
_0_bn[0][0]	
conv4_block1_3_bn (BatchNormali (None, 10, 10, 1024) 4096	conv4_block1
_3_bn[0][0]	
conv4_block1_out (Activation) (None, 10, 10, 1024) 0	conv4_block1
_add[0][0]	
conv4_block2_1_conv (Conv2D) (None, 10, 10, 256) 262400	conv4_block1
_out[0][0]	
conv4_block2_1_bn (BatchNormali (None, 10, 10, 256) 1024	conv4_block2
_1_conv[0][0]	

conv4_block2_1_relu (Activation (None, 10, 10, 256) 0		conv4_block2_1_bn[0][0]	
conv4_block2_2_conv (Conv2D) (None, 10, 10, 256) 590080		conv4_block2_1_relu[0][0]	
conv4_block2_2_bn (BatchNormali (None, 10, 10, 256) 1024		conv4_block2_2_conv[0][0]	
conv4_block2_2_relu (Activation (None, 10, 10, 256) 0		conv4_block2_2_bn[0][0]	
conv4_block2_3_conv (Conv2D) (None, 10, 10, 1024) 263168		conv4_block2_2_relu[0][0]	
conv4_block2_3_bn (BatchNormali (None, 10, 10, 1024) 4096		conv4_block2_3_conv[0][0]	
conv4_block2_add (Add) (None, 10, 10, 1024) 0		conv4_block1_out[0][0]	
		conv4_block2_3_bn[0][0]	
conv4_block2_out (Activation) (None, 10, 10, 1024) 0		conv4_block2_add[0][0]	
conv4_block3_1_conv (Conv2D) (None, 10, 10, 256) 262400		conv4_block2_out[0][0]	
conv4_block3_1_bn (BatchNormali (None, 10, 10, 256) 1024		conv4_block3_1_conv[0][0]	
conv4_block3_1_relu (Activation (None, 10, 10, 256) 0		conv4_block3_1_bn[0][0]	
conv4_block3_2_conv (Conv2D) (None, 10, 10, 256) 590080		conv4_block3_1_relu[0][0]	
conv4_block3_2_bn (BatchNormali (None, 10, 10, 256) 1024		conv4_block3_2_conv[0][0]	
conv4_block3_2_relu (Activation (None, 10, 10, 256) 0		conv4_block3_2_bn[0][0]	

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\_2\_bn[0][0]

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conv4\_block3\_3\_conv (Conv2D) (None, 10, 10, 1024) 263168 conv4\_block3  
 \_2\_relu[0][0]

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conv4\_block3\_3\_bn (BatchNormali (None, 10, 10, 1024) 4096 conv4\_block3  
 \_3\_conv[0][0]

---

conv4\_block3\_add (Add) (None, 10, 10, 1024) 0 conv4\_block2  
 \_out[0][0]

conv4\_block3  
 \_3\_bn[0][0]

---

conv4\_block3\_out (Activation) (None, 10, 10, 1024) 0 conv4\_block3  
 \_add[0][0]

---

conv4\_block4\_1\_conv (Conv2D) (None, 10, 10, 256) 262400 conv4\_block3  
 \_out[0][0]

---

conv4\_block4\_1\_bn (BatchNormali (None, 10, 10, 256) 1024 conv4\_block4  
 \_1\_conv[0][0]

---

conv4\_block4\_1\_relu (Activation (None, 10, 10, 256) 0 conv4\_block4  
 \_1\_bn[0][0]

---

conv4\_block4\_2\_conv (Conv2D) (None, 10, 10, 256) 590080 conv4\_block4  
 \_1\_relu[0][0]

---

conv4\_block4\_2\_bn (BatchNormali (None, 10, 10, 256) 1024 conv4\_block4  
 \_2\_conv[0][0]

---

conv4\_block4\_2\_relu (Activation (None, 10, 10, 256) 0 conv4\_block4  
 \_2\_bn[0][0]

---

conv4\_block4\_3\_conv (Conv2D) (None, 10, 10, 1024) 263168 conv4\_block4  
 \_2\_relu[0][0]

---

conv4\_block4\_3\_bn (BatchNormali (None, 10, 10, 1024) 4096 conv4\_block4  
 \_3\_conv[0][0]

---

conv4\_block4\_add (Add) (None, 10, 10, 1024) 0 conv4\_block3  
 \_out[0][0]

conv4\_block4  
 \_3\_bn[0][0]

conv4_block4_out (Activation) (None, 10, 10, 1024) 0		conv4_block4
conv4_block5_1_conv (Conv2D) (None, 10, 10, 256) 262400		conv4_block4
conv4_block5_1_bn (BatchNormali (None, 10, 10, 256) 1024		conv4_block5
conv4_block5_1_relu (Activation (None, 10, 10, 256) 0		conv4_block5
conv4_block5_2_conv (Conv2D) (None, 10, 10, 256) 590080		conv4_block5
conv4_block5_2_bn (BatchNormali (None, 10, 10, 256) 1024		conv4_block5
conv4_block5_2_relu (Activation (None, 10, 10, 256) 0		conv4_block5
conv4_block5_3_conv (Conv2D) (None, 10, 10, 1024) 263168		conv4_block5
conv4_block5_3_bn (BatchNormali (None, 10, 10, 1024) 4096		conv4_block5
conv4_block5_add (Add) (None, 10, 10, 1024) 0		conv4_block4
conv4_block5_3_bn[0][0]		conv4_block5
conv4_block5_out (Activation) (None, 10, 10, 1024) 0		conv4_block5
conv4_block6_1_conv (Conv2D) (None, 10, 10, 256) 262400		conv4_block5
conv4_block6_1_bn (BatchNormali (None, 10, 10, 256) 1024		conv4_block6
conv4_block6_1_relu (Activation (None, 10, 10, 256) 0		conv4_block6

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\_1\_bn[0][0]

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conv4\_block6\_2\_conv (Conv2D) (None, 10, 10, 256) 590080 conv4\_block6  
\_1\_relu[0][0]

---

conv4\_block6\_2\_bn (BatchNormali (None, 10, 10, 256) 1024 conv4\_block6  
\_2\_conv[0][0]

---

conv4\_block6\_2\_relu (Activation (None, 10, 10, 256) 0 conv4\_block6  
\_2\_bn[0][0]

---

conv4\_block6\_3\_conv (Conv2D) (None, 10, 10, 1024) 263168 conv4\_block6  
\_2\_relu[0][0]

---

conv4\_block6\_3\_bn (BatchNormali (None, 10, 10, 1024) 4096 conv4\_block6  
\_3\_conv[0][0]

---

conv4\_block6\_add (Add) (None, 10, 10, 1024) 0 conv4\_block5  
\_out[0][0]  
conv4\_block6  
\_3\_bn[0][0]

---

conv4\_block6\_out (Activation) (None, 10, 10, 1024) 0 conv4\_block6  
\_add[0][0]

---

conv5\_block1\_1\_conv (Conv2D) (None, 5, 5, 512) 524800 conv4\_block6  
\_out[0][0]

---

conv5\_block1\_1\_bn (BatchNormali (None, 5, 5, 512) 2048 conv5\_block1  
\_1\_conv[0][0]

---

conv5\_block1\_1\_relu (Activation (None, 5, 5, 512) 0 conv5\_block1  
\_1\_bn[0][0]

---

conv5\_block1\_2\_conv (Conv2D) (None, 5, 5, 512) 2359808 conv5\_block1  
\_1\_relu[0][0]

---

conv5\_block1\_2\_bn (BatchNormali (None, 5, 5, 512) 2048 conv5\_block1  
\_2\_conv[0][0]

---

conv5\_block1\_2\_relu (Activation (None, 5, 5, 512) 0 conv5\_block1  
\_2\_bn[0][0]

---

conv5_block1_0_conv (Conv2D) _out[0][0]	(None, 5, 5, 2048)	2099200	conv4_block6
conv5_block1_3_conv (Conv2D) _relu[0][0]	(None, 5, 5, 2048)	1050624	conv5_block1
conv5_block1_0_bn (BatchNormali _0_conv[0][0]	(None, 5, 5, 2048)	8192	conv5_block1
conv5_block1_3_bn (BatchNormali _3_conv[0][0]	(None, 5, 5, 2048)	8192	conv5_block1
conv5_block1_add (Add) _bn[0][0]	(None, 5, 5, 2048)	0	conv5_block1
conv5_block1_3_bn[0][0]			conv5_block1
conv5_block1_out (Activation) _add[0][0]	(None, 5, 5, 2048)	0	conv5_block1
conv5_block2_1_conv (Conv2D) _out[0][0]	(None, 5, 5, 512)	1049088	conv5_block1
conv5_block2_1_bn (BatchNormali _1_conv[0][0]	(None, 5, 5, 512)	2048	conv5_block2
conv5_block2_1_relu (Activation _1_bn[0][0]	(None, 5, 5, 512)	0	conv5_block2
conv5_block2_2_conv (Conv2D) _1_relu[0][0]	(None, 5, 5, 512)	2359808	conv5_block2
conv5_block2_2_bn (BatchNormali _2_conv[0][0]	(None, 5, 5, 512)	2048	conv5_block2
conv5_block2_2_relu (Activation _2_bn[0][0]	(None, 5, 5, 512)	0	conv5_block2
conv5_block2_3_conv (Conv2D) _2_relu[0][0]	(None, 5, 5, 2048)	1050624	conv5_block2
conv5_block2_3_bn (BatchNormali _3_conv[0][0]	(None, 5, 5, 2048)	8192	conv5_block2

conv5_block2_add (Add) _out[0][0]	(None, 5, 5, 2048) 0		conv5_block1 conv5_block2
conv5_block2_out (Activation) _add[0][0]	(None, 5, 5, 2048) 0		conv5_block2
conv5_block3_1_conv (Conv2D) _out[0][0]	(None, 5, 5, 512) 1049088		conv5_block2
conv5_block3_1_bn (BatchNormali _1_conv[0][0]	(None, 5, 5, 512) 2048		conv5_block3
conv5_block3_1_relu (Activation _1_bn[0][0]	(None, 5, 5, 512) 0		conv5_block3
conv5_block3_2_conv (Conv2D) _1_relu[0][0]	(None, 5, 5, 512) 2359808		conv5_block3
conv5_block3_2_bn (BatchNormali _2_conv[0][0]	(None, 5, 5, 512) 2048		conv5_block3
conv5_block3_2_relu (Activation _2_bn[0][0]	(None, 5, 5, 512) 0		conv5_block3
conv5_block3_3_conv (Conv2D) _2_relu[0][0]	(None, 5, 5, 2048) 1050624		conv5_block3
conv5_block3_3_bn (BatchNormali _3_conv[0][0]	(None, 5, 5, 2048) 8192		conv5_block3
conv5_block3_add (Add) _out[0][0]	(None, 5, 5, 2048) 0		conv5_block2 conv5_block3
conv5_block3_out (Activation) _add[0][0]	(None, 5, 5, 2048) 0		conv5_block3
Flatten (Flatten) _out[0][0]	(None, 51200) 0		conv5_block3

FC1 (Dense) [0]	(None, 512)	26214912	Flatten[0]
dropout (Dropout)	(None, 512)	0	FC1[0][0]
FC2 (Dense) [0]	(None, 256)	131328	dropout[0]
dropout_1 (Dropout)	(None, 256)	0	FC2[0][0]
FC3 (Dense) [0]	(None, 128)	32896	dropout_1[0]
dropout_2 (Dropout)	(None, 128)	0	FC3[0][0]
FC4 (Dense) [0]	(None, 64)	8256	dropout_2[0]
dropout_3 (Dropout)	(None, 64)	0	FC4[0][0]
Output (Dense) [0]	(None, 1)	65	dropout_3[0]
<hr/>			
<hr/>			
Total params: 49,975,169			
Trainable params: 26,387,457			
Non-trainable params: 23,587,712			



```
In [13]: def scheduler(epoch,lr):
    if((epoch+1)%3==0):
        lr=lr*0.95
        return lr
    else:
        return lr
```

```
In [14]: filepath="model_save/weights-{epoch:02d}-{val_accuracy:.4f}.h5"
checkpoint = ModelCheckpoint(filepath=filepath, monitor='val_accuracy', mode='auto')

lrschedule = tf.keras.callbacks.LearningRateScheduler(scheduler, verbose=0.1)

#stop the training if your validation accuracy is not increased in last 2 epochs.
early_stop= EarlyStopping(monitor='val_accuracy', patience=3, verbose=1)

#If your validation accuracy at that epoch is less than previous epoch accuracy, you have to decrease the
#Learning rate by 10%
reduce_lr = ReduceLROnPlateau(monitor='val_accuracy', factor=0.75,
                             patience=3, min_lr=0.001, verbose=1)

model.compile(
    loss='binary_crossentropy',
    optimizer=tf.keras.optimizers.RMSprop(lr=1e-5),
    metrics=[ 'accuracy',tf.keras.metrics.Precision(),tf.keras.metrics.Recall(),tf.keras.metrics.F1Score(num_classes=1)]
)
```

```
In [15]: history=model.fit_generator(train_generator,steps_per_epoch=len(train_generator),epochs=50,validation_data=test_prediction_generator,validation_steps=len(test_prediction_generator),use_multiprocessing=False,workers=12,callbacks=[lrschedule,checkpoint,reduce_lr])
```

Epoch 1/50

Epoch 00001: LearningRateScheduler reducing learning rate to 9.9999974737875  
2e-06.

114/114 [=====] - 131s 803ms/step - loss: 1.0947 - accuracy: 0.5207 - precision: 0.5131 - recall: 0.5313 - f1\_score: 0.6602 - val\_loss: 0.7159 - val\_accuracy: 0.5183 - val\_precision: 0.5024 - val\_recall: 0.3791 - val\_f1\_score: 0.6518

Epoch 2/50

Epoch 00002: LearningRateScheduler reducing learning rate to 9.9999974737875  
2e-06.

114/114 [=====] - 94s 777ms/step - loss: 0.8673 - accuracy: 0.5102 - precision: 0.5097 - recall: 0.4941 - f1\_score: 0.6658 - val\_loss: 0.7060 - val\_accuracy: 0.5137 - val\_precision: 0.4965 - val\_recall: 0.4308 - val\_f1\_score: 0.6518

Epoch 3/50

Epoch 00003: LearningRateScheduler reducing learning rate to 9.4999976000981  
3e-06.

114/114 [=====] - 97s 796ms/step - loss: 0.7841 - accuracy: 0.5270 - precision: 0.5277 - recall: 0.5327 - f1\_score: 0.6674 - val\_loss: 0.7028 - val\_accuracy: 0.5032 - val\_precision: 0.4807 - val\_recall: 0.3454 - val\_f1\_score: 0.6518

Epoch 4/50

Epoch 00004: LearningRateScheduler reducing learning rate to 9.4999957811087  
4e-06.

114/114 [=====] - 97s 805ms/step - loss: 0.8040 - accuracy: 0.4909 - precision: 0.4802 - recall: 0.4769 - f1\_score: 0.6570 - val\_loss: 0.7002 - val\_accuracy: 0.5079 - val\_precision: 0.4913 - val\_recall: 0.5078 - val\_f1\_score: 0.6518

Epoch 5/50

Epoch 00005: LearningRateScheduler reducing learning rate to 9.4999957811087  
4e-06.

114/114 [=====] - 95s 791ms/step - loss: 0.7621 - accuracy: 0.5194 - precision: 0.5050 - recall: 0.5051 - f1\_score: 0.6533 - val\_loss: 0.6983 - val\_accuracy: 0.5265 - val\_precision: 0.5124 - val\_recall: 0.4212 - val\_f1\_score: 0.6518

Epoch 6/50

Epoch 00006: LearningRateScheduler reducing learning rate to 9.02499959920533  
e-06.

114/114 [=====] - 93s 778ms/step - loss: 0.7554 - accuracy: 0.5171 - precision: 0.5106 - recall: 0.5012 - f1\_score: 0.6609 - val\_loss: 0.6960 - val\_accuracy: 0.5073 - val\_precision: 0.4858 - val\_recall: 0.3285 - val\_f1\_score: 0.6518

Epoch 7/50

Epoch 00007: LearningRateScheduler reducing learning rate to 9.02499959920533  
e-06.

114/114 [=====] - 94s 772ms/step - loss: 0.7650 - accuracy: 0.5124 - precision: 0.4941 - recall: 0.4814 - f1\_score: 0.6522 - val\_loss: 0.6956 - val\_accuracy: 0.5119 - val\_precision: 0.4946 - val\_recall: 0.4368 - val\_f1\_score: 0.6518

Epoch 8/50

Epoch 00008: LearningRateScheduler reducing learning rate to 9.02499959920533e-06.  
114/114 [=====] - 93s 769ms/step - loss: 0.7323 - accuracy: 0.5220 - precision: 0.5152 - recall: 0.5042 - f1\_score: 0.6601 - val\_loss: 0.6993 - val\_accuracy: 0.5189 - val\_precision: 0.5037 - val\_recall: 0.3237 - val\_f1\_score: 0.6518  
Epoch 9/50

Epoch 00009: LearningRateScheduler reducing learning rate to 8.573749619245064e-06.  
114/114 [=====] - 93s 767ms/step - loss: 0.7449 - accuracy: 0.5264 - precision: 0.5182 - recall: 0.5157 - f1\_score: 0.6588 - val\_loss: 0.7004 - val\_accuracy: 0.5113 - val\_precision: 0.4935 - val\_recall: 0.4116 - val\_f1\_score: 0.6518  
Epoch 10/50

Epoch 00010: LearningRateScheduler reducing learning rate to 8.573749255447183e-06.  
114/114 [=====] - 93s 766ms/step - loss: 0.7285 - accuracy: 0.5348 - precision: 0.5184 - recall: 0.5392 - f1\_score: 0.6514 - val\_loss: 0.6951 - val\_accuracy: 0.5224 - val\_precision: 0.5096 - val\_recall: 0.3189 - val\_f1\_score: 0.6518  
Epoch 11/50

Epoch 00011: LearningRateScheduler reducing learning rate to 8.573749255447183e-06.  
114/114 [=====] - 94s 778ms/step - loss: 0.7404 - accuracy: 0.5167 - precision: 0.5190 - recall: 0.4973 - f1\_score: 0.6680 - val\_loss: 0.6902 - val\_accuracy: 0.5404 - val\_precision: 0.5304 - val\_recall: 0.4308 - val\_f1\_score: 0.6518  
Epoch 12/50

Epoch 00012: LearningRateScheduler reducing learning rate to 8.145061792674824e-06.  
114/114 [=====] - 93s 766ms/step - loss: 0.7186 - accuracy: 0.5438 - precision: 0.5298 - recall: 0.5163 - f1\_score: 0.6524 - val\_loss: 0.6898 - val\_accuracy: 0.5329 - val\_precision: 0.5211 - val\_recall: 0.4164 - val\_f1\_score: 0.6518  
Epoch 13/50

Epoch 00013: LearningRateScheduler reducing learning rate to 8.145061656250618e-06.  
114/114 [=====] - 94s 774ms/step - loss: 0.7117 - accuracy: 0.5452 - precision: 0.5410 - recall: 0.5346 - f1\_score: 0.6630 - val\_loss: 0.6902 - val\_accuracy: 0.5346 - val\_precision: 0.5220 - val\_recall: 0.4416 - val\_f1\_score: 0.6518  
Epoch 14/50

Epoch 00014: LearningRateScheduler reducing learning rate to 8.145061656250618e-06.  
114/114 [=====] - 93s 763ms/step - loss: 0.7121 - accuracy: 0.5562 - precision: 0.5403 - recall: 0.5333 - f1\_score: 0.6499 - val\_loss: 0.6915 - val\_accuracy: 0.5393 - val\_precision: 0.5243 - val\_recall: 0.5066 - val\_f1\_score: 0.6518  
Epoch 15/50

Epoch 00015: LearningRateScheduler reducing learning rate to 7.73780857343808 7e-06.  
114/114 [=====] - 94s 785ms/step - loss: 0.7095 - accuracy: 0.5528 - precision: 0.5552 - recall: 0.5943 - f1\_score: 0.6729 - val\_loss: 0.6935 - val\_accuracy: 0.5428 - val\_precision: 0.5348 - val\_recall: 0.4164 - val\_f1\_score: 0.6518  
Epoch 16/50

Epoch 00016: LearningRateScheduler reducing learning rate to 7.73780811869073 7e-06.  
114/114 [=====] - 93s 773ms/step - loss: 0.7056 - accuracy: 0.5693 - precision: 0.5668 - recall: 0.5679 - f1\_score: 0.6641 - val\_loss: 0.6893 - val\_accuracy: 0.5422 - val\_precision: 0.5308 - val\_recall: 0.4561 - val\_f1\_score: 0.6518  
Epoch 17/50

Epoch 00017: LearningRateScheduler reducing learning rate to 7.73780811869073 7e-06.  
114/114 [=====] - 95s 786ms/step - loss: 0.7125 - accuracy: 0.5476 - precision: 0.5521 - recall: 0.5534 - f1\_score: 0.6710 - val\_loss: 0.6893 - val\_accuracy: 0.5451 - val\_precision: 0.5410 - val\_recall: 0.3887 - val\_f1\_score: 0.6518  
Epoch 18/50

Epoch 00018: LearningRateScheduler reducing learning rate to 7.3509177127562e -06.  
114/114 [=====] - 93s 778ms/step - loss: 0.7133 - accuracy: 0.5439 - precision: 0.5489 - recall: 0.5435 - f1\_score: 0.6715 - val\_loss: 0.6883 - val\_accuracy: 0.5445 - val\_precision: 0.5482 - val\_recall: 0.3285 - val\_f1\_score: 0.6518  
Epoch 19/50

Epoch 00019: LearningRateScheduler reducing learning rate to 7.3509177127562e -06.  
114/114 [=====] - 93s 775ms/step - loss: 0.7225 - accuracy: 0.5347 - precision: 0.5229 - recall: 0.5018 - f1\_score: 0.6546 - val\_loss: 0.6857 - val\_accuracy: 0.5608 - val\_precision: 0.5574 - val\_recall: 0.4440 - val\_f1\_score: 0.6518  
Epoch 20/50

Epoch 00020: LearningRateScheduler reducing learning rate to 7.3509177127562e -06.  
114/114 [=====] - 94s 769ms/step - loss: 0.6861 - accuracy: 0.5664 - precision: 0.5756 - recall: 0.5944 - f1\_score: 0.6789 - val\_loss: 0.6891 - val\_accuracy: 0.5573 - val\_precision: 0.5610 - val\_recall: 0.3875 - val\_f1\_score: 0.6518  
Epoch 21/50

Epoch 00021: LearningRateScheduler reducing learning rate to 6.98337182711838 9e-06.  
114/114 [=====] - 93s 772ms/step - loss: 0.6998 - accuracy: 0.5464 - precision: 0.5378 - recall: 0.5392 - f1\_score: 0.6586 - val\_loss: 0.6862 - val\_accuracy: 0.5637 - val\_precision: 0.5740 - val\_recall: 0.3779 - val\_f1\_score: 0.6518  
Epoch 22/50

Epoch 00022: LearningRateScheduler reducing learning rate to 6.98337180438102

2e-06.  
114/114 [=====] - 93s 772ms/step - loss: 0.6943 - accuracy: 0.5674 - precision: 0.5673 - recall: 0.5621 - f1\_score: 0.6658 - val\_loss: 0.6866 - val\_accuracy: 0.5649 - val\_precision: 0.5729 - val\_recall: 0.3923 - val\_f1\_score: 0.6518  
Epoch 23/50

Epoch 00023: LearningRateScheduler reducing learning rate to 6.983371804381022e-06.  
114/114 [=====] - 92s 763ms/step - loss: 0.6980 - accuracy: 0.5546 - precision: 0.5514 - recall: 0.5711 - f1\_score: 0.6655 - val\_loss: 0.6888 - val\_accuracy: 0.5573 - val\_precision: 0.5684 - val\_recall: 0.3502 - val\_f1\_score: 0.6518  
Epoch 24/50

Epoch 00024: LearningRateScheduler reducing learning rate to 6.6342032141619704e-06.  
114/114 [=====] - 96s 790ms/step - loss: 0.7080 - accuracy: 0.5451 - precision: 0.5297 - recall: 0.5214 - f1\_score: 0.6515 - val\_loss: 0.6868 - val\_accuracy: 0.5497 - val\_precision: 0.5481 - val\_recall: 0.3911 - val\_f1\_score: 0.6518  
Epoch 25/50

Epoch 00025: LearningRateScheduler reducing learning rate to 6.6342031459498685e-06.  
114/114 [=====] - 94s 774ms/step - loss: 0.7013 - accuracy: 0.5615 - precision: 0.5532 - recall: 0.5462 - f1\_score: 0.6579 - val\_loss: 0.6902 - val\_accuracy: 0.5556 - val\_precision: 0.5631 - val\_recall: 0.3598 - val\_f1\_score: 0.6518  
Epoch 26/50

Epoch 00026: LearningRateScheduler reducing learning rate to 6.6342031459498685e-06.  
114/114 [=====] - 93s 759ms/step - loss: 0.6911 - accuracy: 0.5646 - precision: 0.5693 - recall: 0.5844 - f1\_score: 0.6733 - val\_loss: 0.6899 - val\_accuracy: 0.5660 - val\_precision: 0.5737 - val\_recall: 0.3983 - val\_f1\_score: 0.6518  
Epoch 27/50

Epoch 00027: LearningRateScheduler reducing learning rate to 6.302492988652374e-06.  
114/114 [=====] - 94s 776ms/step - loss: 0.6958 - accuracy: 0.5750 - precision: 0.5696 - recall: 0.5559 - f1\_score: 0.6591 - val\_loss: 0.6894 - val\_accuracy: 0.5497 - val\_precision: 0.5435 - val\_recall: 0.4284 - val\_f1\_score: 0.6518  
Epoch 28/50

Epoch 00028: LearningRateScheduler reducing learning rate to 6.302493147813948e-06.  
114/114 [=====] - 93s 762ms/step - loss: 0.6811 - accuracy: 0.5733 - precision: 0.5629 - recall: 0.5797 - f1\_score: 0.6578 - val\_loss: 0.6878 - val\_accuracy: 0.5561 - val\_precision: 0.5514 - val\_recall: 0.4392 - val\_f1\_score: 0.6518  
Epoch 29/50

Epoch 00029: LearningRateScheduler reducing learning rate to 6.302493147813948e-06.

114/114 [=====] - 93s 773ms/step - loss: 0.6991 - accuracy: 0.5792 - precision: 0.5920 - recall: 0.5791 - f1\_score: 0.6782 - val\_loss: 0.6910 - val\_accuracy: 0.5718 - val\_precision: 0.5823 - val\_recall: 0.4043 - val\_f1\_score: 0.6518  
Epoch 30/50

Epoch 00030: LearningRateScheduler reducing learning rate to 5.98736849042325e-06.

114/114 [=====] - 94s 773ms/step - loss: 0.6905 - accuracy: 0.5619 - precision: 0.5582 - recall: 0.5441 - f1\_score: 0.6607 - val\_loss: 0.6910 - val\_accuracy: 0.5718 - val\_precision: 0.5736 - val\_recall: 0.4452 - val\_f1\_score: 0.6518

Epoch 31/50

Epoch 00031: LearningRateScheduler reducing learning rate to 5.98736869505955e-06.

114/114 [=====] - 95s 790ms/step - loss: 0.6883 - accuracy: 0.5522 - precision: 0.5382 - recall: 0.5484 - f1\_score: 0.6533 - val\_loss: 0.6892 - val\_accuracy: 0.5695 - val\_precision: 0.5670 - val\_recall: 0.4633 - val\_f1\_score: 0.6518

Epoch 32/50

Epoch 00032: LearningRateScheduler reducing learning rate to 5.98736869505955e-06.

114/114 [=====] - 97s 813ms/step - loss: 0.6771 - accuracy: 0.5814 - precision: 0.5801 - recall: 0.5803 - f1\_score: 0.6648 - val\_loss: 0.6910 - val\_accuracy: 0.5794 - val\_precision: 0.5978 - val\_recall: 0.3971 - val\_f1\_score: 0.6518

Epoch 33/50

Epoch 00033: LearningRateScheduler reducing learning rate to 5.68800026030658e-06.

114/114 [=====] - 95s 789ms/step - loss: 0.6761 - accuracy: 0.5875 - precision: 0.5852 - recall: 0.5835 - f1\_score: 0.6629 - val\_loss: 0.6938 - val\_accuracy: 0.5748 - val\_precision: 0.5929 - val\_recall: 0.3839 - val\_f1\_score: 0.6518

Epoch 34/50

Epoch 00034: LearningRateScheduler reducing learning rate to 5.68800032851868e-06.

114/114 [=====] - 95s 784ms/step - loss: 0.6784 - accuracy: 0.5875 - precision: 0.5961 - recall: 0.5859 - f1\_score: 0.6739 - val\_loss: 0.6972 - val\_accuracy: 0.5800 - val\_precision: 0.6011 - val\_recall: 0.3899 - val\_f1\_score: 0.6518

Epoch 35/50

Epoch 00035: LearningRateScheduler reducing learning rate to 5.68800032851868e-06.

114/114 [=====] - 95s 785ms/step - loss: 0.6715 - accuracy: 0.5829 - precision: 0.5805 - recall: 0.5626 - f1\_score: 0.6616 - val\_loss: 0.7055 - val\_accuracy: 0.5835 - val\_precision: 0.6143 - val\_recall: 0.3718 - val\_f1\_score: 0.6518

Epoch 36/50

Epoch 00036: LearningRateScheduler reducing learning rate to 5.403600312092749e-06.

114/114 [=====] - 97s 804ms/step - loss: 0.6768 - ac

```
curacy: 0.5811 - precision: 0.5788 - recall: 0.5839 - f1_score: 0.6652 - val_loss: 0.7012 - val_accuracy: 0.5806 - val_precision: 0.6004 - val_recall: 0.3959 - val_f1_score: 0.6518
Epoch 37/50

Epoch 00037: LearningRateScheduler reducing learning rate to 5.40360042577958e-06.
114/114 [=====] - 95s 785ms/step - loss: 0.6727 - accuracy: 0.6016 - precision: 0.5895 - recall: 0.5922 - f1_score: 0.6542 - val_loss: 0.7049 - val_accuracy: 0.5852 - val_precision: 0.6081 - val_recall: 0.3995 - val_f1_score: 0.6518
Epoch 38/50

Epoch 00038: LearningRateScheduler reducing learning rate to 5.40360042577958e-06.
114/114 [=====] - 95s 783ms/step - loss: 0.6738 - accuracy: 0.5876 - precision: 0.5765 - recall: 0.5854 - f1_score: 0.6560 - val_loss: 0.7069 - val_accuracy: 0.5846 - val_precision: 0.6025 - val_recall: 0.4140 - val_f1_score: 0.6518
Epoch 39/50

Epoch 00039: LearningRateScheduler reducing learning rate to 5.13342040449060e-06.
114/114 [=====] - 95s 782ms/step - loss: 0.6849 - accuracy: 0.5830 - precision: 0.5660 - recall: 0.5821 - f1_score: 0.6513 - val_loss: 0.7032 - val_accuracy: 0.5817 - val_precision: 0.5946 - val_recall: 0.4236 - val_f1_score: 0.6518
Epoch 40/50

Epoch 00040: LearningRateScheduler reducing learning rate to 5.13342047270271e-06.
114/114 [=====] - 95s 783ms/step - loss: 0.6673 - accuracy: 0.5995 - precision: 0.5946 - recall: 0.5978 - f1_score: 0.6612 - val_loss: 0.7055 - val_accuracy: 0.5829 - val_precision: 0.6067 - val_recall: 0.3899 - val_f1_score: 0.6518
Epoch 41/50

Epoch 00041: LearningRateScheduler reducing learning rate to 5.13342047270271e-06.
114/114 [=====] - 94s 785ms/step - loss: 0.6818 - accuracy: 0.5880 - precision: 0.5781 - recall: 0.5691 - f1_score: 0.6547 - val_loss: 0.6997 - val_accuracy: 0.5817 - val_precision: 0.5952 - val_recall: 0.4212 - val_f1_score: 0.6518
Epoch 42/50

Epoch 00042: LearningRateScheduler reducing learning rate to 4.8767494449067574e-06.
114/114 [=====] - 94s 781ms/step - loss: 0.6727 - accuracy: 0.5808 - precision: 0.5681 - recall: 0.5745 - f1_score: 0.6542 - val_loss: 0.7010 - val_accuracy: 0.5829 - val_precision: 0.5963 - val_recall: 0.4248 - val_f1_score: 0.6518
Epoch 43/50

Epoch 00043: LearningRateScheduler reducing learning rate to 4.8767492444312666e-06.
114/114 [=====] - 94s 780ms/step - loss: 0.6865 - accuracy: 0.5638 - precision: 0.5628 - recall: 0.5589 - f1_score: 0.6653 - val_
```

```
loss: 0.7101 - val_accuracy: 0.5724 - val_precision: 0.5952 - val_recall: 0.3  
610 - val_f1_score: 0.6518  
Epoch 44/50  
  
Epoch 00044: LearningRateScheduler reducing learning rate to 4.87674924443126  
66e-06.  
114/114 [=====] - 93s 766ms/step - loss: 0.6689 - ac  
curacy: 0.5944 - precision: 0.5933 - recall: 0.5782 - f1_score: 0.6627 - val_  
loss: 0.7145 - val_accuracy: 0.5794 - val_precision: 0.6000 - val_recall: 0.3  
899 - val_f1_score: 0.6518  
Epoch 45/50  
  
Epoch 00045: LearningRateScheduler reducing learning rate to 4.63291178220970  
3e-06.  
114/114 [=====] - 93s 758ms/step - loss: 0.6646 - ac  
curacy: 0.5894 - precision: 0.5822 - recall: 0.5678 - f1_score: 0.6570 - val_  
loss: 0.7166 - val_accuracy: 0.5713 - val_precision: 0.5858 - val_recall: 0.3  
863 - val_f1_score: 0.6518  
Epoch 46/50  
  
Epoch 00046: LearningRateScheduler reducing learning rate to 4.63291189589654  
1e-06.  
114/114 [=====] - 95s 790ms/step - loss: 0.6691 - ac  
curacy: 0.5939 - precision: 0.6006 - recall: 0.5833 - f1_score: 0.6704 - val_  
loss: 0.7268 - val_accuracy: 0.5794 - val_precision: 0.6027 - val_recall: 0.3  
815 - val_f1_score: 0.6518  
Epoch 47/50  
  
Epoch 00047: LearningRateScheduler reducing learning rate to 4.63291189589654  
1e-06.  
114/114 [=====] - 95s 779ms/step - loss: 0.6764 - ac  
curacy: 0.5788 - precision: 0.5700 - recall: 0.5478 - f1_score: 0.6549 - val_  
loss: 0.7292 - val_accuracy: 0.5759 - val_precision: 0.5959 - val_recall: 0.3  
815 - val_f1_score: 0.6518  
Epoch 48/50  
  
Epoch 00048: LearningRateScheduler reducing learning rate to 4.40126630110171  
36e-06.  
114/114 [=====] - 93s 769ms/step - loss: 0.6657 - ac  
curacy: 0.5905 - precision: 0.5916 - recall: 0.5647 - f1_score: 0.6632 - val_  
loss: 0.7262 - val_accuracy: 0.5730 - val_precision: 0.5887 - val_recall: 0.3  
875 - val_f1_score: 0.6518  
Epoch 49/50  
  
Epoch 00049: LearningRateScheduler reducing learning rate to 4.40126632383908  
15e-06.  
114/114 [=====] - 94s 779ms/step - loss: 0.6629 - ac  
curacy: 0.6181 - precision: 0.6212 - recall: 0.6044 - f1_score: 0.6652 - val_  
loss: 0.7217 - val_accuracy: 0.5649 - val_precision: 0.5717 - val_recall: 0.3  
983 - val_f1_score: 0.6518  
Epoch 50/50  
  
Epoch 00050: LearningRateScheduler reducing learning rate to 4.40126632383908  
15e-06.  
114/114 [=====] - 93s 771ms/step - loss: 0.6799 - ac  
curacy: 0.5961 - precision: 0.5994 - recall: 0.5850 - f1_score: 0.6675 - val_
```

```
loss: 0.7261 - val_accuracy: 0.5724 - val_precision: 0.5816 - val_recall: 0.4
116 - val_f1_score: 0.6518
```

In [17]:

```
model_checkpoint = Model(inputs=ResNet50.input, outputs=Out)
model_checkpoint.load_weights('/content/model_save/weights-04-0.5079.h5')
model_checkpoint.save('bestmodel_resnet50.h5')
new_model = tf.keras.models.load_model('bestmodel_resnet50.h5')
```

WARNING:tensorflow:No training configuration found in the save file, so the model was \*not\* compiled. Compile it manually.

In [18]:

```
test_prediction=new_model.predict_generator(test_prediction_generator,steps=len(test_prediction_generator),workers=12)
test_prediction=((test_prediction > 0.5)+0).ravel()
print(test_prediction.shape)
y_test =tf.keras.utils.to_categorical(test_data['dank_level'].values,2)
y_test=np.argmax(y_test,axis=-1)
y_test.shape
```

(1719,)

Out[18]: (1719,)

In [19]:

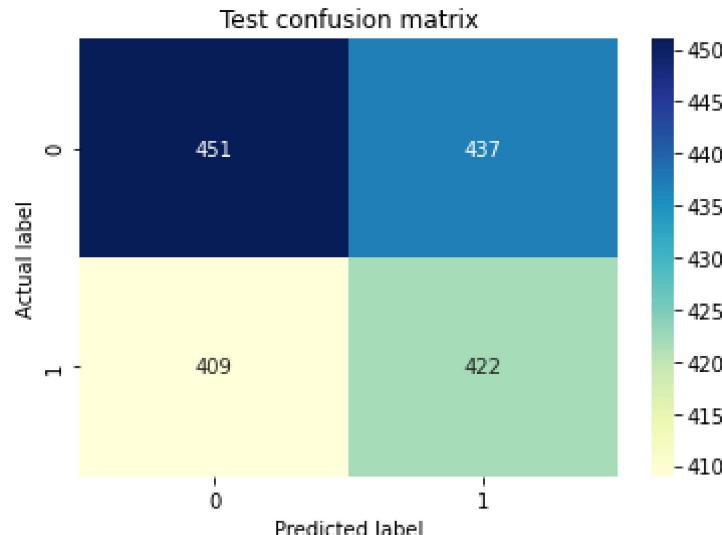
```
accuracy=accuracy_score(y_test,test_prediction)
print("Test accuracy_score",accuracy)
f1_test_score=f1_score(y_test,test_prediction)
print("Test F1_score",f1_test_score)
print("Test confusion matrix")
cnf_matrix2=confusion_matrix(y_test,test_prediction)
p = sns.heatmap(pd.DataFrame(cnf_matrix2), annot=True, cmap="YlGnBu" ,fmt='g')
plt.title('Test confusion matrix', y=1.1)
plt.ylabel('Actual label')
plt.xlabel('Predicted label')
```

Test accuracy\_score 0.5078534031413613

Test F1\_score 0.4994082840236686

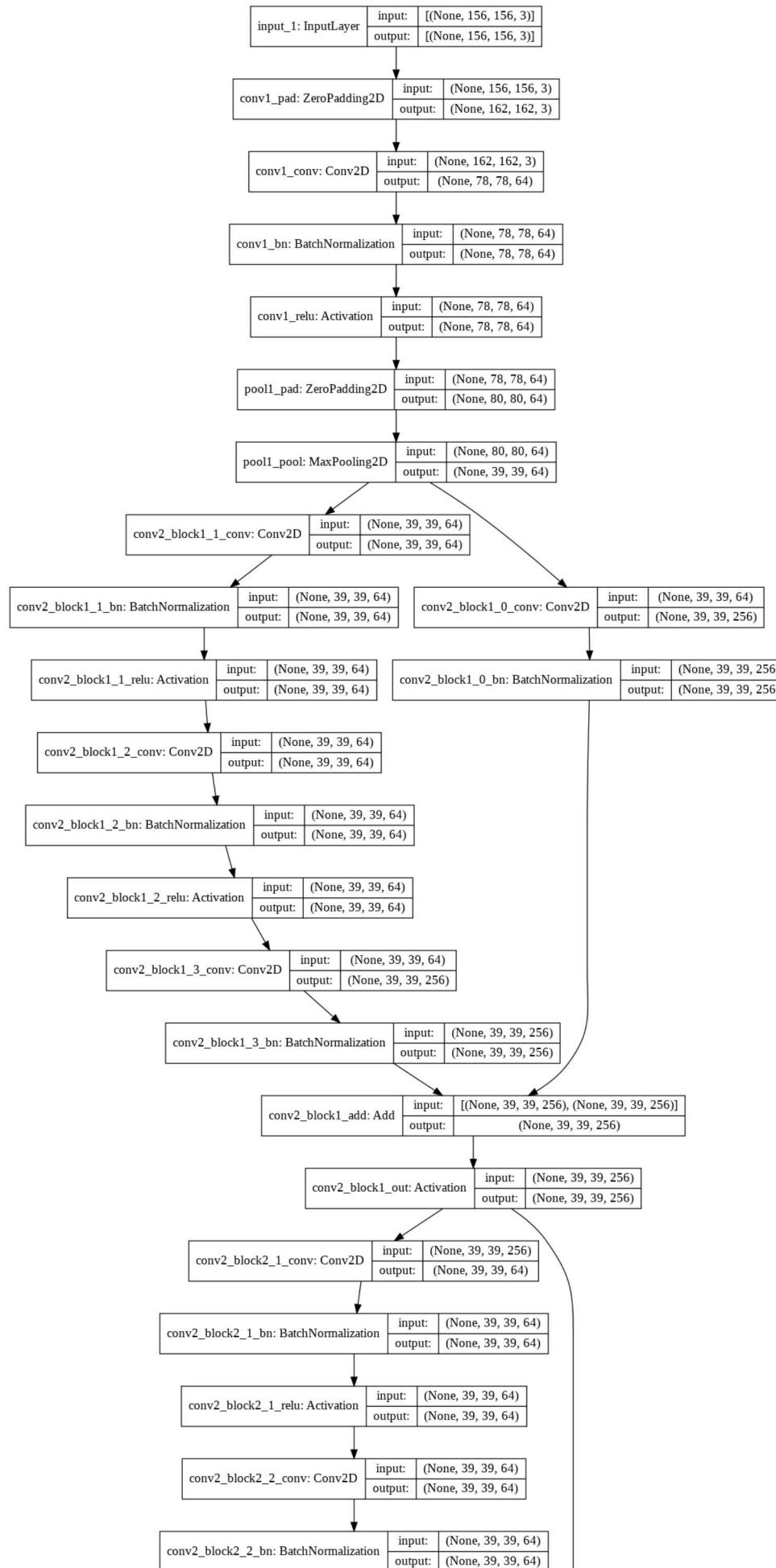
Test confusion matrix

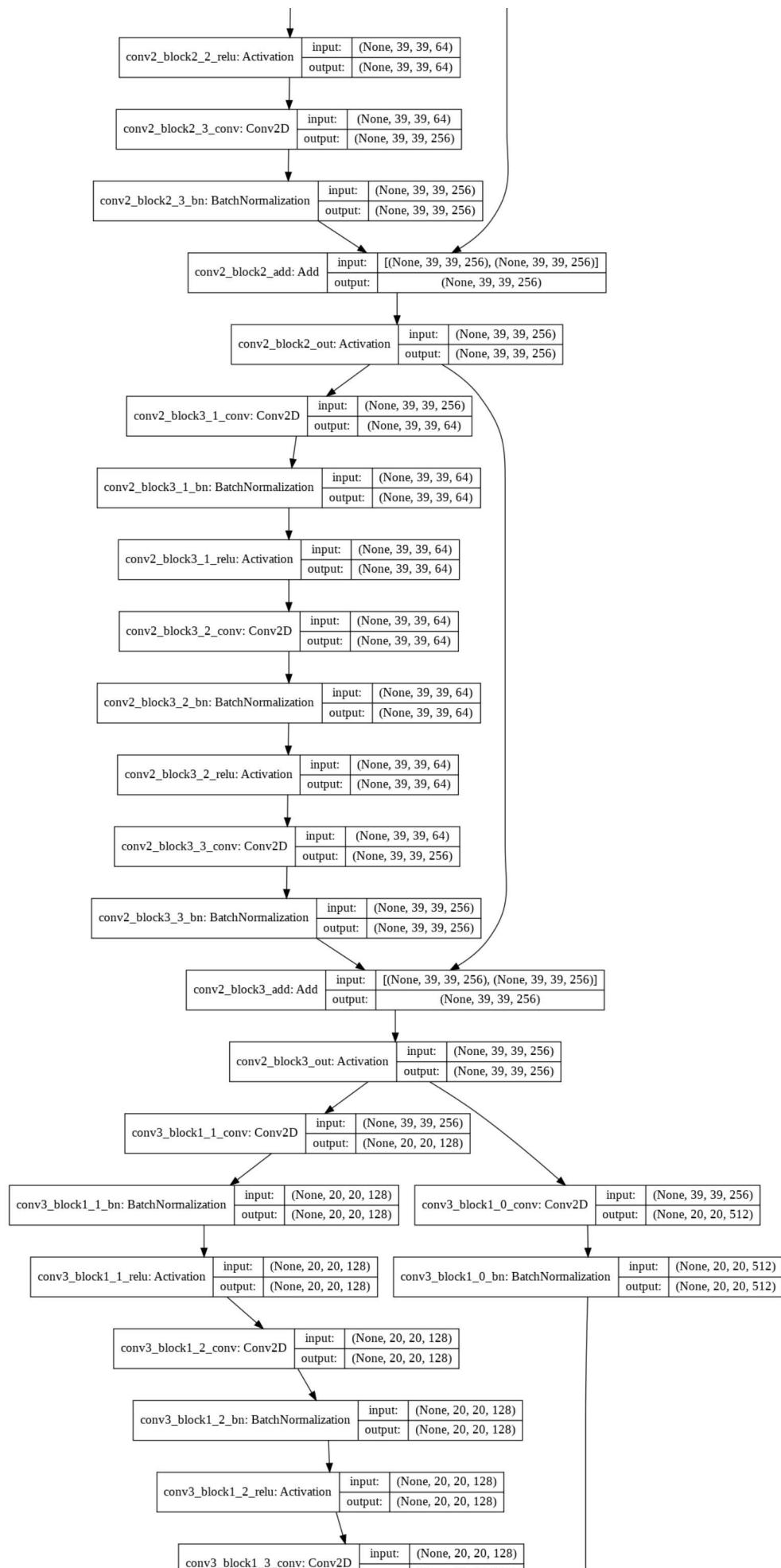
Out[19]: Text(0.5, 15.0, 'Predicted label')

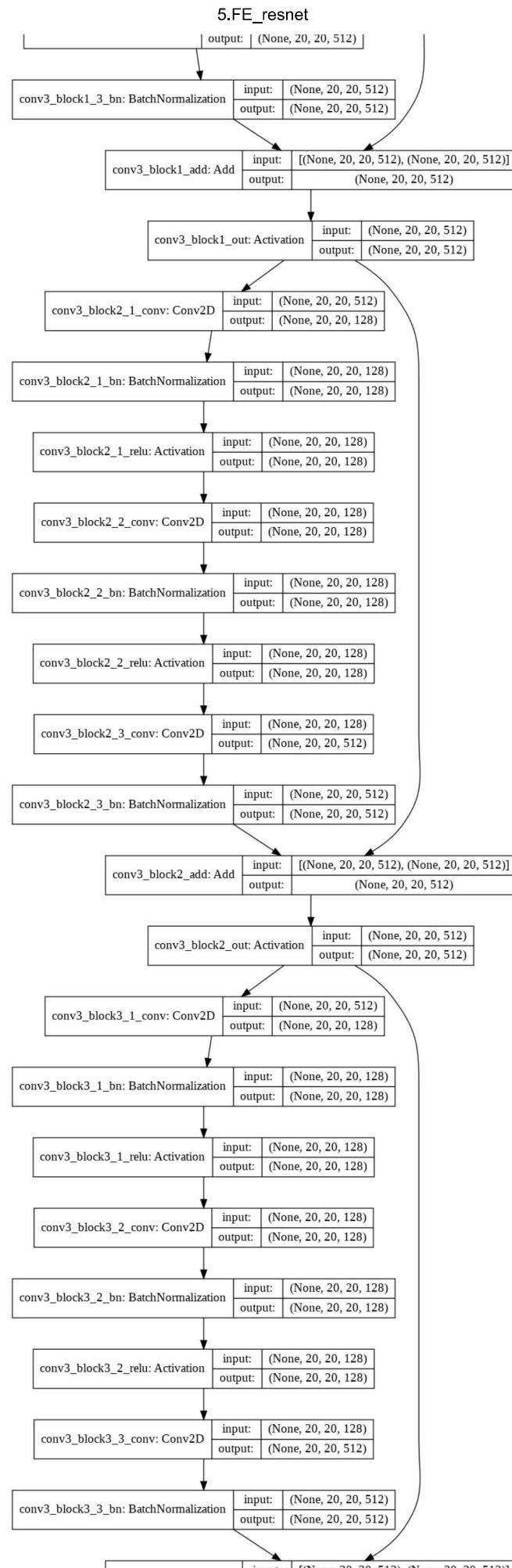


```
In [20]: file = '/content/model_1.png'  
tf.keras.utils.plot_model(model,to_file=file, show_shapes=True)
```

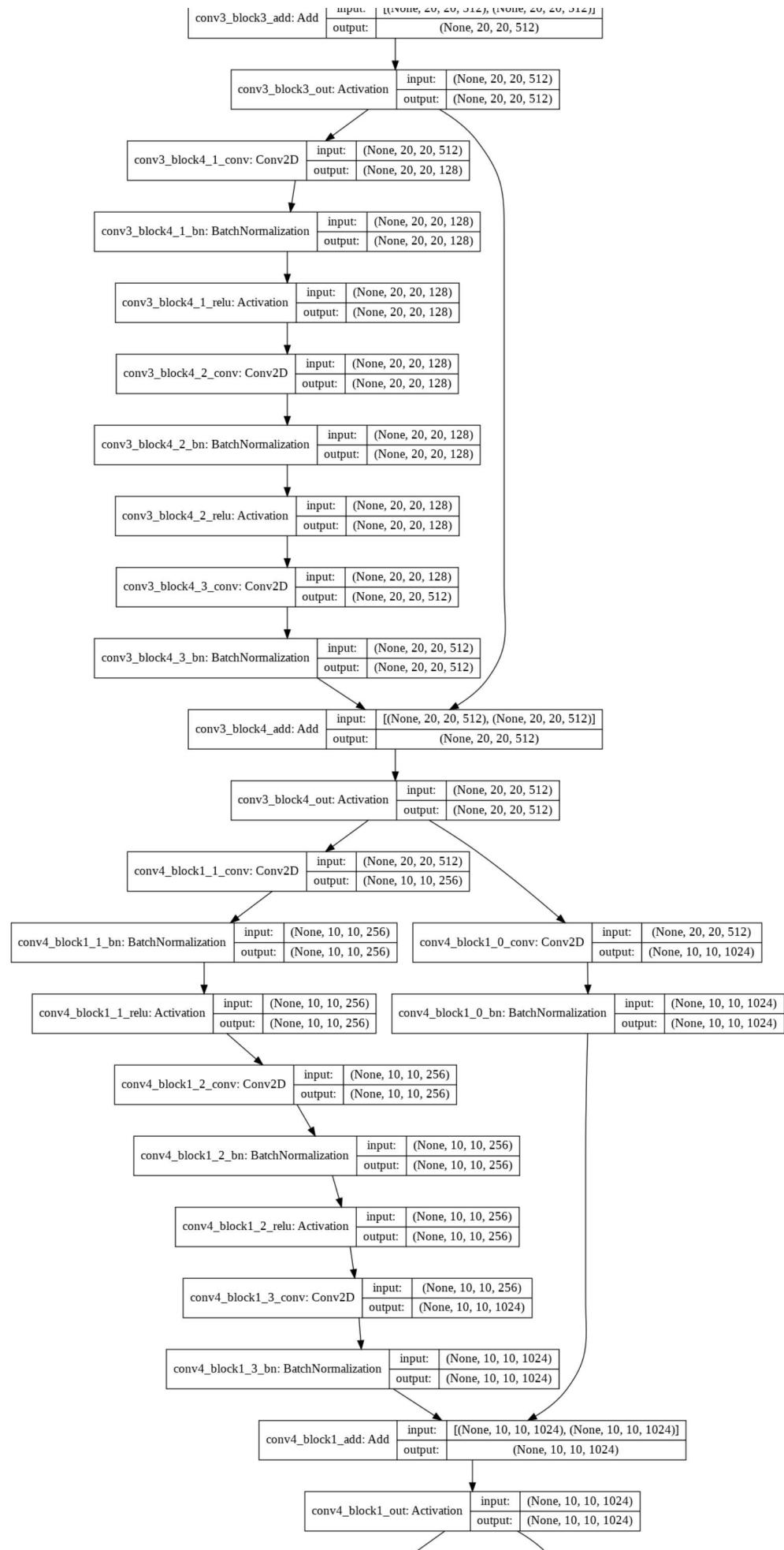
Out[20]:



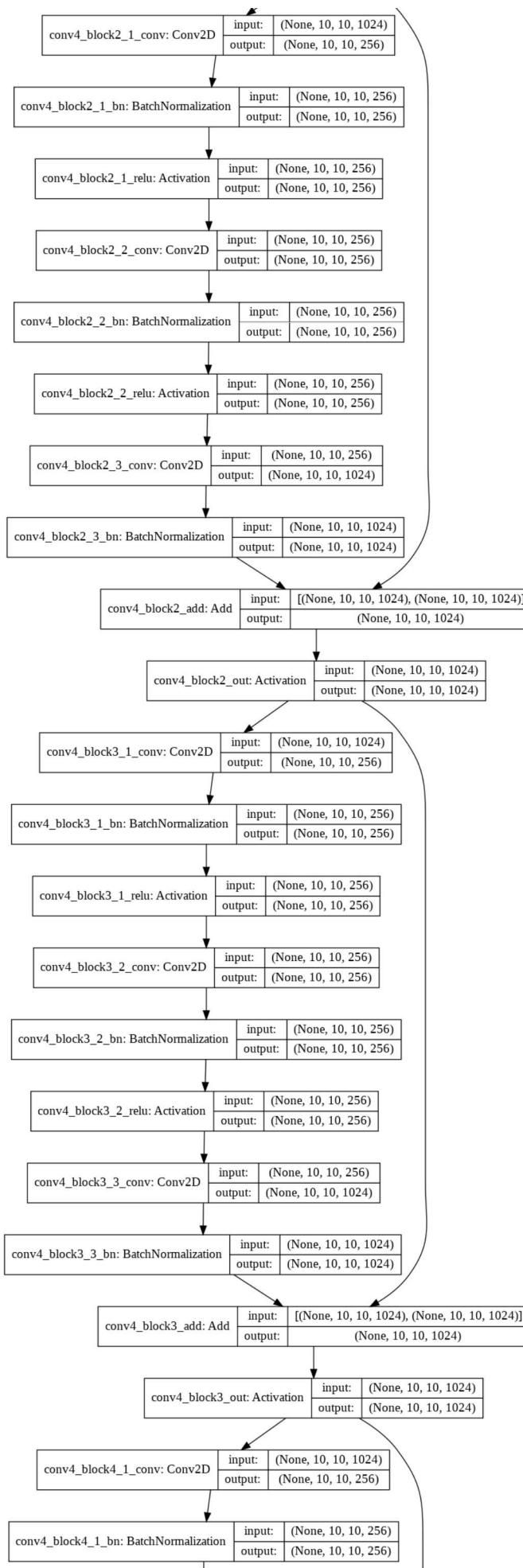




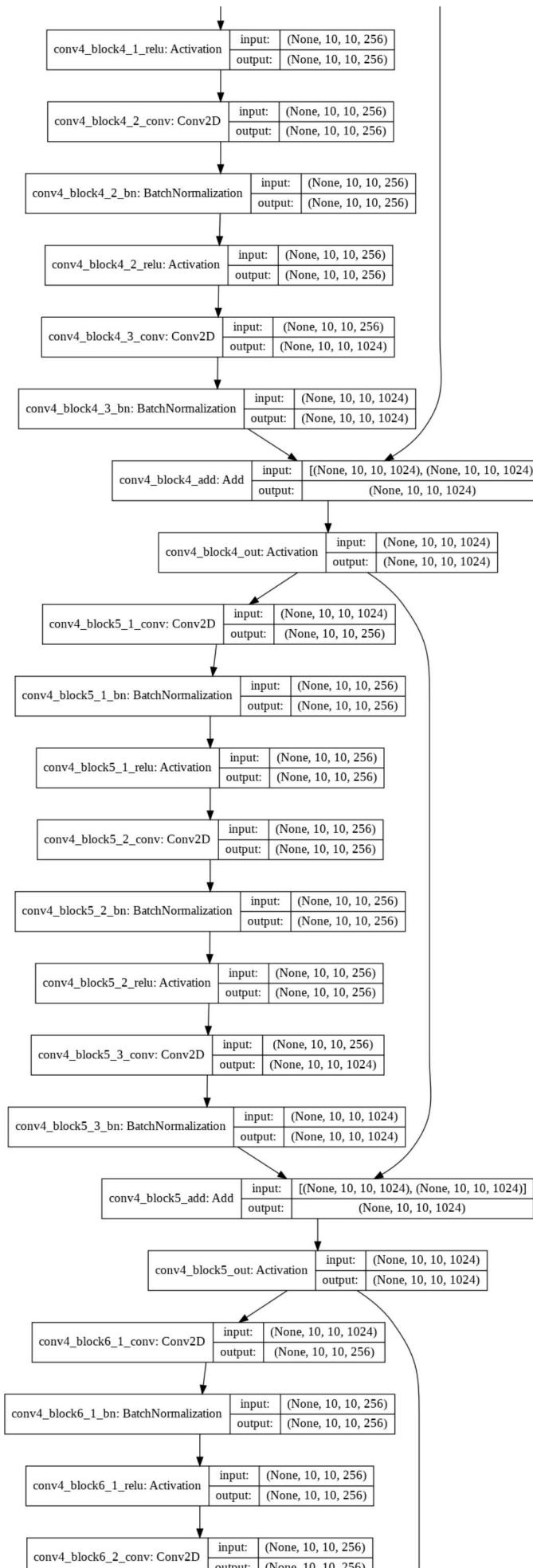
## 5.FE\_resnet

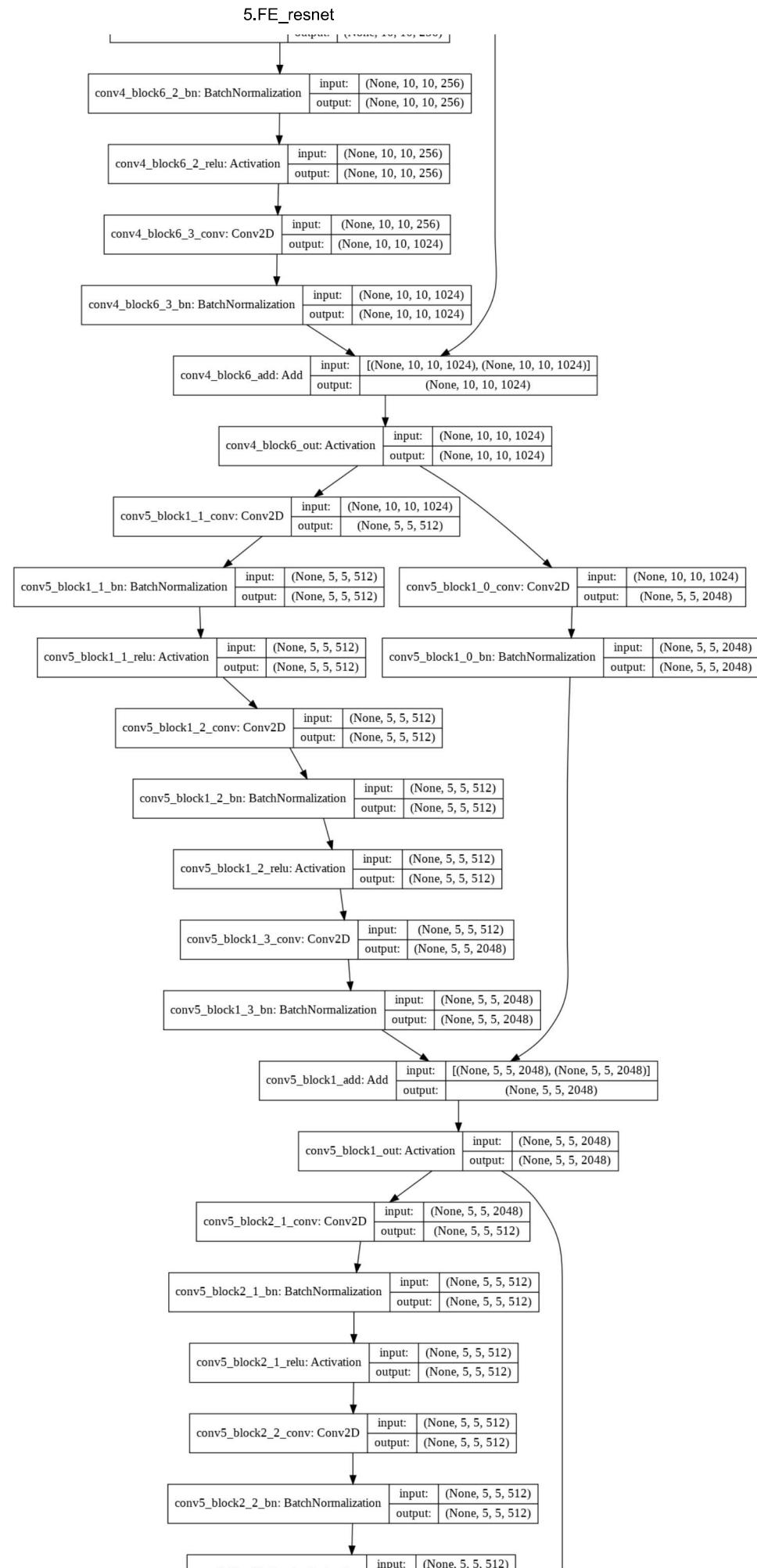


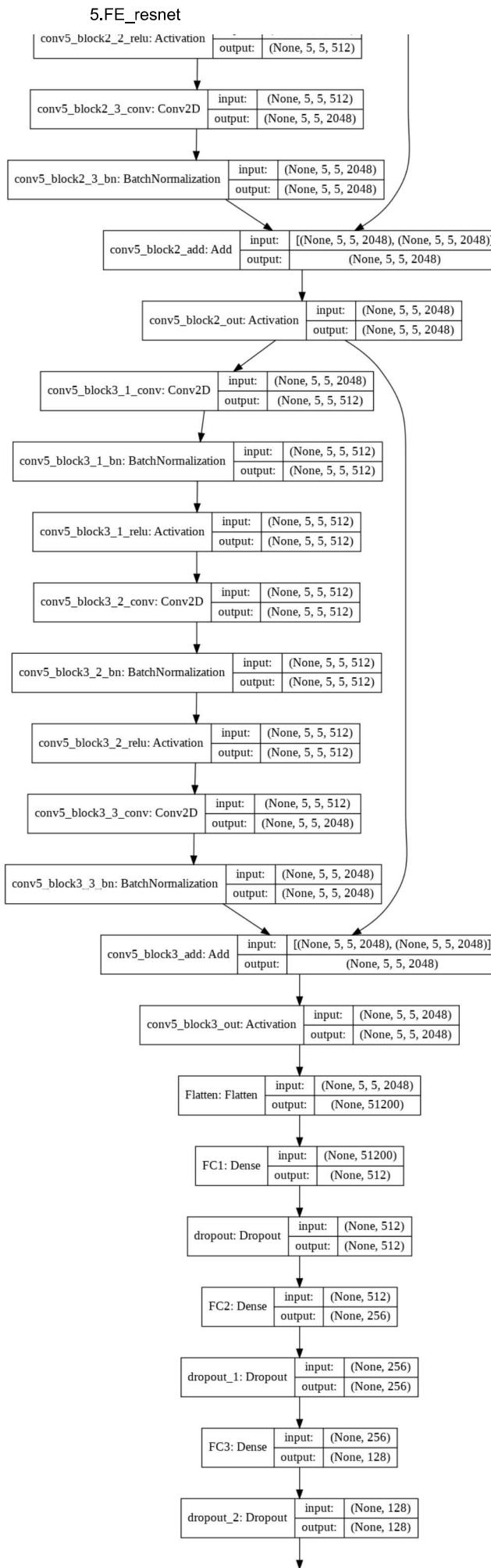
## 5.FE\_resnet



## 5.FE\_resnet







## 5.FE\_resnet

