

```
In [1]: #!unzip dank_data-master.zip
#!pip install tensorflow_addons
#!wget http://nlp.stanford.edu/data/glove.6B.zip
#!unzip glove*.zip
```

```
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 logging
import numpy as np
import tensorflow_addons as tfa
from tensorflow.keras.preprocessing.text import Tokenizer
from sklearn.preprocessing import LabelEncoder
from sklearn.preprocessing import StandardScaler
from tensorflow.keras.applications.vgg16 import VGG16
from tensorflow.keras.applications.vgg16 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)
```

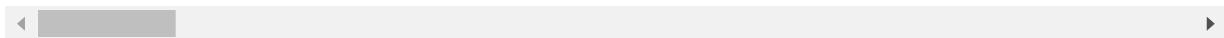
```
In [5]: final_dank=pd.read_csv('/content/dank_data-master/data/final_dank.csv')
train_labels = [fn.split('/')[-1].split('.')[0].strip() for fn in training]
validation_labels = [fn.split('/')[-1].split('.')[0].strip() for fn in validation]
test_labels = [fn.split('/')[-1].split('.')[0].strip() for 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= (512,512))
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= (512,512))
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= (512,512))
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= (512,512))

```

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 = [512,512]
vgg16 = VGG16(input_shape=IMAGE_SIZE + [3], weights='imagenet', include_top=False)
```

Downloading data from [https://storage.googleapis.com/tensorflow/keras-applications/vgg16/vgg16\\_weights\\_tf\\_dim\\_ordering\\_tf\\_kernels\\_notop.h5](https://storage.googleapis.com/tensorflow/keras-applications/vgg16/vgg16_weights_tf_dim_ordering_tf_kernels_notop.h5)
58892288/58889256 [=====] - 1s 0us/step

```
In [11]: for layer in vgg16.layers[:11]:
    layer.trainable = False
```

```
In [12]: #Flatten
flatten = Flatten(data_format='channels_last',name='Flatten')(vgg16.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=512,activation='relu',kernel_initializer=tf.keras.initializers.glorot_normal(seed=33),name='FC2')(x)
x = Dropout(0.3)(FC2)

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

model = Model(inputs=vgg16.input, outputs=Out)
model.summary()
```

Model: "model"

Layer (type)	Output Shape	Param #
<hr/>		
input_1 (InputLayer)	[(None, 512, 512, 3)]	0
block1_conv1 (Conv2D)	(None, 512, 512, 64)	1792
block1_conv2 (Conv2D)	(None, 512, 512, 64)	36928
block1_pool (MaxPooling2D)	(None, 256, 256, 64)	0
block2_conv1 (Conv2D)	(None, 256, 256, 128)	73856
block2_conv2 (Conv2D)	(None, 256, 256, 128)	147584
block2_pool (MaxPooling2D)	(None, 128, 128, 128)	0
block3_conv1 (Conv2D)	(None, 128, 128, 256)	295168
block3_conv2 (Conv2D)	(None, 128, 128, 256)	590080
block3_conv3 (Conv2D)	(None, 128, 128, 256)	590080
block3_pool (MaxPooling2D)	(None, 64, 64, 256)	0
block4_conv1 (Conv2D)	(None, 64, 64, 512)	1180160
block4_conv2 (Conv2D)	(None, 64, 64, 512)	2359808
block4_conv3 (Conv2D)	(None, 64, 64, 512)	2359808
block4_pool (MaxPooling2D)	(None, 32, 32, 512)	0
block5_conv1 (Conv2D)	(None, 32, 32, 512)	2359808
block5_conv2 (Conv2D)	(None, 32, 32, 512)	2359808
block5_conv3 (Conv2D)	(None, 32, 32, 512)	2359808
block5_pool (MaxPooling2D)	(None, 16, 16, 512)	0
Flatten (Flatten)	(None, 131072)	0
FC1 (Dense)	(None, 512)	67109376
dropout (Dropout)	(None, 512)	0
FC2 (Dense)	(None, 512)	262656
dropout_1 (Dropout)	(None, 512)	0
Output (Dense)	(None, 1)	513
<hr/>		
Total params: 82,087,233		
Trainable params: 80,351,745		

Non-trainable params: 1,735,488

```
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_new/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 [16]: history=model.fit_generator(train_generator,steps_per_epoch=len(train_generator),epochs=2,validation_data=test_prediction_generator,validation_steps=len(test_prediction_generator),use_multiprocessing=False,workers=12,callbacks=[lrschedule,checkpoint,reduce_lr])
```

Epoch 1/2

Epoch 00001: LearningRateScheduler reducing learning rate to 9.02499959920533e-06.

114/114 [=====] - 297s 2s/step - loss: 0.6772 - accuracy: 0.5715 - precision: 0.5732 - recall: 0.5128 - f1\_score: 0.6605 - val\_loss: 0.6859 - val\_accuracy: 0.5445 - val\_precision: 0.5508 - val\_recall: 0.3129 - val\_f1\_score: 0.6518

Epoch 2/2

Epoch 00002: LearningRateScheduler reducing learning rate to 9.02499959920533e-06.

114/114 [=====] - 296s 2s/step - loss: 0.6768 - accuracy: 0.5783 - precision: 0.5770 - recall: 0.5420 - f1\_score: 0.6605 - val\_loss: 0.6808 - val\_accuracy: 0.5608 - val\_precision: 0.5556 - val\_recall: 0.4573 - val\_f1\_score: 0.6518

```
In [18]: model_checkpoint = Model(inputs=vgg16.input, outputs=FC2)
model_checkpoint.save('bestmodel_vgg16_lstm.h5')
new_model = tf.keras.models.load_model('bestmodel_vgg16_lstm.h5')
```

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

```
In [19]: predict_train=new_model.predict_generator(train_prediction_generator,steps=len(train_prediction_generator),workers=12)
predict_test=new_model.predict_generator(test_prediction_generator,steps=len(test_prediction_generator),workers=12)
predict_train.shape
```

Out[19]: (3405, 512)

```
In [20]: train_data_words=train_data['processed_words'].values
validation_words=val_data['processed_words'].values
test_data_words=test_data['processed_words'].values

tokenizer = Tokenizer()
tokenizer.fit_on_texts(train_data_words)
vocab_size=len(tokenizer.word_index)
encoded_Xtrain_words = [tf.keras.preprocessing.text.one_hot(d, vocab_size,filters='!"#$%&()*+,-./:;=>?@[\\]^{|}~\\t\\n') for d in train_data_words]
encoded_validation_words = [tf.keras.preprocessing.text.one_hot(d, vocab_size,filters='!"#$%&()*+,-./:;=>?@[\\]^{|}~\\t\\n') for d in validation_words]
encoded_Xtest_words = [tf.keras.preprocessing.text.one_hot(d, vocab_size,filters='!"#$%&()*+,-./:;=>?@[\\]^{|}~\\t\\n') for d in test_data_words]

padded_Xtrain_words = tf.keras.preprocessing.sequence.pad_sequences(encoded_Xtrain_words, maxlen=20, padding='post')
padded_Xvalidation_words = tf.keras.preprocessing.sequence.pad_sequences(encoded_validation_words, maxlen=20, padding='post')
padded_Xtest_words = tf.keras.preprocessing.sequence.pad_sequences(encoded_Xtest_words, maxlen=20, padding='post')
```

```
In [21]: embeddings_index = dict()
f = open('/content/glove.6B.300d.txt')

for line in f:
    values = line.split()
    word = values[0]
    coefs = np.asarray(values[1:], dtype='float32')
    embeddings_index[word] = coefs

f.close()
print('Loaded %s word vectors.' % len(embeddings_index))
```

Loaded 400000 word vectors.

```
In [22]: embedding_matrix = np.zeros((vocab_size+1, 300))
for word, i in tokenizer.word_index.items():
    embedding_vector = embeddings_index.get(word)
    if embedding_vector is not None:
        embedding_matrix[i] = embedding_vector
```

```
In [23]: labelencoder = LabelEncoder()
labelencoder.fit(train_data['subreddit'].values)
subreddit_train=labelencoder.transform(train_data['subreddit'].values).reshape(-1,1)
subreddit_validation=labelencoder.transform(val_data['subreddit'].values).reshape(-1,1)
subreddit_test=labelencoder.transform(test_data['subreddit'].values).reshape(-1, 1)

print(subreddit_train.shape)
print(subreddit_test.shape)
print(subreddit_validation.shape)
```

```
(3405, 1)
(1719, 1)
(1688, 1)
```

```
In [24]: labelencoder = LabelEncoder()
labelencoder.fit(train_data['is_nsfw'].values)
is_nsfw_train=labelencoder.transform(train_data['is_nsfw'].values).reshape(-1,1)
is_nsfw_validation=labelencoder.transform(val_data['is_nsfw'].values).reshape(-1,1)
is_nsfw_test=labelencoder.transform(test_data['is_nsfw'].values).reshape(-1,1)

print(is_nsfw_train.shape)
print(is_nsfw_test.shape)
print(is_nsfw_validation.shape)
```

```
(3405, 1)
(1719, 1)
(1688, 1)
```

```
In [25]: time_of_day_train=(train_data['time_of_day'].values).reshape(-1,1)
time_of_day_validation=(val_data['time_of_day'].values).reshape(-1,1)
time_of_day_test=(test_data['time_of_day'].values).reshape(-1,1)

print(time_of_day_train.shape)
print(time_of_day_validation.shape)
print(time_of_day_test.shape)
```

```
(3405, 1)
(1688, 1)
(1719, 1)
```

```
In [26]: scaler = StandardScaler()
scaler=scaler.fit(train_data['created_utc'].values.reshape(-1, 1))

created_utc_train=scaler.transform(train_data['created_utc'].values.reshape(-1, 1))
created_utc_validation=scaler.transform(val_data['created_utc'].values.reshape(-1, 1))
created_utc_test=scaler.transform(test_data['created_utc'].values.reshape(-1, 1))

print(created_utc_train.shape)
print(created_utc_test.shape)
print(created_utc_validation.shape)
```

```
(3405, 1)
(1719, 1)
(1688, 1)
```

```
In [27]: scaler = StandardScaler()
scaler=scaler.fit(train_data['subscribers'].values.reshape(-1, 1))

subscribers_train=scaler.transform(train_data['subscribers'].values.reshape(-1, 1))
subscribers_validation=scaler.transform(val_data['subscribers'].values.reshape(-1, 1))
subscribers_test=scaler.transform(test_data['subscribers'].values.reshape(-1, 1))

print(subscribers_train.shape)
print(subscribers_validation.shape)
print(subscribers_test.shape)
```

```
(3405, 1)
(1688, 1)
(1719, 1)
```

```
In [28]: #words embedding layer
words = Input(shape=(20,),name="words")
embedding=Embedding(vocab_size+1,300,weights=[embedding_matrix],input_length=20,trainable=False)(words)
lstm_layer=LSTM(500)(embedding)
flatten1 = Flatten(data_format='channels_last')(lstm_layer)

image_predicted =Input(shape=(predict_train.shape[1],),name="image_predicted")
flatten2= Flatten(data_format='channels_last')(image_predicted)

#categore_data
subreddit_train_layer =Input(shape=(subreddit_train.shape[1],),name="subreddit_train_layer")
flatten3= Flatten(data_format='channels_last')(subreddit_train_layer)
#####
is_nsfw_train_layer =Input(shape=(is_nsfw_train.shape[1],),name="is_nsfw_train_layer")
flatten4 = Flatten(data_format='channels_last')(is_nsfw_train_layer)
#####
time_of_day_train_layer =Input(shape=(time_of_day_train.shape[1],),name="time_of_day_train_layer")
flatten5 = Flatten(data_format='channels_last')(time_of_day_train_layer)

#numeric_data
created_utc_train_layer =Input(shape=(created_utc_train.shape[1],),name="created_utc_train_layer")
created_utc_dence = Dense(units=3,activation='relu',kernel_initializer=tf.keras.initializers.glorot_normal(seed=33))(created_utc_train_layer)

#numeric_data
subscribers_train_layer =Input(shape=(subscribers_train.shape[1],),name="subscribers_train_layer")
subscribers_dence = Dense(units=3,activation='relu',kernel_initializer=tf.keras.initializers.glorot_normal(seed=33))(subscribers_train_layer)

#concat layer
concatenated = concatenate([subscribers_train_layer,created_utc_dence,flatten5,flatten4,flatten3,flatten2,flatten1],axis = -1)

dense_layer1 = Dense(units=420,activation='relu',kernel_initializer=tf.keras.initializers.glorot_normal(seed=33))(concatenated)
dropout1=Dropout(0.3)(dense_layer1)

dense_layer2 = Dense(units=210,activation='relu',kernel_initializer=tf.keras.initializers.glorot_normal(seed=33))(dropout1)
dropout2=Dropout(0.3)(dense_layer2)

dense_layer3 = Dense(units=105,activation='relu',kernel_initializer=tf.keras.initializers.glorot_normal(seed=33))(dropout2)
dropout3=Dropout(0.3)(dense_layer3)

dense_layer4 = Dense(units=60,activation='relu',kernel_initializer=tf.keras.initializers.glorot_normal(seed=33))(dropout3)
dropout4=Dropout(0.3)(dense_layer4)

dense_layer5 = Dense(units=30,activation='relu',kernel_initializer=tf.keras.in
```

```
initializers.glorot_normal(seed=33))(dropout4)
dropout5=Dropout(0.3)(dense_layer5)

dense_layer6 = Dense(units=15,activation='relu',kernel_initializer=tf.keras.initializers.glorot_normal(seed=33))(dropout5)

Out = Dense(units=1,activation='sigmoid',kernel_initializer=tf.keras.initializers.glorot_normal(seed=3),name='Output')(dense_layer6)

model = Model(inputs=[image_predicted,words,subreddit_train_layer,is_nsfw_train_layer,time_of_day_train_layer,created_utc_train_layer,subscribers_train_layer],outputs=Out)
model.summary()
```

Model: "model\_2"

Layer (type)	Output Shape	Param #	Connected to
words (InputLayer)	[None, 20]	0	
embedding (Embedding)	(None, 20, 300)	2712000	words[0][0]
created_utc_train_layer (InputLayer)	[None, 1]	0	
time_of_day_train_layer (InputLayer)	[None, 1]	0	
is_nsfw_train_layer (InputLayer)	[None, 1]	0	
subreddit_train_layer (InputLayer)	[None, 1]	0	
image_predicted (InputLayer)	[None, 512]	0	
lstm (LSTM)	(None, 500)	1602000	embedding[0]
[0]			
subscribers_train_layer (InputLayer)	[None, 1]	0	
dense (Dense)	(None, 3)	6	created_utc_train_layer[0][0]
[0]			
flatten_4 (Flatten)	(None, 1)	0	time_of_day_train_layer[0][0]
[0]			
flatten_3 (Flatten)	(None, 1)	0	is_nsfw_train_layer[0][0]
[0]			
flatten_2 (Flatten)	(None, 1)	0	subreddit_train_layer[0][0]
[0]			
flatten_1 (Flatten)	(None, 512)	0	image_predicted[0][0]
[0]			
flatten (Flatten)	(None, 500)	0	lstm[0][0]
[0]			

	FE_VGG16_lstm		
concatenate (Concatenate) train_layer[0][0]	(None, 1019)	0	subscribers_
[0]			dense[0][0]
[0]			flatten_4[0]
[0]			flatten_3[0]
[0]			flatten_2[0]
[0]			flatten_1[0]
[0]			flatten[0]
-----			
dense_2 (Dense) [0][0]	(None, 420)	428400	concatenate
-----			
dropout_2 (Dropout) [0]	(None, 420)	0	dense_2[0]
-----			
dense_3 (Dense) [0]	(None, 210)	88410	dropout_2[0]
-----			
dropout_3 (Dropout) [0]	(None, 210)	0	dense_3[0]
-----			
dense_4 (Dense) [0]	(None, 105)	22155	dropout_3[0]
-----			
dropout_4 (Dropout) [0]	(None, 105)	0	dense_4[0]
-----			
dense_5 (Dense) [0]	(None, 60)	6360	dropout_4[0]
-----			
dropout_5 (Dropout) [0]	(None, 60)	0	dense_5[0]
-----			
dense_6 (Dense) [0]	(None, 30)	1830	dropout_5[0]
-----			
dropout_6 (Dropout) [0]	(None, 30)	0	dense_6[0]
-----			
dense_7 (Dense) [0]	(None, 15)	465	dropout_6[0]

---

Output (Dense) [0]	(None, 1)	16	dense_7[0]
=====			
=====			
Total params: 4,861,642			
Trainable params: 2,149,642			
Non-trainable params: 2,712,000			

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◀ ▶

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In [29]:

```
filepath="model_save/weights-{epoch:02d}-{val_accuracy:.4f}.h5"
checkpoint = ModelCheckpoint(filepath=filepath, monitor='val_accuracy', save_best_only=True, 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=2,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=0.9,
                               patience=0, 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 [30]:

```
y_train =train_data['dank_level'].values
y_test =test_data['dank_level'].values
y_train.shape
```

Out[30]: (3405,)

```
In [32]: history=model.fit({"image_predicted":predict_train,"words":padded_Xtrain_words  
," subreddit_train_layer":subreddit_train,"is_nsfw_train_layer":is_nsfw_train,  
"time_of_day_train_layer":time_of_day_train,  
"created_utc_train_layer":created_utc_train,"subscribers_t  
rain_layer":subscribers_train},  
y_train,epochs=100,batch_size=30,  
validation_data=( {"image_predicted":predict_test,"words":pad  
ded_Xtest_words," subreddit_train_layer":subreddit_test,"is_nsfw_train_layer":i  
s_nsfw_test,"time_of_day_train_layer":time_of_day_test,  
"created_utc_train_layer":created_utc_test,"subscribers_tr  
ain_layer":subscribers_test},y_test),callbacks=[lrschedule,checkpoint,reduce_l  
r])
```

Epoch 1/100

Epoch 00001: LearningRateScheduler reducing learning rate to 1.8402588466415182e-06.

114/114 [=====] - 2s 14ms/step - loss: 0.6751 - accuracy: 0.5680 - precision\_1: 0.5695 - recall\_1: 0.5074 - f1\_score: 0.6605 - val\_loss: 0.6780 - val\_accuracy: 0.5707 - val\_precision\_1: 0.5658 - val\_recall\_1: 0.4813 - val\_f1\_score: 0.6518

Epoch 2/100

Epoch 00002: LearningRateScheduler reducing learning rate to 1.8402588466415182e-06.

114/114 [=====] - 1s 13ms/step - loss: 0.6731 - accuracy: 0.5824 - precision\_1: 0.5848 - recall\_1: 0.5277 - f1\_score: 0.6605 - val\_loss: 0.6779 - val\_accuracy: 0.5713 - val\_precision\_1: 0.5664 - val\_recall\_1: 0.4826 - val\_f1\_score: 0.6518

Epoch 3/100

Epoch 00003: LearningRateScheduler reducing learning rate to 1.7482459043094422e-06.

114/114 [=====] - 2s 13ms/step - loss: 0.6741 - accuracy: 0.5794 - precision\_1: 0.5796 - recall\_1: 0.5354 - f1\_score: 0.6605 - val\_loss: 0.6778 - val\_accuracy: 0.5724 - val\_precision\_1: 0.5670 - val\_recall\_1: 0.4886 - val\_f1\_score: 0.6518

Epoch 4/100

Epoch 00004: LearningRateScheduler reducing learning rate to 1.7482459497841774e-06.

114/114 [=====] - 1s 13ms/step - loss: 0.6738 - accuracy: 0.5774 - precision\_1: 0.5800 - recall\_1: 0.5182 - f1\_score: 0.6605 - val\_loss: 0.6778 - val\_accuracy: 0.5718 - val\_precision\_1: 0.5670 - val\_recall\_1: 0.4838 - val\_f1\_score: 0.6518

Epoch 5/100

Epoch 00005: LearningRateScheduler reducing learning rate to 1.7482459497841774e-06.

114/114 [=====] - 2s 14ms/step - loss: 0.6774 - accuracy: 0.5671 - precision\_1: 0.5687 - recall\_1: 0.5051 - f1\_score: 0.6605 - val\_loss: 0.6777 - val\_accuracy: 0.5724 - val\_precision\_1: 0.5674 - val\_recall\_1: 0.4862 - val\_f1\_score: 0.6518

Epoch 6/100

Epoch 00006: LearningRateScheduler reducing learning rate to 1.6608336522949684e-06.

114/114 [=====] - 2s 14ms/step - loss: 0.6727 - accuracy: 0.5850 - precision\_1: 0.5907 - recall\_1: 0.5158 - f1\_score: 0.6605 - val\_loss: 0.6776 - val\_accuracy: 0.5713 - val\_precision\_1: 0.5653 - val\_recall\_1: 0.4898 - val\_f1\_score: 0.6518

Epoch 7/100

Epoch 00007: LearningRateScheduler reducing learning rate to 1.6608336181889172e-06.

114/114 [=====] - 1s 13ms/step - loss: 0.6721 - accuracy: 0.5827 - precision\_1: 0.5848 - recall\_1: 0.5301 - f1\_score: 0.6605 - val\_loss: 0.6776 - val\_accuracy: 0.5707 - val\_precision\_1: 0.5649 - val\_recall\_1: 0.4874 - val\_f1\_score: 0.6518

Epoch 8/100

Epoch 00008: LearningRateScheduler reducing learning rate to 1.66083361818891  
72e-06.  
114/114 [=====] - 1s 13ms/step - loss: 0.6742 - accuracy: 0.5756 - precision\_1: 0.5756 - recall\_1: 0.5307 - f1\_score: 0.6605 - val\_loss: 0.6775 - val\_accuracy: 0.5695 - val\_precision\_1: 0.5636 - val\_recall\_1: 0.4850 - val\_f1\_score: 0.6518  
Epoch 9/100

Epoch 00009: LearningRateScheduler reducing learning rate to 1.57779193727947  
11e-06.  
114/114 [=====] - 2s 13ms/step - loss: 0.6753 - accuracy: 0.5689 - precision\_1: 0.5695 - recall\_1: 0.5146 - f1\_score: 0.6605 - val\_loss: 0.6774 - val\_accuracy: 0.5684 - val\_precision\_1: 0.5621 - val\_recall\_1: 0.4850 - val\_f1\_score: 0.6518  
Epoch 10/100

Epoch 00010: LearningRateScheduler reducing learning rate to 1.57779197706986  
45e-06.  
114/114 [=====] - 2s 14ms/step - loss: 0.6700 - accuracy: 0.5862 - precision\_1: 0.5885 - recall\_1: 0.5348 - f1\_score: 0.6605 - val\_loss: 0.6773 - val\_accuracy: 0.5684 - val\_precision\_1: 0.5617 - val\_recall\_1: 0.4874 - val\_f1\_score: 0.6518  
Epoch 11/100

Epoch 00011: LearningRateScheduler reducing learning rate to 1.57779197706986  
45e-06.  
114/114 [=====] - 2s 13ms/step - loss: 0.6725 - accuracy: 0.5827 - precision\_1: 0.5846 - recall\_1: 0.5307 - f1\_score: 0.6605 - val\_loss: 0.6773 - val\_accuracy: 0.5724 - val\_precision\_1: 0.5658 - val\_recall\_1: 0.4970 - val\_f1\_score: 0.6518  
Epoch 12/100

Epoch 00012: LearningRateScheduler reducing learning rate to 1.49890237821637  
13e-06.  
114/114 [=====] - 2s 14ms/step - loss: 0.6691 - accuracy: 0.5921 - precision\_1: 0.5946 - recall\_1: 0.5426 - f1\_score: 0.6605 - val\_loss: 0.6772 - val\_accuracy: 0.5730 - val\_precision\_1: 0.5663 - val\_recall\_1: 0.4982 - val\_f1\_score: 0.6518  
Epoch 13/100

Epoch 00013: LearningRateScheduler reducing learning rate to 1.49890240663808  
07e-06.  
114/114 [=====] - 2s 13ms/step - loss: 0.6722 - accuracy: 0.5789 - precision\_1: 0.5799 - recall\_1: 0.5295 - f1\_score: 0.6605 - val\_loss: 0.6771 - val\_accuracy: 0.5748 - val\_precision\_1: 0.5681 - val\_recall\_1: 0.5018 - val\_f1\_score: 0.6518  
Epoch 14/100

Epoch 00014: LearningRateScheduler reducing learning rate to 1.49890240663808  
07e-06.  
114/114 [=====] - 2s 13ms/step - loss: 0.6693 - accuracy: 0.5894 - precision\_1: 0.5917 - recall\_1: 0.5402 - f1\_score: 0.6605 - val\_loss: 0.6771 - val\_accuracy: 0.5748 - val\_precision\_1: 0.5681 - val\_recall\_1: 0.5018 - val\_f1\_score: 0.6518  
Epoch 15/100

Epoch 00015: LearningRateScheduler reducing learning rate to 1.42395728630617  
67e-06.  
114/114 [=====] - 1s 13ms/step - loss: 0.6724 - accuracy: 0.5747 - precision\_1: 0.5737 - recall\_1: 0.5354 - f1\_score: 0.6605 - val\_loss: 0.6770 - val\_accuracy: 0.5753 - val\_precision\_1: 0.5687 - val\_recall\_1: 0.5030 - val\_f1\_score: 0.6518  
Epoch 16/100

Epoch 00016: LearningRateScheduler reducing learning rate to 1.42395731472788  
61e-06.  
114/114 [=====] - 2s 14ms/step - loss: 0.6708 - accuracy: 0.5912 - precision\_1: 0.5947 - recall\_1: 0.5366 - f1\_score: 0.6605 - val\_loss: 0.6770 - val\_accuracy: 0.5753 - val\_precision\_1: 0.5687 - val\_recall\_1: 0.5030 - val\_f1\_score: 0.6518  
Epoch 17/100

Epoch 00017: LearningRateScheduler reducing learning rate to 1.42395731472788  
61e-06.  
114/114 [=====] - 2s 13ms/step - loss: 0.6709 - accuracy: 0.5874 - precision\_1: 0.5879 - recall\_1: 0.5456 - f1\_score: 0.6605 - val\_loss: 0.6769 - val\_accuracy: 0.5771 - val\_precision\_1: 0.5701 - val\_recall\_1: 0.5090 - val\_f1\_score: 0.6518  
Epoch 18/100

Epoch 00018: LearningRateScheduler reducing learning rate to 1.35275944899149  
17e-06.  
114/114 [=====] - 2s 13ms/step - loss: 0.6706 - accuracy: 0.5827 - precision\_1: 0.5857 - recall\_1: 0.5253 - f1\_score: 0.6605 - val\_loss: 0.6768 - val\_accuracy: 0.5771 - val\_precision\_1: 0.5703 - val\_recall\_1: 0.5078 - val\_f1\_score: 0.6518  
Epoch 19/100

Epoch 00019: LearningRateScheduler reducing learning rate to 1.35275945467583  
37e-06.  
114/114 [=====] - 2s 14ms/step - loss: 0.6717 - accuracy: 0.5744 - precision\_1: 0.5757 - recall\_1: 0.5211 - f1\_score: 0.6605 - val\_loss: 0.6768 - val\_accuracy: 0.5748 - val\_precision\_1: 0.5681 - val\_recall\_1: 0.5018 - val\_f1\_score: 0.6518  
Epoch 20/100

Epoch 00020: LearningRateScheduler reducing learning rate to 1.35275945467583  
37e-06.  
114/114 [=====] - 2s 14ms/step - loss: 0.6700 - accuracy: 0.5827 - precision\_1: 0.5838 - recall\_1: 0.5354 - f1\_score: 0.6605 - val\_loss: 0.6767 - val\_accuracy: 0.5748 - val\_precision\_1: 0.5681 - val\_recall\_1: 0.5018 - val\_f1\_score: 0.6518  
Epoch 21/100

Epoch 00021: LearningRateScheduler reducing learning rate to 1.28512148194204  
2e-06.  
114/114 [=====] - 1s 13ms/step - loss: 0.6720 - accuracy: 0.5765 - precision\_1: 0.5792 - recall\_1: 0.5164 - f1\_score: 0.6605 - val\_loss: 0.6767 - val\_accuracy: 0.5748 - val\_precision\_1: 0.5681 - val\_recall\_1: 0.5018 - val\_f1\_score: 0.6518  
Epoch 22/100

Epoch 00022: LearningRateScheduler reducing learning rate to 1.28512147057335

82e-06.  
114/114 [=====] - 1s 13ms/step - loss: 0.6686 - accuracy: 0.5921 - precision\_1: 0.5963 - recall\_1: 0.5348 - f1\_score: 0.6605 - val\_loss: 0.6766 - val\_accuracy: 0.5748 - val\_precision\_1: 0.5681 - val\_recall\_1: 0.5018 - val\_f1\_score: 0.6518  
Epoch 23/100

Epoch 00023: LearningRateScheduler reducing learning rate to 1.28512147057335 82e-06.  
114/114 [=====] - 1s 13ms/step - loss: 0.6688 - accuracy: 0.5794 - precision\_1: 0.5828 - recall\_1: 0.5176 - f1\_score: 0.6605 - val\_loss: 0.6766 - val\_accuracy: 0.5724 - val\_precision\_1: 0.5658 - val\_recall\_1: 0.4970 - val\_f1\_score: 0.6518  
Epoch 24/100

Epoch 00024: LearningRateScheduler reducing learning rate to 1.22086539704469 03e-06.  
114/114 [=====] - 1s 13ms/step - loss: 0.6725 - accuracy: 0.5818 - precision\_1: 0.5849 - recall\_1: 0.5229 - f1\_score: 0.6605 - val\_loss: 0.6766 - val\_accuracy: 0.5753 - val\_precision\_1: 0.5683 - val\_recall\_1: 0.5054 - val\_f1\_score: 0.6518  
Epoch 25/100

Epoch 00025: LearningRateScheduler reducing learning rate to 1.22086544251942 54e-06.  
114/114 [=====] - 1s 13ms/step - loss: 0.6723 - accuracy: 0.5800 - precision\_1: 0.5825 - recall\_1: 0.5235 - f1\_score: 0.6605 - val\_loss: 0.6765 - val\_accuracy: 0.5759 - val\_precision\_1: 0.5685 - val\_recall\_1: 0.5090 - val\_f1\_score: 0.6518  
Epoch 26/100

Epoch 00026: LearningRateScheduler reducing learning rate to 1.22086544251942 54e-06.  
114/114 [=====] - 1s 13ms/step - loss: 0.6691 - accuracy: 0.5959 - precision\_1: 0.5973 - recall\_1: 0.5539 - f1\_score: 0.6605 - val\_loss: 0.6765 - val\_accuracy: 0.5765 - val\_precision\_1: 0.5695 - val\_recall\_1: 0.5078 - val\_f1\_score: 0.6518  
Epoch 27/100

Epoch 00027: LearningRateScheduler reducing learning rate to 1.15982217039345 4e-06.  
114/114 [=====] - 1s 12ms/step - loss: 0.6739 - accuracy: 0.5736 - precision\_1: 0.5740 - recall\_1: 0.5241 - f1\_score: 0.6605 - val\_loss: 0.6764 - val\_accuracy: 0.5748 - val\_precision\_1: 0.5672 - val\_recall\_1: 0.5078 - val\_f1\_score: 0.6518  
Epoch 28/100

Epoch 00028: LearningRateScheduler reducing learning rate to 1.15982220449950 55e-06.  
114/114 [=====] - 1s 13ms/step - loss: 0.6716 - accuracy: 0.5838 - precision\_1: 0.5848 - recall\_1: 0.5378 - f1\_score: 0.6605 - val\_loss: 0.6764 - val\_accuracy: 0.5742 - val\_precision\_1: 0.5666 - val\_recall\_1: 0.5066 - val\_f1\_score: 0.6518  
Epoch 29/100

Epoch 00029: LearningRateScheduler reducing learning rate to 1.15982220449950 55e-06.

114/114 [=====] - 2s 13ms/step - loss: 0.6714 - accuracy: 0.5927 - precision\_1: 0.5949 - recall\_1: 0.5450 - f1\_score: 0.6605 - val\_loss: 0.6764 - val\_accuracy: 0.5753 - val\_precision\_1: 0.5676 - val\_recall\_1: 0.5102 - val\_f1\_score: 0.6518  
Epoch 30/100

Epoch 00030: LearningRateScheduler reducing learning rate to 1.10183109427453e-06.

114/114 [=====] - 2s 13ms/step - loss: 0.6723 - accuracy: 0.5900 - precision\_1: 0.5930 - recall\_1: 0.5372 - f1\_score: 0.6605 - val\_loss: 0.6763 - val\_accuracy: 0.5753 - val\_precision\_1: 0.5678 - val\_recall\_1: 0.5090 - val\_f1\_score: 0.6518

Epoch 31/100

Epoch 00031: LearningRateScheduler reducing learning rate to 1.1018311170118977e-06.

114/114 [=====] - 1s 13ms/step - loss: 0.6722 - accuracy: 0.5777 - precision\_1: 0.5781 - recall\_1: 0.5313 - f1\_score: 0.6605 - val\_loss: 0.6763 - val\_accuracy: 0.5759 - val\_precision\_1: 0.5684 - val\_recall\_1: 0.5102 - val\_f1\_score: 0.6518

Epoch 32/100

Epoch 00032: LearningRateScheduler reducing learning rate to 1.1018311170118977e-06.

114/114 [=====] - 1s 13ms/step - loss: 0.6680 - accuracy: 0.5833 - precision\_1: 0.5856 - recall\_1: 0.5295 - f1\_score: 0.6605 - val\_loss: 0.6763 - val\_accuracy: 0.5753 - val\_precision\_1: 0.5676 - val\_recall\_1: 0.5102 - val\_f1\_score: 0.6518

Epoch 33/100

Epoch 00033: LearningRateScheduler reducing learning rate to 1.0467395611613027e-06.

114/114 [=====] - 1s 13ms/step - loss: 0.6701 - accuracy: 0.5850 - precision\_1: 0.5851 - recall\_1: 0.5444 - f1\_score: 0.6605 - val\_loss: 0.6762 - val\_accuracy: 0.5765 - val\_precision\_1: 0.5688 - val\_recall\_1: 0.5126 - val\_f1\_score: 0.6518

Epoch 34/100

Epoch 00034: LearningRateScheduler reducing learning rate to 1.0467396123203798e-06.

114/114 [=====] - 1s 13ms/step - loss: 0.6656 - accuracy: 0.6041 - precision\_1: 0.6068 - recall\_1: 0.5599 - f1\_score: 0.6605 - val\_loss: 0.6762 - val\_accuracy: 0.5759 - val\_precision\_1: 0.5684 - val\_recall\_1: 0.5102 - val\_f1\_score: 0.6518

Epoch 35/100

Epoch 00035: LearningRateScheduler reducing learning rate to 1.0467396123203798e-06.

114/114 [=====] - 1s 13ms/step - loss: 0.6699 - accuracy: 0.5827 - precision\_1: 0.5834 - recall\_1: 0.5372 - f1\_score: 0.6605 - val\_loss: 0.6762 - val\_accuracy: 0.5742 - val\_precision\_1: 0.5666 - val\_recall\_1: 0.5066 - val\_f1\_score: 0.6518

Epoch 36/100

Epoch 00036: LearningRateScheduler reducing learning rate to 9.944026317043607e-07.

114/114 [=====] - 1s 13ms/step - loss: 0.6718 - accu

racy: 0.5903 - precision\_1: 0.5917 - recall\_1: 0.5456 - f1\_score: 0.6605 - val\_loss: 0.6762 - val\_accuracy: 0.5742 - val\_precision\_1: 0.5670 - val\_recall\_1: 0.5042 - val\_f1\_score: 0.6518  
Epoch 37/100

Epoch 00037: LearningRateScheduler reducing learning rate to 9.94402626020019e-07.  
114/114 [=====] - 1s 13ms/step - loss: 0.6681 - accuracy: 0.5786 - precision\_1: 0.5791 - recall\_1: 0.5319 - f1\_score: 0.6605 - val\_loss: 0.6761 - val\_accuracy: 0.5753 - val\_precision\_1: 0.5682 - val\_recall\_1: 0.5066 - val\_f1\_score: 0.6518  
Epoch 38/100

Epoch 00038: LearningRateScheduler reducing learning rate to 9.94402626020019e-07.  
114/114 [=====] - 1s 13ms/step - loss: 0.6736 - accuracy: 0.5824 - precision\_1: 0.5855 - recall\_1: 0.5241 - f1\_score: 0.6605 - val\_loss: 0.6761 - val\_accuracy: 0.5771 - val\_precision\_1: 0.5691 - val\_recall\_1: 0.5150 - val\_f1\_score: 0.6518  
Epoch 39/100

Epoch 00039: LearningRateScheduler reducing learning rate to 9.44682494719018e-07.  
114/114 [=====] - 1s 13ms/step - loss: 0.6680 - accuracy: 0.6029 - precision\_1: 0.6085 - recall\_1: 0.5462 - f1\_score: 0.6605 - val\_loss: 0.6760 - val\_accuracy: 0.5765 - val\_precision\_1: 0.5688 - val\_recall\_1: 0.5126 - val\_f1\_score: 0.6518  
Epoch 40/100

Epoch 00040: LearningRateScheduler reducing learning rate to 9.44682483350334e-07.  
114/114 [=====] - 1s 13ms/step - loss: 0.6718 - accuracy: 0.5818 - precision\_1: 0.5823 - recall\_1: 0.5372 - f1\_score: 0.6605 - val\_loss: 0.6760 - val\_accuracy: 0.5765 - val\_precision\_1: 0.5686 - val\_recall\_1: 0.5138 - val\_f1\_score: 0.6518  
Epoch 41/100

Epoch 00041: LearningRateScheduler reducing learning rate to 9.44682483350334e-07.  
114/114 [=====] - 1s 13ms/step - loss: 0.6666 - accuracy: 0.6009 - precision\_1: 0.6034 - recall\_1: 0.5563 - f1\_score: 0.6605 - val\_loss: 0.6760 - val\_accuracy: 0.5771 - val\_precision\_1: 0.5691 - val\_recall\_1: 0.5150 - val\_f1\_score: 0.6518  
Epoch 42/100

Epoch 00042: LearningRateScheduler reducing learning rate to 8.97448359182817e-07.  
114/114 [=====] - 1s 13ms/step - loss: 0.6666 - accuracy: 0.5850 - precision\_1: 0.5870 - recall\_1: 0.5342 - f1\_score: 0.6605 - val\_loss: 0.6760 - val\_accuracy: 0.5771 - val\_precision\_1: 0.5691 - val\_recall\_1: 0.5150 - val\_f1\_score: 0.6518  
Epoch 43/100

Epoch 00043: LearningRateScheduler reducing learning rate to 8.97448330761108e-07.  
114/114 [=====] - 1s 13ms/step - loss: 0.6718 - accuracy: 0.5853 - precision\_1: 0.5852 - recall\_1: 0.5462 - f1\_score: 0.6605 - va

l\_loss: 0.6759 - val\_accuracy: 0.5800 - val\_precision\_1: 0.5718 - val\_recall\_1: 0.5223 - val\_f1\_score: 0.6518  
Epoch 44/100

Epoch 00044: LearningRateScheduler reducing learning rate to 8.97448330761108 1e-07.  
114/114 [=====] - 1s 13ms/step - loss: 0.6708 - accuracy: 0.5844 - precision\_1: 0.5868 - recall\_1: 0.5313 - f1\_score: 0.6605 - val\_loss: 0.6759 - val\_accuracy: 0.5759 - val\_precision\_1: 0.5680 - val\_recall\_1: 0.5126 - val\_f1\_score: 0.6518  
Epoch 45/100

Epoch 00045: LearningRateScheduler reducing learning rate to 8.52575914223052 7e-07.  
114/114 [=====] - 1s 13ms/step - loss: 0.6701 - accuracy: 0.5791 - precision\_1: 0.5792 - recall\_1: 0.5360 - f1\_score: 0.6605 - val\_loss: 0.6759 - val\_accuracy: 0.5771 - val\_precision\_1: 0.5701 - val\_recall\_1: 0.5090 - val\_f1\_score: 0.6518  
Epoch 46/100

Epoch 00046: LearningRateScheduler reducing learning rate to 8.52575908538710 8e-07.  
114/114 [=====] - 1s 13ms/step - loss: 0.6679 - accuracy: 0.5947 - precision\_1: 0.5970 - recall\_1: 0.5479 - f1\_score: 0.6605 - val\_loss: 0.6759 - val\_accuracy: 0.5777 - val\_precision\_1: 0.5699 - val\_recall\_1: 0.5150 - val\_f1\_score: 0.6518  
Epoch 47/100

Epoch 00047: LearningRateScheduler reducing learning rate to 8.52575908538710 8e-07.  
114/114 [=====] - 1s 13ms/step - loss: 0.6711 - accuracy: 0.5830 - precision\_1: 0.5830 - recall\_1: 0.5420 - f1\_score: 0.6605 - val\_loss: 0.6758 - val\_accuracy: 0.5782 - val\_precision\_1: 0.5707 - val\_recall\_1: 0.5150 - val\_f1\_score: 0.6518  
Epoch 48/100

Epoch 00048: LearningRateScheduler reducing learning rate to 8.09947113111775 2e-07.  
114/114 [=====] - 1s 13ms/step - loss: 0.6700 - accuracy: 0.5836 - precision\_1: 0.5849 - recall\_1: 0.5354 - f1\_score: 0.6605 - val\_loss: 0.6758 - val\_accuracy: 0.5782 - val\_precision\_1: 0.5707 - val\_recall\_1: 0.5150 - val\_f1\_score: 0.6518  
Epoch 49/100

Epoch 00049: LearningRateScheduler reducing learning rate to 8.09947096058749 6e-07.  
114/114 [=====] - 1s 13ms/step - loss: 0.6692 - accuracy: 0.5856 - precision\_1: 0.5869 - recall\_1: 0.5390 - f1\_score: 0.6605 - val\_loss: 0.6758 - val\_accuracy: 0.5788 - val\_precision\_1: 0.5712 - val\_recall\_1: 0.5162 - val\_f1\_score: 0.6518  
Epoch 50/100

Epoch 00050: LearningRateScheduler reducing learning rate to 8.09947096058749 6e-07.  
114/114 [=====] - 1s 13ms/step - loss: 0.6666 - accuracy: 0.5930 - precision\_1: 0.5933 - recall\_1: 0.5551 - f1\_score: 0.6605 - val\_loss: 0.6758 - val\_accuracy: 0.5800 - val\_precision\_1: 0.5720 - val\_recall\_1:

1: 0.5211 - val\_f1\_score: 0.6518  
Epoch 51/100

Epoch 00051: LearningRateScheduler reducing learning rate to 7.69449741255812 1e-07.  
114/114 [=====] - 1s 13ms/step - loss: 0.6686 - accuracy: 0.5827 - precision\_1: 0.5826 - recall\_1: 0.5420 - f1\_score: 0.6605 - val\_loss: 0.6757 - val\_accuracy: 0.5800 - val\_precision\_1: 0.5716 - val\_recall\_1: 0.5235 - val\_f1\_score: 0.6518  
Epoch 52/100

Epoch 00052: LearningRateScheduler reducing learning rate to 7.69449741255812 1e-07.  
114/114 [=====] - 1s 13ms/step - loss: 0.6706 - accuracy: 0.5906 - precision\_1: 0.5926 - recall\_1: 0.5432 - f1\_score: 0.6605 - val\_loss: 0.6757 - val\_accuracy: 0.5800 - val\_precision\_1: 0.5718 - val\_recall\_1: 0.5223 - val\_f1\_score: 0.6518  
Epoch 53/100

Epoch 00053: LearningRateScheduler reducing learning rate to 7.69449741255812 1e-07.  
114/114 [=====] - 1s 13ms/step - loss: 0.6745 - accuracy: 0.5768 - precision\_1: 0.5782 - recall\_1: 0.5241 - f1\_score: 0.6605 - val\_loss: 0.6757 - val\_accuracy: 0.5800 - val\_precision\_1: 0.5720 - val\_recall\_1: 0.5211 - val\_f1\_score: 0.6518  
Epoch 54/100

Epoch 00054: LearningRateScheduler reducing learning rate to 7.30977254193021 5e-07.  
114/114 [=====] - 1s 13ms/step - loss: 0.6693 - accuracy: 0.5979 - precision\_1: 0.5976 - recall\_1: 0.5652 - f1\_score: 0.6605 - val\_loss: 0.6757 - val\_accuracy: 0.5806 - val\_precision\_1: 0.5724 - val\_recall\_1: 0.5235 - val\_f1\_score: 0.6518  
Epoch 55/100

Epoch 00055: LearningRateScheduler reducing learning rate to 7.30977262719534 3e-07.  
114/114 [=====] - 2s 13ms/step - loss: 0.6716 - accuracy: 0.5800 - precision\_1: 0.5793 - recall\_1: 0.5414 - f1\_score: 0.6605 - val\_loss: 0.6757 - val\_accuracy: 0.5806 - val\_precision\_1: 0.5726 - val\_recall\_1: 0.5223 - val\_f1\_score: 0.6518  
Epoch 56/100

Epoch 00056: LearningRateScheduler reducing learning rate to 7.30977262719534 3e-07.  
114/114 [=====] - 1s 13ms/step - loss: 0.6652 - accuracy: 0.5935 - precision\_1: 0.5975 - recall\_1: 0.5384 - f1\_score: 0.6605 - val\_loss: 0.6757 - val\_accuracy: 0.5794 - val\_precision\_1: 0.5714 - val\_recall\_1: 0.5199 - val\_f1\_score: 0.6518  
Epoch 57/100

Epoch 00057: LearningRateScheduler reducing learning rate to 6.94428399583557 6e-07.  
114/114 [=====] - 1s 13ms/step - loss: 0.6687 - accuracy: 0.5850 - precision\_1: 0.5849 - recall\_1: 0.5456 - f1\_score: 0.6605 - val\_loss: 0.6756 - val\_accuracy: 0.5812 - val\_precision\_1: 0.5731 - val\_recall\_1: 0.5235 - val\_f1\_score: 0.6518

Epoch 58/100

Epoch 00058: LearningRateScheduler reducing learning rate to 6.94428422320925  
2e-07.

114/114 [=====] - 1s 13ms/step - loss: 0.6688 - accuracy: 0.5877 - precision\_1: 0.5890 - recall\_1: 0.5420 - f1\_score: 0.6605 - val\_loss: 0.6756 - val\_accuracy: 0.5812 - val\_precision\_1: 0.5731 - val\_recall\_1: 0.5235 - val\_f1\_score: 0.6518

Epoch 59/100

Epoch 00059: LearningRateScheduler reducing learning rate to 6.94428422320925  
2e-07.

114/114 [=====] - 1s 12ms/step - loss: 0.6694 - accuracy: 0.5991 - precision\_1: 0.6032 - recall\_1: 0.5468 - f1\_score: 0.6605 - val\_loss: 0.6756 - val\_accuracy: 0.5812 - val\_precision\_1: 0.5731 - val\_recall\_1: 0.5235 - val\_f1\_score: 0.6518

Epoch 60/100

Epoch 00060: LearningRateScheduler reducing learning rate to 6.59707001204878  
8e-07.

114/114 [=====] - 1s 13ms/step - loss: 0.6686 - accuracy: 0.5968 - precision\_1: 0.5975 - recall\_1: 0.5587 - f1\_score: 0.6605 - val\_loss: 0.6756 - val\_accuracy: 0.5806 - val\_precision\_1: 0.5724 - val\_recall\_1: 0.5235 - val\_f1\_score: 0.6518

Epoch 61/100

Epoch 00061: LearningRateScheduler reducing learning rate to 6.59706984151853  
2e-07.

114/114 [=====] - 1s 13ms/step - loss: 0.6701 - accuracy: 0.5900 - precision\_1: 0.5919 - recall\_1: 0.5426 - f1\_score: 0.6605 - val\_loss: 0.6756 - val\_accuracy: 0.5800 - val\_precision\_1: 0.5720 - val\_recall\_1: 0.5211 - val\_f1\_score: 0.6518

Epoch 62/100

Epoch 00062: LearningRateScheduler reducing learning rate to 6.59706984151853  
2e-07.

114/114 [=====] - 1s 13ms/step - loss: 0.6708 - accuracy: 0.5962 - precision\_1: 0.5979 - recall\_1: 0.5527 - f1\_score: 0.6605 - val\_loss: 0.6756 - val\_accuracy: 0.5806 - val\_precision\_1: 0.5728 - val\_recall\_1: 0.5211 - val\_f1\_score: 0.6518

Epoch 63/100

Epoch 00063: LearningRateScheduler reducing learning rate to 6.26721634944260  
6e-07.

114/114 [=====] - 1s 13ms/step - loss: 0.6693 - accuracy: 0.5736 - precision\_1: 0.5724 - recall\_1: 0.5342 - f1\_score: 0.6605 - val\_loss: 0.6755 - val\_accuracy: 0.5800 - val\_precision\_1: 0.5722 - val\_recall\_1: 0.5199 - val\_f1\_score: 0.6518

Epoch 64/100

Epoch 00064: LearningRateScheduler reducing learning rate to 6.26721657681628  
1e-07.

114/114 [=====] - 1s 13ms/step - loss: 0.6702 - accuracy: 0.5906 - precision\_1: 0.5922 - recall\_1: 0.5450 - f1\_score: 0.6605 - val\_loss: 0.6755 - val\_accuracy: 0.5794 - val\_precision\_1: 0.5716 - val\_recall\_1: 0.5187 - val\_f1\_score: 0.6518

Epoch 65/100

Epoch 00065: LearningRateScheduler reducing learning rate to 6.26721657681628 1e-07.  
114/114 [=====] - 1s 13ms/step - loss: 0.6681 - accuracy: 0.5915 - precision\_1: 0.5913 - recall\_1: 0.5557 - f1\_score: 0.6605 - val\_loss: 0.6755 - val\_accuracy: 0.5800 - val\_precision\_1: 0.5722 - val\_recall\_1: 0.5199 - val\_f1\_score: 0.6518  
Epoch 66/100

Epoch 00066: LearningRateScheduler reducing learning rate to 5.95385574797546 7e-07.  
114/114 [=====] - 1s 13ms/step - loss: 0.6697 - accuracy: 0.5859 - precision\_1: 0.5864 - recall\_1: 0.5438 - f1\_score: 0.6605 - val\_loss: 0.6755 - val\_accuracy: 0.5794 - val\_precision\_1: 0.5714 - val\_recall\_1: 0.5199 - val\_f1\_score: 0.6518  
Epoch 67/100

Epoch 00067: LearningRateScheduler reducing learning rate to 5.95385586166230 5e-07.  
114/114 [=====] - 1s 13ms/step - loss: 0.6704 - accuracy: 0.5803 - precision\_1: 0.5823 - recall\_1: 0.5265 - f1\_score: 0.6605 - val\_loss: 0.6755 - val\_accuracy: 0.5800 - val\_precision\_1: 0.5722 - val\_recall\_1: 0.5199 - val\_f1\_score: 0.6518  
Epoch 68/100

Epoch 00068: LearningRateScheduler reducing learning rate to 5.95385586166230 5e-07.  
114/114 [=====] - 1s 13ms/step - loss: 0.6652 - accuracy: 0.5844 - precision\_1: 0.5846 - recall\_1: 0.5432 - f1\_score: 0.6605 - val\_loss: 0.6755 - val\_accuracy: 0.5800 - val\_precision\_1: 0.5722 - val\_recall\_1: 0.5199 - val\_f1\_score: 0.6518  
Epoch 69/100

Epoch 00069: LearningRateScheduler reducing learning rate to 5.65616306857918 9e-07.  
114/114 [=====] - 1s 13ms/step - loss: 0.6708 - accuracy: 0.5947 - precision\_1: 0.5960 - recall\_1: 0.5527 - f1\_score: 0.6605 - val\_loss: 0.6754 - val\_accuracy: 0.5800 - val\_precision\_1: 0.5720 - val\_recall\_1: 0.5211 - val\_f1\_score: 0.6518  
Epoch 70/100

Epoch 00070: LearningRateScheduler reducing learning rate to 5.65616289804893 3e-07.  
114/114 [=====] - 1s 13ms/step - loss: 0.6670 - accuracy: 0.5894 - precision\_1: 0.5885 - recall\_1: 0.5563 - f1\_score: 0.6605 - val\_loss: 0.6754 - val\_accuracy: 0.5806 - val\_precision\_1: 0.5728 - val\_recall\_1: 0.5211 - val\_f1\_score: 0.6518  
Epoch 71/100

Epoch 00071: LearningRateScheduler reducing learning rate to 5.65616289804893 3e-07.  
114/114 [=====] - 1s 13ms/step - loss: 0.6694 - accuracy: 0.5877 - precision\_1: 0.5887 - recall\_1: 0.5438 - f1\_score: 0.6605 - val\_loss: 0.6754 - val\_accuracy: 0.5800 - val\_precision\_1: 0.5720 - val\_recall\_1: 0.5211 - val\_f1\_score: 0.6518  
Epoch 72/100

Epoch 00072: LearningRateScheduler reducing learning rate to 5.37335475314648 7e-07.

114/114 [=====] - 1s 13ms/step - loss: 0.6669 - accuracy: 0.5962 - precision\_1: 0.5949 - recall\_1: 0.5676 - f1\_score: 0.6605 - val\_loss: 0.6754 - val\_accuracy: 0.5806 - val\_precision\_1: 0.5724 - val\_recall\_1: 0.5235 - val\_f1\_score: 0.6518

Epoch 73/100

Epoch 00073: LearningRateScheduler reducing learning rate to 5.37335495209845 2e-07.

114/114 [=====] - 1s 13ms/step - loss: 0.6684 - accuracy: 0.5859 - precision\_1: 0.5867 - recall\_1: 0.5420 - f1\_score: 0.6605 - val\_loss: 0.6754 - val\_accuracy: 0.5806 - val\_precision\_1: 0.5724 - val\_recall\_1: 0.5235 - val\_f1\_score: 0.6518

Epoch 74/100

Epoch 00074: LearningRateScheduler reducing learning rate to 5.37335495209845 2e-07.

114/114 [=====] - 1s 13ms/step - loss: 0.6691 - accuracy: 0.5824 - precision\_1: 0.5823 - recall\_1: 0.5414 - f1\_score: 0.6605 - val\_loss: 0.6754 - val\_accuracy: 0.5800 - val\_precision\_1: 0.5714 - val\_recall\_1: 0.5247 - val\_f1\_score: 0.6518

Epoch 75/100

Epoch 00075: LearningRateScheduler reducing learning rate to 5.10468720449352 9e-07.

114/114 [=====] - 1s 13ms/step - loss: 0.6668 - accuracy: 0.6029 - precision\_1: 0.6078 - recall\_1: 0.5491 - f1\_score: 0.6605 - val\_loss: 0.6754 - val\_accuracy: 0.5800 - val\_precision\_1: 0.5712 - val\_recall\_1: 0.5259 - val\_f1\_score: 0.6518

Epoch 76/100

Epoch 00076: LearningRateScheduler reducing learning rate to 5.10468737502378 6e-07.

114/114 [=====] - 1s 13ms/step - loss: 0.6701 - accuracy: 0.5909 - precision\_1: 0.5917 - recall\_1: 0.5497 - f1\_score: 0.6605 - val\_loss: 0.6754 - val\_accuracy: 0.5800 - val\_precision\_1: 0.5712 - val\_recall\_1: 0.5259 - val\_f1\_score: 0.6518

Epoch 77/100

Epoch 00077: LearningRateScheduler reducing learning rate to 5.10468737502378 6e-07.

114/114 [=====] - 1s 13ms/step - loss: 0.6644 - accuracy: 0.6006 - precision\_1: 0.6036 - recall\_1: 0.5533 - f1\_score: 0.6605 - val\_loss: 0.6753 - val\_accuracy: 0.5788 - val\_precision\_1: 0.5701 - val\_recall\_1: 0.5235 - val\_f1\_score: 0.6518

Epoch 78/100

Epoch 00078: LearningRateScheduler reducing learning rate to 4.84945300627259 7e-07.

114/114 [=====] - 1s 13ms/step - loss: 0.6683 - accuracy: 0.5888 - precision\_1: 0.5885 - recall\_1: 0.5527 - f1\_score: 0.6605 - val\_loss: 0.6753 - val\_accuracy: 0.5812 - val\_precision\_1: 0.5724 - val\_recall\_1: 0.5283 - val\_f1\_score: 0.6518

Epoch 79/100

Epoch 00079: LearningRateScheduler reducing learning rate to 4.84945303469430

7e-07.  
114/114 [=====] - 1s 13ms/step - loss: 0.6660 - accuracy: 0.5968 - precision\_1: 0.5975 - recall\_1: 0.5587 - f1\_score: 0.6605 - val\_loss: 0.6753 - val\_accuracy: 0.5800 - val\_precision\_1: 0.5712 - val\_recall\_1: 0.5259 - val\_f1\_score: 0.6518  
Epoch 80/100

Epoch 00080: LearningRateScheduler reducing learning rate to 4.84945303469430 7e-07.  
114/114 [=====] - 1s 13ms/step - loss: 0.6669 - accuracy: 0.5979 - precision\_1: 0.5966 - recall\_1: 0.5700 - f1\_score: 0.6605 - val\_loss: 0.6753 - val\_accuracy: 0.5788 - val\_precision\_1: 0.5701 - val\_recall\_1: 0.5235 - val\_f1\_score: 0.6518  
Epoch 81/100

Epoch 00081: LearningRateScheduler reducing learning rate to 4.60698038295959 1e-07.  
114/114 [=====] - 1s 13ms/step - loss: 0.6709 - accuracy: 0.5856 - precision\_1: 0.5863 - recall\_1: 0.5420 - f1\_score: 0.6605 - val\_loss: 0.6753 - val\_accuracy: 0.5800 - val\_precision\_1: 0.5716 - val\_recall\_1: 0.5235 - val\_f1\_score: 0.6518  
Epoch 82/100

Epoch 00082: LearningRateScheduler reducing learning rate to 4.60698032611617 24e-07.  
114/114 [=====] - 1s 13ms/step - loss: 0.6663 - accuracy: 0.6021 - precision\_1: 0.6045 - recall\_1: 0.5581 - f1\_score: 0.6605 - val\_loss: 0.6753 - val\_accuracy: 0.5806 - val\_precision\_1: 0.5718 - val\_recall\_1: 0.5271 - val\_f1\_score: 0.6518  
Epoch 83/100

Epoch 00083: LearningRateScheduler reducing learning rate to 4.60698032611617 24e-07.  
114/114 [=====] - 1s 13ms/step - loss: 0.6697 - accuracy: 0.5880 - precision\_1: 0.5887 - recall\_1: 0.5456 - f1\_score: 0.6605 - val\_loss: 0.6753 - val\_accuracy: 0.5794 - val\_precision\_1: 0.5709 - val\_recall\_1: 0.5235 - val\_f1\_score: 0.6518  
Epoch 84/100

Epoch 00084: LearningRateScheduler reducing learning rate to 4.37663130981036 35e-07.  
114/114 [=====] - 1s 13ms/step - loss: 0.6672 - accuracy: 0.5950 - precision\_1: 0.5963 - recall\_1: 0.5533 - f1\_score: 0.6605 - val\_loss: 0.6753 - val\_accuracy: 0.5806 - val\_precision\_1: 0.5716 - val\_recall\_1: 0.5283 - val\_f1\_score: 0.6518  
Epoch 85/100

Epoch 00085: LearningRateScheduler reducing learning rate to 4.37663118191267 13e-07.  
114/114 [=====] - 1s 13ms/step - loss: 0.6684 - accuracy: 0.5865 - precision\_1: 0.5871 - recall\_1: 0.5438 - f1\_score: 0.6605 - val\_loss: 0.6753 - val\_accuracy: 0.5806 - val\_precision\_1: 0.5716 - val\_recall\_1: 0.5283 - val\_f1\_score: 0.6518  
Epoch 86/100

Epoch 00086: LearningRateScheduler reducing learning rate to 4.37663118191267 13e-07.

114/114 [=====] - 1s 13ms/step - loss: 0.6701 - accuracy: 0.5786 - precision\_1: 0.5772 - recall\_1: 0.5432 - f1\_score: 0.6605 - val\_loss: 0.6753 - val\_accuracy: 0.5817 - val\_precision\_1: 0.5735 - val\_recall\_1: 0.5259 - val\_f1\_score: 0.6518  
Epoch 87/100

Epoch 00087: LearningRateScheduler reducing learning rate to 4.157799622817037e-07.  
114/114 [=====] - 1s 13ms/step - loss: 0.6684 - accuracy: 0.5915 - precision\_1: 0.5900 - recall\_1: 0.5622 - f1\_score: 0.6605 - val\_loss: 0.6753 - val\_accuracy: 0.5800 - val\_precision\_1: 0.5718 - val\_recall\_1: 0.5223 - val\_f1\_score: 0.6518  
Epoch 88/100

Epoch 00088: LearningRateScheduler reducing learning rate to 4.157799651238747e-07.  
114/114 [=====] - 2s 13ms/step - loss: 0.6687 - accuracy: 0.5932 - precision\_1: 0.5938 - recall\_1: 0.5545 - f1\_score: 0.6605 - val\_loss: 0.6753 - val\_accuracy: 0.5800 - val\_precision\_1: 0.5718 - val\_recall\_1: 0.5223 - val\_f1\_score: 0.6518  
Epoch 89/100

Epoch 00089: LearningRateScheduler reducing learning rate to 4.157799651238747e-07.  
114/114 [=====] - 2s 13ms/step - loss: 0.6706 - accuracy: 0.5897 - precision\_1: 0.5904 - recall\_1: 0.5485 - f1\_score: 0.6605 - val\_loss: 0.6752 - val\_accuracy: 0.5794 - val\_precision\_1: 0.5712 - val\_recall\_1: 0.5211 - val\_f1\_score: 0.6518  
Epoch 90/100

Epoch 00090: LearningRateScheduler reducing learning rate to 3.9499096686768094e-07.  
114/114 [=====] - 2s 14ms/step - loss: 0.6659 - accuracy: 0.5971 - precision\_1: 0.6016 - recall\_1: 0.5414 - f1\_score: 0.6605 - val\_loss: 0.6752 - val\_accuracy: 0.5794 - val\_precision\_1: 0.5712 - val\_recall\_1: 0.5211 - val\_f1\_score: 0.6518  
Epoch 91/100

Epoch 00091: LearningRateScheduler reducing learning rate to 3.9499096260442457e-07.  
114/114 [=====] - 2s 14ms/step - loss: 0.6678 - accuracy: 0.5918 - precision\_1: 0.5932 - recall\_1: 0.5479 - f1\_score: 0.6605 - val\_loss: 0.6752 - val\_accuracy: 0.5794 - val\_precision\_1: 0.5712 - val\_recall\_1: 0.5211 - val\_f1\_score: 0.6518  
Epoch 92/100

Epoch 00092: LearningRateScheduler reducing learning rate to 3.9499096260442457e-07.  
114/114 [=====] - 2s 14ms/step - loss: 0.6654 - accuracy: 0.5953 - precision\_1: 0.5977 - recall\_1: 0.5485 - f1\_score: 0.6605 - val\_loss: 0.6752 - val\_accuracy: 0.5788 - val\_precision\_1: 0.5707 - val\_recall\_1: 0.5199 - val\_f1\_score: 0.6518  
Epoch 93/100

Epoch 00093: LearningRateScheduler reducing learning rate to 3.752414144742033e-07.  
114/114 [=====] - 2s 15ms/step - loss: 0.6694 - accu

racy: 0.5830 - precision\_1: 0.5818 - recall\_1: 0.5485 - f1\_score: 0.6605 - val\_loss: 0.6752 - val\_accuracy: 0.5794 - val\_precision\_1: 0.5716 - val\_recall\_1: 0.5187 - val\_f1\_score: 0.6518  
Epoch 94/100

Epoch 00094: LearningRateScheduler reducing learning rate to 3.75241427263972e-07.  
114/114 [=====] - 2s 15ms/step - loss: 0.6665 - accuracy: 0.5906 - precision\_1: 0.5928 - recall\_1: 0.5420 - f1\_score: 0.6605 - val\_loss: 0.6752 - val\_accuracy: 0.5794 - val\_precision\_1: 0.5716 - val\_recall\_1: 0.5187 - val\_f1\_score: 0.6518  
Epoch 95/100

Epoch 00095: LearningRateScheduler reducing learning rate to 3.75241427263972e-07.  
114/114 [=====] - 2s 15ms/step - loss: 0.6681 - accuracy: 0.5921 - precision\_1: 0.5945 - recall\_1: 0.5432 - f1\_score: 0.6605 - val\_loss: 0.6752 - val\_accuracy: 0.5800 - val\_precision\_1: 0.5724 - val\_recall\_1: 0.5187 - val\_f1\_score: 0.6518  
Epoch 96/100

Epoch 00096: LearningRateScheduler reducing learning rate to 3.56479355900773e-07.  
114/114 [=====] - 2s 15ms/step - loss: 0.6685 - accuracy: 0.5979 - precision\_1: 0.5995 - recall\_1: 0.5563 - f1\_score: 0.6605 - val\_loss: 0.6752 - val\_accuracy: 0.5788 - val\_precision\_1: 0.5712 - val\_recall\_1: 0.5162 - val\_f1\_score: 0.6518  
Epoch 97/100

Epoch 00097: LearningRateScheduler reducing learning rate to 3.56479347374261e-07.  
114/114 [=====] - 2s 15ms/step - loss: 0.6664 - accuracy: 0.5953 - precision\_1: 0.5974 - recall\_1: 0.5497 - f1\_score: 0.6605 - val\_loss: 0.6752 - val\_accuracy: 0.5788 - val\_precision\_1: 0.5712 - val\_recall\_1: 0.5162 - val\_f1\_score: 0.6518  
Epoch 98/100

Epoch 00098: LearningRateScheduler reducing learning rate to 3.56479347374261e-07.  
114/114 [=====] - 2s 15ms/step - loss: 0.6686 - accuracy: 0.6009 - precision\_1: 0.6054 - recall\_1: 0.5473 - f1\_score: 0.6605 - val\_loss: 0.6752 - val\_accuracy: 0.5800 - val\_precision\_1: 0.5724 - val\_recall\_1: 0.5187 - val\_f1\_score: 0.6518  
Epoch 99/100

Epoch 00099: LearningRateScheduler reducing learning rate to 3.38655380005548e-07.  
114/114 [=====] - 2s 15ms/step - loss: 0.6659 - accuracy: 0.5941 - precision\_1: 0.5981 - recall\_1: 0.5390 - f1\_score: 0.6605 - val\_loss: 0.6752 - val\_accuracy: 0.5800 - val\_precision\_1: 0.5724 - val\_recall\_1: 0.5187 - val\_f1\_score: 0.6518  
Epoch 100/100

Epoch 00100: LearningRateScheduler reducing learning rate to 3.38655382847719e-07.  
114/114 [=====] - 2s 15ms/step - loss: 0.6648 - accuracy: 0.5968 - precision\_1: 0.5970 - recall\_1: 0.5610 - f1\_score: 0.6605 - va

```
l_loss: 0.6752 - val_accuracy: 0.5800 - val_precision_1: 0.5724 - val_recall_
1: 0.5187 - val_f1_score: 0.6518
```

In [33]:

```
model.save('bestmodel_vgg16_lstm_1.h5')
new_model = tf.keras.models.load_model('bestmodel_vgg16_lstm_1.h5')
```

In [34]:

```
test_prediction=model.predict([predict_test,padded_Xtest_words,subreddit_test,
                               is_nsfw_test,time_of_day_test,
                               created_utc_test,subscribers_test])
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[34]:

(1719,)

In [35]:

```
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')
```

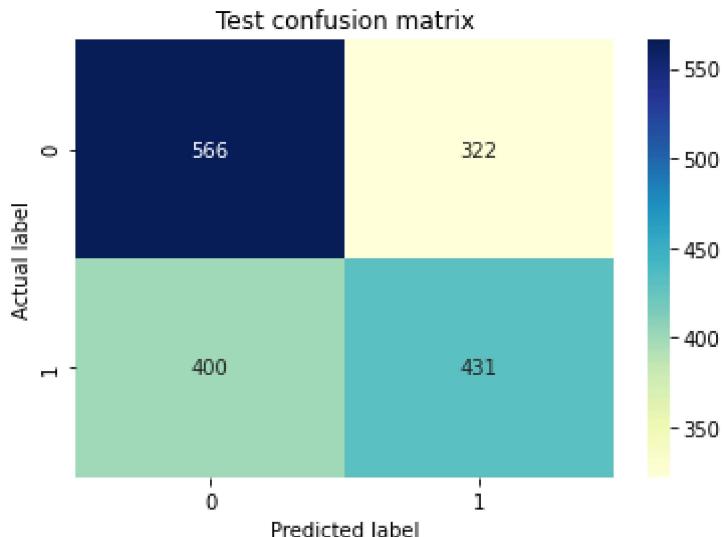
Test accuracy\_score 0.5799883653286795

Test F1\_score 0.5441919191919193

Test confusion matrix

Out[35]:

Text(0.5, 15.0, 'Predicted label')



```
In [36]: file = '/content/model_1.png'
tf.keras.utils.plot_model(model,to_file=file, show_shapes=True)
```

Out[36]:

