In [41]:
```
from keras.models import Sequential
```

In [42]:
```
from keras.layers import Convolution2D
```

In [43]:
```
from keras.layers import MaxPooling2D
```

In [44]:
```
from keras.layers import Flatten
```

In [45]:
```
from keras.layers import Dense
```

In [46]:
```
#intiliaizing
classifier = Sequential()
```

In [47]:
```
#convolution layer
classifier.add(Convolution2D(32, 3, 3, input_shape=(64, 64, 3), activation='relu'))  #tesonrflow backend
#32 feature detector, 3X3 diemesion fearure detector
#(32 feature matrix convolution layer)
#input shape = (all image are not need to be same size or format, so we convert image)
#input shape= umber of channel and dimension
```

```
C:\Users\chandan sharma\Anaconda3\lib\site-packages\ipykernel_launcher.py:2: UserWarning: Update your `Conv2D` call to
the Keras 2 API: `Conv2D(32, (3, 3), input_shape=(64, 64, 3..., activation="relu")`
```

In [48]:
```
# pooling
classifier.add(MaxPooling2D(pool_size=(2, 2)))
```

In [49]:
```
#flattening
classifier.add(Flatten())
```

In [50]:
```
#create classic ann for classification
classifier.add(Dense(output_dim= 128, activation = 'relu'))
classifier.add(Dense(output_dim= 1, activation = 'sigmoid')) #bez binary outcome
```

```
C:\Users\chandan sharma\Anaconda3\lib\site-packages\ipykernel_launcher.py:2: UserWarning: Update your `Dense` call to t
he Keras 2 API: `Dense(activation="relu", units=128)`

C:\Users\chandan sharma\Anaconda3\lib\site-packages\ipykernel_launcher.py:3: UserWarning: Update your `Dense` call to t
he Keras 2 API: `Dense(activation="sigmoid", units=1)`
  This is separate from the ipykernel package so we can avoid doing imports until
```

In [51]:
```
#compiling CNN
classifier.compile(optimizer= 'adam', loss = 'binary_crossentropy', metrics=['accuracy'])
```

In [52]:
```
# Fitting the CNN to the images
from keras.preprocessing.image import ImageDataGenerator
```

In [53]:
```
train_datagen = ImageDataGenerator(
        rescale=1./255,
        shear_range=0.2,
        zoom_range=0.2,
        horizontal_flip=True)
```

In [54]:
```
test_datagen = ImageDataGenerator(rescale=1./255)
```

In [55]:
```
training_set = train_datagen.flow_from_directory(
        r'C:\Users\chandan sharma\Desktop\startup\CNN\trainset',
        target_size=(64, 64),
        batch_size=32,
        class_mode='binary')
```

```
Found 2362 images belonging to 2 classes.
```

In [56]:
```
test_set = test_datagen.flow_from_directory(
        r'C:\Users\chandan sharma\Desktop\startup\CNN\testset',
        target_size=(64, 64),
        batch_size=32,
        class_mode='binary')
```

```
Found 493 images belonging to 2 classes.
```

In [57]:
```
classifier.fit_generator(
        training_set,
        steps_per_epoch=2362,
        epochs=20,
        validation_data=test_set,
        validation_steps=493)
```

```
Epoch 1/20
2362/2362 [==============================] - 572s 242ms/step - loss: 0.4080 - acc: 0.8173 - val_loss: 1.2803 - val_acc:
0.6489
Epoch 2/20
2362/2362 [==============================] - 566s 240ms/step - loss: 0.1386 - acc: 0.9482 - val_loss: 1.5094 - val_acc:
0.6707
Epoch 3/20
2362/2362 [==============================] - 533s 226ms/step - loss: 0.0675 - acc: 0.9770 - val_loss: 2.1812 - val_acc:
0.6679
Epoch 4/20
2362/2362 [==============================] - 517s 219ms/step - loss: 0.0421 - acc: 0.9861 - val_loss: 2.1481 - val_acc:
0.6656
Epoch 5/20
2362/2362 [==============================] - 516s 219ms/step - loss: 0.0322 - acc: 0.9897 - val_loss: 2.3680 - val_acc:
0.6838
Epoch 6/20
2362/2362 [==============================] - 515s 218ms/step - loss: 0.0266 - acc: 0.9912 - val_loss: 2.7380 - val_acc:
0.6615
Epoch 7/20
2362/2362 [==============================] - 517s 219ms/step - loss: 0.0289 - acc: 0.9907 - val_loss: 2.6578 - val_acc:
0.6676
Epoch 8/20
2362/2362 [==============================] - 29500s 12s/step - loss: 0.0219 - acc: 0.9928 - val_loss: 3.1586 - val_acc:
0.6548
Epoch 9/20
2362/2362 [==============================] - 710s 301ms/step - loss: 0.0195 - acc: 0.9939 - val_loss: 3.3084 - val_acc:
0.6629
Epoch 10/20
2362/2362 [==============================] - 745s 315ms/step - loss: 0.0160 - acc: 0.9953 - val_loss: 2.9239 - val_acc:
0.6672
Epoch 11/20
2362/2362 [==============================] - 788s 334ms/step - loss: 0.0150 - acc: 0.9951 - val_loss: 2.5898 - val_acc:
0.6777
Epoch 12/20
```

```
2362/2362 [==============================] - 714s 302ms/step - loss: 0.0149 - acc: 0.9953 - val_loss: 3.0307 - val_acc:
0.6814
Epoch 13/20
2362/2362 [==============================] - 716s 303ms/step - loss: 0.0124 - acc: 0.9963 - val_loss: 3.3969 - val_acc:
0.6716
Epoch 14/20
2362/2362 [==============================] - 676s 286ms/step - loss: 0.0108 - acc: 0.9968 - val_loss: 2.8060 - val_acc:
0.7027
Epoch 15/20
2362/2362 [==============================] - 768s 325ms/step - loss: 0.0108 - acc: 0.9966 - val_loss: 3.2140 - val_acc:
0.6933
Epoch 16/20
2362/2362 [==============================] - 905s 383ms/step - loss: 0.0116 - acc: 0.9966 - val_loss: 2.8542 - val_acc:
0.7162
Epoch 17/20
2362/2362 [==============================] - 758s 321ms/step - loss: 0.0088 - acc: 0.9972 - val_loss: 3.0594 - val_acc:
0.7141
Epoch 18/20
2362/2362 [==============================] - 551s 233ms/step - loss: 0.0108 - acc: 0.9966 - val_loss: 3.4742 - val_acc:
0.6627
Epoch 19/20
2362/2362 [==============================] - 539s 228ms/step - loss: 0.0076 - acc: 0.9979 - val_loss: 3.1098 - val_acc:
0.7084
Epoch 20/20
2362/2362 [==============================] - 537s 227ms/step - loss: 0.0104 - acc: 0.9972 - val_loss: 3.2911 - val_acc:
0.6837
```

Out[57]: <keras.callbacks.History at 0x245006a6ba8>

In [ ]: