

```
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 the 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 the 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 [*]: 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
2361/2362 [=====>.] - ETA: 0s - loss: 0.0116 - acc: 0.9966
```

In []: