

```
In [ ]: from keras.preprocessing.image import ImageDataGenerator
train_datagen=ImageDataGenerator(rescale=1./255, shear_range=0.2, zoom_range=0.2,
test_datagen=ImageDataGenerator(rescale=1./255))
```

```
In [ ]: x_train = train_datagen.flow_from_directory('/content/Dataset/training_set',
Found 15750 images belonging to 9 classes.
```

```
In [ ]: x_test = test_datagen.flow_from_directory('/content/Dataset/test_set',
Found 2250 images belonging to 9 classes.
```

```
In [ ]: from keras.models import Sequential
from keras.layers import Dense
from keras.layers import Convolution2D
from keras.layers import MaxPooling2D
from keras.layers import Dropout
from keras.layers import Flatten
```

```
In [ ]: model = Sequential()
```

```
In [ ]: model.add(Convolution2D(32,(3,3),input_shape=(64,64,1), activation='relu')
#no. of feature detectors, size of feature detector, image size, activation
```

```
In [ ]: model.add(MaxPooling2D(pool_size=(2,2)))
```

```
In [ ]: model.add(Flatten())
```

```
In [ ]: model.add(Dense(units=512, activation = 'relu'))
```

```
In [ ]: model.add(Dense(units=9, activation = 'softmax'))
```

```
In [ ]: model.compile(loss='categorical_crossentropy', optimizer = 'adam', metric
```

```
In [ ]: model.fit_generator(x_train,steps_per_epoch=24,epochs=10,validation_data
#steps_per_epoch = no. of train images//batch size
```

/usr/local/lib/python3.7/dist-packages/ipykernel\_launcher.py:1: UserWarning: `Model.fit\_generator` is deprecated and will be removed in a future version. Please use `Model.fit`, which supports generators.

"""Entry point for launching an IPython kernel.

Epoch 1/10

24/24 [=====] - ETA: 0s - loss: 1.2714 - accuracy: 0.6219

WARNING:tensorflow:Your input ran out of data; interrupting training. Make sure that your dataset or generator can generate at least `steps\_per\_epoch \* epochs` batches (in this case, 40 batches). You may need to use the repeater generator.

```
24/24 [=====] - 41s 2s/step - loss: 1.2714 - accu
racy: 0.6219 - val_loss: 0.4031 - val_accuracy: 0.8982
Epoch 2/10
24/24 [=====] - 33s 1s/step - loss: 0.2827 - accu
racy: 0.9211
Epoch 3/10
24/24 [=====] - 34s 1s/step - loss: 0.1448 - accu
racy: 0.9615
Epoch 4/10
24/24 [=====] - 32s 1s/step - loss: 0.0958 - accu
racy: 0.9746
Epoch 5/10
24/24 [=====] - 34s 1s/step - loss: 0.0679 - accu
racy: 0.9826
Epoch 6/10
24/24 [=====] - 32s 1s/step - loss: 0.0424 - accu
racy: 0.9909
Epoch 7/10
24/24 [=====] - 32s 1s/step - loss: 0.0373 - accu
racy: 0.9908
Epoch 8/10
24/24 [=====] - 33s 1s/step - loss: 0.0319 - accu
racy: 0.9915
Epoch 9/10
24/24 [=====] - 32s 1s/step - loss: 0.0235 - accu
racy: 0.9940
Epoch 10/10
24/24 [=====] - 32s 1s/step - loss: 0.0170 - accu
racy: 0.9972
```

Out[ ]: