```
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)
```

```
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
```

```
X_train = train_datagen.flow_from_directory('/content/Dataset/training_set', target_size =
```

```
Found 15750 images belonging to 9 classes.
```

```
X_test = test_datagen.flow_from_directory('/content/Dataset/test_set', target_size = (64,6
```

```
Found 2250 images belonging to 9 classes.
```

```
model = Sequential()
model.add(Convolution2D(32,(3,3), input_shape = (64,64,1), activation = 'relu'))
model.add(MaxPooling2D(pool_size = (2,2)))
model.add(Flatten())
model.add(Dense(units = 512, activation = 'relu'))
model.add(Dense(units = 256, activation = 'relu'))
model.add(Dense(units = 128, activation = 'relu'))
model.add(Dense(units = 64, activation = 'relu'))
model.add(Dense(units = 9, activation = 'softmax'))
```

```
model.compile(loss = 'categorical_crossentropy', optimizer = 'adam', metrics = ['accuracy'
```

```
model.fit(X_train, steps_per_epoch = len(X_train),epochs=10, validation_data = X_test, val
```

```
Epoch 1/10
53/53 [==============================] - 20s 323ms/step - loss: 0.6905 - accuracy: 0
Epoch 2/10
53/53 [==============================] - 13s 246ms/step - loss: 0.0775 - accuracy: 0
Epoch 3/10
53/53 [==============================] - 13s 240ms/step - loss: 0.0266 - accuracy: 0
Epoch 4/10
53/53 [==============================] - 13s 241ms/step - loss: 0.0169 - accuracy: 0
Epoch 5/10
53/53 [==============================] - 13s 243ms/step - loss: 0.0113 - accuracy: 0
Epoch 6/10
53/53 [==============================] - 13s 244ms/step - loss: 0.0100 - accuracy: 0
Epoch 7/10
53/53 [==============================] - 13s 251ms/step - loss: 0.0065 - accuracy: 0
Epoch 8/10
53/53 [==============================] - 13s 239ms/step - loss: 0.0036 - accuracy: 0
Epoch 9/10
53/53 [==============================] - 13s 241ms/step - loss: 0.0037 - accuracy: 0
```

```
Epoch 10/10
53/53 [==============================] - 13s 244ms/step - loss: 0.0033 - accuracy: 0
<keras.callbacks.History at 0x7fc9c2b6e9d0>
```

```
model.summary()
```

```
Model: "sequential"
_________________________________________________________________
 Layer (type)                Output Shape              Param #
=================================================================
 conv2d (Conv2D)             (None, 62, 62, 32)        320

 max_pooling2d (MaxPooling2D  (None, 31, 31, 32)       0
 )

 flatten (Flatten)           (None, 30752)             0

 dense (Dense)               (None, 512)               15745536

 dense_1 (Dense)             (None, 256)               131328

 dense_2 (Dense)             (None, 128)               32896

 dense_3 (Dense)             (None, 64)                8256

 dense_4 (Dense)             (None, 9)                 585

=================================================================
Total params: 15,918,921
Trainable params: 15,918,921
Non-trainable params: 0
_________________________________________________________________
```

```
model.save('Model.h5')
```

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