```
from tensorflow.keras.preprocessing.image import ImageDataGenerator

train_datagen=ImageDataGenerator(rescale=1./255,shear_range=0.2,
                                 zoom_range=0.2,horizontal_flip=True)
test_datagen=ImageDataGenerator(rescale=1./255)

xtrain=train_datagen.flow_from_directory(r'Flowers-Dataset/flowers/
train',
                                         target_size=(64, 64),
                                          batch_size=100,

                                          class_mode='categorical'
                                         )
```

```
Found 4317 images belonging to 5 classes.
```

```
xtest=test_datagen.flow_from_directory(r'Flowers-Dataset/flowers/
test',
                                         target_size=(64, 64),
                                         batch_size=100,

                                         class_mode='categorical')
```

```
Found 27 images belonging to 5 classes.
```

```
from tensorflow.keras.models import Sequential
from tensorflow.keras.layers import
Convolution2D,MaxPool2D,Flatten,Dense

model = Sequential()
model.add(Convolution2D(32,
(3,3),activation='relu',input_shape=(64,64,3)))
model.add(MaxPool2D(pool_size=(2,2)))
model.add(Flatten())
model.add(Dense(300,activation='relu'))
model.add(Dense(150,activation='relu'))
model.add(Dense(5,activation='softmax'))

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

model.fit_generator(xtrain,
                    steps_per_epoch=len(xtrain),
                    epochs=30,
                    validation_data=xtest,
                    validation_steps=len(xtest))
```

```
/tmp/ipykernel_5850/371111531.py:1: UserWarning: `Model.fit_generator`
is deprecated and will be removed in a future version. Please use
`Model.fit`, which supports generators.
  model.fit_generator(xtrain,
```

```
Epoch 1/30
44/44 [==============================] - 12s 273ms/step - loss: 1.4680
- accuracy: 0.4058 - val_loss: 1.0450 - val_accuracy: 0.3704
Epoch 2/30
44/44 [==============================] - 14s 317ms/step - loss: 1.1067
- accuracy: 0.5527 - val_loss: 1.0041 - val_accuracy: 0.6296
Epoch 3/30
44/44 [==============================] - 14s 322ms/step - loss: 1.0130
- accuracy: 0.5997 - val_loss: 0.7982 - val_accuracy: 0.6296
Epoch 4/30
44/44 [==============================] - 17s 382ms/step - loss: 0.9442
- accuracy: 0.6328 - val_loss: 0.7864 - val_accuracy: 0.7037
Epoch 5/30
44/44 [==============================] - 15s 332ms/step - loss: 0.8792
- accuracy: 0.6623 - val_loss: 0.9963 - val_accuracy: 0.7778
Epoch 6/30
44/44 [==============================] - 18s 404ms/step - loss: 0.8547
- accuracy: 0.6690 - val_loss: 0.8110 - val_accuracy: 0.7037
Epoch 7/30
44/44 [==============================] - 16s 350ms/step - loss: 0.7990
- accuracy: 0.7007 - val_loss: 0.6435 - val_accuracy: 0.8148
Epoch 8/30
44/44 [==============================] - 15s 343ms/step - loss: 0.7546
- accuracy: 0.7142 - val_loss: 0.7294 - val_accuracy: 0.7407
Epoch 9/30
44/44 [==============================] - 18s 396ms/step - loss: 0.7123
- accuracy: 0.7313 - val_loss: 0.6709 - val_accuracy: 0.7778
Epoch 10/30
44/44 [==============================] - 18s 407ms/step - loss: 0.6852
- accuracy: 0.7438 - val_loss: 0.6060 - val_accuracy: 0.7778
Epoch 11/30
44/44 [==============================] - 15s 334ms/step - loss: 0.6674
- accuracy: 0.7417 - val_loss: 0.6927 - val_accuracy: 0.6667
Epoch 12/30
44/44 [==============================] - 17s 378ms/step - loss: 0.6334
- accuracy: 0.7670 - val_loss: 0.6090 - val_accuracy: 0.7778
Epoch 13/30
44/44 [==============================] - 15s 338ms/step - loss: 0.6083
- accuracy: 0.7714 - val_loss: 0.4950 - val_accuracy: 0.8519
Epoch 14/30
44/44 [==============================] - 17s 377ms/step - loss: 0.5675
- accuracy: 0.7855 - val_loss: 0.4593 - val_accuracy: 0.8519
Epoch 15/30
44/44 [==============================] - 15s 347ms/step - loss: 0.5539
- accuracy: 0.7890 - val_loss: 0.5288 - val_accuracy: 0.8519
Epoch 16/30
44/44 [==============================] - 15s 334ms/step - loss: 0.5261
- accuracy: 0.8043 - val_loss: 0.4308 - val_accuracy: 0.8889
Epoch 17/30
44/44 [==============================] - 16s 375ms/step - loss: 0.4869
```

```
- accuracy: 0.8205 - val_loss: 0.6826 - val_accuracy: 0.8148
Epoch 18/30
44/44 [==============================] - 15s 333ms/step - loss: 0.4781
- accuracy: 0.8274 - val_loss: 0.4648 - val_accuracy: 0.8148
Epoch 19/30
44/44 [==============================] - 15s 344ms/step - loss: 0.4325
- accuracy: 0.8453 - val_loss: 0.2542 - val_accuracy: 0.8889
Epoch 20/30
44/44 [==============================] - 14s 306ms/step - loss: 0.4402
- accuracy: 0.8404 - val_loss: 0.2697 - val_accuracy: 0.9259
Epoch 21/30
44/44 [==============================] - 15s 348ms/step - loss: 0.4141
- accuracy: 0.8531 - val_loss: 0.3391 - val_accuracy: 0.7778
Epoch 22/30
44/44 [==============================] - 16s 375ms/step - loss: 0.4195
- accuracy: 0.8527 - val_loss: 0.3712 - val_accuracy: 0.8148
Epoch 23/30
44/44 [==============================] - 16s 357ms/step - loss: 0.3524
- accuracy: 0.8816 - val_loss: 0.3969 - val_accuracy: 0.8519
Epoch 24/30
44/44 [==============================] - 17s 400ms/step - loss: 0.3484
- accuracy: 0.8747 - val_loss: 0.5674 - val_accuracy: 0.8148
Epoch 25/30
44/44 [==============================] - 14s 321ms/step - loss: 0.3002
- accuracy: 0.8976 - val_loss: 0.4071 - val_accuracy: 0.8519
Epoch 26/30
44/44 [==============================] - 13s 299ms/step - loss: 0.2927
- accuracy: 0.8967 - val_loss: 0.2987 - val_accuracy: 0.8519
Epoch 27/30
44/44 [==============================] - 14s 320ms/step - loss: 0.3122
- accuracy: 0.8837 - val_loss: 0.1558 - val_accuracy: 0.9630
Epoch 28/30
44/44 [==============================] - 15s 340ms/step - loss: 0.2895
- accuracy: 0.8983 - val_loss: 0.2189 - val_accuracy: 0.8889
Epoch 29/30
44/44 [==============================] - 15s 351ms/step - loss: 0.2702
- accuracy: 0.9092 - val_loss: 0.3741 - val_accuracy: 0.8148
Epoch 30/30
44/44 [==============================] - 13s 302ms/step - loss: 0.2515
- accuracy: 0.9168 - val_loss: 0.1828 - val_accuracy: 0.8889

<keras.callbacks.History at 0x7f80dc1ab520>
```

```
model.save('flower.h5')
model_json=model.to_json()
with open("model-bw.json","w") as
json_file:json_file.write(model_json)
```

```
from tensorflow.keras.models import load_model
import keras
import numpy as np
from IPython.display import Image

model=load_model("flower.h5")
```

```
2022-10-06 11:31:31.497469: I
tensorflow/core/platform/cpu_feature_guard.cc:193] This TensorFlow
binary is optimized with oneAPI Deep Neural Network Library (oneDNN)
to use the following CPU instructions in performance-critical
operations:  AVX2 AVX512F AVX512_VNNI FMA
To enable them in other operations, rebuild TensorFlow with the
appropriate compiler flags.
2022-10-06 11:31:31.597871: I tensorflow/core/util/util.cc:169] oneDNN
custom operations are on. You may see slightly different numerical
results due to floating-point round-off errors from different
computation orders. To turn them off, set the environment variable
`TF_ENABLE_ONEDNN_OPTS=0`.
2022-10-06 11:31:31.601610: W
tensorflow/stream_executor/platform/default/dso_loader.cc:64] Could
not load dynamic library 'libcudart.so.11.0'; dlerror:
libcudart.so.11.0: cannot open shared object file: No such file or
directory
2022-10-06 11:31:31.601642: I
tensorflow/stream_executor/cuda/cudart_stub.cc:29] Ignore above cudart
dlerror if you do not have a GPU set up on your machine.
2022-10-06 11:31:31.621879: E
tensorflow/stream_executor/cuda/cuda_blas.cc:2981] Unable to register
cuBLAS factory: Attempting to register factory for plugin cuBLAS when
one has already been registered
2022-10-06 11:31:32.063026: W
tensorflow/stream_executor/platform/default/dso_loader.cc:64] Could
not load dynamic library 'libnvinfer.so.7'; dlerror: libnvinfer.so.7:
cannot open shared object file: No such file or directory
2022-10-06 11:31:32.063077: W
tensorflow/stream_executor/platform/default/dso_loader.cc:64] Could
not load dynamic library 'libnvinfer_plugin.so.7'; dlerror:
libnvinfer_plugin.so.7: cannot open shared object file: No such file
or directory
2022-10-06 11:31:32.063081: W
tensorflow/compiler/tf2tensorrt/utils/py_utils.cc:38] TF-TRT Warning:
Cannot dlopen some TensorRT libraries. If you would like to use Nvidia
GPU with TensorRT, please make sure the missing libraries mentioned
above are installed properly.
2022-10-06 11:31:32.566455: W
tensorflow/stream_executor/platform/default/dso_loader.cc:64] Could
not load dynamic library 'libcuda.so.1'; dlerror: libcuda.so.1: cannot
open shared object file: No such file or directory
2022-10-06 11:31:32.566477: W
```

```
tensorflow/stream_executor/cuda/cuda_driver.cc:263] failed call to
cuInit: UNKNOWN ERROR (303)
2022-10-06 11:31:32.566492: I
tensorflow/stream_executor/cuda/cuda_diagnostics.cc:156] kernel driver
does not appear to be running on this host (vaishnav-pt5653):
/proc/driver/nvidia/version does not exist
2022-10-06 11:31:32.566643: I
tensorflow/core/platform/cpu_feature_guard.cc:193] This TensorFlow
binary is optimized with oneAPI Deep Neural Network Library (oneDNN)
to use the following CPU instructions in performance-critical
operations:  AVX2 AVX512F AVX512_VNNI FMA
To enable them in other operations, rebuild TensorFlow with the
appropriate compiler flags.
```

```
img=keras.utils.load_img("Flowers-Dataset/flowers/test/
1/1.jpg",target_size=(64,64))
img
```

```
x=keras.utils.img_to_array(img)
x=np.expand_dims(x,axis=0)
pred=model.predict(x)
pred=pred.astype(int).tolist()
pred=pred[0]
pred
```

```
1/1 [==============================] - 0s 81ms/step

[1, 0, 0, 0, 0]
```

```
index=['daisy','dandelion','rose','sunfower','tulip']
for i in range(len(pred)):
    if(pred[i]==1):
        print(index[i])
```

```
daisy
```

```
for i in range(1,6):
    for j in range(1,6):

img=keras.utils.load_img("Flowers-Dataset/flowers/test/"+str(i)
+"/"+str(j)
+".jpg"                                    ,target_size=(64,64))
        display(Image(filename="Flowers-Dataset/flowers/test/"+str(i)
+"/"+str(j)+".jpg") )
```

```
x=keras.utils.img_to_array(img)
x=np.expand_dims(x,axis=0)
pred=model.predict(x)
pred=pred.astype(int).tolist()
pred=pred[0]
for k in range(len(pred)):
    if(pred[k]==1):
        print(index[k])
```

```
1/1 [==============================] - 0s 14ms/step
daisy
```

```
1/1 [==============================] - 0s 14ms/step
daisy
```

```
1/1 [==============================] - 0s 14ms/step
daisy
```

```
1/1 [==============================] - 0s 14ms/step
daisy
```

```
1/1 [==============================] - 0s 14ms/step
daisy
```

```
1/1 [==============================] - 0s 14ms/step
dandelion
```

```
1/1 [==============================] - 0s 13ms/step
tulip
```

```
1/1 [==============================] - 0s 13ms/step
sunfower
```

```
1/1 [==============================] - 0s 14ms/step
sunfower
```

```
1/1 [==============================] - 0s 14ms/step
tulip
```

```
1/1 [==============================] - 0s 13ms/step
rose
```

```
1/1 [==============================] - 0s 13ms/step
rose
```

```
1/1 [==============================] - 0s 14ms/step
tulip
```

```
1/1 [==============================] - 0s 13ms/step
rose
```

```
1/1 [==============================] - 0s 14ms/step
rose
```

```
1/1 [==============================] - 0s 12ms/step
tulip
```

```
1/1 [==============================] - 0s 14ms/step
tulip
```

```
1/1 [==============================] - 0s 14ms/step
sunfower
```

```
1/1 [==============================] - 0s 14ms/step
sunfower
```

```
1/1 [==============================] - 0s 15ms/step
sunfower
```

```
1/1 [==============================] - 0s 13ms/step
tulip
```

```
1/1 [==============================] - 0s 13ms/step
tulip
```

```
1/1 [==============================] - 0s 13ms/step
tulip
```

```
1/1 [==============================] - 0s 14ms/step
tulip
```

```
1/1 [==============================] - 0s 13ms/step
tulip
```

absl-py==1.2.0

asttokens==2.0.8

astunparse==1.6.3

backcall==0.2.0

cachetools==5.2.0

certifi==2022.9.24

charset-normalizer==2.1.1

contourpy==1.0.5

cycler==0.11.0

debugpy==1.6.3

decorator==5.1.1

entrypoints==0.4

executing==1.1.0

flatbuffers==22.9.24

fonttools==4.37.4

gast==0.4.0

google-auth==2.12.0

google-auth-oauthlib==0.4.6

google-pasta==0.2.0

grpcio==1.49.1

h5py==3.7.0

idna==3.4

importlib-metadata==5.0.0

ipykernel==6.16.0

ipython==8.5.0

jedi==0.18.1

jupyter-core==4.11.1

jupyter_client==7.3.5

keras==2.10.0

Keras-Preprocessing==1.1.2

kiwisolver==1.4.4

libclang==14.0.6

Markdown==3.4.1

MarkupSafe==2.1.1

matplotlib==3.6.0

matplotlib-inline==0.1.6

nest-asyncio==1.5.6

numpy==1.23.3

oauthlib==3.2.1

opt-einsum==3.3.0

packaging==21.3

parso==0.8.3

pexpect==4.8.0

pickleshare==0.7.5

Pillow==9.2.0

prompt-toolkit==3.0.31

protobuf==3.19.6

psutil==5.9.2

ptyprocess==0.7.0

pure-eval==0.2.2

pyasn1==0.4.8

pyasn1-modules==0.2.8

Pygments==2.13.0

pyparsing==3.0.9

python-dateutil==2.8.2

pyzmq==24.0.1

requests==2.28.1

requests-oauthlib==1.3.1

rsa==4.9

scipy==1.9.1

six==1.16.0

stack-data==0.5.1

tensorboard==2.10.1

tensorboard-data-server==0.6.1

tensorboard-plugin-wit==1.8.1

tensorflow==2.10.0

tensorflow-estimator==2.10.0

tensorflow-io-gcs-filesystem==0.27.0

termcolor==2.0.1

tornado==6.2

traitlets==5.4.0

typing_extensions==4.3.0

urllib3==1.26.12

wcwidth==0.2.5

Werkzeug==2.2.2

wrapt==1.14.1

zipp==3.8.1