

1.DOWNLOAD THE DATA SET AND UNZIP IT

```
from google.colab import drive
drive.mount('/content/drive')
```

Mounted at /content/drive

Importation of Libraries

```
import numpy as np # linear algebra
import pandas as pd # data processing, CSV file I/O (e.g. pd.read_csv)
import matplotlib.pyplot as plt
%matplotlib inline
import os
import PIL
import cv2
import tensorflow as tf
from tensorflow import keras
from tensorflow.keras import layers,models
```

```
!unzip '/content/drive/MyDrive/Flowers-Dataset.zip'
```

```
Archive: /content/drive/MyDrive/Flowers-Dataset.zip
  inflating: flowers/daisy/100080576_f52e8ee070_n.jpg
  inflating: flowers/daisy/10140303196_b88d3d6cec.jpg
  inflating: flowers/daisy/10172379554_b296050f82_n.jpg
  inflating: flowers/daisy/10172567486_2748826a8b.jpg
  inflating: flowers/daisy/10172636503_21bededa75_n.jpg
  inflating: flowers/daisy/102841525_bd6628ae3c.jpg
  inflating: flowers/daisy/10300722094_28fa978807_n.jpg
  inflating: flowers/daisy/1031799732_e7f4008c03.jpg
  inflating: flowers/daisy/10391248763_1d16681106_n.jpg
  inflating: flowers/daisy/10437754174_22ec990b77_m.jpg
  inflating: flowers/daisy/10437770546_8bb6f7bdd3_m.jpg
  inflating: flowers/daisy/10437929963_bc13eebe0c.jpg
  inflating: flowers/daisy/10466290366_cc72e33532.jpg
  inflating: flowers/daisy/10466558316_a7198b87e2.jpg
  inflating: flowers/daisy/10555749515_13a12a026e.jpg
  inflating: flowers/daisy/10555815624_dc211569b0.jpg
  inflating: flowers/daisy/10555826524_423eb8bf71_n.jpg
  inflating: flowers/daisy/10559679065_50d2b16f6d.jpg
  inflating: flowers/daisy/105806915_a9c13e2106_n.jpg
  inflating: flowers/daisy/10712722853_5632165b04.jpg
  inflating: flowers/daisy/107592979_aaa9cdf78_m.jpg
  inflating: flowers/daisy/10770585085_4742b9dac3_n.jpg
  inflating: flowers/daisy/10841136265_af473efc60.jpg
  inflating: flowers/daisy/10993710036_2033222c91.jpg
  inflating: flowers/daisy/10993818044_4c19b86c82.jpg
```

```
inflating: flowers/daisy/10994032453_ac7f8d9e2e.jpg
inflating: flowers/daisy/11023214096_b5b39fab08.jpg
inflating: flowers/daisy/11023272144_fce94401f2_m.jpg
inflating: flowers/daisy/11023277956_8980d53169_m.jpg
inflating: flowers/daisy/11124324295_503f3a0804.jpg
inflating: flowers/daisy/1140299375_3aa7024466.jpg
inflating: flowers/daisy/11439894966_dca877f0cd.jpg
inflating: flowers/daisy/1150395827_6f94a5c6e4_n.jpg
inflating: flowers/daisy/11642632_1e7627a2cc.jpg
inflating: flowers/daisy/11834945233_a53b7a92ac_m.jpg
inflating: flowers/daisy/11870378973_2ec1919f12.jpg
inflating: flowers/daisy/11891885265_ccefec7284_n.jpg
inflating: flowers/daisy/12193032636_b50ae7db35_n.jpg
inflating: flowers/daisy/12348343085_d4c396e5b5_m.jpg
inflating: flowers/daisy/12585131704_0f64b17059_m.jpg
inflating: flowers/daisy/12601254324_3cb62c254a_m.jpg
inflating: flowers/daisy/1265350143_6e2b276ec9.jpg
inflating: flowers/daisy/12701063955_4840594ea6_n.jpg
inflating: flowers/daisy/1285423653_18926dc2c8_n.jpg
inflating: flowers/daisy/1286274236_1d7ac84efb_n.jpg
inflating: flowers/daisy/12891819633_e4c82b51e8.jpg
inflating: flowers/daisy/1299501272_59d9da5510_n.jpg
inflating: flowers/daisy/1306119996_ab8ae14d72_n.jpg
inflating: flowers/daisy/1314069875_da8dc023c6_m.jpg
inflating: flowers/daisy/1342002397_9503c97b49.jpg
inflating: flowers/daisy/134409839_71069a95d1_m.jpg
inflating: flowers/daisy/1344985627_c3115e2d71_n.jpg
inflating: flowers/daisy/13491959645_2cd9df44d6_n.jpg
inflating: flowers/daisy/1354396826_2868631432_m.jpg
inflating: flowers/daisy/1355787476_32e9f2a30b.jpg
inflating: flowers/daisy/13583238844_573df2de8e_m.jpg
inflating: flowers/daisy/1374193928_a52320eafa.jpg
```

Image Augmentation

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

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

```
test_datagen = ImageDataGenerator(rescale=1./255)
```

```
xtrain = train_datagen.flow_from_directory('/content/flowers',
                                           target_size=(64,64),
                                           class_mode='categorical',
                                           batch_size=100)
```

Found 4317 images belonging to 5 classes.

Create the model

```
from tensorflow.keras.models import Sequential
from tensorflow.keras.layers import Convolution2D,MaxPooling2D,Flatten,Dense
```

Add Layers

```
model = Sequential()
model.add(Convolution2D(32,(3,3),activation='relu',input_shape=(64,64,3))) # Convolution ]
model.add(MaxPooling2D(pool_size=(2,2))) # Max pooling layer
model.add(Flatten()) # Flatten layer
# Dense layers
model.add(Dense(300,activation='relu')) # Hidden layer
model.add(Dense(150,activation='relu')) # Hidden layer
model.add(Dense(5,activation='softmax')) # Output layer
```

Compile The Model

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

Fit The Model

```
model.fit(xtrain,
        steps_per_epoch=len(xtrain),
        epochs=10,
        )
```

```
Epoch 1/10
44/44 [=====] - 30s 657ms/step - loss: 1.5627 - accuracy: 0
Epoch 2/10
44/44 [=====] - 29s 663ms/step - loss: 1.1055 - accuracy: 0
Epoch 3/10
44/44 [=====] - 29s 655ms/step - loss: 1.0354 - accuracy: 0
Epoch 4/10
44/44 [=====] - 29s 657ms/step - loss: 0.9466 - accuracy: 0
Epoch 5/10
44/44 [=====] - 29s 661ms/step - loss: 0.8928 - accuracy: 0
Epoch 6/10
44/44 [=====] - 29s 661ms/step - loss: 0.8559 - accuracy: 0
Epoch 7/10
44/44 [=====] - 29s 666ms/step - loss: 0.8239 - accuracy: 0
Epoch 8/10
44/44 [=====] - 29s 664ms/step - loss: 0.7701 - accuracy: 0
Epoch 9/10
44/44 [=====] - 29s 655ms/step - loss: 0.7397 - accuracy: 0
Epoch 10/10
44/44 [=====] - 29s 660ms/step - loss: 0.7280 - accuracy: 0
<keras.callbacks.History at 0x7fc422599650>
```

Save The Model

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

TESTING THE MODEL

```
import numpy as np
from tensorflow.keras.preprocessing import image
```

```
img = image.load_img('/content/flowers/sunflower/1008566138_6927679c8a.jpg',target_size=(64,64))
img
```



```
x = image.img_to_array(img)
x
x = np.expand_dims(x,axis=0)
x
model.predict(x)
```

```
1/1 [=====] - 0s 103ms/step
array([[0., 0., 0., 1., 0.]], dtype=float32)
```

```
xtrain.class_indices
```

```
{'daisy': 0, 'dandelion': 1, 'rose': 2, 'sunflower': 3, 'tulip': 4}
```

```
op = ['daisy','dandelion','rose','sunflower','tulip']
pred = np.argmax(model.predict(x))
op[pred]
```

```
1/1 [=====] - 0s 25ms/step
'sunflower'
```

Testing

Tulip Testing

```
from numpy.lib.type_check import imag
img = image.load_img('/content/flowers/tulip/10128546863_8de70c610d.jpg',target_size=(64,64))
```

img



```
x = image.img_to_array(img)
x = np.expand_dims(x,axis=0)
pred = np.argmax(model.predict(x))
op[pred]
```

```
1/1 [=====] - 0s 24ms/step
'tulip'
```

Rose Testing

```
img = image.load_img('/content/flowers/rose/102501987_3cdb8e5394_n.jpg',target_size=(64,64))
img
```



```
x = image.img_to_array(img)
x = np.expand_dims(x,axis=0)
pred = np.argmax(model.predict(x))
op[pred]
```

```
1/1 [=====] - 0s 29ms/step
'rose'
```

Daisy Testing

```
img = image.load_img('/content/flowers/daisy/10172567486_2748826a8b.jpg',target_size=(64,64))
img
```



```
x = image.img_to_array(img)
x = np.expand_dims(x,axis=0)
pred = np.argmax(model.predict(x))
op[pred]
```

1/1 [=====] - 0s 23ms/step

Dandelion Testing

```
img = image.load_img('/content/flowers/dandelion/11405573_24a8a838cc_n.jpg',target_size=(64,64))
img
```



```
x = image.img_to_array(img)
x = np.expand_dims(x,axis=0)
pred = np.argmax(model.predict(x))
op[pred]
```

1/1 [=====] - 0s 26ms/step
'dandelion'