

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

Mounted at /content/drive

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



```
inflating: flowers/tulip/7136973281_b2a935ce20.jpg
inflating: flowers/tulip/7144016605_e159b6c06b_m.jpg
inflating: flowers/tulip/7145978709_2d1596f462.jpg
inflating: flowers/tulip/7166539842_43b7e02883.jpg
inflating: flowers/tulip/7166539842_43b7e02883_n.jpg
inflating: flowers/tulip/7166544280_9d975c4d9a_n.jpg
inflating: flowers/tulip/7166546934_c97b08c9d9_n.jpg
inflating: flowers/tulip/7166550328_de0d73cfa9.jpg
inflating: flowers/tulip/7166550328_de0d73cfa9_n.jpg
inflating: flowers/tulip/7166552648_28b6dce578.jpg
inflating: flowers/tulip/7166552648_28b6dce578_n.jpg
inflating: flowers/tulip/7166554924_432aaae4b2_n.jpg
inflating: flowers/tulip/7166558370_f7f68983ea_n.jpg
inflating: flowers/tulip/7166560822_27b1d1d132_n.jpg
inflating: flowers/tulip/7166564830_8b34a3fd35_n.jpg
inflating: flowers/tulip/7166567320_0a2beb6d42.jpg
inflating: flowers/tulip/7166567320_0a2beb6d42_n.jpg
inflating: flowers/tulip/7166570828_7c26ca5766_n.jpg
inflating: flowers/tulip/7166574936_3d93a510c5_n.jpg
inflating: flowers/tulip/7166581866_861cd081b8_n.jpg
inflating: flowers/tulip/7166589802_8238cec83b_n.jpg
inflating: flowers/tulip/7166591854_93c0dd6f8d_n.jpg
inflating: flowers/tulip/7166596680_a01961a618_n.jpg
inflating: flowers/tulip/7166598930_18d8686ace_n.jpg
inflating: flowers/tulip/7166606598_5d2cd307c3.jpg
inflating: flowers/tulip/7166606598_5d2cd307c3_n.jpg
inflating: flowers/tulip/7166612682_711e680027_n.jpg
inflating: flowers/tulip/7166614014_5f0f8d715b_n.jpg
inflating: flowers/tulip/7166616072_1233051d98_n.jpg
inflating: flowers/tulip/7166618384_850905fc63_n.jpg
inflating: flowers/tulip/7166620850_8a37b95972_n.jpg
inflating: flowers/tulip/7166623602_256179ab00_n.jpg
inflating: flowers/tulip/7166626128_8e0983ac8e_n.jpg
inflating: flowers/tulip/7166632158_666116d770_n.jpg
inflating: flowers/tulip/7166635566_ee240b5408_n.jpg
inflating: flowers/tulip/7166640338_46b15d9ec8_n.jpg
inflating: flowers/tulip/7166644048_b00a14f01b.jpg
inflating: flowers/tulip/7166644048_b00a14f01b_n.jpg
inflating: flowers/tulip/7166646966_41d83cd703.jpg
inflating: flowers/tulip/7177682195_c29265748d_n.jpg
inflating: flowers/tulip/7179796338_05e8b1c87b.jpg
inflating: flowers/tulip/7205145492_baec4dbb94.jpg
inflating: flowers/tulip/7205698252_b972087cc2.jpg
inflating: flowers/tulip/7247182064_f8d6759446_n.jpg
inflating: flowers/tulip/7266196114_c2a736a15a_m.jpg
inflating: flowers/tulip/7342871880_c17fe0eb4f_m.jpg
```

```
inflating: flowers/tulip/738207467_fc59cfc9b_z.jpg
inflating: flowers/tulip/7447655334_e8f805ab95_m.jpg
inflating: flowers/tulip/7448453762_aea8739f1b.jpg

inflating: flowers/tulip/7481204112_e3c57dd40a_n.jpg
inflating: flowers/tulip/7481215720_73e40f178f_n.jpg
inflating: flowers/tulip/7481217920_6f65766a1c_n.jpg
inflating: flowers/tulip/7775145448_c42e638a6a_n.jpg
inflating: flowers/tulip/779359602_30abcbf5bb_n.jpg
inflating: flowers/tulip/7806320016_fcddfc1f8f_n.jpg
inflating: flowers/tulip/8394186551_28eed83a94_m.jpg
inflating: flowers/tulip/8454707381_453b4862eb_m.jpg
inflating: flowers/tulip/8454719295_4276c0e9c5_n.jpg
```

```
import numpy as np
import tensorflow as tf
from tensorflow.keras import layers
from tensorflow.keras.models import Sequential
from tensorflow.keras.preprocessing.image import ImageDataGenerator
import matplotlib.pyplot as plt
batch_size = 32
img_height = 180
img_width = 180
data_dir = "/content/flowers"
```

```
train_datagen = ImageDataGenerator(rescale = 1./255, horizontal_flip = True, vertical_flip =
```

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

Found 4317 images belonging to 5 classes.

```
data_augmentation = Sequential(
    [
        layers.RandomFlip("vertical",input_shape=(img_height, img_width, 4)),
        layers.RandomRotation(0.1),
        layers.RandomZoom(0.1),
    ]
)
```

```
from tensorflow.keras.layers import Convolution2D,MaxPooling2D,Flatten,Dense
model = Sequential()
```

```
#Image Augumentation accuracy
data_augmentation = Sequential(
    [
```

```
layers.RandomFlip("horizontal",input_shape=(img_height, img_width, 3)),
layers.RandomRotation(0.1),
layers.RandomZoom(0.1),
]
)
```

```
training_ds = tf.keras.utils.image_dataset_from_directory(
    data_dir,
    validation_split=0.2,
    subset="training",
    seed=57,
    image_size=(img_height, img_width),
    batch_size=batch_size)
```

```
Found 4317 files belonging to 5 classes.
Using 3454 files for training.
```

```
validation_ds = tf.keras.utils.image_dataset_from_directory(
    data_dir,
    validation_split=0.2,
    subset="validation",
    seed=107,
    image_size=(img_height, img_width),
    batch_size=batch_size)
```

```
Found 4317 files belonging to 5 classes.
Using 863 files for validation.
```

```
training_ds.class_names
```

```
['daisy', 'dandelion', 'rose', 'sunflower', 'tulip']
```

```
plt.figure(figsize=(7, 7))
for data, labels in training_ds.take(1):
    for i in range(6):
        ax = plt.subplot(3, 4, i + 1)
        plt.imshow(data[i].numpy().astype("uint8"))
        plt.title(training_ds.class_names[labels[i]])
        plt.axis("off")
```



```
model.add(Convolution2D(32, (3,3), activation = "relu", input_shape = (64,64,3) ))
model.add(MaxPooling2D(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(x_train, epochs = 15, steps_per_epoch = len(x_train))
```

```
Epoch 1/15
44/44 [=====] - 31s 697ms/step - loss: 1.5854 - accuracy: 0.385
Epoch 2/15
44/44 [=====] - 29s 664ms/step - loss: 1.1243 - accuracy: 0.541
Epoch 3/15
44/44 [=====] - 29s 656ms/step - loss: 1.0719 - accuracy: 0.565
Epoch 4/15
44/44 [=====] - 29s 658ms/step - loss: 1.0064 - accuracy: 0.601
Epoch 5/15
44/44 [=====] - 29s 657ms/step - loss: 0.9767 - accuracy: 0.616
Epoch 6/15
44/44 [=====] - 34s 753ms/step - loss: 0.9071 - accuracy: 0.638
Epoch 7/15
44/44 [=====] - 30s 684ms/step - loss: 0.9119 - accuracy: 0.643
Epoch 8/15
44/44 [=====] - 29s 655ms/step - loss: 0.8752 - accuracy: 0.655
Epoch 9/15
44/44 [=====] - 29s 661ms/step - loss: 0.8342 - accuracy: 0.673
Epoch 10/15
44/44 [=====] - 29s 652ms/step - loss: 0.8196 - accuracy: 0.681
Epoch 11/15
44/44 [=====] - 29s 649ms/step - loss: 0.8043 - accuracy: 0.678
Epoch 12/15
44/44 [=====] - 29s 642ms/step - loss: 0.7759 - accuracy: 0.702
Epoch 13/15
44/44 [=====] - 28s 641ms/step - loss: 0.7862 - accuracy: 0.688
Epoch 14/15
44/44 [=====] - 28s 635ms/step - loss: 0.7574 - accuracy: 0.711
Epoch 15/15
44/44 [=====] - 29s 657ms/step - loss: 0.7312 - accuracy: 0.726
<keras.callbacks.History at 0x7fd9bc9a9190>
```

```
model.save("flowers.h1")
```

```
from tensorflow.keras.models import load_model
from tensorflow.keras.preprocessing import image
```

```
model = load_model("/content/flowers.h1")
```

```
rose_img = image.load_img('/content/flowers/rose/11944957684_2cc806276e.jpg',target_size=(64,  
x = image.img_to_array(rose_img)  
x = np.expand_dims(x,axis=0)  
predicted_class=model.predict(x)
```

```
labels = ['daisy','dandelion','roses','sunflowers','tulips']  
labels[np.argmax(predicted_class)]
```

'roses'

rose\_img



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