

```
ls
```

```
drive/ sample_data/
```

```
cd /content/drive/MyDrive/Data
```

```
/content/drive/MyDrive/Data
```

```
ls
```

```
Flowers-Dataset.zip
```

```
pwd
```

```
'/content/drive/MyDrive/Data'
```

```
!unzip Flowers-Dataset.zip
```

```

inflating: flowers/tulip/8695372372_302135aeb2.jpg
inflating: flowers/tulip/8695372372_302135aeb2.jpg
inflating: flowers/tulip/8697784345_e75913d220.jpg
inflating: flowers/tulip/8702982836_75222725d7.jpg
inflating: flowers/tulip/8706523526_a0f161b72b.jpg
inflating: flowers/tulip/8708209606_d3aede4801.jpg
inflating: flowers/tulip/8708856019_f3be2353a4_n.jpg
inflating: flowers/tulip/8710148289_6fc196a0f8_n.jpg
inflating: flowers/tulip/8711277462_b43df5454b_m.jpg
inflating: flowers/tulip/8712230357_1298b8513b.jpg
inflating: flowers/tulip/8712243901_54d686319e_m.jpg
inflating: flowers/tulip/8712244311_da8e90bf8e_n.jpg
inflating: flowers/tulip/8712260079_c0ff42e0e2_n.jpg
inflating: flowers/tulip/8712263493_3db76c5f82.jpg
inflating: flowers/tulip/8712266605_3787e346cd_n.jpg
inflating: flowers/tulip/8712267391_c756f18ee7_n.jpg
inflating: flowers/tulip/8712267813_f7a9be2ec5.jpg
inflating: flowers/tulip/8712268519_f4c2c39a06_n.jpg
inflating: flowers/tulip/8712269349_2b933da2b8_n.jpg
inflating: flowers/tulip/8712270243_8512cf4fbd.jpg
inflating: flowers/tulip/8712270665_57b5bda0a2_n.jpg
inflating: flowers/tulip/8712282563_3819afb7bc.jpg
inflating: flowers/tulip/8713357842_9964a93473_n.jpg
inflating: flowers/tulip/8713387500_6a9138b41b_n.jpg
inflating: flowers/tulip/8713388322_e5ae26263b_n.jpg
inflating: flowers/tulip/8713389178_66bceb71a8_n.jpg
inflating: flowers/tulip/8713390684_041148dd3e_n.jpg
inflating: flowers/tulip/8713391394_4b679ea1e3_n.jpg
inflating: flowers/tulip/8713392604_90631fb809_n.jpg
inflating: flowers/tulip/8713394070_b24561b0a9.jpg
inflating: flowers/tulip/8713396140_5af8136136.jpg
inflating: flowers/tulip/8713397358_0505cc0176_n.jpg
inflating: flowers/tulip/8713397694_bcbcbba2c2_n.jpg
inflating: flowers/tulip/8713398114_bc96f1b624_n.jpg
inflating: flowers/tulip/8713398614_88202e452e_n.jpg
inflating: flowers/tulip/8713398906_28e59a225a_n.jpg
inflating: flowers/tulip/8713407768_f880df361f.jpg
inflating: flowers/tulip/8713407768_f880df361f.jpg

```

```

inflating: flowers/tulip/8717500502_2aa508e3e3.jpg
inflating: flowers/tulip/8722514702_7ecc68691c.jpg
inflating: flowers/tulip/8723767533_9145dec4bd_n.jpg
inflating: flowers/tulip/8729501081_b993185542_m.jpg
inflating: flowers/tulip/8733586143_3139db6e9e_n.jpg
inflating: flowers/tulip/8748266132_5298a91dcf_n.jpg
inflating: flowers/tulip/8750288831_5e49a9f29b.jpg
inflating: flowers/tulip/8757486380_90952c5377.jpg
inflating: flowers/tulip/8758464923_75a5ffe320_n.jpg
inflating: flowers/tulip/8758519201_16e8d2d781_n.jpg
inflating: flowers/tulip/8759594528_2534c0ec65_n.jpg
inflating: flowers/tulip/8759597778_7fca5d434b_n.jpg
inflating: flowers/tulip/8759601388_36e2a50d98_n.jpg
inflating: flowers/tulip/8759606166_8e475013fa_n.jpg
inflating: flowers/tulip/8759618746_f5e39fdbf8_n.jpg
inflating: flowers/tulip/8762189906_8223cef62f.jpg
inflating: flowers/tulip/8762193202_0fbf2f6a81.jpg
inflating: flowers/tulip/8768645961_8f1e097170_n.jpg
inflating: flowers/tulip/8817622133_a42bb90e38_n.jpg
inflating: flowers/tulip/8838347159_746d14e6c1_m.jpg
inflating: flowers/tulip/8838354855_c474fc66a3_m.jpg
inflating: flowers/tulip/8838914676_8ef4db7f50_n.jpg

```

▼ Image Augumentation

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

```
train_data=ImageDataGenerator(rescale=1./255, zoom_range=0.2, horizontal_flip=True, vertical
```

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

```
x_train = train_data.flow_from_directory('/content/drive/MyDrive/Data/flowers', target_siz
```

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

```
x_test = test_datagen.flow_from_directory('/content/drive/MyDrive/Data/flowers', target_siz
```

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

▼ CNN model training

```
import warnings
warnings.filterwarnings("ignore")
```

```
import numpy as np
import matplotlib.pyplot as plt
import pandas as pd
```

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

```
model = Sequential()
```

Adding Layers

```
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(300,activation='relu'))
model.add(Dense(5,activation='softmax'))
```

Compiling the model

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

```
len(x_train)
```

```
108
```

Fit the model

```
model.fit(x_train, epochs=5, validation_data=x_test, steps_per_epoch=len(x_train), validate
```

```
Epoch 1/5
108/108 [=====] - 64s 584ms/step - loss: 1.5376 - accuracy:
Epoch 2/5
108/108 [=====] - 62s 579ms/step - loss: 1.0817 - accuracy:
Epoch 3/5
108/108 [=====] - 63s 581ms/step - loss: 0.9962 - accuracy:
Epoch 4/5
108/108 [=====] - 63s 588ms/step - loss: 0.9272 - accuracy:
Epoch 5/5
108/108 [=====] - 63s 582ms/step - loss: 0.8771 - accuracy:
<keras.callbacks.History at 0x7f911a976050>
```



Save the Model

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

Testing the model

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

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

```
# Load the model
model=load_model("/content/drive/MyDrive/Data/flowers.h5")
```

```
img=image.load_img("/content/drive/MyDrive/Data/flowers/tulip/10128546863_8de70c610d.jpg",
```

```
img
```



```
img = image.load_img('/content/drive/MyDrive/Data/flowers/rose/11233672494_d8bf0a3dbf_n.jpg')
x = image.img_to_array(img)
x = np.expand_dims(x,axis=0)
pred = np.argmax(model.predict(x))
op = ['daisy','dandelion','rose','sunflower','tulip']
op[pred]
```

```
1/1 [=====] - 0s 27ms/step
'rose'
```

```
classes=['daisy','dandelion','rose','sunflower','tulip']
def testing(img):
    img=image.load_img(img,target_size=(64,64))
    x=image.img_to_array(img)
    x=np.expand_dims(x,axis=0)
    pred=np.argmax(model.predict(x))
    return print("Predicted class as:",classes[pred])
```

```
def img_show(img):
    img1=image.load_img(img,target_size=(64,64))
    plt.imshow(img1)
```

```
#test1
img_show('/content/drive/MyDrive/Data/flowers/tulip/3529889389_ab4cb6c43b.jpg')
testing('/content/drive/MyDrive/Data/flowers/tulip/3529889389_ab4cb6c43b.jpg')
```

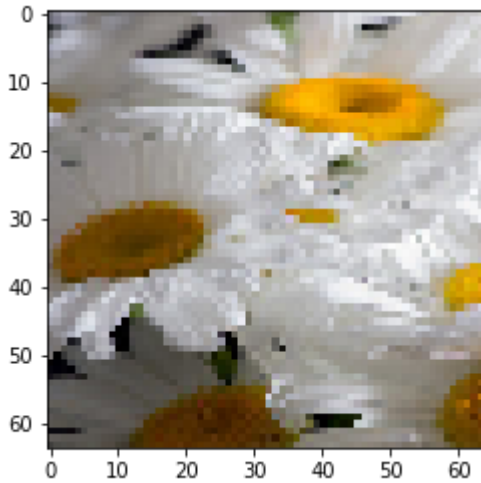
```
1/1 [=====] - 0s 30ms/step  
Predicted class as: tulip
```



```
#test2
```

```
img_show('/content/drive/MyDrive/Data/flowers/daisy/11023272144_fce94401f2_m.jpg')  
testing('/content/drive/MyDrive/Data/flowers/daisy/11023272144_fce94401f2_m.jpg')
```

```
1/1 [=====] - 0s 24ms/step  
Predicted class as: daisy
```



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✓ 0s completed at 08:08

