In [56]:

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

In [57]:

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

In [58]:

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

In [59]:

```
x_train = train_datagen.flow_from_directory(r"C:\Users\ADMIN\Desktop\flowers",target_size =
                                            class_mode = "categorical",batch_size = 24)
```

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

In [60]:

```
x_test = test_datagen.flow_from_directory(r"C:\Users\ADMIN\Desktop\flowers",target_size = (
                                        class_mode = "categorical",batch_size = 24)
```

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

In [61]:

```
x_train.class_indices
```

Out[61]:

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

In [62]:

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

In [63]:

```
model=Sequential()
```

In [64]:

```
model.add(Convolution2D(32,(3,3),input_shape=(64,64,3),activation='relu'))
```

In [65]:

```
model.add(MaxPooling2D(pool_size=(2,2)))
```

In [66]:

```
model.add(Flatten())
```

In [67]:

```
model.summary()
```

```
Model: "sequential_1"
_________________________________________________________________
 Layer (type)                Output Shape              Param #   
=================================================================
 conv2d_1 (Conv2D)           (None, 62, 62, 32)        896       
                                                                 
 max_pooling2d_1 (MaxPooling  (None, 31, 31, 32)       0         
 2D)                                                             
                                                                 
 flatten_1 (Flatten)         (None, 30752)             0         
                                                                 
=================================================================
Total params: 896
Trainable params: 896
Non-trainable params: 0
_________________________________________________________________
```

In [68]:

```
model.add(Dense(300,activation='relu'))
model.add(Dense(150,activation='relu'))
```

In [69]:

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

In [70]:

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

In [71]:

```
len(x_train)
```

Out[71]:

```
180
```

In [72]:

```
model.fit(x_train, epochs = 2, validation_data=x_test, steps_per_epoch=len(x_train), valida
```

```
Epoch 1/2
180/180 [==============================] - 28s 153ms/step - loss: 1.2501 - a
ccuracy: 0.4807 - val_loss: 1.1886 - val_accuracy: 0.5242
Epoch 2/2
180/180 [==============================] - 27s 149ms/step - loss: 1.0602 - a
ccuracy: 0.5719 - val_loss: 1.1136 - val_accuracy: 0.5617
```

Out[72]:

```
<keras.callbacks.History at 0x205cb6d6170>
```

In [73]:

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

In [74]:

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

In [75]:

```
model=load_model('flowers.h5')
```

In [76]:

```
img=image.load_img(r"C:\Users\ADMIN\Desktop\flowers\daisy\107592979_aaa9cdfe78_m.jpg")
```

In [77]:

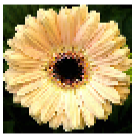
```
img
```

Out[77]:

In [78]:

```
img=image.load_img(r"C:\Users\ADMIN\Desktop\flowers\daisy\107592979_aaa9cdfe78_m.jpg", targ
img
```

Out[78]:



In [79]:

```
x=image.img_to_array(img)
```

In [80]:

```
x
```

Out[80]:

```
array([[[35., 68., 11.],
        [31., 54., 12.],
        [34., 55., 14.],
        ...,
        [ 2.,  2.,  2.],
        [ 2.,  2.,  2.],
        [ 2.,  2.,  2.]],

       [[41., 76., 12.],
        [40., 67., 16.],
        [34., 53.,  8.],
        ...,
        [ 0.,  2.,  1.],
        [ 0.,  0.,  0.],
        [ 0.,  0.,  0.]],

       [[32., 65., 10.],
        [39., 63., 11.],
        [40., 64., 16.],
        ...,
        [14., 29.,  6.],
        [16., 32.,  5.],
        [13., 27.,  2.]],

       ...,

       [[10., 21.,  4.],
        [ 9., 22.,  2.],
        [16., 30.,  7.],
        ...,
        [ 5., 16.,  2.],
        [ 2.,  7.,  1.],
        [ 4., 11.,  3.]],

       [[ 4., 15.,  1.],
        [ 5., 16.,  0.],
        [14., 30.,  4.],
        ...,
        [ 1.,  3.,  0.],
        [ 4.,  9.,  3.],
        [ 4.,  9.,  3.]],

       [[ 2.,  7.,  1.],
        [11., 22.,  5.],
        [17., 31.,  6.],
        ...,
        [ 2.,  2.,  0.],
        [ 3.,  5.,  2.],
        [ 2., 12.,  1.]]], dtype=float32)
```

In [81]:

```
x=np.expand_dims(x,axis=0)
x
```

Out[81]:

```
array([[[[35., 68., 11.],
         [31., 54., 12.],
         [34., 55., 14.],
         ...,
         [ 2.,  2.,  2.],
         [ 2.,  2.,  2.],
         [ 2.,  2.,  2.]],

        [[41., 76., 12.],
         [40., 67., 16.],
         [34., 53.,  8.],
         ...,
         [ 0.,  2.,  1.],
         [ 0.,  0.,  0.],
         [ 0.,  0.,  0.]],

        [[32., 65., 10.],
         [39., 63., 11.],
         [40., 64., 16.],
         ...,
         [14., 29.,  6.],
         [16., 32.,  5.],
         [13., 27.,  2.]],

        ...,

        [[10., 21.,  4.],
         [ 9., 22.,  2.],
         [16., 30.,  7.],
         ...,
         [ 5., 16.,  2.],
         [ 2.,  7.,  1.],
         [ 4., 11.,  3.]],

        [[ 4., 15.,  1.],
         [ 5., 16.,  0.],
         [14., 30.,  4.],
         ...,
         [ 1.,  3.,  0.],
         [ 4.,  9.,  3.],
         [ 4.,  9.,  3.]],

        [[ 2.,  7.,  1.],
         [11., 22.,  5.],
         [17., 31.,  6.],
         ...,
         [ 2.,  2.,  0.],
         [ 3.,  5.,  2.],
         [ 2., 12.,  1.]]]], dtype=float32)
```

In [82]:

```
y=np.argmax(model.predict(x),axis=0)
```

```
1/1 [==============================] - 0s 74ms/step
```

In [83]:

```
y
```

Out[83]:

```
array([0, 0, 0, 0, 0], dtype=int64)
```

In [84]:

```
x_train.class_indices
```

Out[84]:

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

In [85]:

```
index=['daisy','dandelion','rose','sunflower']
```

In [86]:

```
index[y[0]]
```

Out[86]:

```
'daisy'
```

In [87]:

```
img=image.load_img(r"C:\Users\ADMIN\Desktop\flowers\dandelion\751941983_58e1ae3957_m.jpg",
x=image.img_to_array(img)
x=np.expand_dims(x,axis=0)
y=np.argmax(model.predict(x),axis=1)
index=['daisy','dandelion','rose','sunflower']
index[y[0]]
```

```
1/1 [==============================] - 0s 33ms/step
```

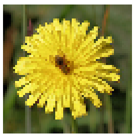
Out[87]:

```
'sunflower'
```

In [88]:

```
img
```

Out[88]:



In [89]:

```
img=image.load_img(r"C:\Users\ADMIN\Desktop\flowers\rose\3664842094_5fd60ee26b.jpg", target
x=image.img_to_array(img)
x=np.expand_dims(x,axis=0)
y=np.argmax(model.predict(x),axis=1)
index=['daisy','rose','dandelion','sunflower']
index[y[0]]
```

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

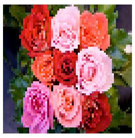
Out[89]:

```
'dandelion'
```

In [90]:

```
img
```

Out[90]:



In [93]:

```
img=image.load_img(r"C:\Users\ADMIN\Desktop\flowers\sunflower\3840761441_7c648abf4d_n.jpg",
x=image.img_to_array(img)
x=np.expand_dims(x,axis=0)
y=np.argmax(model.predict(x),axis=0)
index=['sunflower','daisy','dandelion','rose']
index[y[0]]
```

```
1/1 [==============================] - 0s 22ms/step
```

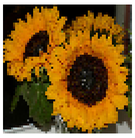
Out[93]:

```
'sunflower'
```

In [94]:

```
img
```

Out[94]:



In [ ]:

```

```