Assignment -3
Python Programming

Assignment Date	29 September 2022
Student Name	Mahesh
Student Roll Number	720819106044
Maximum Marks	2 Marks

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

×

```
    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_aaa9cdfe78_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:
                 Archive:  /content/drive/MyDrive/Flowers-Dataset.zip  inflating:
    flowers/daisy/12601254324_3cb62c254a_m.jpg
Saved successfully!    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
```

2.Image Augmentation

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

    Mounted at /content/drive


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

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

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

```python
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.
```

```python
xtest=test_datagen.flow_from_directory('/content/flowers',
target_size=(64,64),
class_mode='categorical',
batch_size=100)
```

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

3.Create Model

```python
from tensorflow.keras.models import Sequential  Saved successfully!
from tensorflow.keras.layers import Convolution2D,MaxPooling2D,Flatten,Dense
```

✕

4.Add Layers

```python
model       =    Sequential()      #Initializing    sequential   model
model.add(Convolution2D(32,(3,3),activation='relu',input_shape=(64,64,3)))  #Convolution l
model.add(MaxPooling2D(pool_size=(2,2)))  #MaxPooling layer model.add(Flatten())  #Flatten
layer       model.add(Dense(300,activation='relu'))            #Hidden     layer 1
model.add(Dense(150,activation='relu'))          #Hidden      layer 2
model.add(Dense(4,activation='softmax')) #Output layer
```

5.Compile the Model

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

6.Fit the Model

```python
from keras.callbacks import EarlyStopping, ReduceLROnPlateau
```

7.Save the Model

▼

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

▼
```
early_stopping = EarlyStopping(monitor='val_accuracy',
patience=5)
reduce_lr = ReduceLROnPlateau(monitor='val_accuracy',
patience=5,
factor=0.5,min_lr=0.00001) callback =
[reduce_lr,early_stopping]
```

▼
```
model.fit_generator(xtrain,
steps_per_epoch=len(xtrain),
epochs=10,
validation_data=xtest,
validation_steps=len(xtest));
```

8.Test the Model

▼
```
import Saved successfully! numpy as np
from tensorflow.keras.preprocessing import image


img = image.load_img('/content/flowers/daisy/10391248763_1d16681106_n.jpg',target_size=(64


x = image.img_to_array(img) x

    array([[[ 85., 121., 107.],
    [142., 147., 125.],          [253.,
    255., 249.],
          ...,
          [ 59.,  72.,  62.],
          [ 31.,  50.,  46.],
          [100., 116.,  71.]],

          [[ 88., 104., 119.],
          [186., 193., 235.],
          [239., 244., 240.],
          ...,
          [ 83., 109.,  74.],
          [110., 132.,  93.],
          [ 51.,  60.,  67.]],

          [[142., 150., 163.],
          [243., 254., 248.],
          [247., 247., 255.],
    ...,
```

```
        [255., 254., 250.],
        [114., 131., 139.],
        [ 40.,  42.,  37.]],

       ...,

       [[ 40.,  72.,  35.],
        [ 52.,  88.,  44.],
        [ 46.,  70.,  34.],
       ...,
        [ 44.,  75.,  31.],
        [ 55.,  87.,  37.],
        [ 43.,  74.,  33.]],

       [[ 49.,  85.,  37.],
        [ 58.,  93.,  37.],
        [ 35.,  66.,  22.],
       ...,
        [ 31.,  61.,  11.],
        [ 52.,  82.,  30.],
        [ 53.,  87.,  36.]],

       [[ 49.,  75.,  36.],
        [ 62.,  96.,  46.],
        [ 42.,  68.,  23.],
       ...,
        [ 61.,  93.,  44.],
        [ 60.,  86.,  51.],
        [ 41.,  67.,  30.]]], dtype=float32)
```

Saved successfully!

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

array([[[[ 85., 121., 107.],
        [142., 147., 125.],
         [253., 255., 249.],
       ...,
         [ 59.,  72.,  62.],
         [ 31.,  50.,  46.],
         [100., 116.,  71.]],

         [[ 88., 104., 119.],
         [186., 193., 235.],
         [239., 244., 240.],
       ...,
         [ 83., 109.,  74.],
         [110., 132.,  93.],
         [ 51.,  60.,  67.]],
        [[142., 150., 163.],
         [243., 254., 248.],
         [247., 247., 255.],
       ...,
         [255., 254., 250.],
         [114., 131., 139.],
         [ 40.,  42.,  37.]],
```

```
             ...,

             [[ 40.,   72.,   35.],
              [ 52.,   88.,   44.],
              [ 46.,   70.,   34.],
       ...,
              [ 44.,   75.,   31.],
              [ 55.,   87.,   37.],
              [ 43.,   74.,   33.]],

             [[ 49.,   85.,   37.],
              [ 58.,   93.,   37.],
              [ 35.,   66.,   22.],
       ...,
              [ 31.,   61.,   11.],
              [ 52.,   82.,   30.],
              [ 53.,   87.,   36.]],

             [[ 49.,   75.,   36.],
              [ 62.,   96.,   46.],
              [ 42.,   68.,   23.],
       ...,
              [ 61.,   93.,   44.],
              [ 60.,   86.,   51.],
              [ 41.,   67.,   30.]]]], dtype=float32)
```

```
model.predict(x)
```

```
     array([[9.9999833e-01, 0.0000000e+00, 1.6717552e-06, 3.8870642e-20]],
     dtype=float32)
```

Saved successfully!

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

×

```
     'daisy'
```

```
img = image.load_img('/content/flowers/rose/11233672494_d8bf0a3dbf_n.jpg',target_size=(64,
x = image.img_to_array(img) x = np.expand_dims(x,axis=0) pred =
np.argmax(model.predict(x))
```

```
op[pred]
```

'rose'

```
img = image.load_img('/content/flowers/dandelion/10828951106_c3cd47983f.jpg',target_size=(
x = image.img_to_array(img)
x = np.expand_dims(x,axis=0)
pred = np.argmax(model.predict(x))
op[pred]
```

'rose'

```
img = image.load_img('/content/flowers/tulip/112951086_150a59d499_n.jpg',target_size=(64,64
x = image.img_to_array(img)
x = np.expand_dims(x,axis=0)
pred = np.argmax(model.predict(x))
op[pred]
```

'rose'

```
img = image.load_img('/content/flowers/sunflower/1244774242_25a20d99a9.jpg',target_size=(64
x = image.img_to_array(img)
x = np.expand_dims(x,axis=0)
pred = np.argmax(model.predict(x))
op[pred]
```

'rose'

Saved successfully!

Colab paid products - Cancel contracts here