

## ASSIGNMENT-3

Assignment Date	30 September 2022
Student Name	R.Sornamala
Student Roll Number	962719106034
Maximum Marks	2 Marks

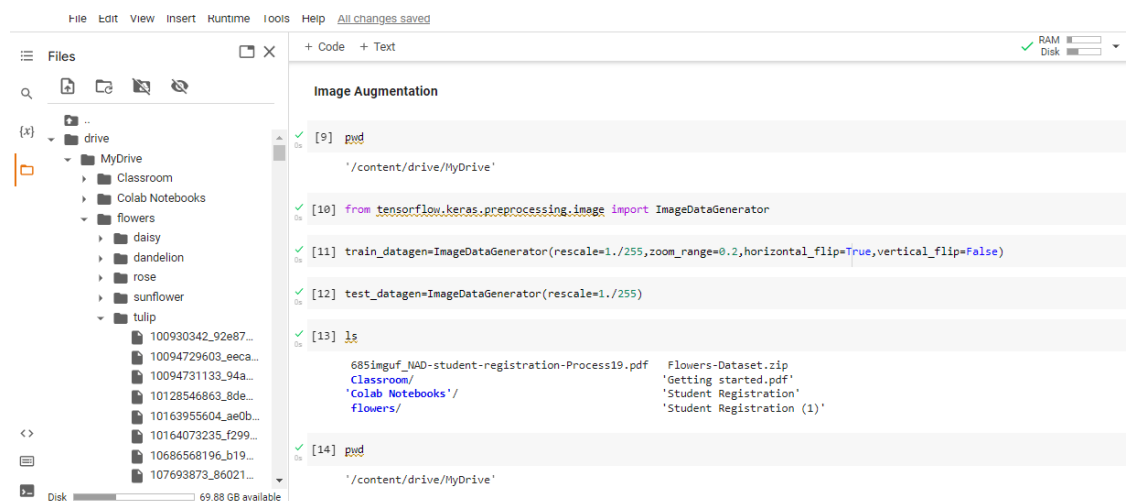
## 1.Download the Dataset

Link: [https://drive.google.com/file/d/1zZ87e7GDpN90-Sa\\_AKbvMm3EEfQkEQ\\_R/view](https://drive.google.com/file/d/1zZ87e7GDpN90-Sa_AKbvMm3EEfQkEQ_R/view)

## 2. Image Augmentation

**Solution:**

```
pwd
from tensorflow.keras.preprocessing.image import ImageDataGenerator
train_datagen=ImageDataGenerator(rescale=1./255,zoom_range=0.2,horizontal_flip=True,vertical_flip=False)
test_datagen=ImageDataGenerator(rescale=1./255)
ls
pwd
x_train=train_datagen.flow_from_directory(r"/content/drive/MyDrive/flowers",target_size=(64,64),
                                         class_mode='categorical',batch_size=24)
x_test=test_datagen.flow_from_directory(r"/content/drive/MyDrive/flowers",target_size=(64,64),
                                        class_mode='categorical',batch_size=24)
x_train.class_indices
```



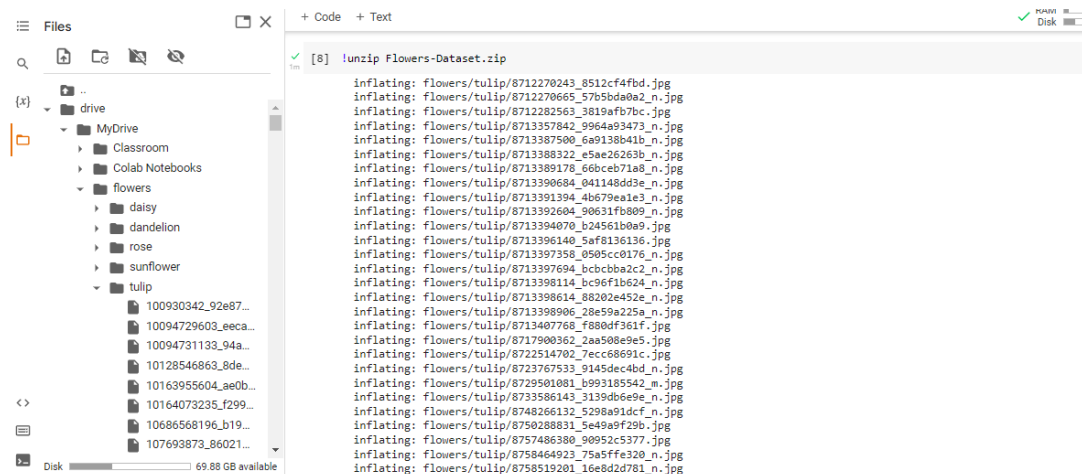


### 3.Create Model

#### Solution:

```
pwd
ls
from google.colab import drive
drive.mount('/content/drive')
cd /content/drive/MyDrive
!unzip Flowers-Dataset.zip
```





#### 4.Add Layers(Convolution,Maxpooling,Flatten,Dense-(Hidden Layers),Output)

Solution:

```
from tensorflow.keras.models import Sequential
from tensorflow.keras.layers import Dense,Convolution2D,MaxPooling2D,Flatten
model=Sequential()
model.add(Convolution2D(32,(3,3),input_shape=(64,64,3),activation='relu'))
model.add(MaxPooling2D(pool_size=(2,2)))
model.add(Flatten())
model.summary()
32*(3*3*3+1)
```

Hidden layer

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

Output layer

```
model.add(Dense(4,activation='softmax'))
```



The top screenshot shows the Jupyter Notebook interface with a file explorer on the left and a code editor on the right. The code editor contains the following code:

```
[24] model.summary()
```

The output of the code is a summary of the model:

```
Model: "sequential"
Layer (type)                Output Shape                Param #
-----
conv2d (Conv2D)              (None, 62, 62, 32)         896
max_pooling2d (MaxPooling2D) (None, 31, 31, 32)         0
flatten (Flatten)            (None, 30752)              0
-----
Total params: 896
Trainable params: 896
Non-trainable params: 0
```

The bottom screenshot shows the Jupyter Notebook interface with the same file explorer and code editor. The code editor contains the following code:

```
[25] 32*(3*3*3+1)
896

Hidden Layers

[26] model.add(Dense(300,activation='relu'))
model.add(Dense(150,activation='relu'))

Output Layers

[27] model.add(Dense(4,activation='softmax'))

Compile the model

[28] model.compile(loss='categorical_crossentropy',optimizer='adam',metrics=['accuracy'])
[29] len(x_train)
180
```

## 5. Compile The Model

Solution:

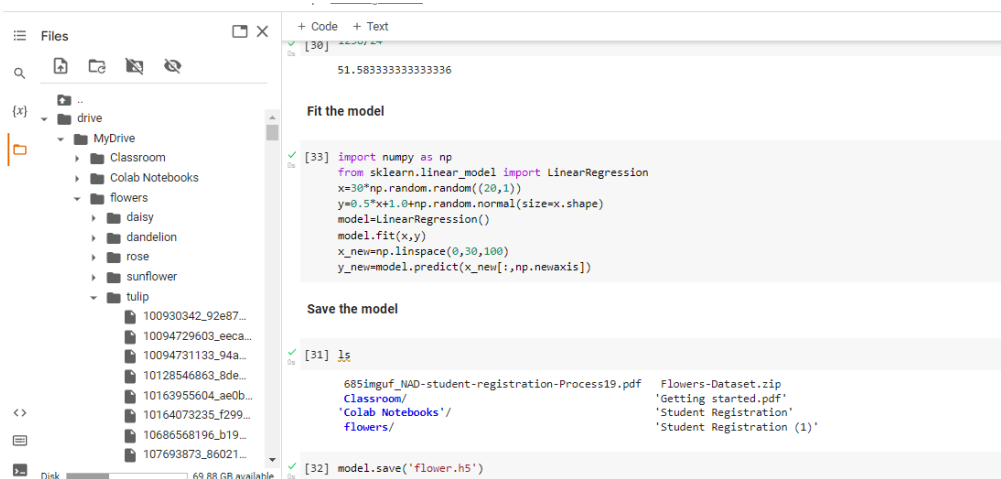
```
model.compile(loss='categorical_crossentropy',optimizer='adam',metrics=['accuracy'])
len(x_train)
1238/24
```



## 6. Fit The Model

Solution:

```
import numpy as np
from sklearn.linear_model import LinearRegression
x=30*np.random.random((20,1))
y=0.5*x+1.0*np.random.normal(size=x.shape)
model=LinearRegression()
model.fit(x,y)
x_new=np.linspace(0,30,100)
y_new=model.predict(x_new[:,np.newaxis])
```



## 7. Save The Model

## Solution:

```
Ls
model.save('flower.h5')
ls
```



## 8.Test The Model

### Solution:

```
import numpy as np
from tensorflow.keras.models import load_model
from tensorflow.keras.preprocessing import image
#load the model
model=load_model('flower.h5')
img=image.load_img(r"/content/drive/MyDrive/flowers/rose/10503217854_e66a804309.jpg")
img
img=image.load_img(r"/content/drive/MyDrive/flowers/rose/10503217854_e66a804309.jpg",t
target_size=(64,64))
img
x=image.img_to_array(img)
x
x=np.expand_dims(x,axis=0)
x
y=np.argmax(model.predict(x),axis=1)
y
x_train.class_indices
index=['daisy','dandelion','rose','sunflower','tulip']
index[y[0]]

img=image.load_img(r"/content/drive/MyDrive/flowers/daisy/100080576_f52e8ee070_n.jpg",
target_size=(64,64))
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','tulip']
index[y[0]]
```

```
img=image.load_img(r"/content/drive/MyDrive/flowers/dandelion/10043234166_e6dd915111_n
.jpg",target_size=(64,64))
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','tulip']
index[y[0]]
```

```
img=image.load_img(r"/content/drive/MyDrive/flowers/rose/10090824183_d02c613f10_m.jpg"
,target_size=(64,64))
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','tulip']
index[y[0]]
```

```
img=image.load_img(r"/content/drive/MyDrive/flowers/sunflower/1008566138_6927679c8a.jp
g",target_size=(64,64))
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','tulip']
index[y[0]]
```

```
img=image.load_img(r"/content/drive/MyDrive/flowers/tulip/100930342_92e8746431_n.jpg",
target_size=(64,64))
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','tulip']
index[y[0]]
```

Files

drive

MyDrive

Classroom

Colab Notebooks

flowers

daisy

dandelion

rose

10090824183\_d02c...

102501987\_3cdb8...

10503217854\_e66...

10894627425\_ec76...

110472418\_87b6a...

11102341464\_508...

11233672494\_d8bf...

11694025703\_9a9...

118974357\_0faa23...


11944957684\_2cc...

Test the model

[35] import numpy as np  
from tensorflow.keras.models import load\_model  
from tensorflow.keras.preprocessing import image

[36] #load the model  
model=load\_model('flower.h5')

[59] img=image.load\_img(r"/content/drive/MyDrive/flowers/rose/11233672494\_d8bf0a3dbf\_n.jpg")  
img



Files

drive

MyDrive

Classroom

Colab Notebooks

flowers

daisy

dandelion

rose

10090824183\_d02c...

102501987\_3cdb8...

10503217854\_e66...

10894627425\_ec76...

110472418\_87b6a...

11102341464\_508...

11233672494\_d8bf...

11694025703\_9a9...

118974357\_0faa23...

11944957684\_2cc...

RAM  
Disk

img=image.load\_img(r"/content/drive/MyDrive/flowers/rose/11233672494\_d8bf0a3dbf\_n.jpg",target\_size=(64,64))  
img

[40] x=image.img\_to\_array(img)  
x  
  
array([[ [ 0., 2., 0.],  
[ 0., 2., 0.],  
[ 0., 2., 0.],  
...,  
[ 92., 14., 0.],  
[ 61., 13., 9.],  
[ 17., 7., 5.]],  
[[ 0., 2., 0.],  
[ 0., 2., 0.],  
[ 0., 2., 0.],  
...,  
[150., 3., 0.],  
[ 85., 10., 7.],  
[119., 4., 1.]])

Files

drive

MyDrive

Classroom

Colab Notebooks

flowers

daisy

dandelion

rose

sunflower

tulip

100930342\_92e87...

10094729603\_eeca...

10094731133\_94a...

10128546863\_8de...

10163955604\_ae0b...

10164073235\_f299...

10686568196\_b19...

107693873\_86021...

[40] [[ 1., 5., 0.],  
[ 0., 2., 0.],  
[ 1., 1., 0.],  
...,  
[ 29., 5., 1.],  
[ 41., 13., 0.],  
[ 5., 4., 0.]], dtype=float32)

[41] x=np.expand\_dims(x,axis=0)  
x  
  
array([[[ [ 0., 2., 0.],  
[ 0., 2., 0.],  
[ 0., 2., 0.],  
...,  
[ 92., 14., 0.],  
[ 61., 13., 9.],  
[ 17., 7., 5.]],  
[[ 0., 2., 0.],  
[ 0., 2., 0.],  
[ 0., 2., 0.],  
...,  
[150., 3., 0.],  
[ 85., 10., 7.],  
[119., 4., 1.]])



```
Files
(x) drive
  MyDrive
    Classroom
    Colab Notebooks
    flowers
      daisy
      dandelion
      rose
      sunflower
      tulip
        100930342_92e87...
        10094729603_eeca...
        10094731133_94a...
        10128546863_8de...
        10163955604_ae0b...
        10164073235_f299...
        10686568196_b19...
        107693873_86021...

Disk 69.88 GB available

+ Code + Text
[41] x_train = x_train.astype('float32')

[42] y = np.argmax(model.predict(x), axis=1)
y
array([3])

[43] x_train.class_indices
{'daisy': 1,
 'dandelion': 2,
 'rose': 3,
 'sunflower': 4,
 'tulip': 5}

[44] index = ['daisy', 'dandelion', 'rose', 'sunflower', 'tulip']

[46] index[y[0]]
'sunflower'

[50] img = image.load_img(r"/content/drive/MyDrive/flowers/daisy/100080576_f52e8ee070_n.jpg", target_size=(64, 64))
x = image.img_to_array(img)
```

```
Files
(x) drive
  MyDrive
    Classroom
    Colab Notebooks
    flowers
      daisy
      dandelion
      rose
      sunflower
      tulip
        100930342_92e87...
        10094729603_eeca...
        10094731133_94a...
        10128546863_8de...
        10163955604_ae0b...
        10164073235_f299...
        10686568196_b19...
        107693873_86021...

Disk 69.88 GB available

+ Code + Text
[50] img = image.load_img(r"/content/drive/MyDrive/flowers/daisy/100080576_f52e8ee070_n.jpg", target_size=(64, 64))
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', 'tulip']
index[y[0]]
'sunflower'

[51] img = image.load_img(r"/content/drive/MyDrive/flowers/dandelion/10043234166_e6dd915111_n.jpg", target_size=(64, 64))
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', 'tulip']
index[y[0]]
'rose'

[52] img = image.load_img(r"/content/drive/MyDrive/flowers/rose/10090824183_d02c613f10_m.jpg", target_size=(64, 64))
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', 'tulip']
index[y[0]]
'rose'
```

```
Files
(x) drive
  MyDrive
    Classroom
    Colab Notebooks
    flowers
      daisy
      dandelion
      rose
      sunflower
      tulip
        100930342_92e87...
        10094729603_eeca...
        10094731133_94a...
        10128546863_8de...
        10163955604_ae0b...
        10164073235_f299...
        10686568196_b19...
        107693873_86021...

Disk 69.88 GB available

+ Code + Text
[53] img = image.load_img(r"/content/drive/MyDrive/flowers/sunflower/1000300130_0927079c0d.jpg", target_size=(64, 64))
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', 'tulip']
index[y[0]]
'rose'

[54] img = image.load_img(r"/content/drive/MyDrive/flowers/tulip/100930342_92e8746431_n.jpg", target_size=(64, 64))
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', 'tulip']
index[y[0]]
'dandelion'
```