

ASSIGNMENT-3

Assignment Date	30 September 2022
Student Name	P.Selin Prabavathy
Student Roll Number	962719106031
Maximum Marks	2 Marks

1.Download the Dataset

Link: 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
```



```
Image Augmentation

[9] pwd
/content/drive/MyDrive

[10] from tensorflow.keras.preprocessing.image import ImageDataGenerator

[11] train_datagen=ImageDataGenerator(rescale=1./255,zoom_range=0.2,horizontal_flip=True,vertical_flip=False)

[12] test_datagen=ImageDataGenerator(rescale=1./255)

[13] ls
685imguf_NAD-student-registration-Process19.pdf  Flowers-Dataset.zip
Classroom/                                       'Getting started.pdf'
'Colab Notebooks'/'                             'Student Registration'
flowers/                                         'Student Registration (1)'

[14] pwd
/content/drive/MyDrive
```

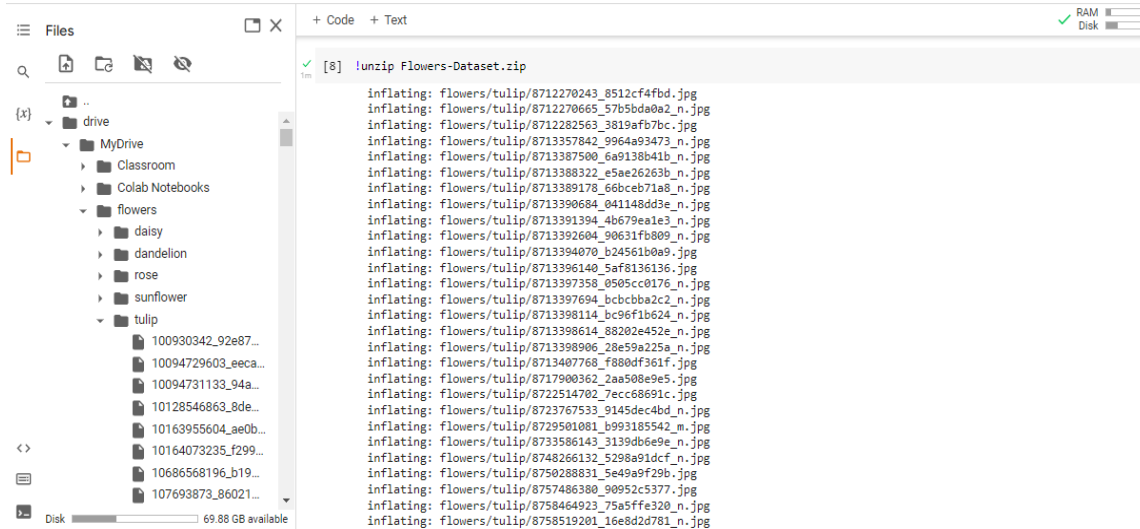
```
14: [14] pwd
15: [15] x_train=train_datagen.flow_from_directory(r"/content/drive/MyDrive/flowers",target_size=(64,64),
16: [16] x_test=test_datagen.flow_from_directory(r"/content/drive/MyDrive/flowers",target_size=(64,64),
18: [18] x_train.class_indices
```

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 first screenshot shows the Jupyter Notebook interface with a file explorer on the left and a code editor on the right. The file explorer displays a directory structure with folders like 'MyDrive', 'Classroom', 'Colab Notebooks', 'flowers', 'daisy', 'dandelion', 'rose', 'sunflower', and 'tulip'. The code editor shows the following code:

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

The output of the `model.summary()` function is displayed as follows:

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

Summary statistics:
 Total params: 896
 Trainable params: 896
 Non-trainable params: 0

The second screenshot shows the continuation of the model construction. The code editor shows the following code:

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

896

Hidden Layers

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

Output Layers

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

Compile the model

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

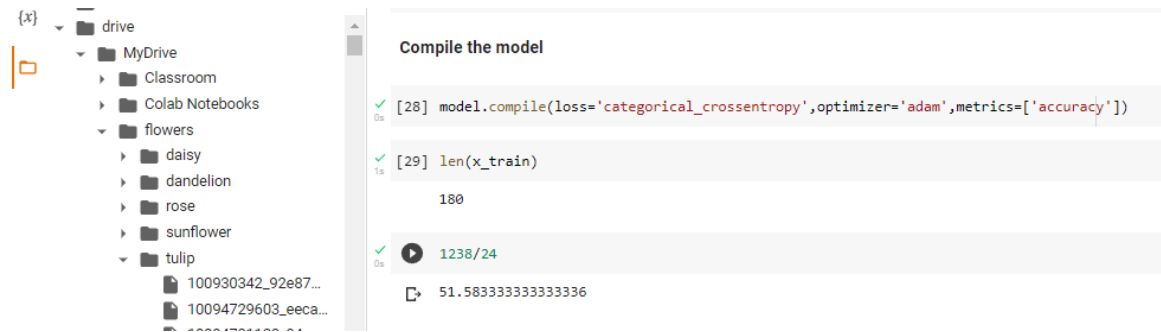
```
[29] len(x_train)
```

180

5.Compile The Model

Solution:

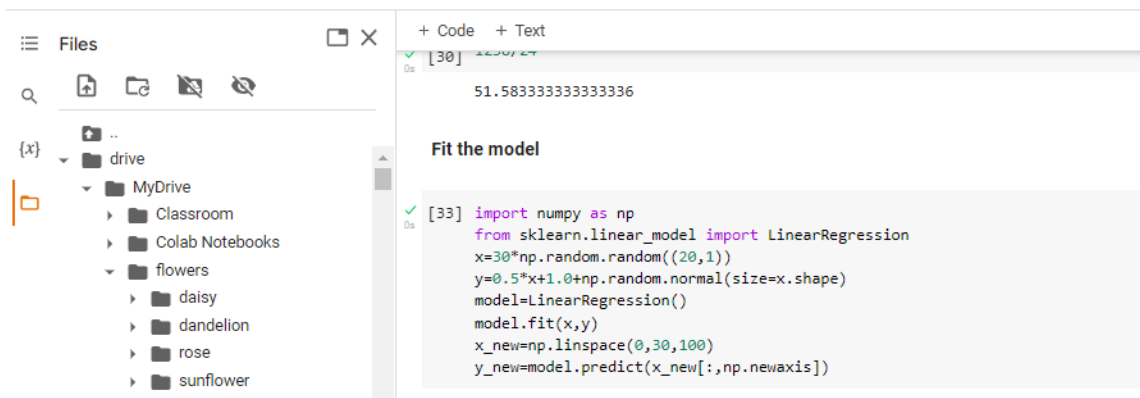
```
model.compile(loss='categorical_crossentropy',optimizer='adam',metrics=['accuracy'])
len(x_train)
1238/24
```



6. Fit The Model

Solution:

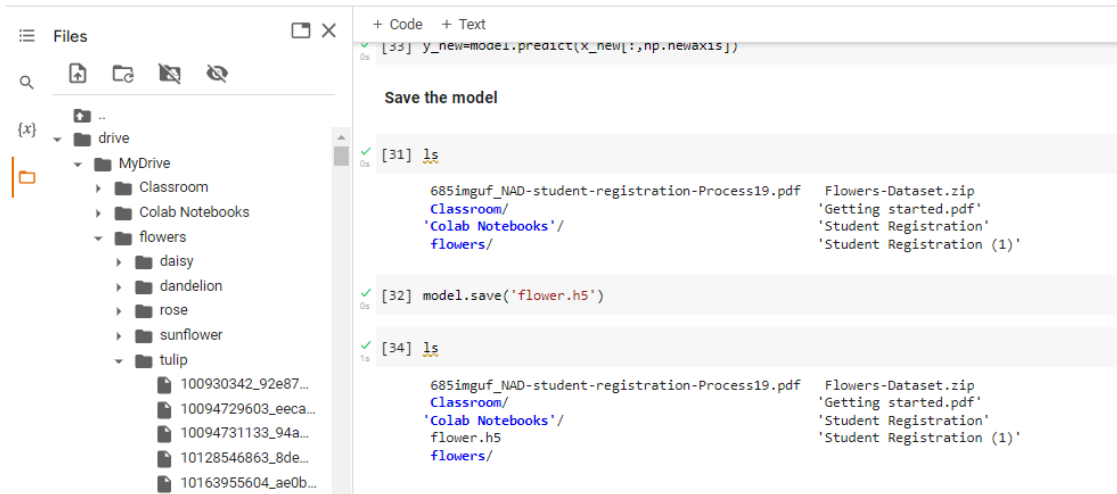
```
import numpy as np
from sklearn.linear_model import LinearRegression
x=30*np.random.random((20,1))
y=0.5*x+1.0+np.random.normal(size=x.shape)
model=LinearRegression()
model.fit(x,y)
x_new=np.linspace(0,30,100)
y_new=model.predict(x_new[:,np.newaxis])
```



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",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))
```

```
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/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
 - 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

[39] `img=image.load_img(r"/content/drive/MyDrive/flowers/rose/10503217854_e66a804309.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.]],
       ...,
       [[ 0.,  2.,  0.],
        [ 0.,  2.,  0.],
        [ 0.,  2.,  0.]])
```

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...

Disk 69.88 GB available

+ Code + Text

[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.]],
        ...,
        [[ 0.,  2.,  0.],
          [ 0.,  2.,  0.],
          [ 0.,  2.,  0.]])])
```