

ASSIGNMENT-3

Assignment Date	30 September 2022
Student Name	A.Thanga Abiya
Student Roll Number	962719106036
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
```



The screenshot shows a Jupyter Notebook titled "Image Augmentation". It contains five code cells, each with a green checkmark icon on the left. The code in the cells is as follows:

```
[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'

```
FLOWERS 3/
CURRENT REGISTRATION (1)

[14] pwd

'/content/drive/MyDrive'

[15] x_train=train_datagen.flow_from_directory(r"/content/drive/MyDrive/flowers",target_size=(64,64),
class_mode='categorical',batch_size=24)

Found 4317 images belonging to 6 classes.

[16] x_test=test_datagen.flow_from_directory(r"/content/drive/MyDrive/flowers",target_size=(64,64),
class_mode='categorical',batch_size=24)

Found 4317 images belonging to 6 classes.

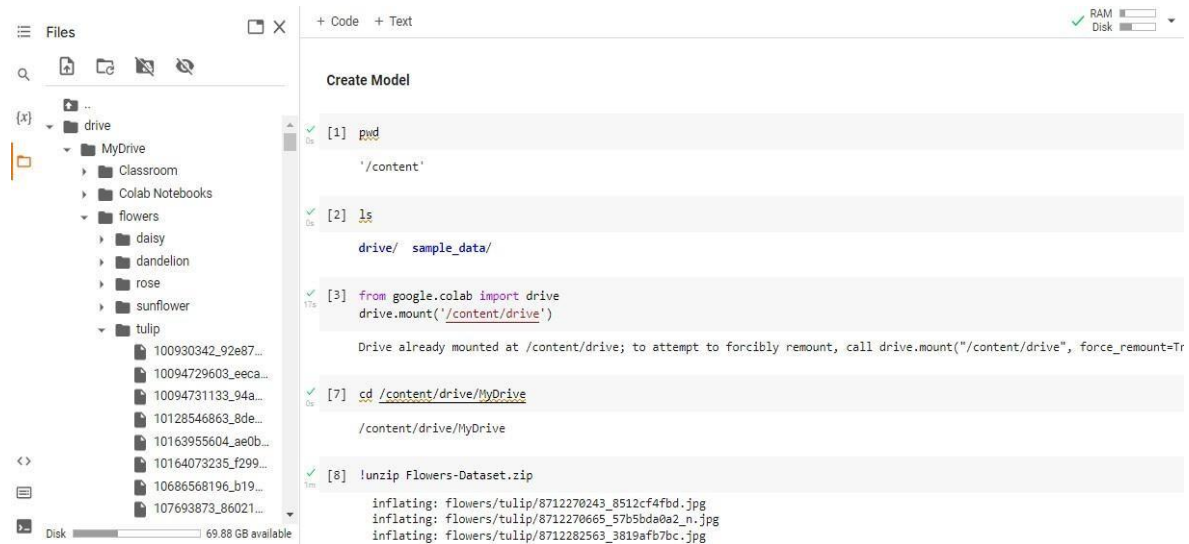
[18] x_train.class_indices

{'_ipyynb_checkpoints': 0,
'daisy': 1,
'dandelion': 2,
'rose': 3,
'sunflower': 4,
'tulip': 5}
```

3.Create Model

Solution:

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



The screenshot shows the Google Colab interface. On the left, the 'Files' pane displays a directory tree with 'drive' as the root. Under 'drive', there is a folder 'MyDrive'. Inside 'MyDrive', there are subfolders 'Classroom', 'Colab Notebooks', and 'flowers'. The 'flowers' folder is expanded, showing subfolders for 'daisy', 'dandelion', 'rose', 'sunflower', and 'tulip'. The 'tulip' folder is further expanded, showing a list of image files with names like '100930342_92e87...', '10094729603_eeca...', etc. On the right, the 'Code' pane is titled 'Create Model' and contains the following code cells:

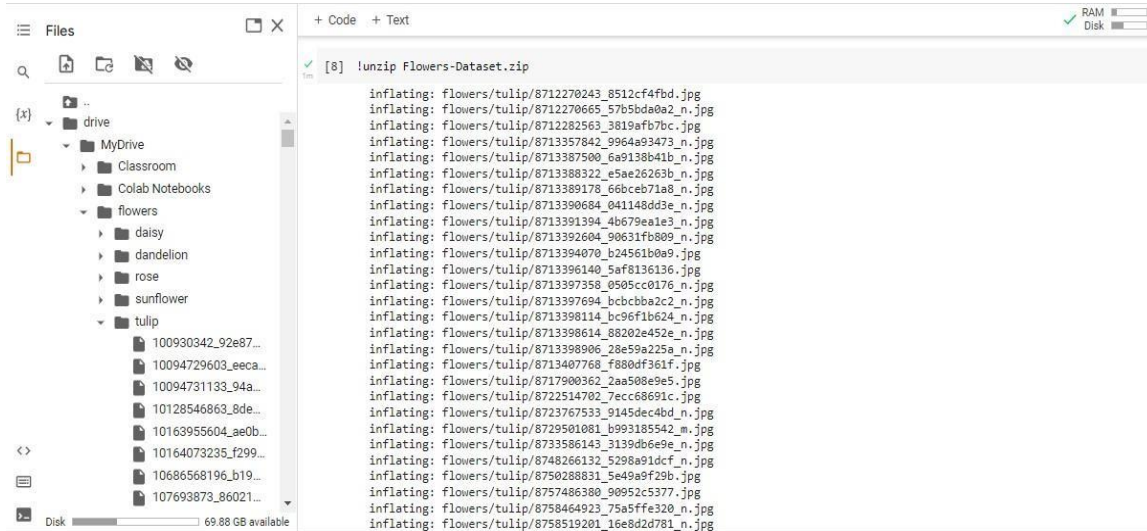
```
[1] pwd
'/content'

[2] ls
drive/ sample_data/

[3] from google.colab import drive
drive.mount('/content/drive')
Drive already mounted at /content/drive; to attempt to forcibly remount, call drive.mount("/content/drive", force_remount=True)

[7] cd /content/drive/MyDrive
/content/drive/MyDrive

[8] !unzip Flowers-Dataset.zip
inflating: flowers/tulip/8712270243_8512cf4fbd.jpg
inflating: flowers/tulip/8712270665_57b5bda0a2_n.jpg
inflating: flowers/tulip/8712282563_3819afb7bc.jpg
```



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 displays the following code and output:

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

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

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

896

Hidden Layers

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

The bottom screenshot shows the continuation of the code in the Jupyter Notebook:

```
[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'])
```

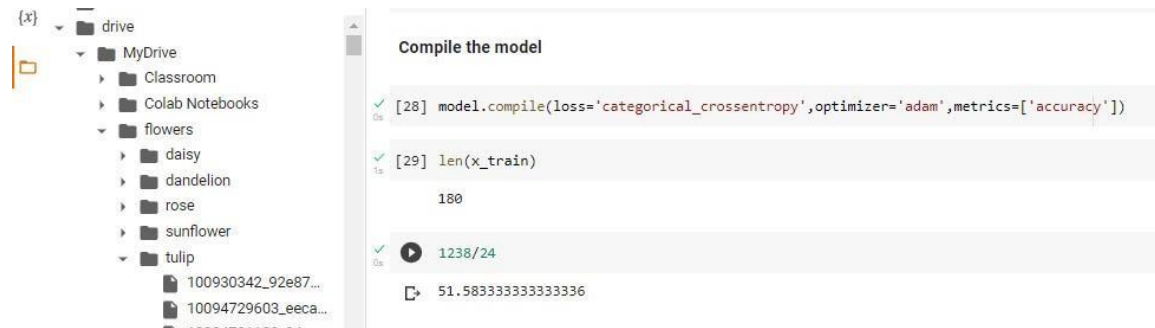
```
[29] len(x_train)
```

180

5. Compile The Model

Solution:

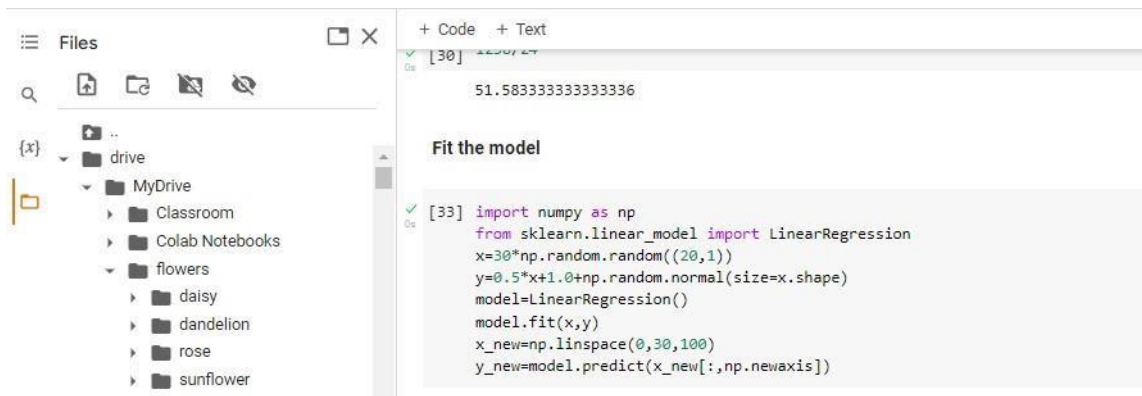
```
model.compile(loss='categorical_crossentropy',optimizer='adam',metrics=['accuracy'])
len(x_train)
1238/24
```



6. Fit The Model

Solution:

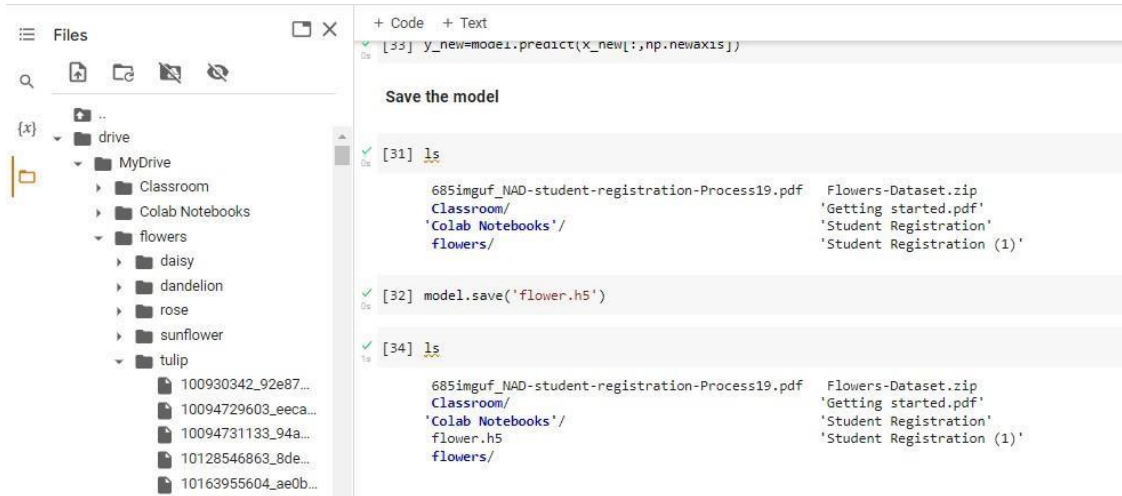
```
import numpy as np
from sklearn.linear_model import LinearRegression
x=30*np.random.random((20,1))
y=0.5*x+1.0+np.random.normal(size=x.shape)
model=LinearRegression()
model.fit(x,y)
x_new=np.linspace(0,30,100)
y_new=model.predict(x_new[:,np.newaxis])
```



7. Save The Model

Solution:

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



8. Test The Model

Solution:

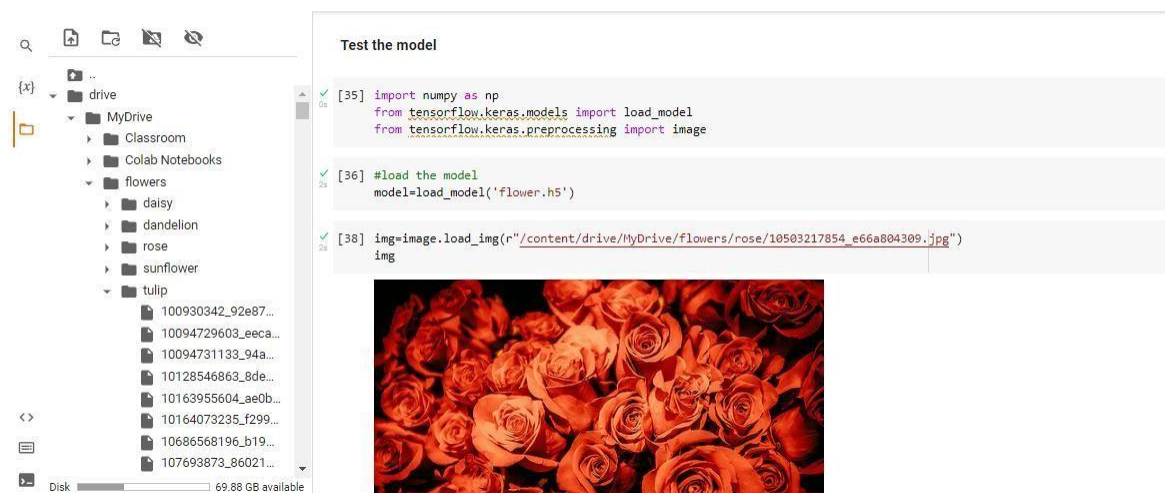
```
import numpy as np
from tensorflow.keras.models import load_model
from tensorflow.keras.preprocessing import image
#load the model
model=load_model('flower.h5')
img=image.load_img(r"/content/drive/MyDrive/flowers/rose/10503217854_e66a804309.jpg")
img
img=image.load_img(r"/content/drive/MyDrive/flowers/rose/10503217854_e66a804309.jpg",t
arget_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 + Code + Text RAM Disk Edit

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...

69.88 GB available

```
[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.],
```

Files + 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.],
         ...,
         [ 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...

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

[43] x_train.class_indices
{'_ipynb_checkpoints': 0,
 '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

- 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...

```
[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]]
'sunflower'
```

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...

```
img=image.load_img(r"/content/drive/MyDrive/flowers/sunflower/1000000000_09x70/0000.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'
```