

ASSIGNMENT-3

Assignment Date	30 September 2022
Student Name	N.Abiram
Student Roll Number	962719106001
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
```

```
FLOWERS/
SUBMIT 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.

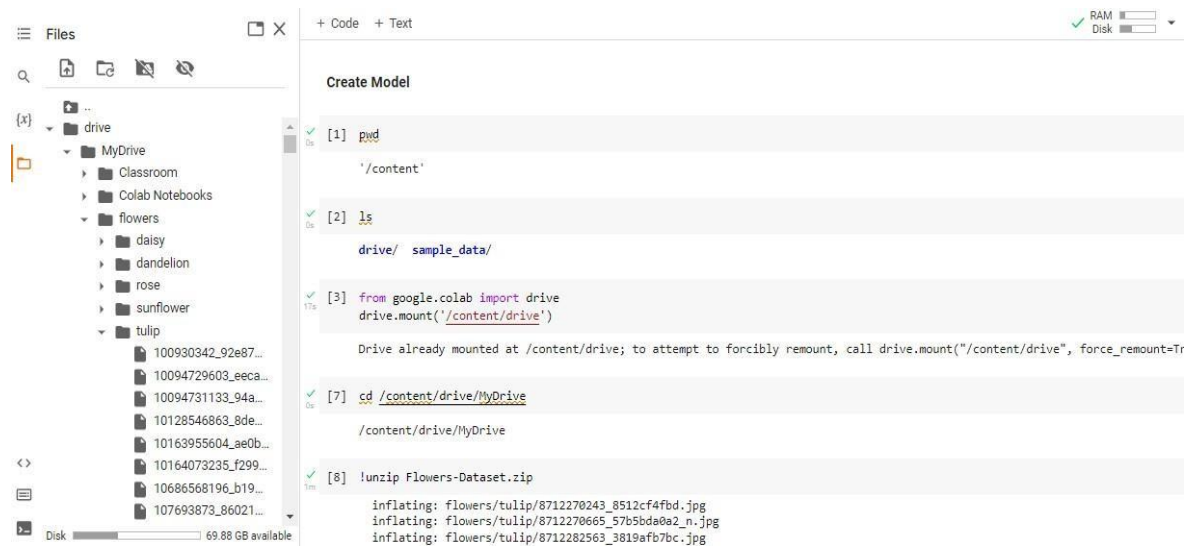
[18] x_train.class_indices

{'_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' containing 'MyDrive', which includes 'Classroom', 'Colab Notebooks', and 'flowers'. The 'flowers' directory contains subdirectories for 'daisy', 'dandelion', 'rose', 'sunflower', and 'tulip'. The 'tulip' directory lists several image files. On the right, the 'Code' pane shows a notebook titled 'Create Model' with the following code cells:

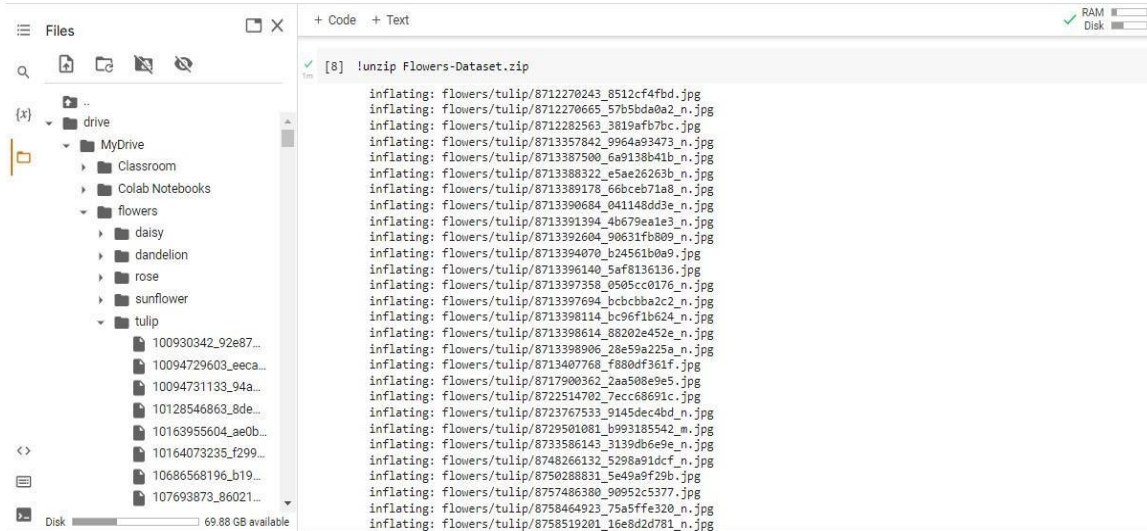
```
[1] pwd
'/content'

[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 image displays two screenshots of a Jupyter Notebook interface, showing the construction of a Keras model for image classification.

Left Screenshot:

- Files Panel:** Shows a file explorer with a directory structure including 'drive', 'MyDrive', 'Classroom', 'Colab Notebooks', 'flowers', 'daisy', 'dandelion', 'rose', 'sunflower', and 'tulip'.
- Code Cell [24]:** Contains the command `model.summary()`. The output shows the model architecture:

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

 The summary also indicates: Total params: 896, Trainable params: 896, Non-trainable params: 0.
- Code Cell [25]:** Contains the calculation `32*(3*3*3+1)`, resulting in 896, labeled as 'Hidden Layers'.
- Code Cell [26]:** Contains the command `model.add(Dense(300,activation='relu'))`.

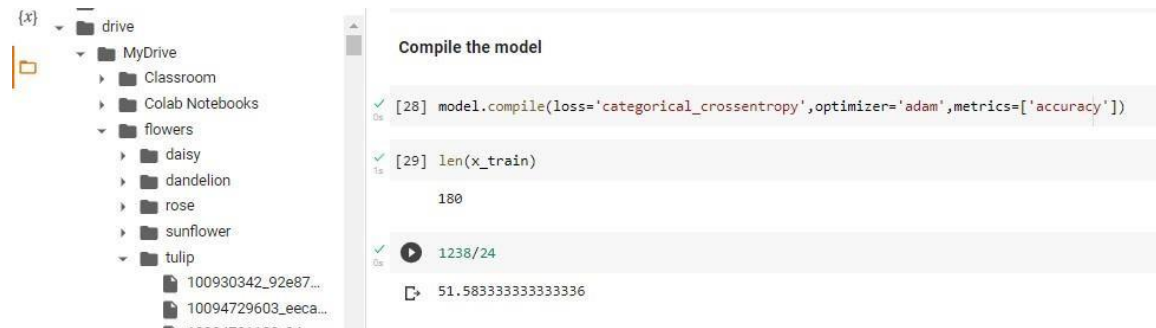
Right Screenshot:

- Code Cell [25]:** Shows the calculation `32*(3*3*3+1)` resulting in 896, labeled as 'Hidden Layers'.
- Code Cell [26]:** Contains the commands `model.add(Dense(300,activation='relu'))` and `model.add(Dense(150,activation='relu'))`, labeled as 'Output Layers'.
- Code Cell [27]:** Contains the command `model.add(Dense(4,activation='softmax'))`, labeled as 'Compile the model'.
- Code Cell [28]:** Contains the command `model.compile(loss='categorical_crossentropy',optimizer='adam',metrics=['accuracy'])`.
- Code Cell [29]:** Contains the command `len(x_train)`, resulting in 180.

5. Compile The Model

Solution:

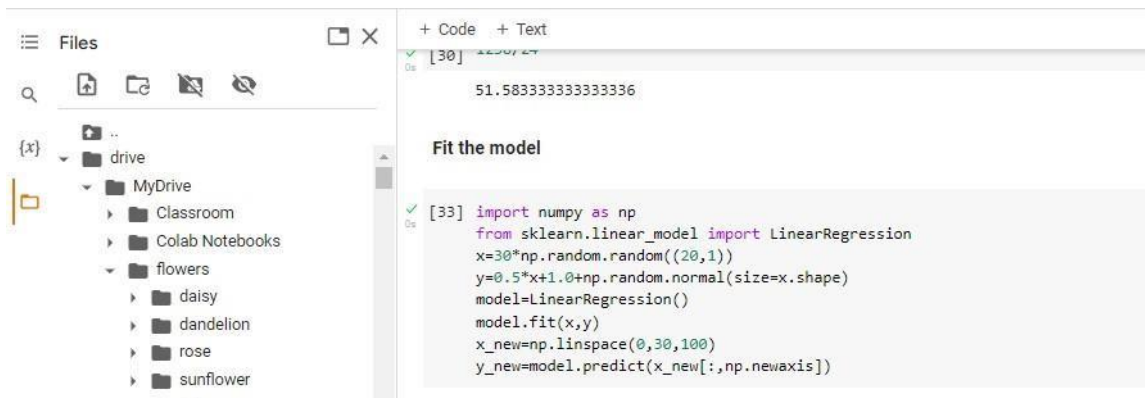
```
model.compile(loss='categorical_crossentropy',optimizer='adam',metrics=['accuracy'])
len(x_train)
1238/24
```



6. Fit The Model

Solution:

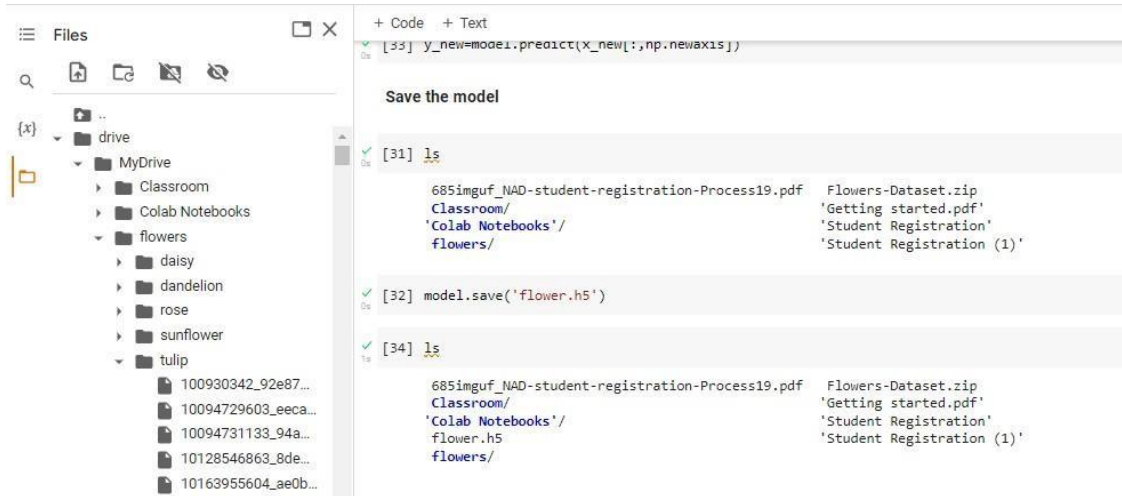
```
import numpy as np
from sklearn.linear_model import LinearRegression
x=30*np.random.random((20,1))
y=0.5*x+1.0+np.random.normal(size=x.shape)
model=LinearRegression()
model.fit(x,y)
x_new=np.linspace(0,30,100)
y_new=model.predict(x_new[:,np.newaxis])
```



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))
```

```
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...

```
[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/1000000420_094707604_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'

[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'
```