Assignment -3

Python Programming

Assignment Date	7 September 2022
Student Name	Anantha Kirishnan S
Student Roll Number	412519104005
Maximum Marks	2 Marks

Question-1:

Download dataset

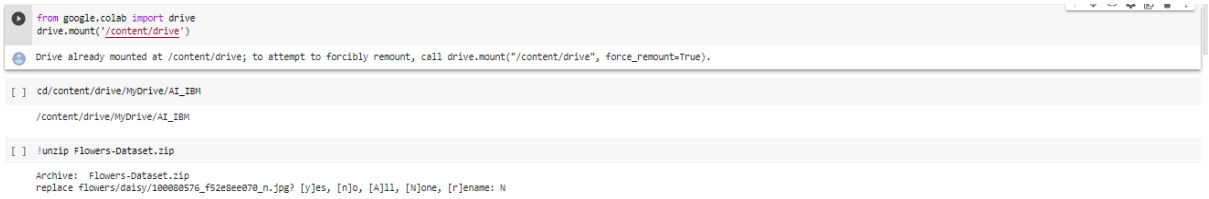
Solution:

```
from google.colab import drive

drive.mount('/content/drive')

cd/content/drive/MyDrive/AI_IBM

!unzip Flowers-Dataset.zip
```



Question-2:

Image Augmentation

Solution:

```
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)

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

x_train.class_indices
```

```
[ ] 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)

[ ] x_train=train_datagen.flow_from_directory(r"/content/drive/MyDrive/AI_IBM/flowers",target_size=(64,64),class_mode='categorical',batch_size=24)
    Found 4317 images belonging to 5 classes.

[ ] x_test=test_datagen.flow_from_directory(r"/content/drive/MyDrive/AI_IBM/flowers",target_size=(64,64),class_mode='categorical',batch_size=24)
    Found 4317 images belonging to 5 classes.

[ ] x_train.class_indices
    {'daisy': 0, 'dandelion': 1, 'rose': 2, 'sunflower': 3, 'tulip': 4}
```

Question 3

Create Model

Solution:

from tensorflow.keras.models import Sequential from tensorflow.keras.layers import Dense,Convolution2D,MaxPooling2D,Flatten

```
Step -3 Initializing CNN And Create Model

[ ] from tensorflow.keras.models import Sequential
    from tensorflow.keras.layers import Dense,Convolution2D,MaxPooling2D,Flatten
```

Question 4

Add Layers

Solution:

model=Sequential()

4.1 Input Layers (Convolution ,MaxPooling,Flatten)

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()

```
Step -4 Add layers

[ ] model=Sequential()

4.1 Input Layers (Convolution ,MaxPooling,Flatten)

[ ] 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()
    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
    _________________________________________________________________
```

4.2 Hidden Layers

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

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

Step -7 Test The model

```
ls
```

```
flowers/  Flowers_classification_model1.h5  Flowers-Dataset.zip
```

```
import numpy as np
from tensorflow.keras.models import load_model
from tensorflow.keras.preprocessing import image
```

```
# Load the model
model=load_model('Flowers_classification_model1.h5')
```

```
img=image.load_img(r"/content/drive/MyDrive/AI_IBM/flowers/s3.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)
# x_train.class_indices
index=['daisy','dandelion','rose','sunflower','tulip']
index[y[0]]
```

```
'daisy'
```

** percent of accuracy with this model** **Team ID : PNT2022TMID03893**

4.3 Output Layers

model.add(Dense(5,activation='softmax'))

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

len(x_train)

4.3 Output Layers

```
model.add(Dense(5,activation='softmax'))
```

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

```
len(x_train)
```

```
180
```

Question 5

Train the Model

model.fit_generator(x_train,steps_per_epoch=len(x_train), validation_data=x_test,
validation_steps=len(x_test), epochs= 30)

Step -5 Train the Model

```
model.fit_generator(x_train,steps_per_epoch=len(x_train), validation_data=x_test, validation_steps=len(x_test), epochs= 30)
```

```
/usr/local/lib/python3.7/dist-packages/ipykernel_launcher.py:1: UserWarning: `Model.fit_generator` is deprecated and will be removed in a future version. Please use `Model.fit`, which supports generators.
  """Entry point for launching an IPython kernel.
Epoch 1/30
180/180 [==============================] - 539s 3s/step - loss: 1.2262 - accuracy: 0.5008 - val_loss: 1.3067 - val_accuracy: 0.4959
Epoch 2/30
180/180 [==============================] - 65s 360ms/step - loss: 0.9982 - accuracy: 0.6092 - val_loss: 0.9071 - val_accuracy: 0.6518
Epoch 3/30
180/180 [==============================] - 63s 350ms/step - loss: 0.9337 - accuracy: 0.6382 - val_loss: 0.8871 - val_accuracy: 0.6574
Epoch 4/30
180/180 [==============================] - 64s 357ms/step - loss: 0.8495 - accuracy: 0.6778 - val_loss: 1.0011 - val_accuracy: 0.6296
Epoch 5/30
180/180 [==============================] - 63s 350ms/step - loss: 0.8044 - accuracy: 0.6912 - val_loss: 0.7725 - val_accuracy: 0.7014
Epoch 6/30
180/180 [==============================] - 63s 349ms/step - loss: 0.7469 - accuracy: 0.7174 - val_loss: 0.7109 - val_accuracy: 0.7320
Epoch 7/30
180/180 [==============================] - 65s 359ms/step - loss: 0.6911 - accuracy: 0.7403 - val_loss: 0.6169 - val_accuracy: 0.7739
Epoch 8/30
180/180 [==============================] - 63s 353ms/step - loss: 0.6428 - accuracy: 0.7545 - val_loss: 0.6712 - val_accuracy: 0.7424
Epoch 9/30
180/180 [==============================] - 66s 365ms/step - loss: 0.6243 - accuracy: 0.7623 - val_loss: 0.5460 - val_accuracy: 0.8010
Epoch 10/30
180/180 [==============================] - 64s 356ms/step - loss: 0.5638 - accuracy: 0.7885 - val_loss: 0.5537 - val_accuracy: 0.7820
Epoch 11/30
180/180 [==============================] - 63s 350ms/step - loss: 0.5468 - accuracy: 0.7948 - val_loss: 0.4838 - val_accuracy: 0.8149
Epoch 12/30
180/180 [==============================] - 64s 355ms/step - loss: 0.4855 - accuracy: 0.8175 - val_loss: 0.4960 - val_accuracy: 0.8151
Epoch 13/30
180/180 [==============================] - 63s 350ms/step - loss: 0.4574 - accuracy: 0.8365 - val_loss: 0.3337 - val_accuracy: 0.8798
Epoch 14/30
180/180 [==============================] - 65s 364ms/step - loss: 0.4429 - accuracy: 0.8372 - val_loss: 0.3569 - val_accuracy: 0.8694
Epoch 15/30
180/180 [==============================] - 63s 352ms/step - loss: 0.4245 - accuracy: 0.8390 - val_loss: 0.4004 - val_accuracy: 0.8487
```


Question 6

Save The model

```
model.save('Flowers_classification_model1.h5')
```

Step -6 Save The model

```
[ ] model.save('Flowers_classification_model1.h5')
```

Question 7

Test The model

```
ls
imnumpy as np
from tensorflow.keras.models import load_model
from tensorflow.keras.preprocessing import imageport
model=load_model('Flowers_classification_model1.h5')
img=image.load_img(r"/content/drive/MyDrive/AI_IBM/flowers/s3.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]]
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Step -7 Test The model

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flowers/  Flowers_classification_model1.h5  Flowers-Dataset.zip
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```
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** percent of accuracy with this model** **Team ID : PNT2022TMID03893**