Assignment -3

Python Programming

Assignment Date	19 September 2022
Student Name	Suganthi K
Maximum Marks	2 Marks

Question-1:

Download the dataset: Dataset

Solution:

https://drive.google.com/file/d/1xkynpL15pt6KT3YSlDimu4A5iRU9qYck/view

Question-2:

Image Augmentation.

Solution:

```
from google.colab import drive
drive.mount('/content/drive/')
data_path = '/content/drive/MyDrive/dataset/flowers/'
batch_size = 32
target_size = (64, 64)
```

```
Drive already mounted at /content/drive/; to attempt to forcibly remount, call drive.mount("/content/drive/", force_remount=True).
```

```
train_datagen = ImageDataGenerator(rescale=1./255,
                                   shear_range=0.2,
                                   zoom_range=0.2,
                                   width_shift_range=0.1,
                                   height_shift_range=0.1,
                                   horizontal_flip=True,
                                   validation_split=0.2)

test_datagen = ImageDataGenerator(rescale=1. / 255, validation_split=0.2)
```

```
X_train = train_datagen.flow_from_directory(data_path,target_size=target_size,batch_size=batch_size,subset="training",class_mode='categorical')
X_test = test_datagen.flow_from_directory(data_path,target_size=target_size,batch_size=batch_size,
                                          subset="validation",
                                          class_mode='categorical')
```

```
Found 3457 images belonging to 5 classes.
Found 860 images belonging to 5 classes.
```

Question-3:

Create Model

Solution:

```
model = Sequential()
```

Question-4:

Add Layers (Convolution, MaxPooling, Flatten, Dense-(Hidden Layers),Output)

Solution:

```
model.add(Convolution2D(32, (3, 3), input_shape=(64, 64, 3), activation='relu'))
model.add(MaxPooling2D(pool_size=(2, 2)))

model.add(Convolution2D(32, (3, 3), activation='relu'))
model.add(MaxPooling2D(pool_size=(2, 2)))

model.add(Convolution2D(64, (3, 3), activation='relu'))
model.add(MaxPooling2D(pool_size=(2, 2)))

model.add(Flatten())

model.add(Dense(units=64, activation='relu'))
model.add(Dense(units=5, activation='softmax'))
model.summary()
```

```
Model: "sequential"
_________________________________________________________________
 Layer (type)                Output Shape              Param #
=================================================================
 conv2d (Conv2D)             (None, 62, 62, 32)        896

 max_pooling2d (MaxPooling2D  (None, 31, 31, 32)       0
 )

 conv2d_1 (Conv2D)           (None, 29, 29, 32)        9248

 max_pooling2d_1 (MaxPooling  (None, 14, 14, 32)       0
 2D)

 conv2d_2 (Conv2D)           (None, 12, 12, 64)        18496

 max_pooling2d_2 (MaxPooling  (None, 6, 6, 64)         0
 2D)

 flatten (Flatten)           (None, 2304)              0

 dense (Dense)               (None, 64)                147520

 dense_1 (Dense)             (None, 5)                 325

=================================================================
Total params: 176,485
Trainable params: 176,485
Non-trainable params: 0
_________________________________________________________________
```

Question-5:

Compile The Model

Solution:

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

Question-6:

Fit The Model

Solution:

```
model.fit(X_train, steps_per_epoch=100, epochs=15)
```

```
Epoch 1/15
100/100 [==============================] - 29s 271ms/step - loss: 1.3171 - accuracy: 0.4074
Epoch 2/15
100/100 [==============================] - 25s 252ms/step - loss: 1.1414 - accuracy: 0.5298
Epoch 3/15
100/100 [==============================] - 27s 265ms/step - loss: 1.0823 - accuracy: 0.5658
Epoch 4/15
100/100 [==============================] - 26s 257ms/step - loss: 0.9996 - accuracy: 0.5989
Epoch 5/15
100/100 [==============================] - 26s 257ms/step - loss: 0.9346 - accuracy: 0.6428
Epoch 6/15
100/100 [==============================] - 26s 255ms/step - loss: 0.9086 - accuracy: 0.6485
Epoch 7/15
100/100 [==============================] - 26s 255ms/step - loss: 0.8738 - accuracy: 0.6570
Epoch 8/15
100/100 [==============================] - 26s 255ms/step - loss: 0.8466 - accuracy: 0.6794
Epoch 9/15
100/100 [==============================] - 25s 253ms/step - loss: 0.8086 - accuracy: 0.6904
Epoch 10/15
100/100 [==============================] - 25s 251ms/step - loss: 0.7897 - accuracy: 0.6974
Epoch 11/15
100/100 [==============================] - 26s 256ms/step - loss: 0.7621 - accuracy: 0.7087
Epoch 12/15
100/100 [==============================] - 25s 254ms/step - loss: 0.7526 - accuracy: 0.7043
Epoch 13/15
100/100 [==============================] - 26s 257ms/step - loss: 0.7291 - accuracy: 0.7223
Epoch 14/15
100/100 [==============================] - 25s 252ms/step - loss: 0.7203 - accuracy: 0.7236
Epoch 15/15
100/100 [==============================] - 25s 251ms/step - loss: 0.7175 - accuracy: 0.7274
```

Question-7:

Save The Model

Solution:

```
model.save("model.h5")
```

Question-8:

Test The Model

Solution:

```
def predict():
    img = image.load_img("/content/drive/MyDrive/dataset/flowers/rose/1775233884_12ff5a124f.jpg", target_size=target_size)
    x = image.img_to_array(img)
    x = tf.expand_dims(x,0)

    labels = ['daisy', 'dandelion', 'rose', 'sunflower', 'tulip']

    pred = model.predict(x)
    prediction = labels[np.argmax(pred[0])]

    print(f'The given image is a {prediction}')
    plt.imshow(plt.imread("/content/drive/MyDrive/dataset/flowers/rose/1775233884_12ff5a124f.jpg"))
    plt.axis('off')
    plt.show()
```