Assignment -3

Build CNN Model for classification of Flowers

Assignment Date	19 September 2022
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Maximum Marks	2 Marks

Question 1:

Download Dataset

```
from google.colab import drive
drive.mount('/content/drive')

Mounted at /content/drive
```

Question 2:

Image Augmentation

```
from tensorflow.keras.preprocessing.image import ImageDataGenerator
train_datagen=ImageDataGenerator(rescale=1./255,zoom_range=0.2,horizontal_flip
=True,vertical_flip=True)
test_datagen=ImageDataGenerator(rescale=1./255)
```

Load Data

```
x_train=train_datagen.flow_from_directory(r"/content/drive/MyDrive/Data/Flower
s/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/Data/Flowers/
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}

x_test.class_indices

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

Question 3:

Create Model

```
from tensorflow.keras.models import Sequential
from tensorflow.keras.layers import Dense,Convolution2D,MaxPooling2D,Flatten
model=Sequential()
```

Question 4:

Add Layers

a)Convolution Layer

```
model.add(Convolution2D(32,(3,3),kernel_initializer="random_uniform",activation="relu",strides=(1,1),input_shape=(64,64,3)))
```

b)MaxPooling Layer

```
model.add(MaxPooling2D(pool_size=(2,2)))
```

c)Flatten

```
model.add(Flatten())
```

d)Dense(Hidden layer)

```
model.add(Dense(300,activation="relu"))
model.add(Dense(300,activation="relu"))
```

e)Output layer

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

Question 5:

Compile the Model

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

Question 6:

Fit the Model

```
model.fit(x_train,epochs=5,steps_per_epoch=len(x_train),validation_data=x_test
,validation_steps=len(x_test))

Epoch 1/5
180/180 [==============================] - 613s 3s/step - loss: 1.1807 -
accuracy: 0.5071 - val_loss: 1.0645 - val_accuracy: 0.5698
Epoch 2/5
180/180 [==============================] - 67s 375ms/step - loss: 1.0647 -
accuracy: 0.5726 - val_loss: 1.0555 - val_accuracy: 0.5837
Epoch 3/5
180/180 [==============================] - 68s 377ms/step - loss: 1.0042 -
accuracy: 0.6013 - val_loss: 0.9352 - val_accuracy: 0.6391
Epoch 4/5
180/180 [==============================] - 66s 368ms/step - loss: 0.9319 -
accuracy: 0.6379 - val_loss: 0.9133 - val_accuracy: 0.6530
Epoch 5/5
180/180 [==============================] - 66s 370ms/step - loss: 0.8710 -
accuracy: 0.6606 - val_loss: 0.9661 - val_accuracy: 0.6375

<keras.callbacks.History at 0x7fc655b9d350>
```

Question 7:

Save the Model

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

Question 8:

Test the Model

```
import numpy as np
from tensorflow.keras.models import load_model
from tensorflow.keras.preprocessing import image
model=load_model("Flowers.h5")
img=image.load_img(r"/content/drive/MyDrive/Data/Flowers/flowers/sunflower/100
8566138_6927679c8a.jpg",target_size=(64,64))

img

x=image.img_to_array(img)

x=np.expand_dims(x,axis=0)

pred=model.predict(x)

pred

array([[0., 0., 0., 1., 0.]], dtype=float32)
```

```
index=['daisy','dandelion','rose','sunflower','tulip']

index[np.argmax(pred)]

'sunflower'
```