Assignment -3

Build CNN Model for Classification Of Flowers

Assignment Date	30 September 2022
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Maximum Marks	2 Marks

Question-1:

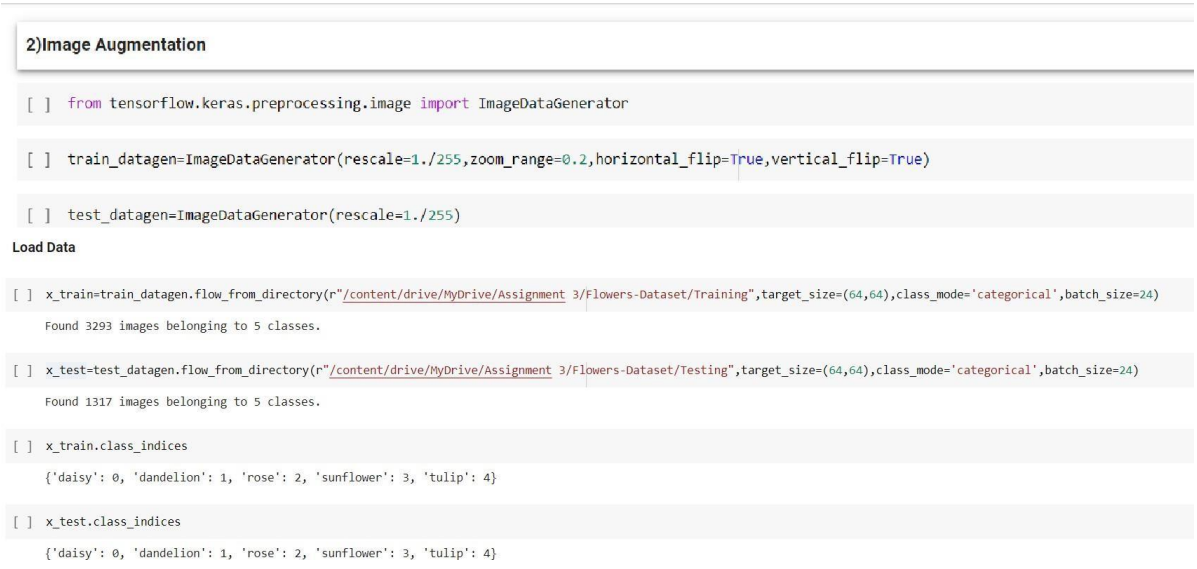
Download the dataset

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=T
r ue)
test_datagen=ImageDataGenerator(rescale=1./255)
```



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/Assignment 3/Flowers-Dataset/Training",target_size=(64,64),class_mode='categorical',batch_size=24)
    Found 3293 images belonging to 5 classes.

[ ] x_test=test_datagen.flow_from_directory(r"/content/drive/MyDrive/Assignment 3/Flowers-Dataset/Testing",target_size=(64,64),class_mode='categorical',batch_size=24)
    Found 1317 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

Solution

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

3)Create Model

```
[ ] from tensorflow.keras.models import Sequential
```

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

```
[ ] model=Sequential()
```

Question-4:

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

Solution

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 Layer

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"))

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

Solution

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

5)Compile the model

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

Question-6:

Fit The Model

Solution

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

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
    138/138 [==============================] - 29s 205ms/step - loss: 0.0980 - accuracy: 0.9712 - val_loss: 2.5114 - val_accuracy: 0.6560
    Epoch 2/5
    138/138 [==============================] - 26s 190ms/step - loss: 0.1125 - accuracy: 0.9623 - val_loss: 2.1169 - val_accuracy: 0.6735
    Epoch 3/5
    138/138 [==============================] - 26s 190ms/step - loss: 0.0765 - accuracy: 0.9787 - val_loss: 1.8115 - val_accuracy: 0.7213
    Epoch 4/5
    138/138 [==============================] - 27s 193ms/step - loss: 0.0675 - accuracy: 0.9757 - val_loss: 1.8917 - val_accuracy: 0.7160
    Epoch 5/5
    138/138 [==============================] - 26s 192ms/step - loss: 0.0841 - accuracy: 0.9745 - val_loss: 2.0121 - val_accuracy: 0.7183
    <keras.callbacks.History at 0x7f5d21b18710>
```

Question-7:

Save The Model

Solution

model.save("Flowers.h5")

7)Save the model

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

Question-8:

Test The Model

Solution 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/Assignment 3/Flowers-Dataset/Testing/daisy/14333681205_a07c9f1752_m.jpg",target_size=(64,64)) x=image.img_to_array(img) x=np.expand_dims(x,axis=0) pred=model.predict(x) pred index=['daisy','dandelion','rose','sunflower','tulip'] index[np.argmax(pred)]

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/Assignment 3/Flowers-Dataset/Testing/daisy/14333681205_a07c9f1752_m.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([[1., 0., 0., 0., 0.]], dtype=float32)
```