Assignment - 3

Assignment Date	03.10.2022
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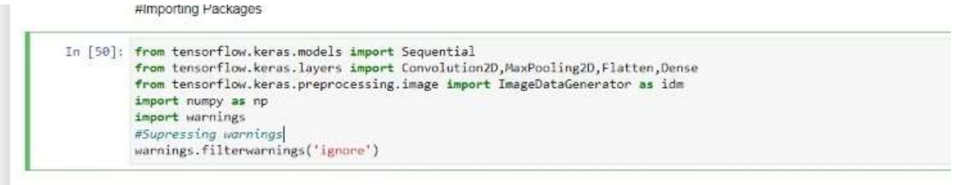
Maximum Marks	2 Marks

Question-1

Download the Dataset



#Importing Packages

```
In [50]: from tensorflow.keras.models import Sequential
         from tensorflow.keras.layers import Convolution2D,MaxPooling2D,Flatten,Dense
         from tensorflow.keras.preprocessing.image import ImageDataGenerator as idm
         import numpy as np
         import warnings
         #Supressing warnings
         warnings.filterwarnings('ignore')
```

Question-2

Image Augmentation

Solution:

Creating augmentation on training variable

train_flowers=idm(rescale=1./255,zoom_range=0.2,horizontal_flip=True)

Passing training data to train variable

Xtrain = train_flowers.flow_from_directory('/content/drive/MyDrive/IBM/Flowers-Dataset',target_size=(76,76),class_mode='categorical',batch_size=100)

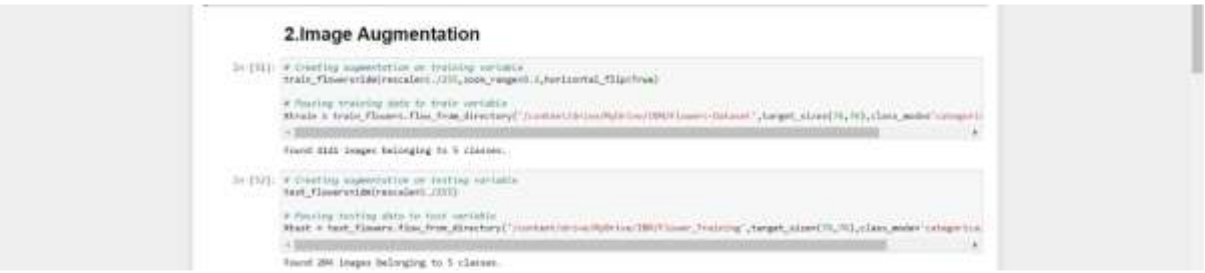
Creating augmentation on testing variable

test_flowers=idm(rescale=1./255)

Passing testing data to test variable

Xtest = test_flowers.flow_from_directory('/content/drive/MyDrive/IBM/Flower_Training',target_size=(76,76),class_mode='categorical',batch_size=100)

Screenshot:



2.Image Augmentation

```
In [51]: # Creating augmentation on training variable
         train_flowers=idm(rescale=1./255,zoom_range=0.2,horizontal_flip=True)

         # Passing training data to train variable
         Xtrain = train_flowers.flow_from_directory('/content/drive/MyDrive/IBM/Flowers-Dataset',target_size=(76,76),class_mode='categori

         Found [illegible] images belonging to 5 classes.

In [52]: # Creating augmentation on testing variable
         test_flowers=idm(rescale=1./255)

         # Passing testing data to test variable
         Xtest = test_flowers.flow_from_directory('/content/drive/MyDrive/IBM/Flower_Training',target_size=(76,76),class_mode='categorica

         Found 204 images belonging to 5 classes.
```

Question-3

Create Model

Solution:

# Creating augmentation on training variable

train_flowers=idm(rescale=1./255,zoom_range=0.2,horizontal_flip=True)

# Passing training data to train variable

Xtrain = train_flowers.flow_from_directory('/content/drive/MyDrive/IBM/Flowers-Dataset',target_size=(76,76),class_mode='categorical',batch_size=100)

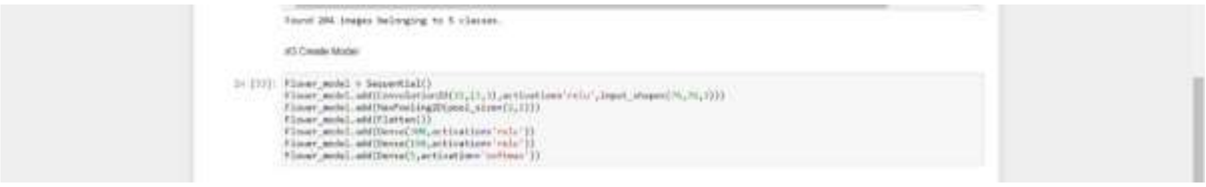
# Creating augmentation on testing variable

test_flowers=idm(rescale=1./255)

# Passing testing data to test variable

Xtest = test_flowers.flow_from_directory('/content/drive/MyDrive/IBM/Flower_Training',target_size=(76,76),class_mode='categorical',batch_size=100)

Screenshot:



```
Found 284 images belonging to 5 classes.
```

#3 Create Model

```
In [33]: Flower_model = Sequential()
         Flower_model.add(Convolution2D(32,(3,3),activation='relu',input_shape=(76,76,3)))
         Flower_model.add(MaxPooling2D(pool_size=(2,2)))
         Flower_model.add(Flatten())
         Flower_model.add(Dense(300,activation='relu'))
         Flower_model.add(Dense(150,activation='relu'))
         Flower_model.add(Dense(5,activation='softmax'))
```

Question-4

Compile The Model

Solution:

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

Screenshot:

#4. Compile the Model

```
In [34]: Flower_model.compile(optimizer='adam',loss='categorical_crossentropy',metrics=['accuracy'])
```

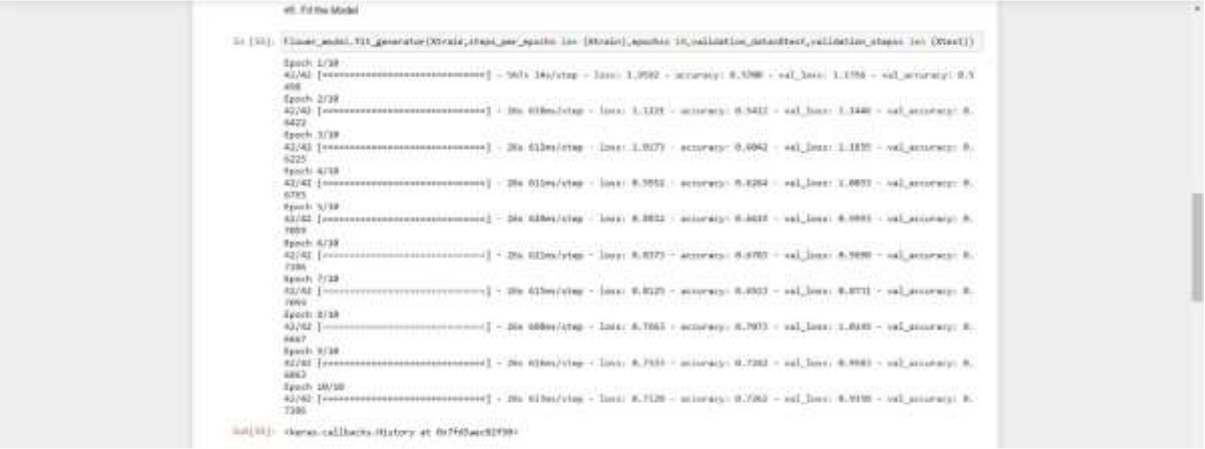
Question-5

Fit The Model

Solution:

Flower_model.fit_generator(Xtrain,steps_per_epoch= len (Xtrain),epochs= 10,validation_data=Xtest,validation_steps= len (Xtest))

Screenshot:



#6. Fit the Model

```
In [51]: Flower_model.fit_generator(Xtrain,steps_per_epoch= len (Xtrain),epochs= 10,validation_data=Xtest,validation_steps= len (Xtest))
Epoch 1/10
42/42 [==============================] - 567s 14s/step - loss: 1.9582 - accuracy: 0.3700 - val_loss: 1.1556 - val_accuracy: 0.5
408
Epoch 2/10
42/42 [==============================] - 26s 618ms/step - loss: 1.1328 - accuracy: 0.5412 - val_loss: 1.1440 - val_accuracy: 0.
6422
Epoch 3/10
42/42 [==============================] - 26s 613ms/step - loss: 1.0173 - accuracy: 0.6042 - val_loss: 1.1835 - val_accuracy: 0.
6225
Epoch 4/10
42/42 [==============================] - 26s 611ms/step - loss: 0.9552 - accuracy: 0.6284 - val_loss: 1.0853 - val_accuracy: 0.
6785
Epoch 5/10
42/42 [==============================] - 26s 618ms/step - loss: 0.8832 - accuracy: 0.6618 - val_loss: 0.9993 - val_accuracy: 0.
7059
Epoch 6/10
42/42 [==============================] - 26s 613ms/step - loss: 0.8373 - accuracy: 0.6783 - val_loss: 0.9890 - val_accuracy: 0.
7386
Epoch 7/10
42/42 [==============================] - 26s 615ms/step - loss: 0.8125 - accuracy: 0.6933 - val_loss: 0.8731 - val_accuracy: 0.
7099
Epoch 8/10
42/42 [==============================] - 26s 608ms/step - loss: 0.7663 - accuracy: 0.7073 - val_loss: 1.0145 - val_accuracy: 0.
6667
Epoch 9/10
42/42 [==============================] - 26s 616ms/step - loss: 0.7533 - accuracy: 0.7282 - val_loss: 0.9981 - val_accuracy: 0.
6863
Epoch 10/10
42/42 [==============================] - 26s 613ms/step - loss: 0.7120 - accuracy: 0.7262 - val_loss: 0.9198 - val_accuracy: 0.
7306
Out[51]: <keras.callbacks.History at 0x7fd5aec92f50>
```

Question-6

Save The Model

Solution:

Flower_model.save('Flower.h5')

Screenshot:

#7. Save the model

```
In [56]: Flower_model.save('Flower.h5')
```

#8. Test the model

Question-7

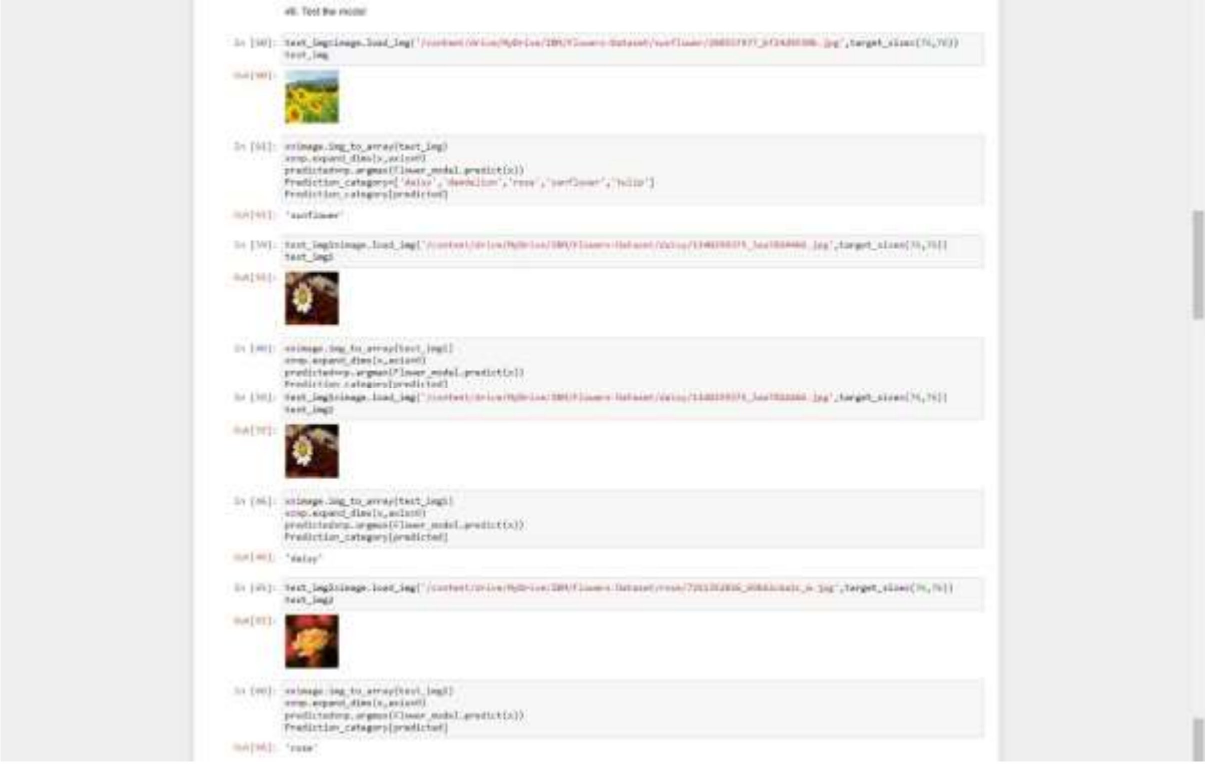
Test The Model

Solution:

```
test_img=image.load_img('/content/drive/MyDrive/IBM/Flowers-Dataset/sunflower/200557977_bf24d9550b.jpg',target_size=(76,76))
test_img

x=image.img_to_array(test_img)
x=np.expand_dims(x,axis=0)
predicted=np.argmax(Flower_model.predict(x))
Prediction_category=['daisy','dandelion','rose','sunflower','tulip']
Prediction_category[predicted]

test_img1=image.load_img('/content/drive/MyDrive/IBM/Flowers-Dataset/daisy/1140299375_3aa7024466.jpg',target_size=(76,76))
test_img1

x=image.img_to_array(test_img1)
x=np.expand_dims(x,axis=0)
predicted=np.argmax(Flower_model.predict(x))
```

```
Prediction_category[predicted]

    test_img2=image.load_img('/content/drive/MyDrive/IBM/Flowers-Dataset/rose/7251352826_69b62cba2c_m.jpg',target_size=(76,76))
test_img2

    x=image.img_to_array(test_img2)
    x=np.expand_dims(x,axis=0)
    predicted=np.argmax(Flower_model.predict(x))
Prediction_category[predicted]
```

Screenshot:



#8. Test the model

```
In [[illegible]]: test_img=image.load_img('/content/drive/MyDrive/IBM/Flowers-Dataset/sunflower/[illegible].jpg',target_size=(76,76))
        test_img
Out[[illegible]]:

In [[illegible]]: x=image.img_to_array(test_img)
        x=np.expand_dims(x,axis=0)
        predicted=np.argmax(Flower_model.predict(x))
        Prediction_category=['daisy','dandelion','rose','sunflower','tulip']
        Prediction_category[predicted]
Out[[illegible]]: 'sunflower'

In [[illegible]]: test_img1=image.load_img('/content/drive/MyDrive/IBM/Flowers-Dataset/daisy/[illegible].jpg',target_size=(76,76))
        test_img1
Out[[illegible]]:

In [[illegible]]: x=image.img_to_array(test_img1)
        x=np.expand_dims(x,axis=0)
        predicted=np.argmax(Flower_model.predict(x))
        Prediction_category[predicted]
In [[illegible]]: test_img1=image.load_img('/content/drive/MyDrive/IBM/Flowers-Dataset/daisy/[illegible].jpg',target_size=(76,76))
        test_img2
Out[[illegible]]:

In [[illegible]]: x=image.img_to_array(test_img1)
        x=np.expand_dims(x,axis=0)
        predicted=np.argmax(Flower_model.predict(x))
        Prediction_category[predicted]
Out[[illegible]]: 'daisy'

In [[illegible]]: test_img2=image.load_img('/content/drive/MyDrive/IBM/Flowers-Dataset/rose/[illegible].jpg',target_size=(76,76))
        test_img2
Out[[illegible]]:

In [[illegible]]: x=image.img_to_array(test_img2)
        x=np.expand_dims(x,axis=0)
        predicted=np.argmax(Flower_model.predict(x))
        Prediction_category[predicted]
Out[[illegible]]: 'rose'
```