ASSIGNMENT 3

Build CNN Model for Classification of Flowers

Assignment Date	29 September 2022
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Maximum Marks	2 Marks

Assignment 3

- Download the Dataset : https://drive.google.com/file/d/1xkynpL15pt6KT3YSlDimu4A5iRU9qYck/view
- Image Augmentation
- Create Model
- Add Layers (Convolution,MaxPooling,Flatten,Dense-(Hidden Layers),Output)
- Compile The Model
- Fit The Model
- Save The Model
- Test The Model

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')
```

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='categorical',batch_size=100)
```

```
Found 4141 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='categorical',batch_size=100)
```

```
Found 204 images belonging to 5 classes.
```

3.Create Model

In [53]:
```
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'))
```

4. Compile the Model

In [54]:
```
Flower_model.compile(optimizer='adam',loss='categorical_crossentropy',metrics=['accuracy'])
```

5. Fit the Model

In [55]:
```
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: 1.9592 - accuracy: 0.3700 - val_loss: 1.1356 - val_accuracy: 0.5490
Epoch 2/10
42/42 [==============================] - 26s 618ms/step - loss: 1.1221 - accuracy: 0.5412 - val_loss: 1.1446 - val_accuracy: 0.6422
Epoch 3/10
42/42 [==============================] - 26s 612ms/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: 0.6264 - val_loss: 1.0033 - val_accuracy: 0.6765
Epoch 5/10
42/42 [==============================] - 26s 620ms/step - loss: 0.8832 - accuracy: 0.6619 - val_loss: 0.9993 - val_accuracy: 0.7059
Epoch 6/10
42/42 [==============================] - 26s 621ms/step - loss: 0.8373 - accuracy: 0.6783 - val_loss: 0.9690 - val_accuracy: 0.7206
Epoch 7/10
42/42 [==============================] - 26s 615ms/step - loss: 0.8125 - accuracy: 0.6923 - val_loss: 0.8731 - val_accuracy: 0.7059
Epoch 8/10
42/42 [==============================] - 26s 608ms/step - loss: 0.7663 - accuracy: 0.7073 - val_loss: 1.0149 - val_accuracy: 0.6667
Epoch 9/10
42/42 [==============================] - 26s 616ms/step - loss: 0.7333 - accuracy: 0.7242 - val_loss: 0.9583 - val_accuracy: 0.6863
Epoch 10/10
42/42 [==============================] - 26s 613ms/step - loss: 0.7128 - accuracy: 0.7262 - val_loss: 0.9150 - val_accuracy: 0.7206
```

Out[55]:

7. Save the model

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

8. Test the model

In [60]:
```
test_img=image.load_img('/content/drive/MyDrive/IBM/Flowers-Dataset/sunflower/200557977_bf24d9550b.jpg',target_size=(76,76))
test_img
```

Out[60]:

In [61]:
```
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[61]: 'sunflower'

In [59]:
```
test_img1=image.load_img('/content/drive/MyDrive/IBM/Flowers-Dataset/daisy/1140299375_3aa7024466.jpg',target_size=(76,76))
test_img1
```

Out[59]:

In [46]:
```
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[46]: 'daisy'

In [65]:
```
test_img2=image.load_img('/content/drive/MyDrive/IBM/Flowers-Dataset/rose/7251352826_69b62cba2c_m.jpg',target_size=(76,76))
test_img2
```

Out[65]:

In [66]:
```
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[66]: 'rose'