# 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'