

**Assignment -3**  
**Build CNN Model for Classification Of Flowers**

|                       |                 |
|-----------------------|-----------------|
| Assignment submission | 10 October 2022 |
| Student Name          | Sivakami R      |
| Student Roll Number   | 951919CS093     |
| Maximum Marks         | 2 Marks         |

**1. Download the dataset: Dataset**

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

```
Mounted at /content/drive
```

```
>cd /content/drive/MyDrive
```

```
/content/drive/MyDrive
```

```
>!unzip Flowers-Dataset.zip
```

```
Archive:  Flowers-Dataset.zip
  inflating: flowers/daisy/100080576_f52e8ee070_n.jpg
  inflating: flowers/daisy/10140303196_b88d3d6cec.jpg
  inflating: flowers/daisy/10172379554_b296050f82_n.jpg
  inflating: flowers/daisy/10172567486_2748826a8b.jpg
  inflating: flowers/daisy/10172636503_21bededa75_n.jpg
  inflating: flowers/daisy/102841525_bd6628ae3c.jpg
```

**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=False)
```

```
test_datagen=ImageDataGenerator(rescale=1./255)
```

**3. Create Model**

```
>X_train=train_datagen.flow_from_directory('/content/drive/MyDrive/Flowers-Dataset/flowers',target_size=(64,64),class_mode='categorical',batch_size=24)
```

```
Found 30 images belonging to 5 classes.
```

```
>X_test=train_datagen.flow_from_directory('/content/drive/MyDrive/Flowers-Dataset/flowers',target_size=(64,64),class_mode='categorical',batch_size=24)
```

```
Found 40 images belonging to 5 classes.
```

```
>X_train.class_indices
```

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

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

```
from tensorflow.keras.models import Sequential
from tensorflow.keras.layers import Dense,Convolution2D,MaxPooling2D,Flatten
model=Sequential()
model.add(Convolution2D(32,(3,3),input_shape=(64,64,3),activation='relu'))
model.add(MaxPooling2D(pool_size=(2,2)))
model.add(Flatten())
model.summary()
Model: "sequential_1"
```

| Layer (type)                 | Output Shape       | Param # |
|------------------------------|--------------------|---------|
| conv2d (Conv2D)              | (None, 62, 62, 32) | 896     |
| max_pooling2d (MaxPooling2D) | (None, 31, 31, 32) | 0       |
| flatten (Flatten)            | (None, 30752)      | 0       |
| Total params: 896            |                    |         |
| Trainable params: 896        |                    |         |
| Non-trainable params: 0      |                    |         |

```
model.add(Dense(300,activation='relu'))
model.add(Dense(150,activation='relu'))
model.add(Dense(4,activation='softmax'))
```

#### 5. Compile The Model

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

#### 6. Fit The Model

```
model.fit_generator(X_train,steps_per_epoch=len(X_train),validation_data=X_test,validation_steps=len(X_test),epochs=10)
```

#### 7. Save The Model

```
model.save('flowersss.h5')
```

#### 8. Test The Model

```
import numpy as np
```

```
from tensorflow.keras.models import load_model
from tensorflow.keras.preprocessing import image
```

```
model=load_model('/content/drive/MyDrive/flowerssss')
```

```
img=image.load_img("/content/drive/MyDrive/flowers/daisy/153210866_03cc9f2f36.jpg" )
```

```
img
```



```
>img=image.load_img("/content/drive/MyDrive/flowers/daisy/153210866_03cc9f2f36.jpg",target_size=(64,64) )
```

```
img
```



```
>X=image.img_to_array(img)
```

```
>X
```

```
array([[13., 20., 13.], [14., 23., 18.], [20., 27., 20.], ..., [50., 41.,
32.], [46., 37., 28.], [17., 19., 14.]], [[18., 20., 15.], [25., 31., 29.],
[29., 31., 28.], ..., [46., 48., 34.], [50., 41., 32.], [ 3., 5., 4.]],
[[14., 20., 16.], [17., 22., 16.], [18., 20., 17.], ..., [52., 50., 38.],
[50., 47., 38.], [21., 23., 20.]], ..., [[21., 26., 20.], [40., 40., 32.],
[34., 35., 30.], ..., [21., 28., 21.], [11., 15., 14.], [22., 21., 17.]],
[[26., 31., 27.], [53., 53., 43.], [32., 37., 31.], ..., [28., 34., 24.],
[21., 31., 22.], [50., 50., 38.]], [[34., 36., 31.], [43., 46., 35.], [24.,
```

```
26., 21.], ..., [71., 65., 49.], [69., 63., 47.], [83., 76., 60.]],  
dtype=float32)
```

```
>y=np.argmax(model.predict(X),axis=1)
```

```
>y
```

```
array([0])
```

```
>X_train.class_indices
```

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

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

```
>index[y[0]]
```

```
'daisy'
```