

ASSIGNMENT-3

| | |
|-----------------|------------------|
| Assignment Date | 8rd October 2022 |
| Name | Aarthi.R |
| Rollnumber | 820319205001 |
| Maximum Marks | 2Marks |

```
from tensorflow.keras.preprocessing.image import ImageDataGenerator
```

```
train_datagen = ImageDataGenerator(rescale= 1./255,horizontal_flip = True,vertical_flip = True, zoom_range = 0.2)
```

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

```
x_train = train_datagen.flow_from_directory(r"C:\Users\maris_q3mm6nk\Desktop\data_for_ibm\Flowers-Dataset\flowers",target_size = (64,64),  
                                             class_mode = "categorical",batch_size = 24)
```

Found 4317 images belonging to 5 classes.

```
x_test = test_datagen.flow_from_directory(r"C:\Users\maris_q3mm6nk\Desktop\data_for_ibm\Flowers-Dataset\flowers",target_size = (64,64),  
                                          class_mode = "categorical",batch_size = 24)
```

Found 4317 images belonging to 5 classes.

```
x_train.class_indices
```

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

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

```
from tensorflow.keras.layers import Dense
```

```
from tensorflow.keras.layers import 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"

| 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(5,activation='softmax'))
len(x_train)
```

180

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

```
model.fit(x_train,steps_per_epoch=len(x_train),validation_data=x_test,validation_steps=len(x_test),epochs=10)
```

Epoch 1/10

180/180 [=====] - 33s 183ms/step - loss: 1.3003 - accuracy: 0.4691 - val_loss: 1.1679 - val_accuracy: 0.5342

Epoch 2/10

180/180 [=====] - 28s 157ms/step - loss: 1.0616 - accuracy: 0.5812 - val_loss: 1.0829 - val_accuracy: 0.5800

Epoch 3/10

180/180 [=====] - 28s 157ms/step - loss: 0.9799 - accuracy: 0.6185 - val_loss: 1.1128 - val_accuracy: 0.5821

Epoch 4/10

180/180 [=====] - 29s 161ms/step - loss: 0.9217 - accuracy: 0.6366 - val_loss: 0.9303 - val_accuracy: 0.6386

Epoch 5/10

180/180 [=====] - 28s 158ms/step - loss: 0.8893 - accuracy: 0.6583 - val_loss: 0.8627 - val_accuracy: 0.6650

Epoch 6/10

180/180 [=====] - 29s 162ms/step - loss: 0.8509 - accuracy: 0.6755 - val_loss: 0.8262 - val_accuracy: 0.6880

Epoch 7/10

180/180 [=====] - 30s 169ms/step - loss: 0.8274 - accuracy: 0.6755 - val_loss: 0.8372 - val_accuracy: 0.6796

Epoch 8/10

180/180 [=====] - 30s 166ms/step - loss: 0.7923 - accuracy: 0.6965 - val_loss: 0.8437 - val_accuracy: 0.6734

Epoch 9/10

180/180 [=====] - 28s 157ms/step - loss: 0.7745 - accuracy: 0.7072 - val_loss: 0.6995 - val_accuracy: 0.7306

Epoch 10/10

180/180 [=====] - 28s 158ms/step - loss: 0.7363 - accuracy: 0.7192 - val_loss: 0.7278 - val_accuracy: 0.7278

<keras.callbacks.History at 0x16061cf68f0>

model.save('IBM_flowers.h5')

pwd

'C:\\Users\\maris_q3mm6nk\\Desktop\\data_for_ibm'

import numpy as np

from tensorflow.keras.models import load_model

from tensorflow.keras.preprocessing import image

model=load_model('IBM_flowers.h5')

```
img=image.load_img(r'C:\Users\maris_q3mm6nk\Desktop\data_for_ibm\Flowers  
-Dataset\flowers\rose/394990940_7af082cf8d_n.jpg')
```

img



```
img=image.load_img(r'C:\Users\maris_q3mm6nk\Desktop\data_for_ibm\Flowers  
-Dataset\flowers\rose/394990940_7af082cf8d_n.jpg',target_size=(64,64))
```

img



```
x=image.img_to_array(img)
```

x

```
array([[[ 4., 14.,  3.],  
        [ 4., 15.,  0.],  
        [ 7., 10.,  3.],  
        ...,  
        [ 1.,  1.,  1.],  
        [ 1.,  1.,  1.],  
        [ 3.,  3.,  3.]])
```

[[21., 37., 8.],
[7., 18., 1.],
[5., 11., 1.],
...,
[1., 1., 3.],
[1., 1., 1.],
[2., 2., 2.]],

[[15., 34., 4.],
[5., 18., 0.],
[6., 14., 3.],
...,
[1., 2., 4.],
[0., 0., 0.],
[1., 1., 1.]],

...,

[[7., 11., 10.],
[7., 16., 15.],
[17., 23., 21.],
...,
[1., 1., 1.],
[2., 2., 2.],
[0., 0., 0.]],

[[9., 18., 15.],
[2., 7., 3.],
[5., 11., 7.],
...,
[0., 0., 0.],
[1., 1., 1.],
[1., 1., 1.]],

[[18., 26., 28.],
[0., 10., 2.],
[8., 14., 10.],

```

...,
[ 2.,  6.,  9.],
[ 1.,  1.,  1.],
[ 1.,  1.,  1.]], dtype=float32)

x=np.expand_dims(x,axis=0)
x

```

```

array([[[[ 4., 14.,  3.],
          [ 4., 15.,  0.],
          [ 7., 10.,  3.],
          ...,
          [ 1.,  1.,  1.],
          [ 1.,  1.,  1.],
          [ 3.,  3.,  3.]],

        [[21., 37.,  8.],
          [ 7., 18.,  1.],
          [ 5., 11.,  1.],
          ...,
          [ 1.,  1.,  3.],
          [ 1.,  1.,  1.],
          [ 2.,  2.,  2.]],

        [[15., 34.,  4.],
          [ 5., 18.,  0.],
          [ 6., 14.,  3.],
          ...,
          [ 1.,  2.,  4.],
          [ 0.,  0.,  0.],
          [ 1.,  1.,  1.]],

        ...,

        [[ 7., 11., 10.],
          [ 7., 16., 15.],
          [17., 23., 21.],
          ...,

```

```
[ 1.,  1.,  1.],  
[ 2.,  2.,  2.],  
[ 0.,  0.,  0.]],
```

```
[[ 9., 18., 15.],  
 [ 2.,  7.,  3.],  
 [ 5., 11.,  7.],  
 ...,  
 [ 0.,  0.,  0.],  
 [ 1.,  1.,  1.],  
 [ 1.,  1.,  1.]],
```

```
[[18., 26., 28.],  
 [ 0., 10.,  2.],  
 [ 8., 14., 10.],  
 ...,  
 [ 2.,  6.,  9.],  
 [ 1.,  1.,  1.],  
 [ 1.,  1.,  1.] ]], dtype=float32)
```

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

```
y
```

```
1/1 [=====] - 0s 74ms/step
```

```
array([2], dtype=int64)
```

```
x_train.class_indices
```

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

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

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

```
'rose'
```