

### ASSIGNMENT-3

Assignment Date	8 <sup>th</sup> October 2022
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Rollnumber	953719106042
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_f
or_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_fo
r_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\\Des

ktop\\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'
```

