

### Assignment -3

Assignment Date	08 october 2022
Student Name	Saranya A
Student Roll Number	310819104075
Maximum Marks	2 Marks

PDF LINK:  Assignment-3-Saranya.pdf

```
In [4]: !unzip '/content/flowers'
Archive: /content/Flowers-Dataset.zip
replace flowers/daisy/100080576_f52e8ee070_n.jpg? [y]es, [n]o, [A]ll, [N]one, [r]ename:

In [6]: #DATA AUGMENTATION
from tensorflow.keras.preprocessing.image import ImageDataGenerator

In [7]: train_datagen = ImageDataGenerator(
    rescale=1./255,
    zoom_range=0.2,
    horizontal_flip=True
)

In [8]: test_datagen = ImageDataGenerator(rescale=1./255)

In [14]: xtrain = train_datagen.flow_from_directory('/content/flowers',
    target_size=(64,64),
    class_mode='categorical',
    batch_size=100)

Found 4317 images belonging to 5 classes.

In [15]: xtest = test_datagen.flow_from_directory('/content/flowers',
    target_size=(64,64),
    class_mode='categorical',
    batch_size=100)

Found 4317 images belonging to 5 classes.

CNN MODEL TRAINING

In [10]: from tensorflow.keras.models import Sequential
from tensorflow.keras.layers import Convolution2D, MaxPooling2D, Flatten, Dense

In [11]: model = Sequential()

#CONVOLUTION LAYER
model.add(Convolution2D(32,(3,3),activation='relu', input_shape=(64,64,3)))

#MAX POOLING LATER
model.add(MaxPooling2D(pool_size=(2, 2)))

#FLATTEN
model.add(Flatten())

#FULLY CONNECTED LAYER
```

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```
#FULLY CONNECTED LAYER
model.add(Dense(400,activation='relu'))
model.add(Dense(300,activation='relu'))

#OUTPUT
model.add(Dense(5,activation='softmax'))

In [12]: # COMPILE
model.compile(optimizer='adam', loss='categorical_crossentropy', metrics=['accuracy'])

In [18]: #FIT THE MODEL
model.fit_generator(xtrain,
    steps_per_epoch=len(xtrain),
    epochs=10,
    validation_data=xtest,
    validation_steps=len(xtest),
)

/usr/local/lib/python3.7/dist-packages/ipykernel_launcher.py:7: UserWarning: 'Model.fit_generator' is deprecated and
will be removed in a future version. Please use 'Model.fit', which supports generators.
  import sys

Epoch 1/10
44/44 [=====] - 31s 504ms/step - loss: 1.7737 - accuracy: 0.3639 - val_loss: 1.2427 - val_ac
curacy: 0.4695
Epoch 2/10
44/44 [=====] - 22s 501ms/step - loss: 1.1417 - accuracy: 0.5288 - val_loss: 1.0688 - val_ac
curacy: 0.5826
Epoch 3/10
44/44 [=====] - 22s 502ms/step - loss: 1.0359 - accuracy: 0.5958 - val_loss: 0.9995 - val_ac
curacy: 0.6224
Epoch 4/10
44/44 [=====] - 22s 502ms/step - loss: 0.9638 - accuracy: 0.6301 - val_loss: 1.0157 - val_ac
curacy: 0.6090
Epoch 5/10
44/44 [=====] - 22s 502ms/step - loss: 0.9027 - accuracy: 0.6484 - val_loss: 0.8879 - val_ac
curacy: 0.6715
Epoch 6/10
44/44 [=====] - 22s 500ms/step - loss: 0.8541 - accuracy: 0.6769 - val_loss: 0.8847 - val_ac
curacy: 0.6725
Epoch 7/10
44/44 [=====] - 22s 500ms/step - loss: 0.8241 - accuracy: 0.6921 - val_loss: 0.9194 - val_ac
curacy: 0.6379
Epoch 8/10
44/44 [=====] - 22s 497ms/step - loss: 0.7982 - accuracy: 0.6921 - val_loss: 0.7008 - val_ac
curacy: 0.7362
Epoch 9/10
44/44 [=====] - 22s 502ms/step - loss: 0.7265 - accuracy: 0.7283 - val_loss: 0.6862 - val_ac
curacy: 0.7445
Epoch 10/10
44/44 [=====] - 22s 496ms/step - loss: 0.7160 - accuracy: 0.7359 - val_loss: 0.6717 - val_ac
```

```

import sys

Epoch 1/10
44/44 [=====] - 31s 504ms/step - loss: 1.7737 - accuracy: 0.3639 - val_loss: 1.2427 - val_ac
curacy: 0.4605
Epoch 2/10
44/44 [=====] - 22s 501ms/step - loss: 1.1417 - accuracy: 0.5298 - val_loss: 1.0688 - val_ac
curacy: 0.5826
Epoch 3/10
44/44 [=====] - 22s 502ms/step - loss: 1.0359 - accuracy: 0.5958 - val_loss: 0.9995 - val_ac
curacy: 0.6224
Epoch 4/10
44/44 [=====] - 22s 502ms/step - loss: 0.9638 - accuracy: 0.6301 - val_loss: 1.0157 - val_ac
curacy: 0.6890
Epoch 5/10
44/44 [=====] - 22s 502ms/step - loss: 0.9027 - accuracy: 0.6404 - val_loss: 0.8879 - val_ac
curacy: 0.6715
Epoch 6/10
44/44 [=====] - 22s 500ms/step - loss: 0.8541 - accuracy: 0.6769 - val_loss: 0.8847 - val_ac
curacy: 0.6725
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Epoch 9/10
44/44 [=====] - 22s 502ms/step - loss: 0.7265 - accuracy: 0.7283 - val_loss: 0.6862 - val_ac
curacy: 0.7445
Epoch 10/10
44/44 [=====] - 22s 496ms/step - loss: 0.7160 - accuracy: 0.7359 - val_loss: 0.6717 - val_ac
curacy: 0.7399

Out[16]: <keras.callbacks.History at 0x7fec702daa90>

In [17]: #SAVE MODEL
model.save('flowers.h5')

In [18]: from tensorflow.keras.preprocessing import image
import numpy as np

In [24]: #TESTING
img = image.load_img('/dandelion.jpg', target_size=(64, 64))
x = image.img_to_array(img)
x = np.expand_dims(x, axis=0)
pred = np.argmax(model.predict(x))
output = ['daisy', 'dandelion', 'rose', 'sunflower', 'tulip']
output[pred]

Out[24]: 'dandelion'

```