

ASSIGNMENT 3 - TASKS

1. Downloading and unzipping dataset

In []:

```
!unzip 'drive/MyDrive/sample_data/Flowers-Dataset.zip'
Archive:  drive/MyDrive/sample_data/Flowers-Dataset.zip
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inflating: flowers/tulip/3991742794_edebc6c8a0_n.jpg
inflating: flowers/tulip/402525114_eaa60c8341_m.jpg
 inflating: flowers/tulip/8759594528_2534c0ec65_n.jpg
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inflating: flowers/tulip/8759601388_36e2a50d98_n.jpg
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inflating: flowers/tulip/9870557734_88eb3b9e3b_n.jpg
inflating: flowers/tulip/9947374414_fdf1d0861c_n.jpg
inflating: flowers/tulip/9947385346_3a8cacea02_n.jpg
inflating: flowers/tulip/9976515506_d496c5e72c.jpg
```

2. Image Augmentation

```
import numpy as np
import tensorflow as tf
from tensorflow.keras import layers
from tensorflow.keras.models import Sequential
from tensorflow.keras.preprocessing.image import ImageDataGenerator
import matplotlib.pyplot as plt

batch_size = 32
img_height = 180
img_width = 180
data_dir = "/content/flowers"

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

In [ ]:
x_train = 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 [ ]:
data_augmentation = Sequential(
    [
```

```

        layers.RandomFlip("vertical",input_shape=(img_height, img_width, 3)),
        layers.RandomRotation(0.1),
        layers.RandomZoom(0.1),
    ]
)

```

3. Creating Model

```

from tensorflow.keras.layers import
Convolution2D,MaxPooling2D,Flatten,Dense
model = Sequential()

```

In []:

```

training_ds = tf.keras.utils.image_dataset_from_directory(
    data_dir,
    validation_split=0.2,
    subset="training",
    seed=57,
    image_size=(img_height, img_width),
    batch_size=batch_size)

```

```

Found 4317 files belonging to 5 classes.
Using 3454 files for training.

```

In []:

```

validation_ds = tf.keras.utils.image_dataset_from_directory(
    data_dir,
    validation_split=0.2,
    subset="validation",
    seed=107,
    image_size=(img_height, img_width),
    batch_size=batch_size)

```

```

Found 4317 files belonging to 5 classes.
Using 863 files for validation.

```

In []:

```

training_ds.class_names

```

Out[]:

```

['daisy', 'dandelion', 'rose', 'sunflower', 'tulip']

```

In []:

```

plt.figure(figsize=(7, 7))
for data, labels in training_ds.take(1):
    for i in range(6):
ax = plt.subplot(2, 3, i + 1)
    plt.imshow(data[i].numpy().astype("uint8"))
    plt.title(training_ds.class_names[labels[i]])
    plt.axis("off")

```



3a. Convolution layer

```
model.add(Convolution2D(32, (3,3), activation = "relu", input_shape = (64,64,3) ))
```

In []:

3b. Maxpooling layer

```
model.add(MaxPooling2D(pool_size = (2,2)))
```

In [20]:

3c. Flatten

```
model.add(Flatten())
```

In [21]:

3d. Hidden/Dense layers

```
model.add(Dense(300, activation = "relu"))
```

In [22]:

```
model.add(Dense(150, activation = "relu"))
```

3e. Output layer

```
model.add(Dense(5, activation = "softmax"))
```

4. Compiling the Model

In [24]:

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

5. Fit The Model

In [25]:

```
model.fit(x_train, epochs = 15, steps_per_epoch = len(x_train))
```

Epoch 1/15

44/44 [=====] - 18s 398ms/step - loss: 1.3774 - accuracy: 0.4223

Epoch 2/15

44/44 [=====] - 18s 406ms/step - loss: 1.1272 - accuracy: 0.5298

Epoch 3/15

44/44 [=====] - 19s 436ms/step - loss: 1.0545 - accuracy: 0.5719

Epoch 4/15

44/44 [=====] - 19s 420ms/step - loss: 1.0108 - accuracy: 0.5942

Epoch 5/15

44/44 [=====] - 20s 452ms/step - loss: 0.9347 - accuracy: 0.6275

Epoch 6/15

44/44 [=====] - 18s 410ms/step - loss: 0.9037 - accuracy: 0.6454

Epoch 7/15

44/44 [=====] - 19s 437ms/step - loss: 0.8823 - accuracy: 0.6562

Epoch 8/15

44/44 [=====] - 18s 403ms/step - loss: 0.8465 - accuracy: 0.6715

Epoch 9/15

44/44 [=====] - 18s 399ms/step - loss: 0.8006 - accuracy: 0.6928

Epoch 10/15

44/44 [=====] - 18s 404ms/step - loss: 0.7897 - accuracy: 0.6926

Epoch 11/15

44/44 [=====] - 18s 399ms/step - loss: 0.7810 - accuracy: 0.6940

Epoch 12/15

```

44/44 [=====] - 18s 409ms/step - loss: 0.7365 - ac
curacy: 0.7109
Epoch 13/15
44/44 [=====] - 18s 399ms/step - loss: 0.7511 - ac
curacy: 0.7060
Epoch 14/15
44/44 [=====] - 18s 398ms/step - loss: 0.7342 - ac
curacy: 0.7195
Epoch 15/15
44/44 [=====] - 18s 398ms/step - loss: 0.7064 - ac
curacy: 0.7281

```

Out[25]:

6. Save The Model

In [27]:

```

model.save("flowers")

WARNING:absl:Found untraced functions such as _jit_compiled_convolution_op
while saving (showing 1 of 1). These functions will not be directly callabl
e after loading.

```

7. Test The Model

In [28]:

```

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

```

In [30]:

```

model = load_model("/content/flowers")

```

In [53]:

```

rose_img =
image.load_img('/content/flowers/rose/568715474_bdb64ccc32.jpg',target_size
=(65,65))
x = image.img_to_array(daisy_img)
x = np.expand_dims(x,axis=0)
predicted_class=model.predict(x)

1/1 [=====] - 0s 17ms/step

```

In [54]:

```

labels = ['daisy','dandelion','roses','sunflowers','tulips']
labels[np.argmax(predicted_class)]

```

Out[54]:

```
'sunflowers'
```

In [55]:

```
roses_img
```

Out[55]:

Out[55]:



