```
#Importing Libraries
import os
import numpy as np

import tensorflow as tf
from tensorflow.keras import layers
from tensorflow.keras.preprocessing.image import load_img, ImageDataGenerator
from tensorflow.keras.models import Sequential, load_model
from tensorflow.keras.layers import Conv2D, MaxPooling2D, Dense, Dropout, Flatten
```

```
#Fetch Images count from Fodlers
```

```
count = 0
dirs = os.listdir('Images/')
for dir in dirs:
    files = list(os.listdir('Images/'+dir))
    print( dir +' Folder has '+ str(len(files)) + ' Images')
    count = count + len(files)
print( 'Images Folder has '+ str(count) + ' Images')
```

```
daisy Folder has 764 Images
dandelion Folder has 1052 Images
rose Folder has 784 Images
sunflower Folder has 733 Images
tulip Folder has 984 Images
Images Folder has 4317 Images
```

```
#Load Images into Arrays as Dataset
```

```
base_dir = 'Images/'
img_size = 180
batch = 32
```

```
train_ds = tf.keras.utils.image_dataset_from_directory( base_dir,
                                                       seed = 123,
                                                       validation_split=0.2,
                                                       subset = 'training',
                                                       batch_size=batch,
                                                       image_size=(img_size,img_size))

val_ds = tf.keras.utils.image_dataset_from_directory( base_dir,
                                                       seed = 123,
                                                       validation_split=0.2,
                                                       subset = 'validation',
                                                       batch_size=batch,
                                                       image_size=(img_size,img_size))
```

```
Found 4317 files belonging to 5 classes.
Using 3454 files for training.
Found 4317 files belonging to 5 classes.
Using 863 files for validation.
```

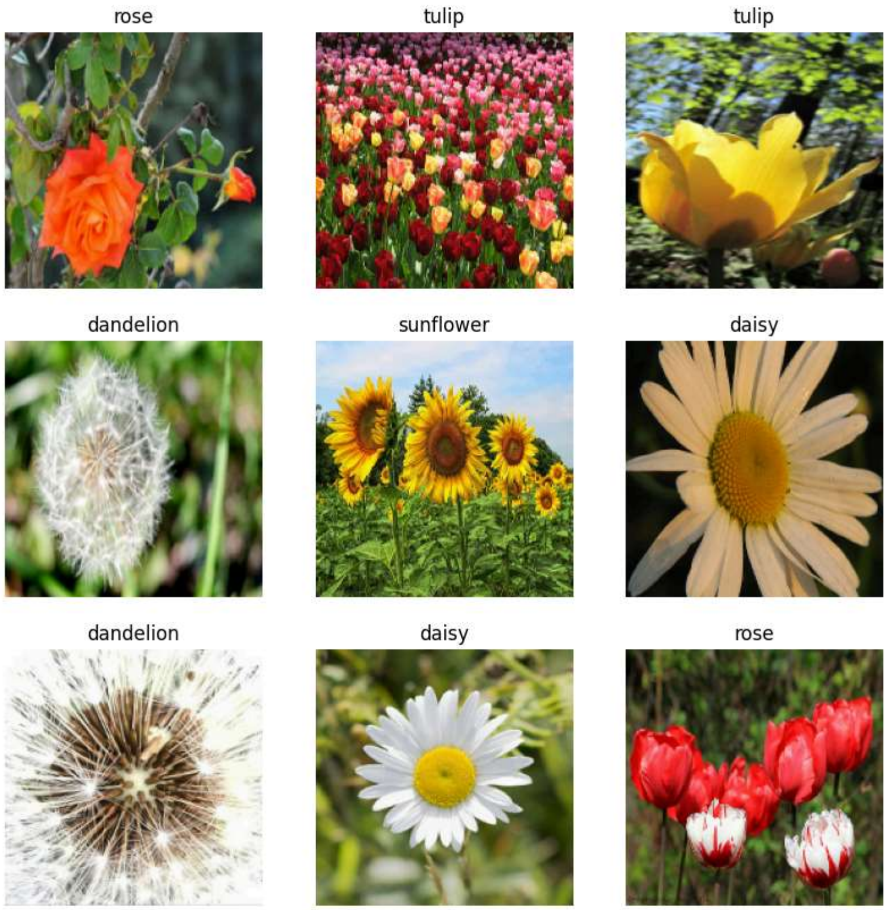
```
flower_names = train_ds.class_names
flower_names
```

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

```
import matplotlib.pyplot as plt
```

```
i = 0
plt.figure(figsize=(10,10))

for images, labels in train_ds.take(1):
    for i in range(9):
        plt.subplot(3,3, i+1)
        plt.imshow(images[i].numpy().astype('uint8'))
        plt.title(flower_names[labels[i]])
        plt.axis('off')
```



```
AUTOTUNE = tf.data.AUTOTUNE
```

```
train_ds = train_ds.cache().shuffle(1000).prefetch(buffer_size = AUTOTUNE)
```

```
val_ds = val_ds.cache().prefetch(buffer_size = AUTOTUNE)
```

```
#Data Augmentation
```

```
data_augmentation = Sequential([
    layers.RandomFlip("horizontal", input_shape = (img_size,img_size,3)),
    layers.RandomRotation(0.1),
    layers.RandomZoom(0.1)
])
```

```
i = 0
plt.figure(figsize=(10,10))

for images, labels in train_ds.take(1):
    for i in range(9):
        images = data_augmentation(images)
        plt.subplot(3,3, i+1)
        plt.imshow(images[0].numpy().astype('uint8'))
        plt.axis('off')
```

```
#MOdel Creation
```

```
model = Sequential([
    data_augmentation,
    layers.Rescaling(1./255),
    Conv2D(16, 3, padding='same', activation='relu'),
    MaxPooling2D(),
    Conv2D(32, 3, padding='same', activation='relu'),
    MaxPooling2D(),
    Conv2D(64, 3, padding='same', activation='relu'),
    MaxPooling2D(),
    Dropout(0.2),
    Flatten(),
    Dense(128, activation='relu'),
    Dense(5)
])
```

```
model.compile(optimizer='adam',
              loss=tf.keras.losses.SparseCategoricalCrossentropy(from_logits=True),
              metrics=['accuracy'])
```

```
model.summary()
```

```
Model: "sequential_9"
_________________________________________________________________
 Layer (type)                Output Shape              Param #
=================================================================
 sequential_8 (Sequential)   (None, 180, 180, 3)       0

 rescaling_3 (Rescaling)     (None, 180, 180, 3)       0

 conv2d_7 (Conv2D)           (None, 180, 180, 16)      448
```