ASSIGNMENT-03

Build CNN Model for Classification Of Flowers

Assignment Date	5 October 2022
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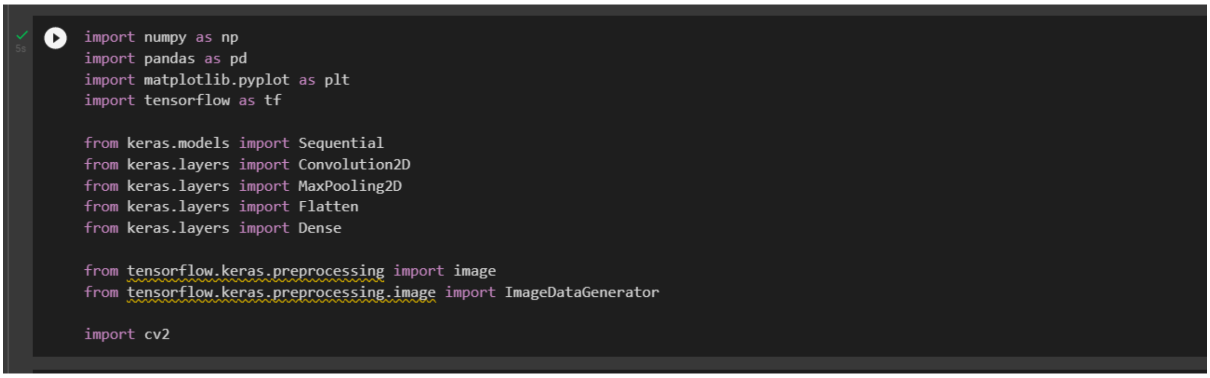
Student Roll Number	113219071006
Maximum Marks	2 Marks

QUESTION 1:

Download the Dataset

Dataset is downloaded and uploaded

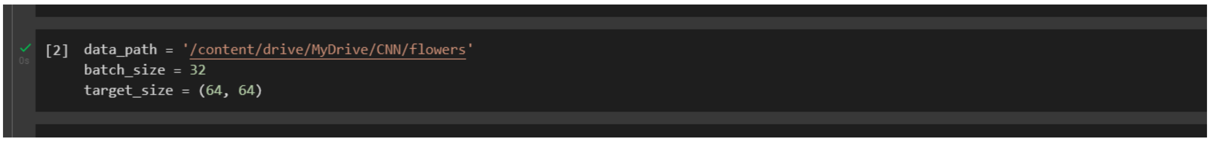


```
import numpy as np
import pandas as pd
import matplotlib.pyplot as plt
import tensorflow as tf

from keras.models import Sequential
from keras.layers import Convolution2D
from keras.layers import MaxPooling2D
from keras.layers import Flatten
from keras.layers import Dense

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

import cv2
```

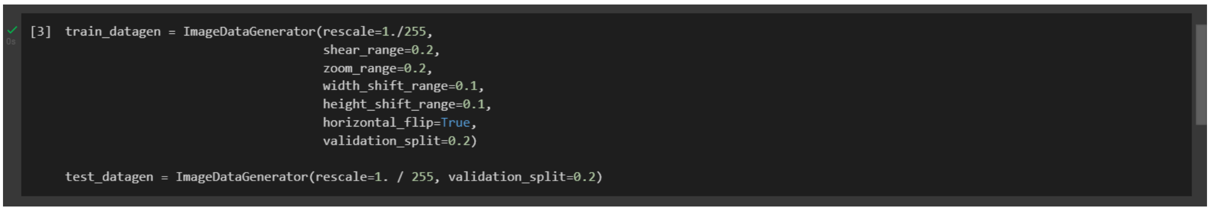
QUESTION 2:

Image Augmentation

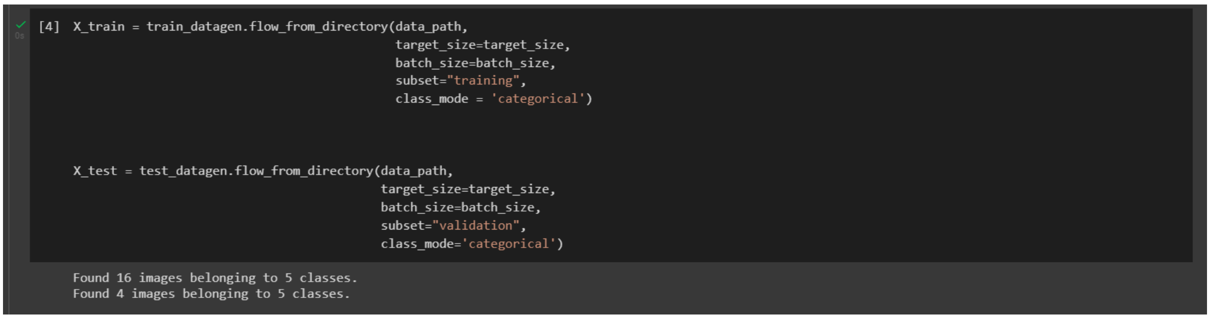
```
data_path = '/content/drive/MyDrive/CNN/flowers'
batch_size = 32
target_size = (64, 64)


train_datagen = ImageDataGenerator(rescale=1./255,
                                   shear_range=0.2,
                                   zoom_range=0.2,
                                   width_shift_range=0.1,
                                   height_shift_range=0.1,
                                   horizontal_flip=True,
                                   validation_split=0.2)

test_datagen = ImageDataGenerator(rescale=1. / 255, validation_split=0.2)


X_train = train_datagen.flow_from_directory(data_path,
                                            target_size=target_size,
                                            batch_size=batch_size,
                                            subset="training",
                                            class_mode = 'categorical')



X_test = test_datagen.flow_from_directory(data_path,
                                          target_size=target_size,
                                          batch_size=batch_size,
                                          subset="validation",
                                          class_mode='categorical')
```



```
[2] data_path = '/content/drive/MyDrive/CNN/flowers'
    batch_size = 32
    target_size = (64, 64)
```



```
[3] train_datagen = ImageDataGenerator(rescale=1./255,
                                       shear_range=0.2,
                                       zoom_range=0.2,
                                       width_shift_range=0.1,
                                       height_shift_range=0.1,
                                       horizontal_flip=True,
                                       validation_split=0.2)

    test_datagen = ImageDataGenerator(rescale=1. / 255, validation_split=0.2)
```

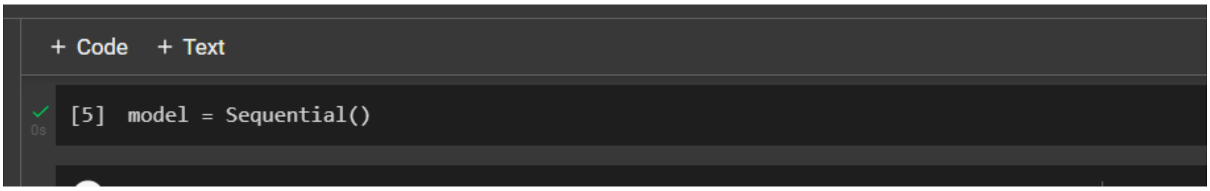


```
[4] X_train = train_datagen.flow_from_directory(data_path,
                                                 target_size=target_size,
                                                 batch_size=batch_size,
                                                 subset="training",
                                                 class_mode = 'categorical')



    X_test = test_datagen.flow_from_directory(data_path,
                                               target_size=target_size,
                                               batch_size=batch_size,
                                               subset="validation",
                                               class_mode='categorical')

    Found 16 images belonging to 5 classes.
    Found 4 images belonging to 5 classes.
```

QUESTION 3:

Create Model

```
model = Sequential()
```

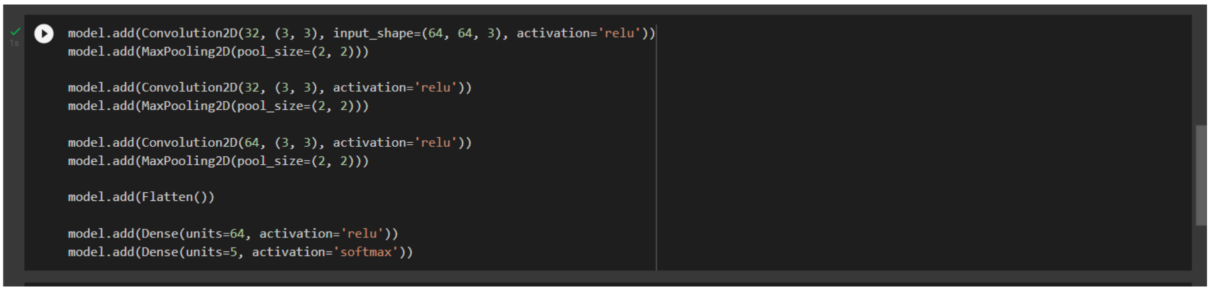


```
[5] model = Sequential()
```

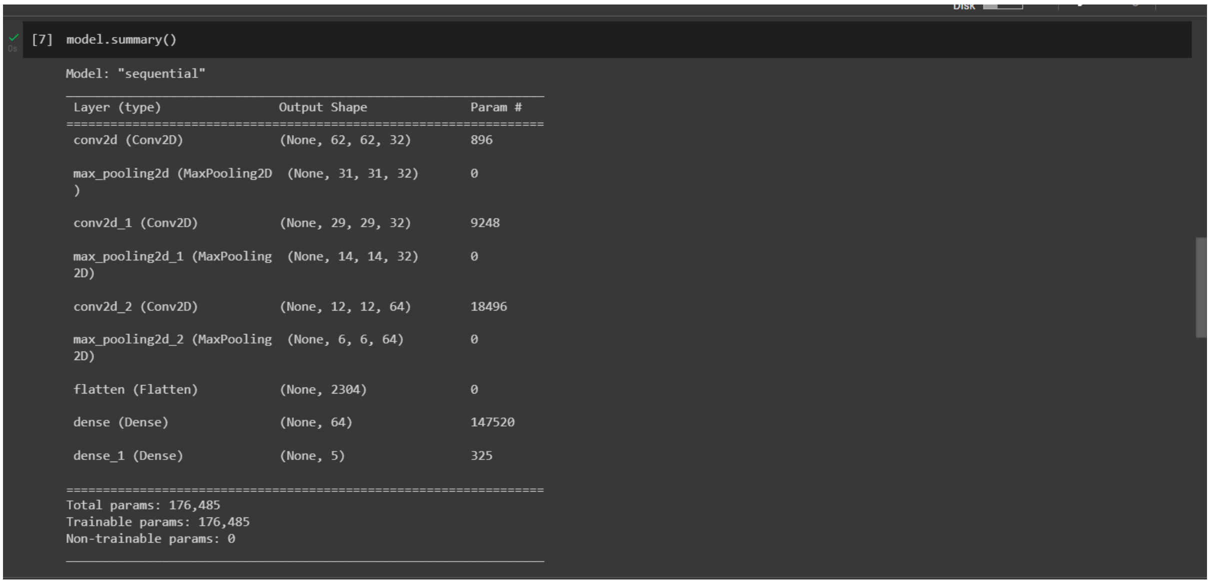
<u>QUESTION 4:</u>

Add Layers (Convolution,MaxPooling,Flatten,Dense-(Hidden Layers),Output

```
model.add(Convolution2D(32, (3, 3), input_shape=(64, 64, 3),
activation='relu'))
model.add(MaxPooling2D(pool_size=(2, 2)))

model.add(Convolution2D(32, (3, 3), activation='relu'))
model.add(MaxPooling2D(pool_size=(2, 2)))

model.add(Convolution2D(64, (3, 3), activation='relu'))
model.add(MaxPooling2D(pool_size=(2, 2)))

model.add(Flatten())

model.add(Dense(units=64, activation='relu'))
model.add(Dense(units=5, activation='softmax'))

model.summary()
```



```
model.add(Convolution2D(32, (3, 3), input_shape=(64, 64, 3), activation='relu'))
model.add(MaxPooling2D(pool_size=(2, 2)))

model.add(Convolution2D(32, (3, 3), activation='relu'))
model.add(MaxPooling2D(pool_size=(2, 2)))

model.add(Convolution2D(64, (3, 3), activation='relu'))
model.add(MaxPooling2D(pool_size=(2, 2)))

model.add(Flatten())

model.add(Dense(units=64, activation='relu'))
model.add(Dense(units=5, activation='softmax'))
```

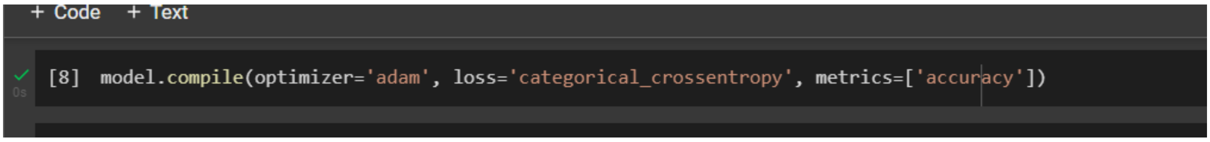


```
[7] model.summary()

    Model: "sequential"
    _________________________________________________________________
     Layer (type)                Output Shape              Param #
    =================================================================
     conv2d (Conv2D)             (None, 62, 62, 32)        896

     max_pooling2d (MaxPooling2D  (None, 31, 31, 32)       0
     )

     conv2d_1 (Conv2D)           (None, 29, 29, 32)        9248

     max_pooling2d_1 (MaxPooling  (None, 14, 14, 32)       0
     2D)

     conv2d_2 (Conv2D)           (None, 12, 12, 64)        18496

     max_pooling2d_2 (MaxPooling  (None, 6, 6, 64)         0
     2D)

     flatten (Flatten)           (None, 2304)              0

     dense (Dense)               (None, 64)                147520

     dense_1 (Dense)             (None, 5)                 325

    =================================================================
    Total params: 176,485
    Trainable params: 176,485
    Non-trainable params: 0
    _________________________________________________________________
```

QUESTION 5:

Compile the Model

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

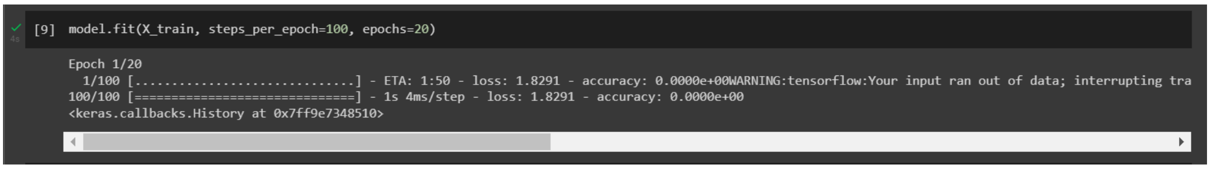


```
[8] model.compile(optimizer='adam', loss='categorical_crossentropy', metrics=['accuracy'])
```

QUESTION 6:

Fit the model

```
model.fit(X_train, steps_per_epoch=100, epochs=20)
```

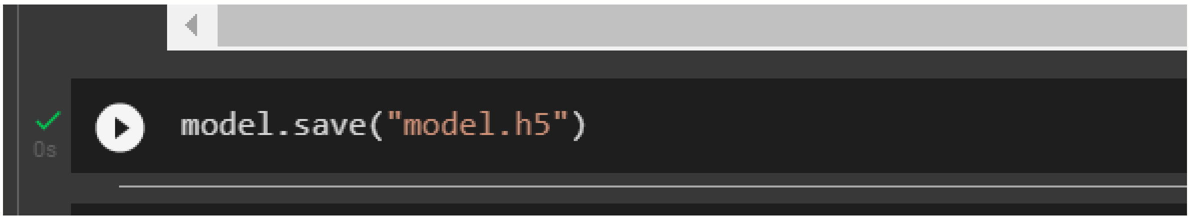


```
[9] model.fit(X_train, steps_per_epoch=100, epochs=20)

Epoch 1/20
  1/100 [..............................] - ETA: 1:50 - loss: 1.8291 - accuracy: 0.0000e+00WARNING:tensorflow:Your input ran out of data; interrupting tra
100/100 [==============================] - 1s 4ms/step - loss: 1.8291 - accuracy: 0.0000e+00
<keras.callbacks.History at 0x7ff9e7348510>
```

QUESTION 7:

Save the Model

```
model.save("model.h5")
```

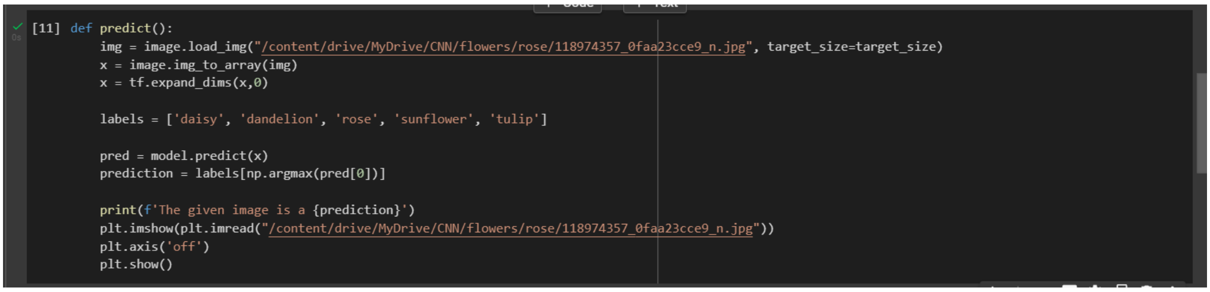


```
model.save("model.h5")
```

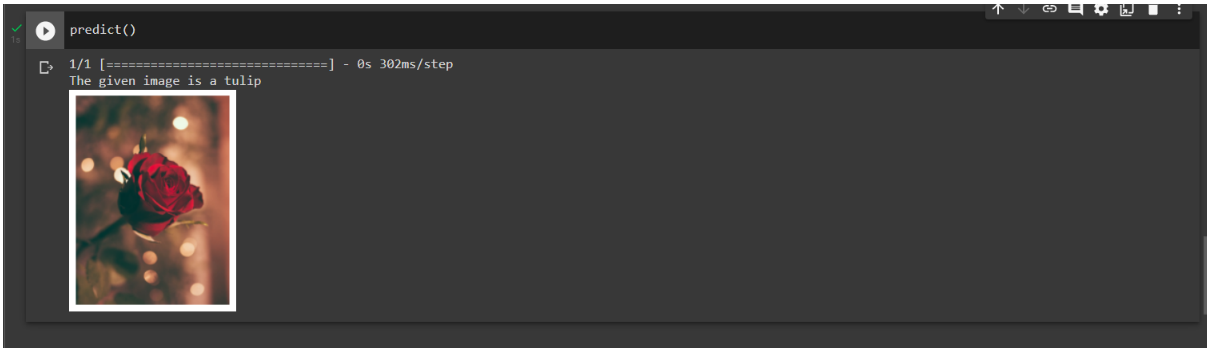
QUESTION 8:

Test the Model

```
def predict():
    img =
image.load_img("/content/drive/MyDrive/CNN/flowers/rose/118974357_0faa23cce
9_n.jpg", target_size=target_size)
    x = image.img_to_array(img)
    x = tf.expand_dims(x,0)

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

    pred = model.predict(x)
    prediction = labels[np.argmax(pred[0])]
    print(f'The given image is a {prediction}')

plt.imshow(plt.imread("/content/drive/MyDrive/CNN/flowers/rose/118974357_0faa23cce9_n.jpg"))
    plt.axis('off')
    plt.show()


predict()
```



```
[11] def predict():
         img = image.load_img("/content/drive/MyDrive/CNN/flowers/rose/118974357_0faa23cce9_n.jpg", target_size=target_size)
         x = image.img_to_array(img)
         x = tf.expand_dims(x,0)

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

         pred = model.predict(x)
         prediction = labels[np.argmax(pred[0])]

         print(f'The given image is a {prediction}')
         plt.imshow(plt.imread("/content/drive/MyDrive/CNN/flowers/rose/118974357_0faa23cce9_n.jpg"))
         plt.axis('off')
         plt.show()
```



```
predict()
```

```
1/1 [==============================] - 0s 302ms/step
The given image is a tulip
```