Assignment -3

Python Programming

Assignment Date	11 October 2022
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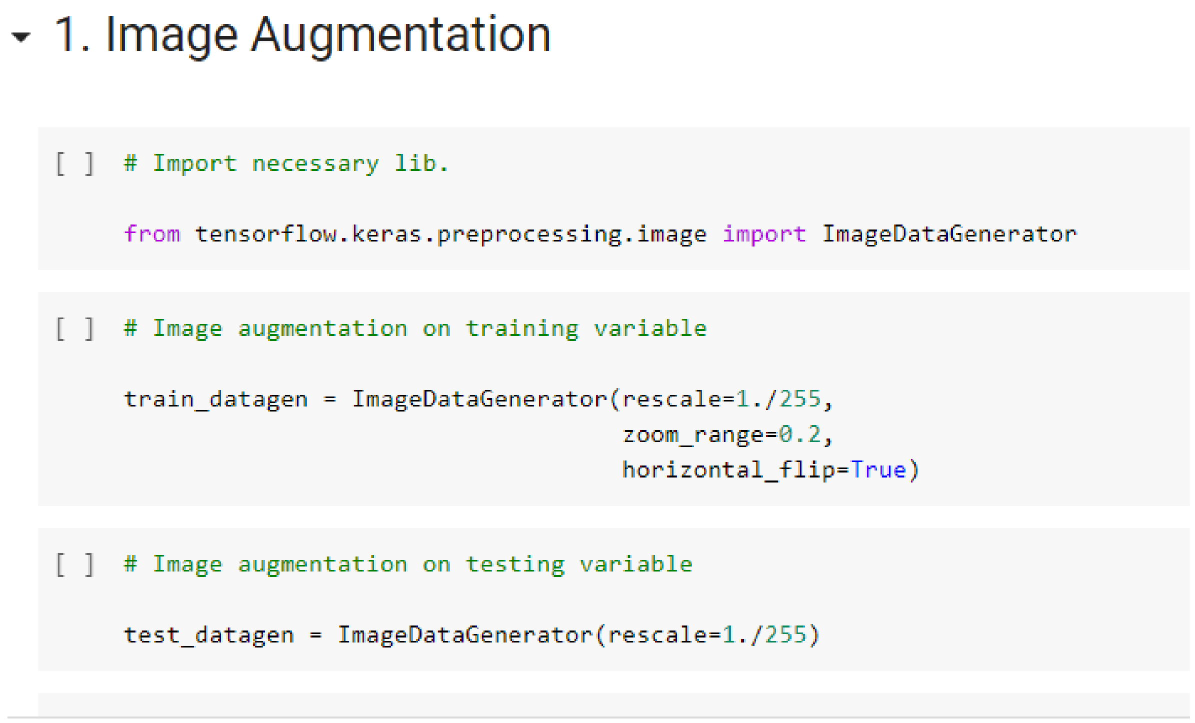
Maximum Marks	2 Marks

Question-1:

Image Augumentation

Solution:

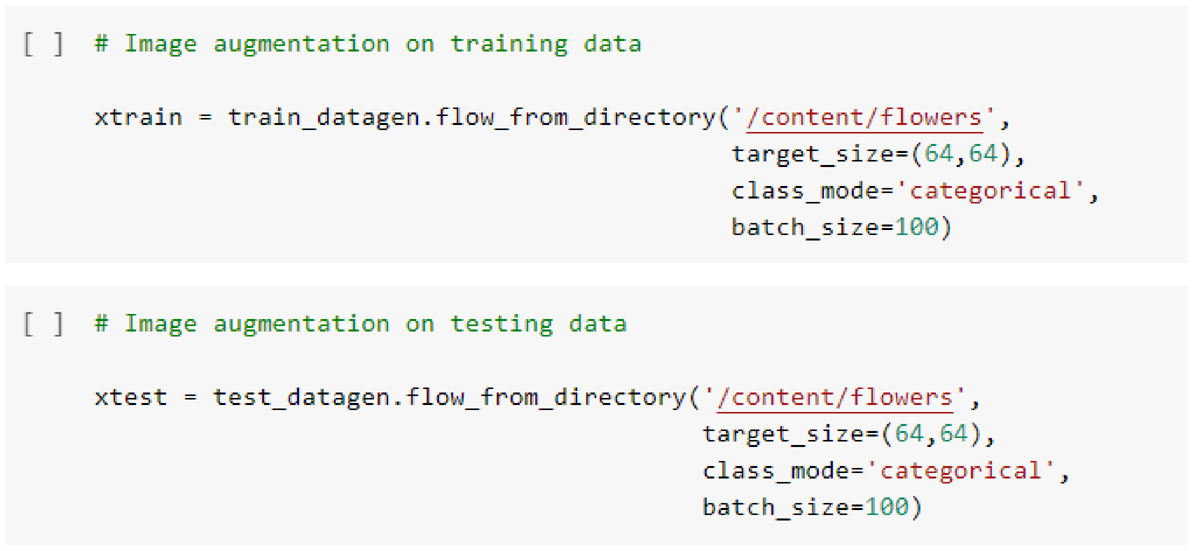


1. Image Augmentation

```
[ ] # Import necessary lib.

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

```
[ ] # Image augmentation on training variable

    train_datagen = ImageDataGenerator(rescale=1./255,
                                       zoom_range=0.2,
                                       horizontal_flip=True)
```

```
[ ] # Image augmentation on testing variable

    test_datagen = ImageDataGenerator(rescale=1./255)
```



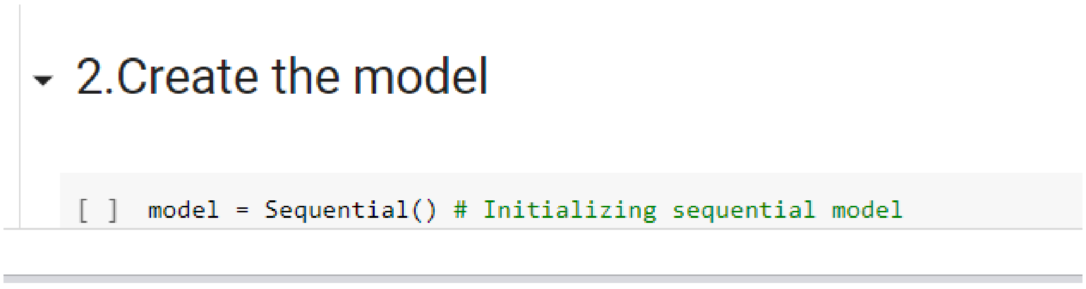
```
[ ] # Image augmentation on training data

    xtrain = train_datagen.flow_from_directory('/content/flowers',
                                               target_size=(64,64),
                                               class_mode='categorical',
                                               batch_size=100)
```

```
[ ] # Image augmentation on testing data

    xtest = test_datagen.flow_from_directory('/content/flowers',
                                             target_size=(64,64),
                                             class_mode='categorical',
                                             batch_size=100)
```

Question-2:

Create Model

Solution:



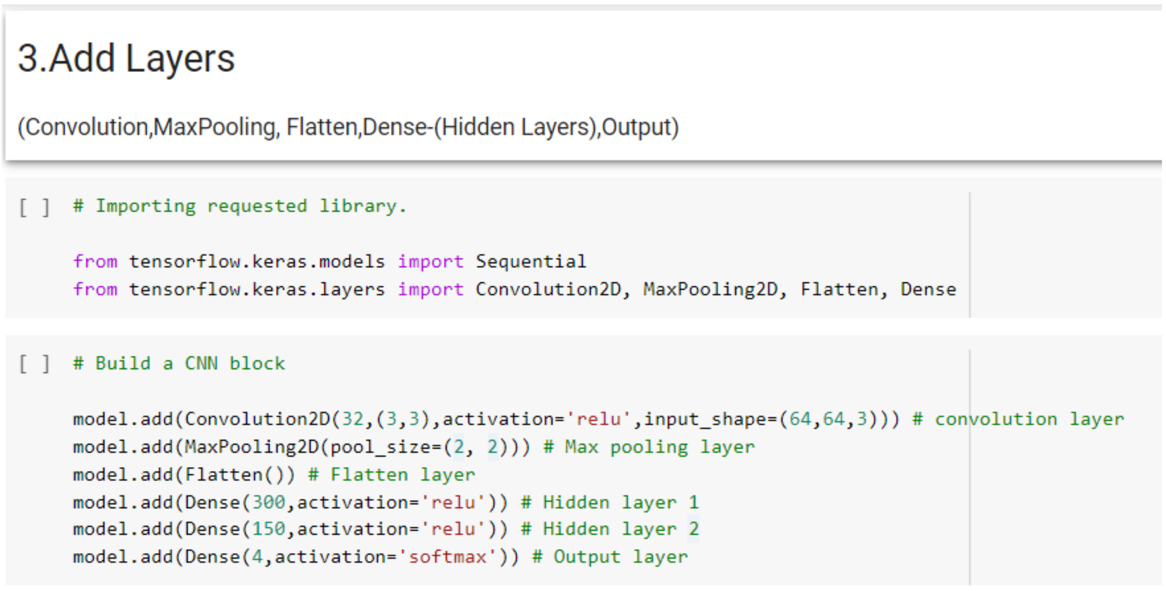
2.Create the model

```
[ ]  model = Sequential() # Initializing sequential model
```

QUESTION -3

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

Solution:



3.Add Layers

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

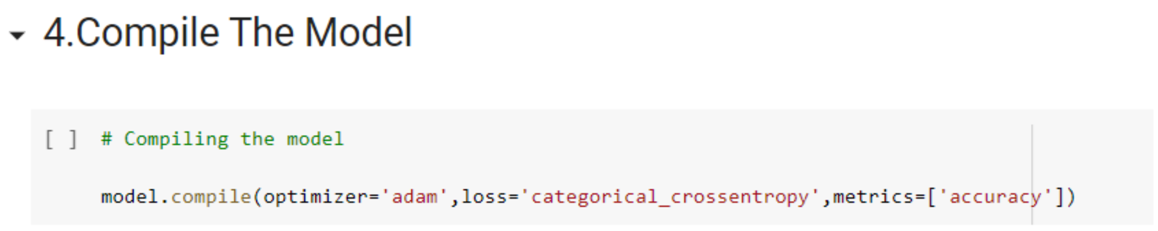
```
[ ]  # Importing requested library.

     from tensorflow.keras.models import Sequential
     from tensorflow.keras.layers import Convolution2D, MaxPooling2D, Flatten, Dense
```

```
[ ]  # Build a CNN block

     model.add(Convolution2D(32,(3,3),activation='relu',input_shape=(64,64,3))) # convolution layer
     model.add(MaxPooling2D(pool_size=(2, 2))) # Max pooling layer
     model.add(Flatten()) # Flatten layer
     model.add(Dense(300,activation='relu')) # Hidden layer 1
     model.add(Dense(150,activation='relu')) # Hidden layer 2
     model.add(Dense(4,activation='softmax')) # Output layer
```

QUESTION-4

Compile the model

Solution:



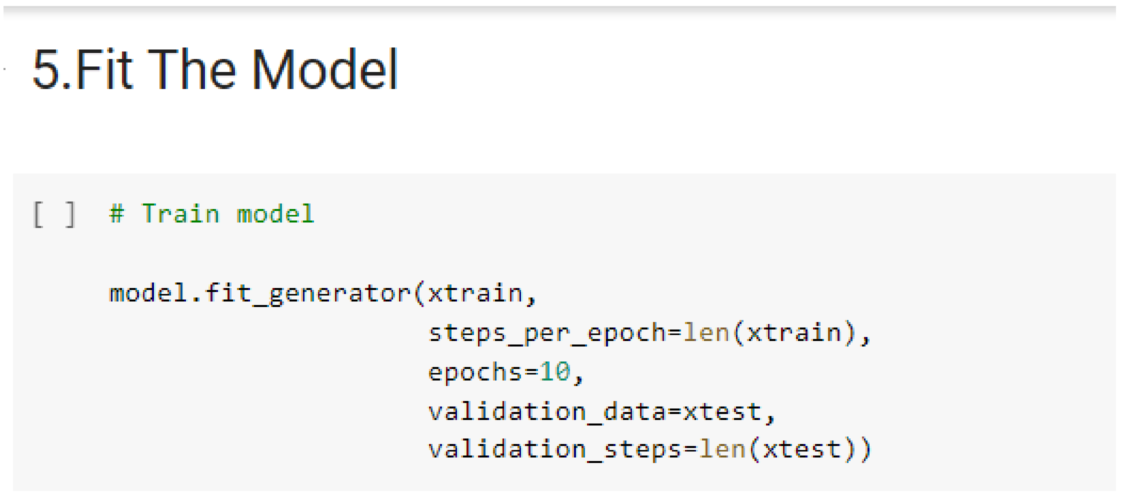
4.Compile The Model

```
[ ]  # Compiling the model

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

QUESTION-5

Fit the model

Solution:



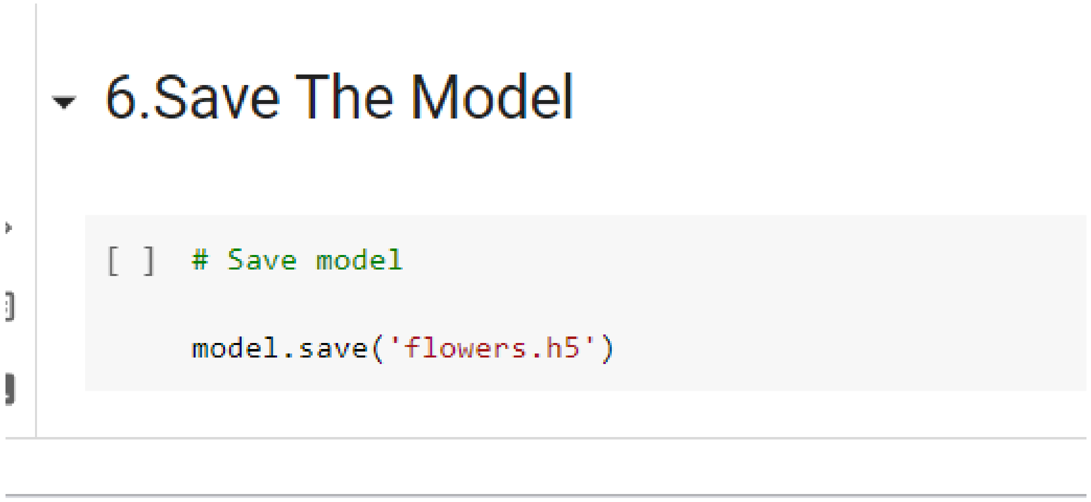
5.Fit The Model

```
[ ]  # Train model

     model.fit_generator(xtrain,
                         steps_per_epoch=len(xtrain),
                         epochs=10,
                         validation_data=xtest,
                         validation_steps=len(xtest))
```

QUESTION-6

Save the model

Solution:



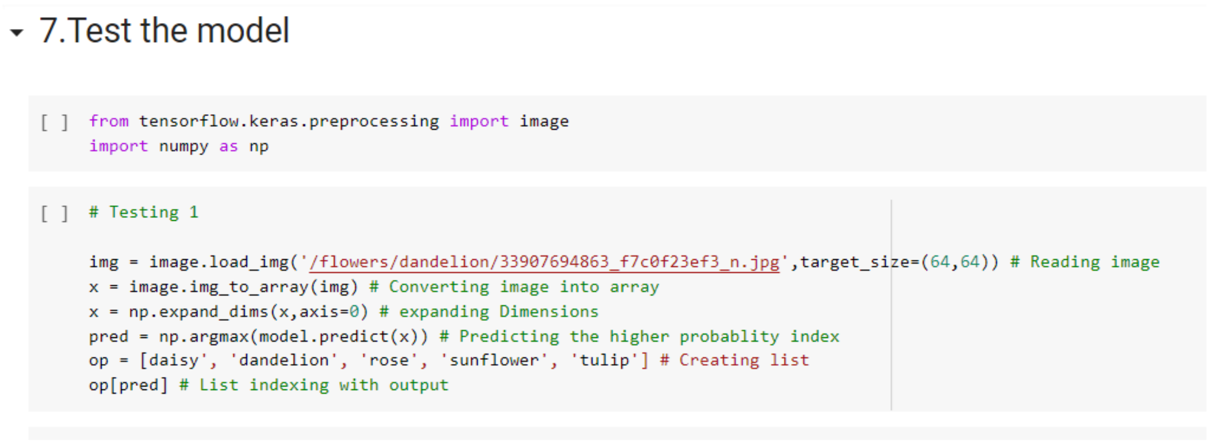
6.Save The Model

```
[ ]  # Save model

     model.save('flowers.h5')
```

QUESTION -7

Test the model

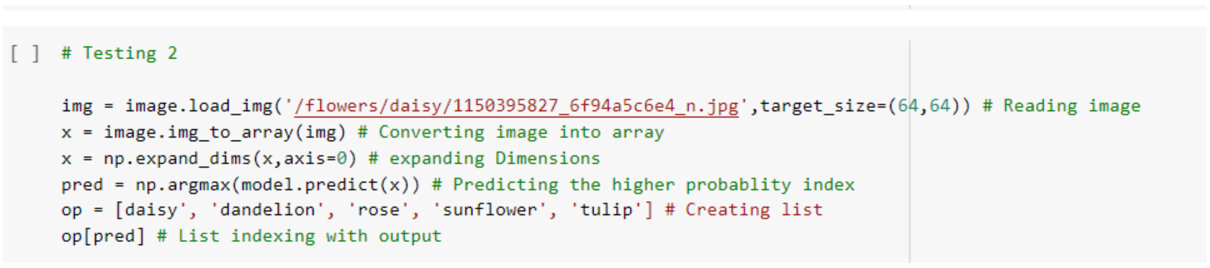
Solution:



7.Test the model

```
[ ]  from tensorflow.keras.preprocessing import image
     import numpy as np
```

```
[ ]  # Testing 1

     img = image.load_img('/flowers/dandelion/33907694863_f7c0f23ef3_n.jpg',target_size=(64,64)) # Reading image
     x = image.img_to_array(img) # Converting image into array
     x = np.expand_dims(x,axis=0) # expanding Dimensions
     pred = np.argmax(model.predict(x)) # Predicting the higher probablity index
     op = [daisy', 'dandelion', 'rose', 'sunflower', 'tulip'] # Creating list
     op[pred] # List indexing with output
```



```
[ ]  # Testing 2

     img = image.load_img('/flowers/daisy/1150395827_6f94a5c6e4_n.jpg',target_size=(64,64)) # Reading image
     x = image.img_to_array(img) # Converting image into array
     x = np.expand_dims(x,axis=0) # expanding Dimensions
     pred = np.argmax(model.predict(x)) # Predicting the higher probablity index
     op = [daisy', 'dandelion', 'rose', 'sunflower', 'tulip'] # Creating list
     op[pred] # List indexing with output
```