Assignment -3

Build CNN model for classification of Flowers

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| Assignment Date | 03 October 2022 |
| Team ID | PNT2022TMID27826 |
| Project Name | AI-powered Nutrition Analyzer for Fitness Enthusiasts |
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| Student Roll Number | 311519104050 |
| Maximum Marks | 2 Marks |

# **Question-1.** Load the dataset

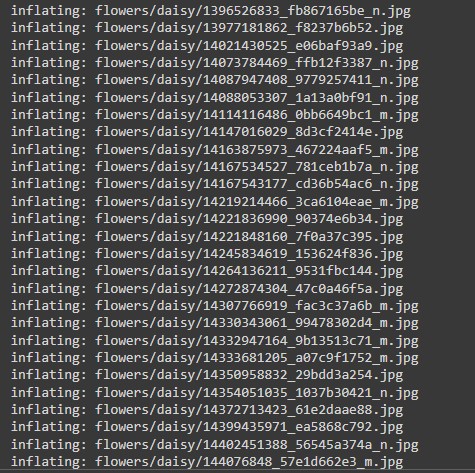
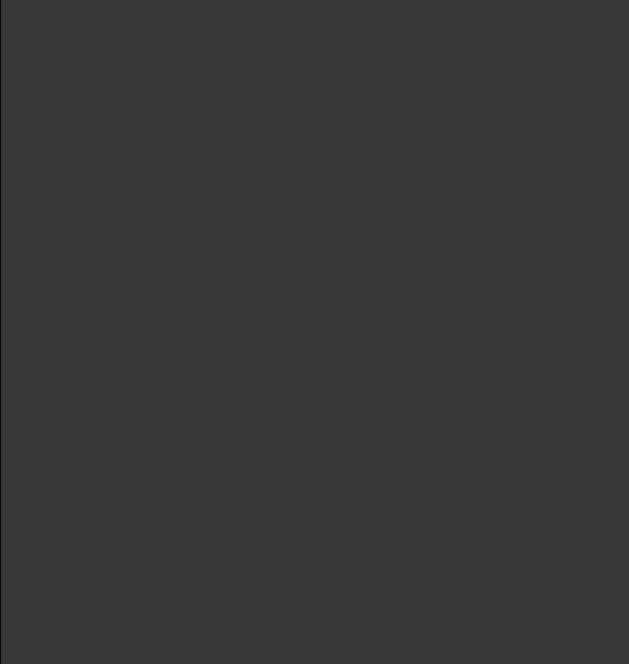
Solution:

!

unzip Flowers

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Dataset.zip



o #importing required libraries to build a CNN classification model with accuracy import numpy as np import tensonflow as tf from tensorflow.keras impont layers from tensorflow.keras.models import Sequential import matplotlib.oyplot as plt

batch s1ze = 32 im height = 186 im

width = 180 data dir - ”/content/flowens“

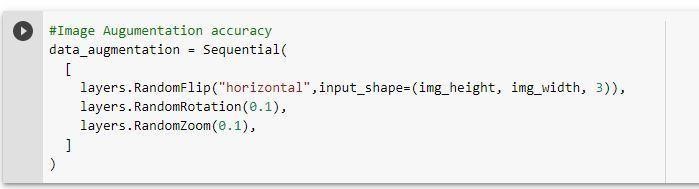
# **Question-2.** Image Augmentation

Solution:

from tensorflow.keras.preprocessing.image import ImageDataGenerator

train\_datagen = ImageDataGenerator(rescale = 1./255, horizontal\_flip = True, vertical\_flip = True, z oom\_range = 0.2)

x\_train = train\_datagen.flow\_from\_directory(r"/content/flowers", target\_size = (64,64) , class\_mode = "categorical", batch\_size = 100)



# **Question-3.** Create model - Model Building and also Split dataset into training and testing sets

Solution:

from tensorflow.keras.models import Sequential

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

train\_ds = tf.keras.utils.image\_dataset\_from\_directory(data\_dir,

validation\_split=0.2, subset="training", seed=123,

image\_size=(img\_height, img\_width), batch\_size=batch\_size)



val\_ds = tf.keras.utils.image\_dataset\_from\_directory( data\_dir,

validation\_split=0.2, subset="validation", seed=123,

image\_size=(img\_height, img\_width), batch\_size=batch\_size)



class\_names = train\_ds.class\_names print(class\_names)



plt.figure(figsize=(10, 10)) for images, labels in train\_ds.take(1): for i in range(9):

ax = plt.subplot(3, 3, i + 1)

plt.imshow(images[i].numpy().astype("uint8"))

plt.title(class\_names[labels[i]])

plt.axis("off")



# **Question-4.** Add the layers (Convolution,MaxPooling,Flatten,Dense-(HiddenLayers),Output)

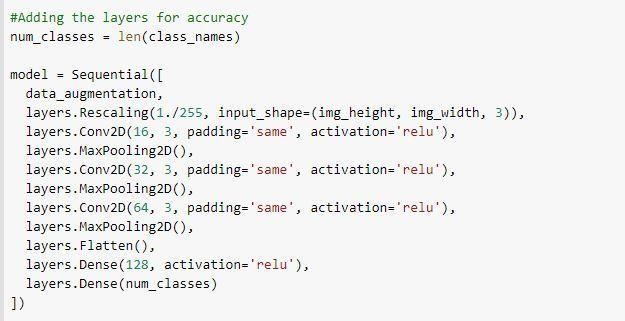
Solution:

model.add(Convolution2D(32, (3,3), activation = "relu", input\_shape = (64,64,3) )) model.add(MaxPooling2D(pool\_size = (2,2))) model.add(Flatten()) model.add(Dense(300, activation =

"relu"))

model.add(Dense(150, activation = "relu")) #mulitple dense layers

model.add(Dense(5, activation = "softmax")) #output layer



# **Question-5.** Compile The Model

Solution:

model.compile(loss = "categorical\_crossentropy", metrics = ["accuracy"], optimizer = "adam") len(x\_train)



# ***#Compile the model for further accuracy***

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

epochs=10

history = model.fit( train\_ds,

validation\_data=val\_ds, epochs=epochs

)



# ***#To find the Training and Validation- Accuracy & Loss (Visualization)***

acc = history.history['accuracy'] val\_acc = history.history['val\_accuracy']

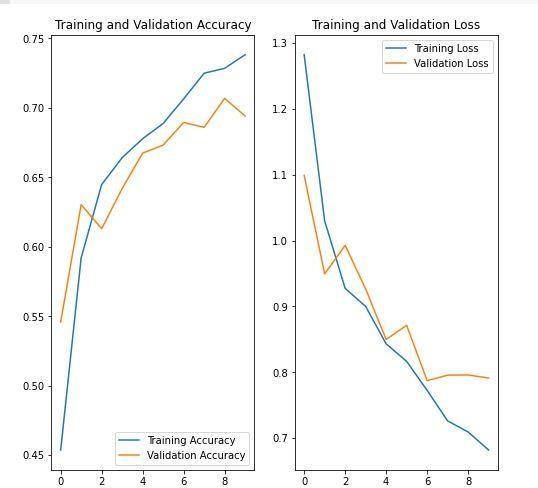
loss = history.history['loss'] val\_loss = history.history['val\_loss'] epochs\_range = range(epochs) plt.figure(figsize=(8, 8))

plt.subplot(1, 2, 1) plt.plot(epochs\_range, acc, label='Training Accuracy') plt.plot(epochs\_range, val\_acc, label='Validation Accuracy') plt.legend(loc='lower right')

plt.title('Training and Validation Accuracy')

plt.subplot(1, 2, 2) plt.plot(epochs\_range, loss, label='Training Loss') plt.plot(epochs\_range, val\_loss, label='Validation Loss') plt.legend(loc='upper right')

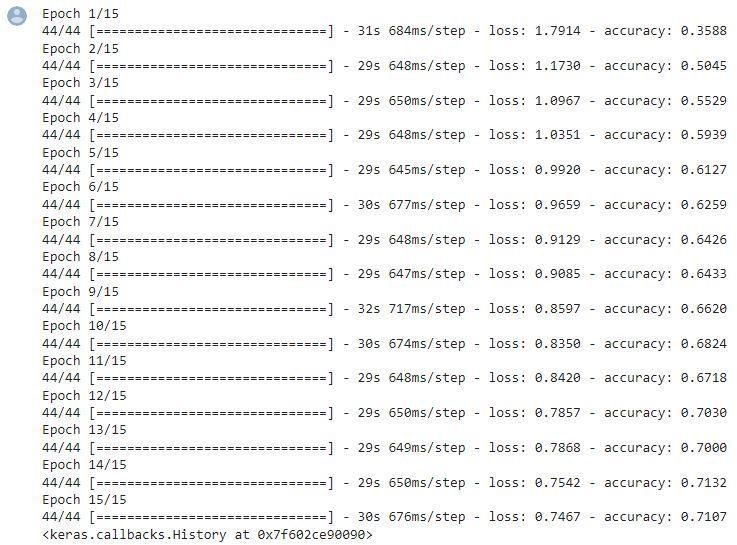
plt.title('Training and Validation Loss') plt.show()



## **Question-6.** Fit The Model

Solution:

model.fit(x\_train, epochs = 15, steps\_per\_epoch = len(x\_train))



## **Question-8.** Test The Model

Solution:

from tensorflow.keras.models import load\_model from tensorflow.keras.preprocessing import image import numpy as np

model = load\_model("/content/flowers.h1")

# ***# Testing with a random rose image from Google***

img = image.load\_img("/content/rose.gif", target\_size = (64,64) )

img



x = image.img\_to\_array(img) x.ndim



x = np.expand\_dims(x,axis = 0) x.ndim



pred = model.predict(x) pred



labels = ['daisy','dandelion','roses','sunflowers','tulips']

labels[np.argmax(pred)]



## **Question-7.** Save The Model

Solution:

model.save("flowers.h1")

model.save("flowers.m5")#another model to show the accuracy

# ***#Testing the alternative model with accuracy***

sunflower\_url = "https://storage.googleapis.com/download.tensorflow.org/example\_images/592 pxRed\_sunflower.jpg"

sunflower\_path = tf.keras.utils.get\_file('Red\_sunflower', origin=sunflower\_url) img = tf.keras.utils.load\_img(

sunflower\_path, target\_size=(img\_height, img\_width)

)

img\_array = tf.keras.utils.img\_to\_array(img)

img\_array = tf.expand\_dims(img\_array, 0) *# Create a batch* predictions = model.predict(img\_array) score = tf.nn.softmax(predictions[0]) print(

"This image most likely belongs to {} with a {:.2f} percent confidence."

.format(class\_names[np.argmax(score)], 100 \* np.max(score))

)

