Assignment -4

SMS SPAM Classification

Team I’D – PNT2022TMID21860

**Question-1.** Import required library

Solution:

import pandas as pd import numpy as np

import matplotlib.pyplot as plt

from sklearn.model\_selection import train\_test\_split from sklearn.preprocessing import LabelEncoder from keras.models import Model

from keras.layers import LSTM, Activation, Dense, Dropout, Input, Embedding from keras.optimizers import Adam

from keras.preprocessing.text import Tokenizer from keras.preprocessing import sequence from keras.utils import pad\_sequences

from keras.utils import to\_categorical from keras.callbacks import EarlyStopping

**Question-2.** Read the Dataset

Solution:

**df = pd.read\_csv('spam.csv',delimiter=',',encoding='latin-1') df.head()**



**Question-3.** Pre processing the Dataset

Solution:

df.drop(['Unnamed: 2', 'Unnamed: 3', 'Unnamed: 4'],axis=1,inplace=True) from wordcloud import WordCloud, STOPWORDS, ImageColorGenerator

X = df.v2 Y = df.v1

le = LabelEncoder()

Y = le.fit\_transform(Y) Y = Y.reshape(-1,1)

X\_train,X\_test,Y\_train,Y\_test = train\_test\_split(X,Y,test\_size=0.25) max\_words = 1000

max\_len = 150

tok = Tokenizer(num\_words=max\_words) tok.fit\_on\_texts(X\_train)

sequences = tok.texts\_to\_sequences(X\_train)

sequences\_matrix = pad\_sequences(sequences,maxlen=max\_len)

**Question-4.** Create Model

Solution:

inputs = Input(shape=[max\_len])

layer = Embedding(max\_words,50,input\_length=max\_len)(inputs) layer = LSTM(128)(layer)

layer = Dense(128)(layer)

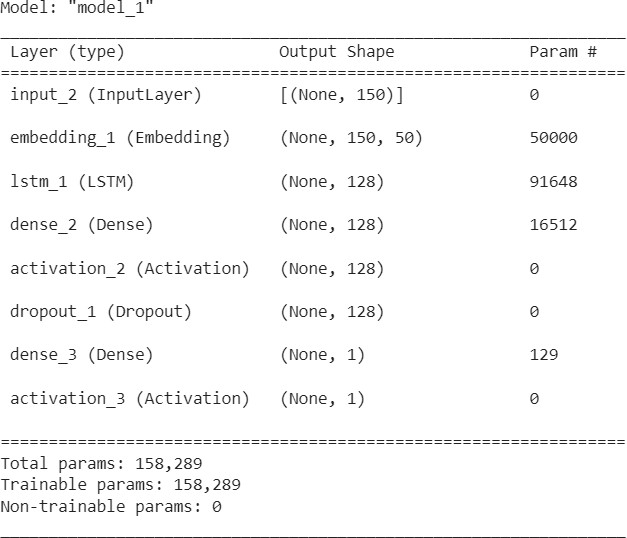
layer = Activation('relu')(layer) layer = Dropout(0.5)(layer) layer = Dense(1)(layer)

layer = Activation('sigmoid')(layer)

model = Model(inputs=inputs,outputs=layer)

**Question-5.** Add Layers (LSTM, Dense-(Hidden Layers), Output)

Solution: model.summary()



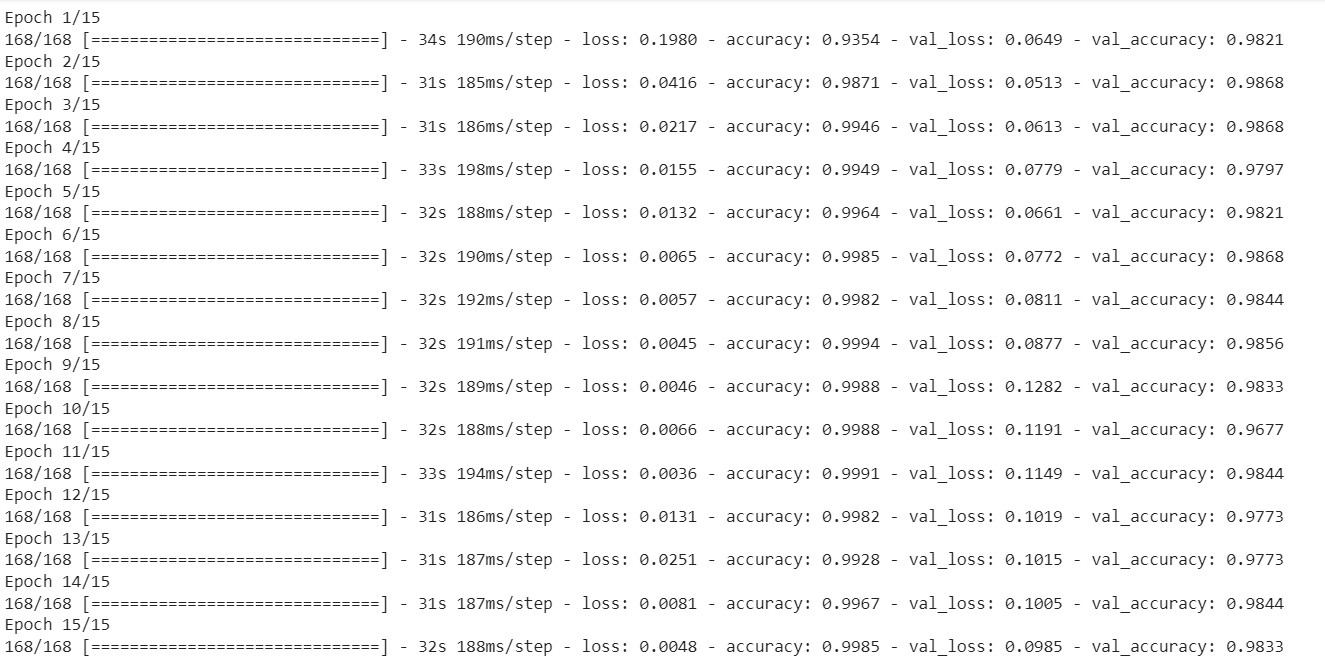
**Question-6.** Compile the Model

Solution: model.compile(loss='binary\_crossentropy',optimizer=Adam(),metrics=['accuracy'])

**Question-7.** Fit the Model

Solution:

history = model.fit(sequences\_matrix,Y\_train,batch\_size=20,epochs=15, validation\_split=0.2)



metrics = pd.DataFrame(history.history)

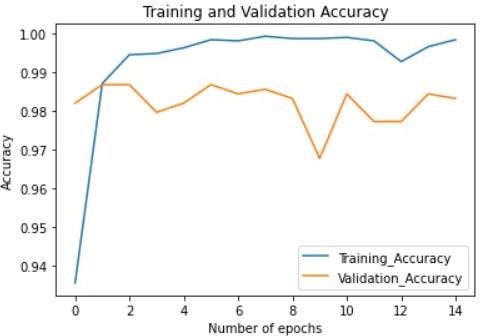
metrics.rename(columns = {'loss': 'Training\_Loss', 'accuracy': 'Training\_Accuracy', 'val\_loss': 'Valida tion\_Loss', 'val\_accuracy': 'Validation\_Accuracy'}, inplace = True)

def plot\_graphs1(var1, var2, string): metrics[[var1, var2]].plot()

plt.title('Training and Validation ' + string) plt.xlabel ('Number of epochs') plt.ylabel(string)

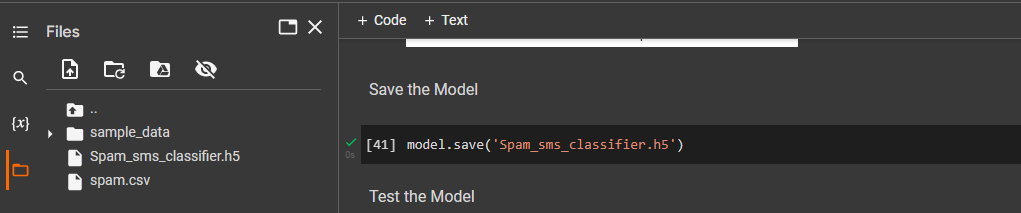
plt.legend([var1, var2])

plot\_graphs1('Training\_Accuracy', 'Validation\_Accuracy', 'Accuracy')



**Question-8.** Save The Model

Solution: model.save('Spam\_sms\_classifier.h5')



**Question-9.** Test The Model

Solution:

test\_sequences = tok.texts\_to\_sequences(X\_test)

test\_sequences\_matrix = pad\_sequences(test\_sequences,maxlen=max\_len)

accuracy1 = model.evaluate(test\_sequences\_matrix,Y\_test)



print(' loss: {:0.4f}'.format(accuracy1[0]))

print(' Accuracy: {:0.4f}'.format(accuracy1[1]))

