Assignment -4

SMS SPAM Classification

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| Assignment Date | 26 October 2022 |
| Team ID | PNT2022TMID03539 |
| Project Name | AI BASED DISCOURSE FOR BANKING INDUSTRY |
| Student Name | KAMALA PRIYA M |
| Student Roll Number | 212219060121 |
| Maximum Marks | 2 Marks |

**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

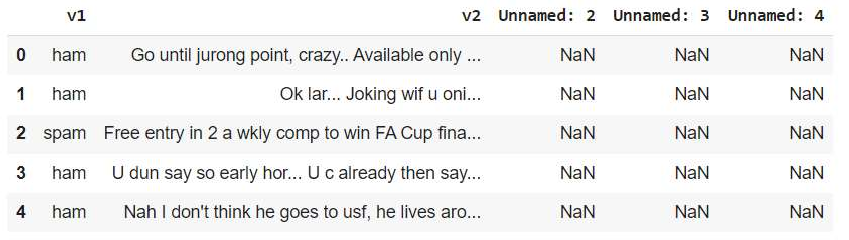
from keras.preprocessing.text import Tokenizer from keras.preprocessing import sequence from keras.utils import pad\_sequences

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.** Preprocessing 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

**words)**

max\_len = 150

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

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

e

**s(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)

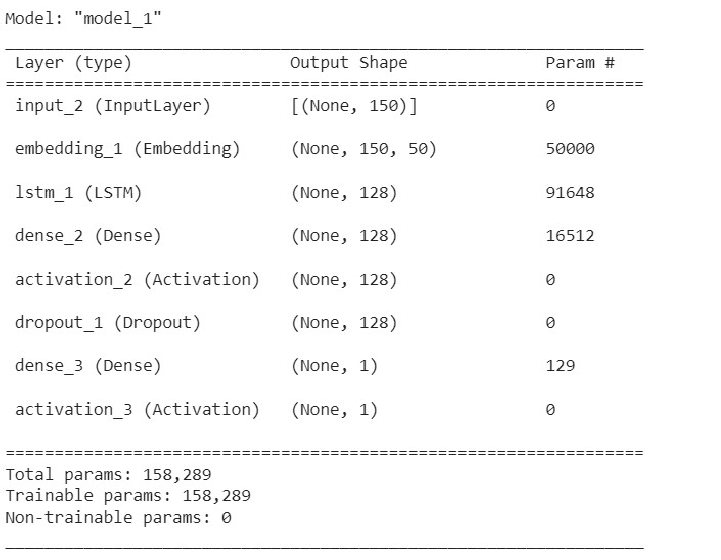
layer = Activation('sigmoid')(layer)

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

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

Solution:

model.summary()



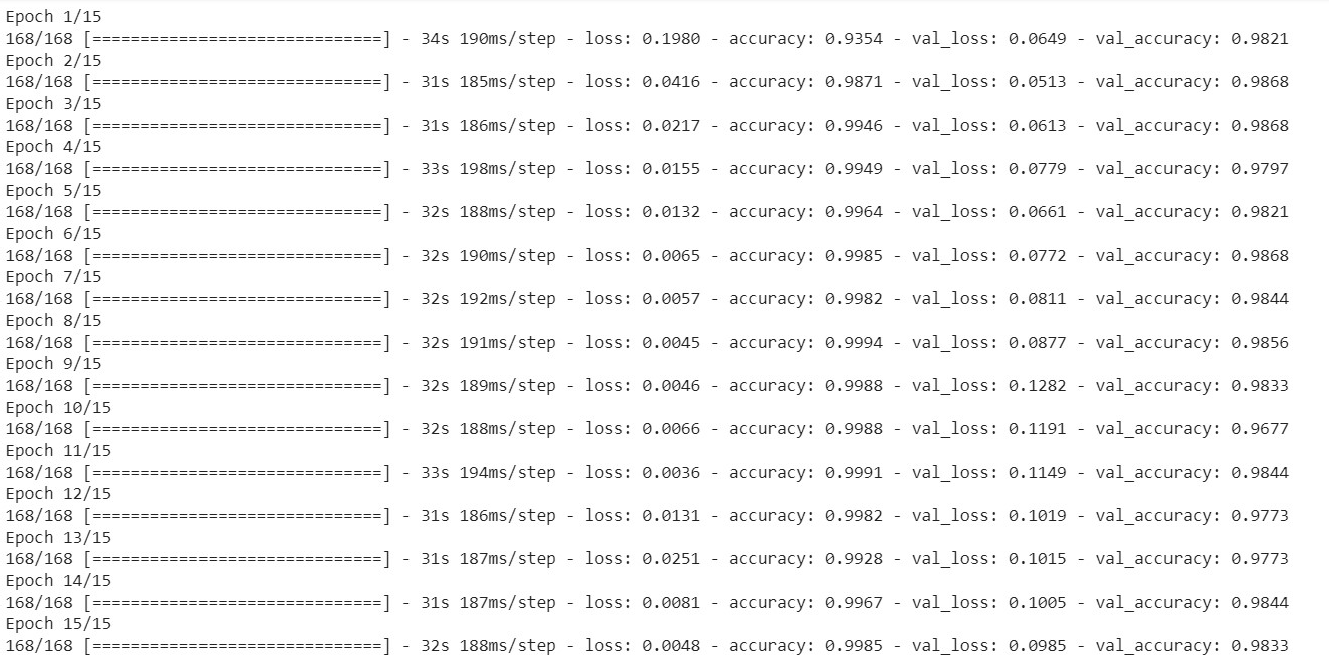
**Question-6.**Compile the Model

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)

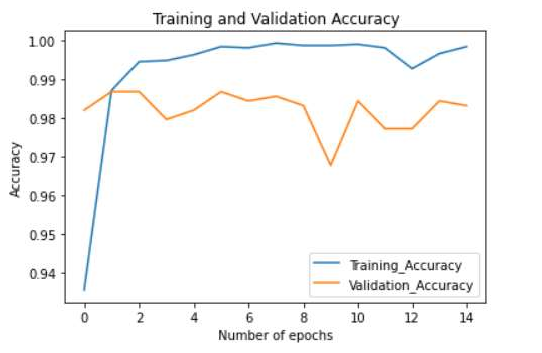
metrics.rename(columns = {'loss': 'Training\_Loss', 'accuracy': 'Training\_Accuracy', 'val\_loss': 'Valida tion\_Loss', 'val\_accuracy': 'Validation\_Accuracy'}, inplace = True)

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

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

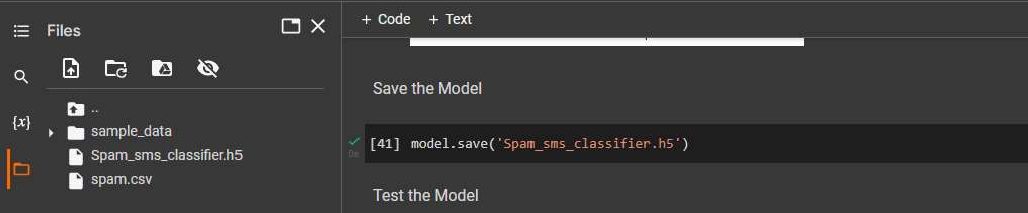
plt.legend([var1, var2])

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]))

