Assignment -4

SMS SPAM Classification

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| Assignment Date | 26 October 2022 |
| Team ID | PNT2022TMID54140 |
| Project Name | AI BASED DISCOURSE FOR BANKING INDUSTRY |
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| Student Roll Number | 310619205094 |
| Maximum Marks | 2 Marks |

# **Question-1.** Import required library

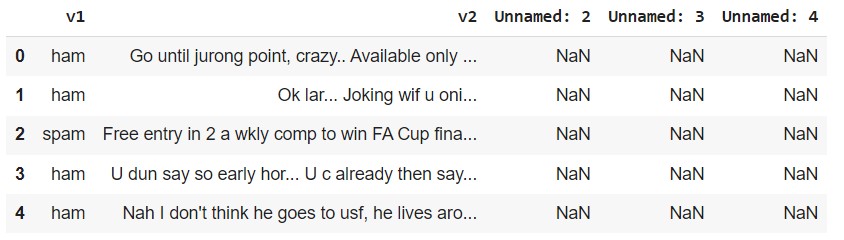
Solution:

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.** Pre processing the Dataset

Solution:

df.drop(['Unnamed: 2', 'Unnamed: 3', 'Unnamed: 4'],axis=1,inplace=True)

from wordcloud import WordCloud, STOPWORDS, ImageColorGenerator

1. = df.v2 Y = df.v1 le = LabelEncoder() Y = le.fit\_transform(Y)
2. = 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

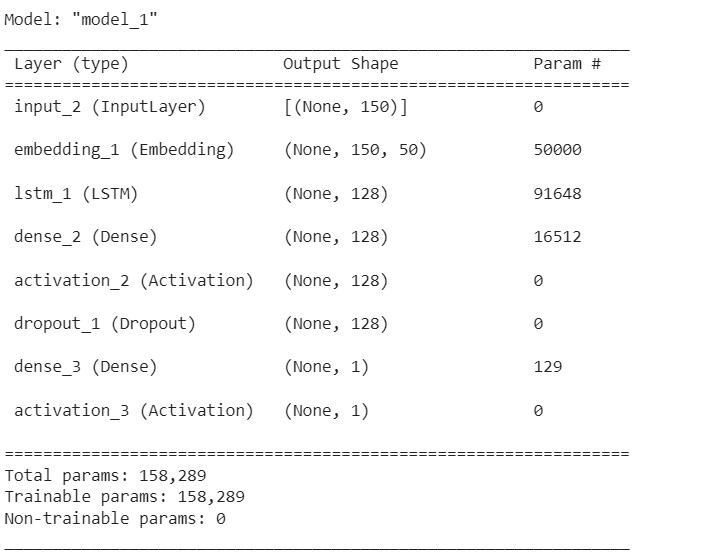
Solution: inputs = Input(shape=[max\_len]) layer = Embedding(max\_words,50,input\_length=max\_len)(inputs) layer = LSTM(128)(layer) layer = Dense(128)(layer)

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

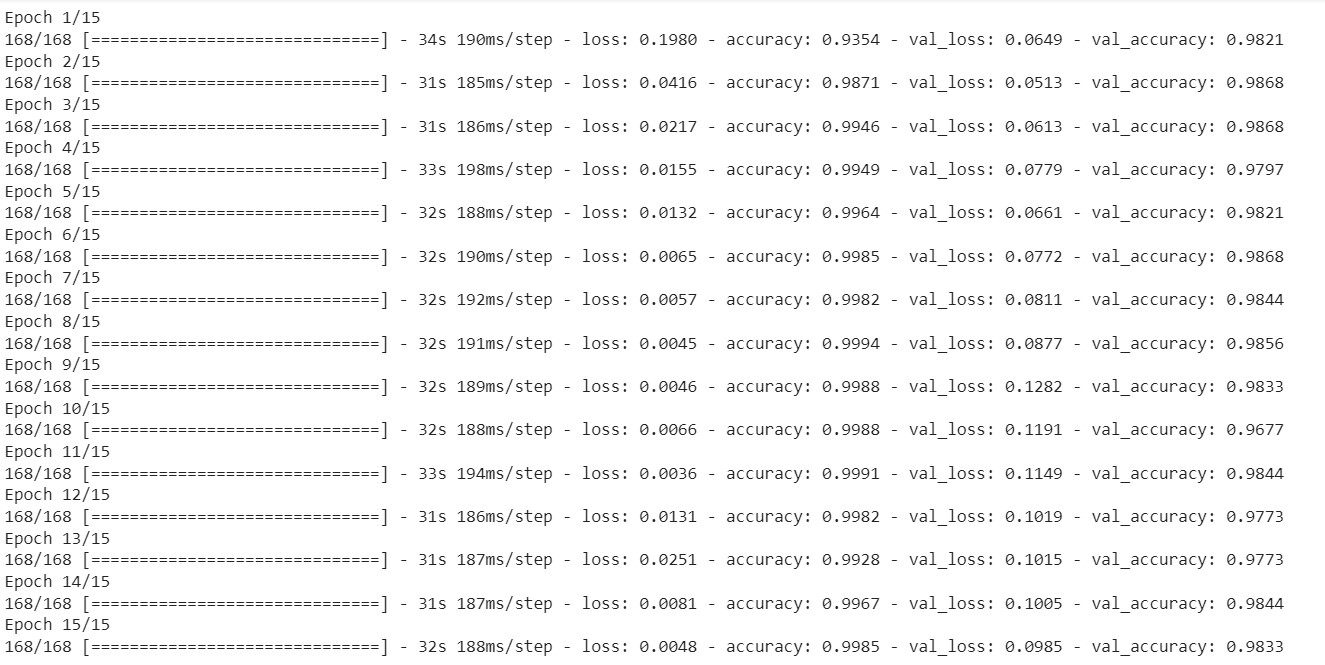
Solution:

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()

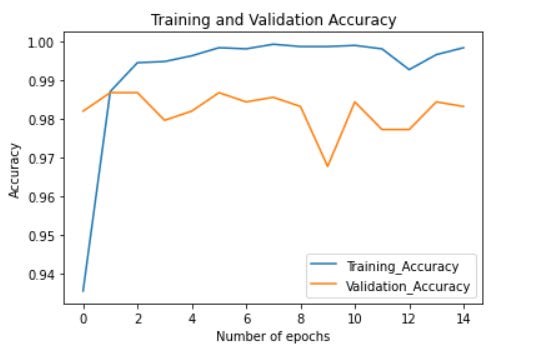
plt.title('Training and Validation ' + string)

plt.xlabel ('Number of epochs')

plt.ylabel(string)

plt.legend([var1, var2])

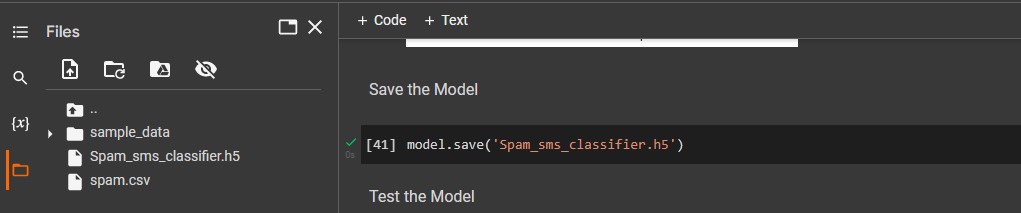
plot\_graphs1('Training\_Accuracy', 'Validation\_Accuracy', 'Accuracy')



# **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]))

