

Assignment -4

SMS SPAM Classification

| | |
|---------------------|-----------------|
| Assignment Date | 22 October 2022 |
| Student Name | Divya.N |
| Student Roll Number | 211419104071 |
| Maximum Marks | 2 Marks |

Question-1:

Download the dataset

Question-2:

Import required library

Solution import
nltk import pandas
as pd import re
from nltk.corpus import stopwords from nltk.stem.porter
import PorterStemmer from sklearn.feature_extraction.text
import CountVectorizer from sklearn.model_selection
import train_test_split from tensorflow.keras.models import
Sequential from tensorflow.keras.layers import Dense



```
Import necessary libraries

[ ] import nltk
    import pandas as pd
    import re

[ ] from nltk.corpus import stopwords
    from nltk.stem.porter import PorterStemmer

[ ] from sklearn.feature_extraction.text import CountVectorizer

[ ] from sklearn.model_selection import train_test_split

[ ] from tensorflow.keras.models import Sequential
    from tensorflow.keras.layers import Dense
```

Question-3:

Read dataset and do pre-processing

Solution

```
data=pd.read_csv('/content/drive/MyDrive/assignment 4/spam.csv',encoding='latin')
nltk.download('stopwords') ps=PorterStemmer() input=[] for i in range(0,5572):
review=data['v2'][i] review=re.sub('[^a-zA-Z]', '',review)
review=review.lower() review=review.split() review=[ps.stem(word) for word in review]
if not word in set(stopwords.words('english')): review=' '.join(review)
input.append(review) cv=CountVectorizer(max_features=7000)
x=cv.fit_transform(input).toarray() y=data['v1'].values x_train,x_test,y_train,y_test=
train_test_split(x,y,test_size=0.2)
```

Read dataset

```
[ ] data=pd.read_csv('/content/drive/MyDrive/assignment 4/spam.csv',encoding='latin')
```

Preprocessing

```
[ ] nltk.download('stopwords')
```

```
[nltk_data] Downloading package stopwords to /root/nltk_data...
[nltk_data] Package stopwords is already up-to-date!
True
```

```
[ ] ps=PorterStemmer()
input=[]
```

```
[ ] for i in range(0,5572):
    review=data['v2'][i]
    review=re.sub('[^a-zA-Z]', '',review)
    review=review.lower()
    review=review.split()
    review=[ps.stem(word) for word in review if not word in set(stopwords.words('english'))]
    review=' '.join(review)
    input.append(review)
```

Activate Windows
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```
[ ] cv=CountVectorizer(max_features=7000)
```

```
[ ] x=cv.fit_transform(input).toarray()
x
```

```
array([[0, 0, 0, ..., 0, 0, 0],
       [0, 0, 0, ..., 0, 0, 0],
       [0, 0, 0, ..., 0, 0, 0],
       ...,
       [0, 0, 0, ..., 0, 0, 0],
       [0, 0, 0, ..., 0, 0, 0],
       [0, 0, 0, ..., 0, 0, 0]])
```

```
[ ] y=data['v1'].values
y
```

```
array(['ham', 'ham', 'spam', ..., 'ham', 'ham', 'ham'], dtype=object)
```

```
[ ] x.shape
```

```
(5572, 6221)
```

```
[ ] x_train,x_test,y_train,y_test= train_test_split(x,y,test_size=0.2)
```

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Question-4:

Create Model

Solution

```
model=Sequential()
```

Question-5:

Add Layers (LSTM, Dense-(Hidden Layers), Output)

Solution `model.add(Dense(units=6221,activation='relu'))`

`model.add(Dense(units=7000,activation='relu'))`

`model.add(Dense(units=1,activation='sigmoid'))`



The screenshot shows a Jupyter Notebook with the following content:

```
+ Code + Text
```

Create model

```
[ ] model=Sequential()
```

Add layers

Input layer

```
[ ] model.add(Dense(units=6221,activation='relu'))
```

Hidden layer

```
[ ] model.add(Dense(units=7000,activation='relu'))
```

Output layer

```
[ ] model.add(Dense(units=1,activation='sigmoid'))
```

RAM 11.1 GB / 16.0 GB
Disk 1.1 GB / 16.0 GB
Editing

Question-6:

Compile The Model

Solution

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



The screenshot shows a Jupyter Notebook with the following content:

```
Compile the model
```

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

Fit the model

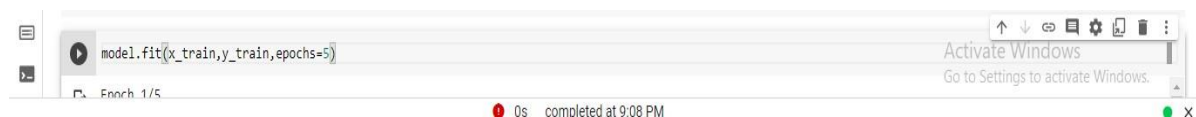
Activate Windows
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Question-7:

Fit The Model

Solution

```
model.fit(x_train,y_train,epochs=5)
```



The screenshot shows a Jupyter Notebook with the following content:

```
model.fit(x_train,y_train,epochs=5)
```

Epoch 1/5

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Question-7:

Save The Model

Solution

```
model.save("Flowers.h5")
```

Fit the model

```
[ ] model.save('spam.h5')
```