

## Assignment -4

### SMS SPAM Classification

Assignment Date	31 October 2022
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Student Roll Number	211419106208
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
```



The screenshot shows a Jupyter Notebook interface with a search bar at the top containing the text "Import necessary libraries". Below the search bar, there are four code cells, each with a run button (a circle with a play icon) on the left. The code cells contain the following Python code:

```
[ ] 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
```

At the bottom of the notebook, there is a toolbar with icons for undo, redo, copy, paste, and other standard editing functions.

#### Question-3:

Read dataset and do pre-processing

#### Solution

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

```

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)

```

## Create Model

### Solution

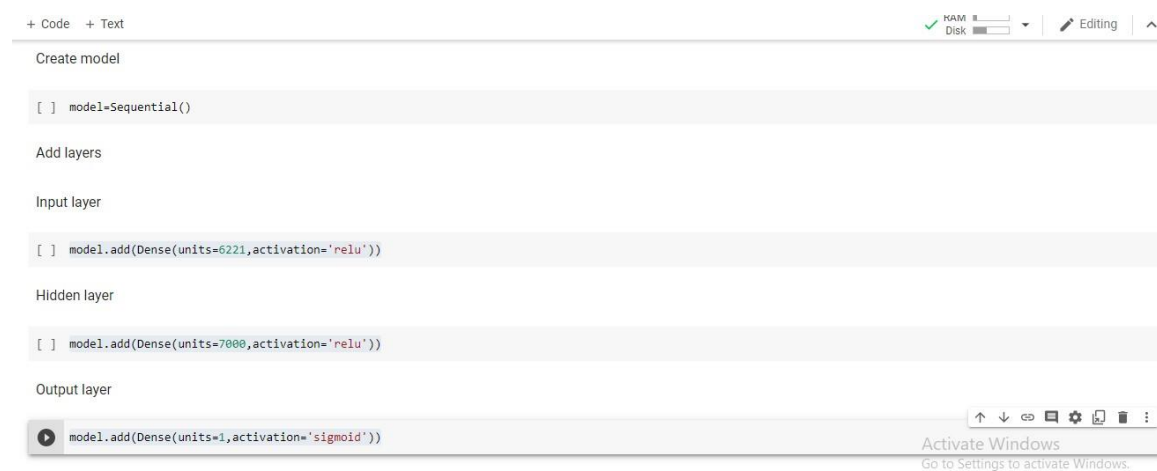
```
model=Sequential()
```

### 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'))
```



```
+ Code + Text RAM Disk Editing
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'))
Activate Windows
Go to Settings to activate Windows.
```

### Question-6:

Compile The Model

### Solution

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



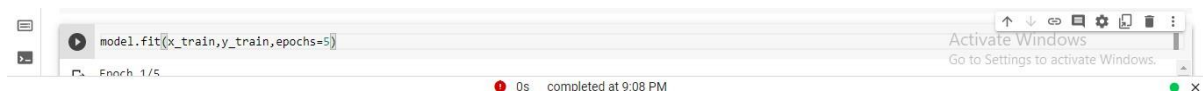
```
+ Code + Text RAM Disk Editing
Compile the model
[ ] model.compile(optimizer='adam',loss='binary_crossentropy',metrics=['accuracy'])
Fit the model
Activate Windows
Go to Settings to activate Windows.
```

### Question-7:

Fit The Model

### Solution

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



### Question-7:

Save The Model

#### Solution

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

Fit the model

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