

Assignment -4

SMS SPAM Classification

Assignment Date	22 October 2022
Student Name	Akshaya.R
Student Roll Number	211419104009
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)
```

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Activate Windows

Go to Settings to activate Windows.

```
[ ] 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)
```

Activate Windows

Go to Settings to activate Windows.

Question-4:

Create Model

Solution

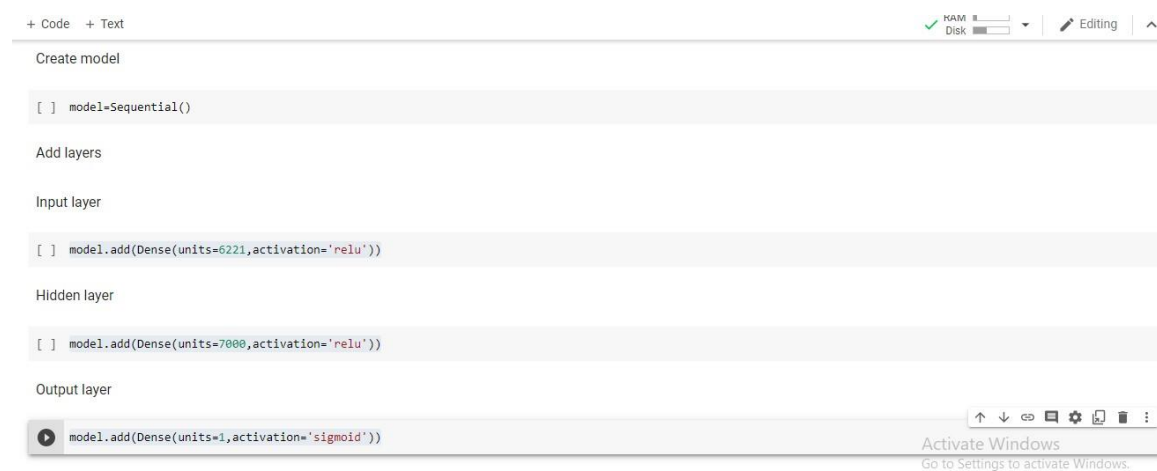
```
model=Sequential()
```

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 interface with a top bar containing '+ Code' and '+ Text' buttons, a RAM/Disk usage indicator, and an 'Editing' mode button. The notebook contains three cells:

- Create model:** A code cell with the line `model=Sequential()`.
- Add layers:** A text cell containing the heading 'Add layers'.
- Input layer:** A code cell with the line `model.add(Dense(units=6221,activation='relu'))`.
- Hidden layer:** A code cell with the line `model.add(Dense(units=7000,activation='relu'))`.
- Output layer:** A code cell with the line `model.add(Dense(units=1,activation='sigmoid'))`.

At the bottom right of the notebook, there is a watermark that says 'Activate Windows' and 'Go to Settings to activate Windows.'

Question-6:

Compile The Model

Solution

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



The screenshot shows a Jupyter Notebook interface with a top bar containing '+ Code' and '+ Text' buttons, a RAM/Disk usage indicator, and an 'Editing' mode button. The notebook contains two cells:

- Compile the model:** A code cell with the line `model.compile(optimizer='adam',loss='binary_crossentropy',metrics=['accuracy'])`.
- Fit the model:** A text cell containing the heading 'Fit the model'.

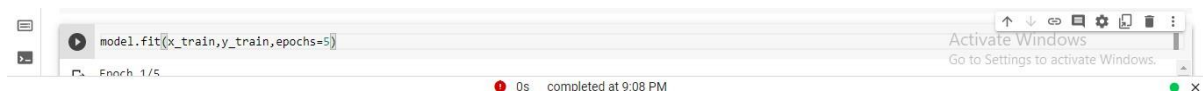
At the bottom right of the notebook, there is a watermark that says 'Activate Windows' and 'Go to Settings to activate Windows.'

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')
```