SURYA GROUP OF INSTITUTIONS

Naan Muthalvan

IBM -Artificial Intelligence

Anbazhagan M

42221104005

Team - 01

Building a Smarter AI-Powered Spam Classifier

Spam Classifier with Keras:

This project uses deep learning and AI to handle spam content. It covers building an AI model, integrating a NoSQL database for storing inference results, and deploying the model into production.

Machine Learning Email Spam Detector:

This tutorial guides you through building an email spam detector using Python. It demonstrates how to train a spam detector to recognize and classify emails into spam and non-spam,Spam Classifier with sklearn: This tutorial provides a step-by-step guide to building a simple spam classifier using Python

Building Spam Classifier with Logistic Regression:

This project focuses on building a logistic regression classifier using scikit-learn. It helps predict whether an email is spam or ham

Indroduction:

The upsurge in the volume of unwanted emails called spam has created an intense need for the development of more dependable and robust antispam filters. Any promotional messages or advertisements that end up in our inbox can be categorised as spam as they don't provide any value and often irritates us.

Overview of the Dataset used:

We will make use of the SMS spam classification data.

The SMS Spam Collection is a set of SMS tagged messages that have been collected for SMS Spam research. It contains one set of SMS messages in English of 5,574 messages, tagged according to being ham (legitimate) or spam.

In this article, We'll discuss:

Data processing :

- Import the required packages
- Loading the Dataset
- Remove the unwanted data columns
- Preprocessing and Exploring the Dataset

- Build word cloud to see which message is spam and which is not.
- Remove the stop words and punctuations
- Convert the text data into vectors

Building a sms spam classification model :

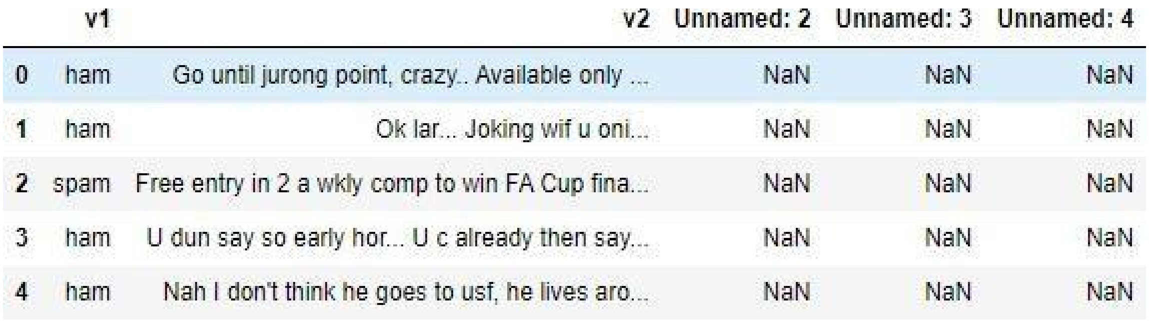
- Split the data into train and test sets
- Use Sklearn built-in classifiers to build the models
- Train the data on the model
- Make predictions on new data

Import the required packages :

```
%matplotlib inline
import matplotlib.pyplot as plt
import csv
import sklearn
import pickle
from wordcloud import WordCloud
import pandas as pd
import numpy as np
import nltk
from nltk.corpus import stopwords
from sklearn.feature_extraction.text import CountVectorizer, TfidfTransformer
from sklearn.tree import DecisionTreeClassifier
from sklearn.model_selection import
GridSearchCV,train_test_split,StratifiedKFold,cross_val_score,learning_curve
```

Loading the dataset :

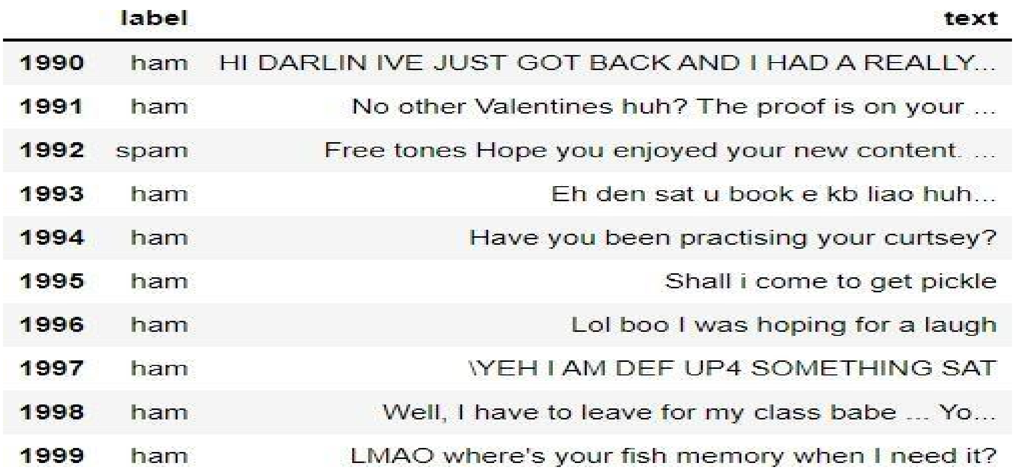
```
data = pd.read_csv('dataset/spam.csv', encoding='latin-1')data.head()
```



	v1	v2	Unnamed: 2	Unnamed: 3	Unnamed: 4
0	ham	Go until jurong point, crazy.. Available only ...	NaN	NaN	NaN
1	ham	Ok lar... Joking wif u oni...	NaN	NaN	NaN
2	spam	Free entry in 2 a wkly comp to win FA Cup fina...	NaN	NaN	NaN
3	ham	U dun say so early hor... U c already then say...	NaN	NaN	NaN
4	ham	Nah I don't think he goes to usf, he lives aro...	NaN	NaN	NaN

Removing unwanted columns :

```
data = data.drop(["Unnamed: 2", "Unnamed: 3", "Unnamed: 4"], axis=1)
    data = data.rename(columns={"v2" : "text", "v1":"label"})
    data[1990:2000]
```



	label	text
1990	ham	HI DARLIN IVE JUST GOT BACK AND I HAD A REALLY...
1991	ham	No other Valentines huh? The proof is on your ...
1992	spam	Free tones Hope you enjoyed your new content. ...
1993	ham	Eh den sat u book e kb liao huh...
1994	ham	Have you been practising your curtsey?
1995	ham	Shall i come to get pickle
1996	ham	Lol boo I was hoping for a laugh
1997	ham	\YEH I AM DEF UP4 SOMETHING SAT
1998	ham	Well, I have to leave for my class babe ... Yo...
1999	ham	LMAO where's your fish memory when I need it?

Let's move on.

```
data['label'].value_counts()
```

```
# OUTPUT
ham 4825
spam 747
Name: label, dtype: int64
```

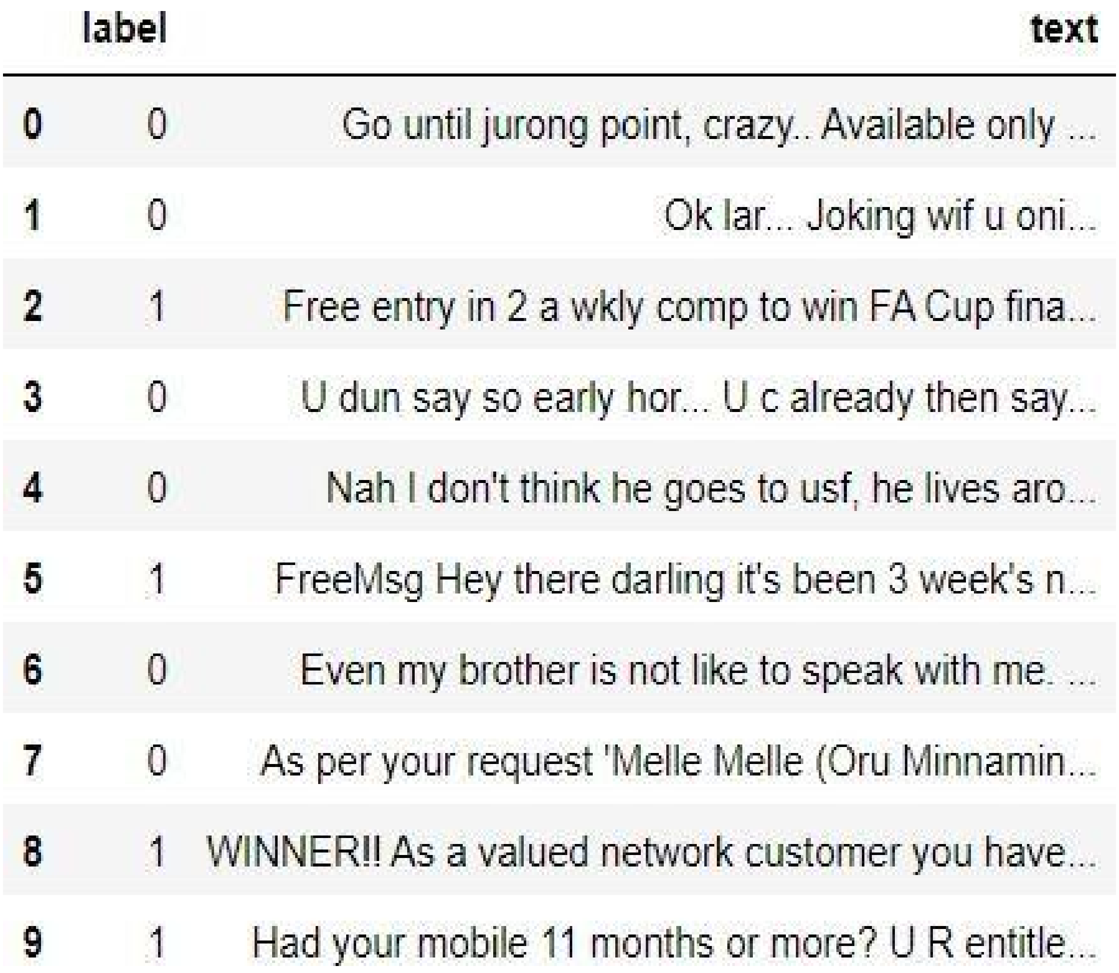
Preprocessing and Eploring the Dataset :

```
# Import nltk packages and Punkt Tokenizer Models
import nltk
nltk.download("punkt")
import warnings
warnings.filterwarnings('ignore')
```

Build word cloud to see which message is spam and which is not :

```
ham_words = ''
spam_words = ''

# Creating a corpus of spam messages
for val in data[data['label'] == 'spam'].text:
text = val.lower()
tokens = nltk.word_tokenize(text)
for words in tokens:
spam_words = spam_words + words + ' '

# Creating a corpus of ham messages
for val in data[data['label'] == 'ham'].text:
text = text.lower()
tokens = nltk.word_tokenize(text)
for words in tokens:
ham_words = ham_words + words + ' '

spam_wordcloud = WordCloud(width=500, height=300).generate(spam_words)
```

```
ham_wordcloud = WordCloud(width=500, height=300).generate(ham_words)

#Spam Word cloud
plt.figure( figsize=(10,8), facecolor='w')
plt.imshow(spam_wordcloud)
plt.axis("off")
plt.tight_layout(pad=0)
plt.show()

#Creating Ham wordcloud
plt.figure( figsize=(10,8), facecolor='g')
plt.imshow(ham_wordcloud)
plt.axis("off")
plt.tight_layout(pad=0)
plt.show()

data = data.replace(['ham','spam'],[0, 1])data.head(10)
```

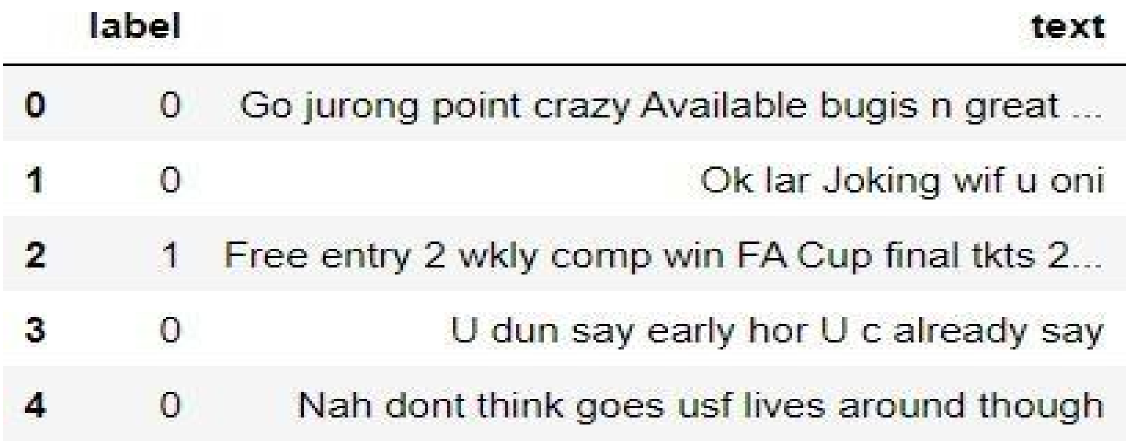


	label	text
0	0	Go until jurong point, crazy.. Available only ...
1	0	Ok lar... Joking wif u oni...
2	1	Free entry in 2 a wkly comp to win FA Cup fina...
3	0	U dun say so early hor... U c already then say...
4	0	Nah I don't think he goes to usf, he lives aro...
5	1	FreeMsg Hey there darling it's been 3 week's n...
6	0	Even my brother is not like to speak with me. ...
7	0	As per your request 'Melle Melle (Oru Minnamin...
8	1	WINNER!! As a valued network customer you have...
9	1	Had your mobile 11 months or more? U R entitle...

Removing punctuation and stopwords from the messages :

```
import nltk
nltk.download('stopwords')

#remove the punctuations and stopwords
```

```
import string
def text_process(text):

text = text.translate(str.maketrans(", ", string.punctuation))
text = [word for word in text.split() if word.lower() not in stopwords.words('english')]

return " ".join(text)

data['text'] = data['text'].apply(text_process)
data.head()
```



	label	text
0	0	Go jurong point crazy Available bugis n great ...
1	0	Ok lar Joking wif u oni
2	1	Free entry 2 wkly comp win FA Cup final tkts 2...
3	0	U dun say early hor U c already say
4	0	Nah dont think goes usf lives around though

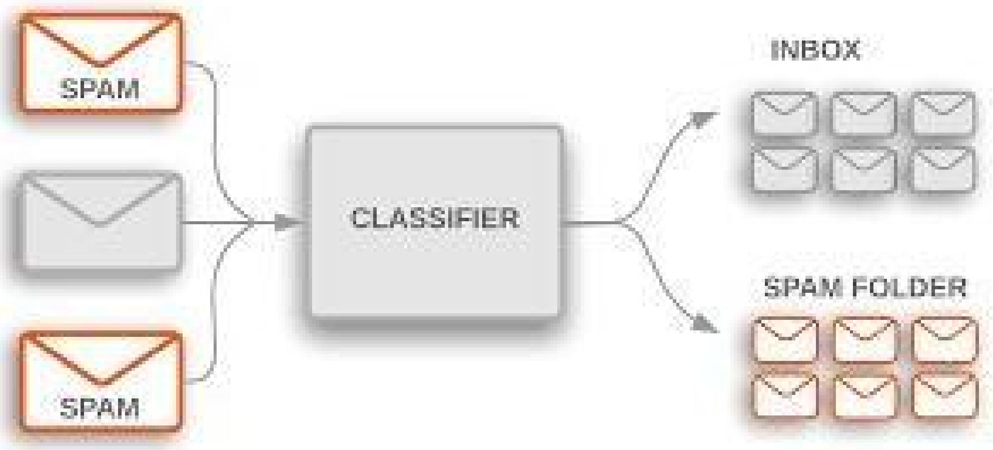
```
text = pd.DataFrame(data['text'])
label = pd.DataFrame(data['label'])
```

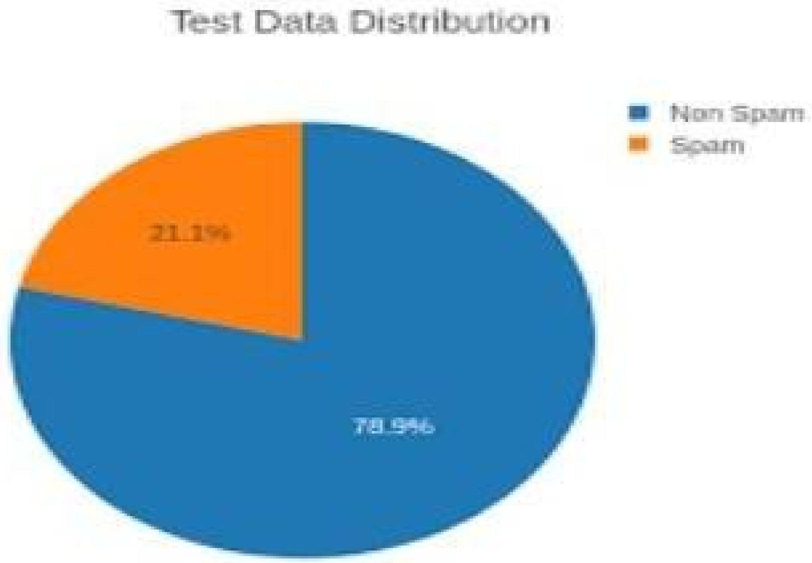
Convert the text data into vectors :

we can convert words to vectors using either Count Vectorizer or by using TF-IDF Vectorizer.

TF-IDF is better than Count Vectorizers because it not only focuses on the frequency of words present in the corpus but also provides the importance of the words. We can then remove the words that are less important for analysis, hence making the model building less complex by reducing the input dimensions.

I have included both methods for your reference.


SPAM
SPAM
CLASSIFIER
INBOX
SPAM FOLDER


Test Data Distribution
Non Spam
Spam
21.1%
78.9%