

```
In [7]: !pip install transformers

Collecting transformers
  Using cached transformers-4.31.0-py3-none-any.whl (7.4 MB)
Requirement already satisfied: filelock in c:\users\virad\appdata\local\packages\pythonsoftwarefoundation.python.3.9_qbz5n2kfra8p0\localcache\local-packages\python39\site-packages (from transformers) (3.12.2)
Requirement already satisfied: huggingface-hub<1.0,>=0.14.1 in c:\users\virad\appdata\local\packages\pythonsoftwarefoundation.python.3.9_qbz5n2kfra8p0\localcache\local-packages\python39\site-packages (from transformers) (0.16.4)
Requirement already satisfied: numpy>=1.17 in c:\users\virad\appdata\local\packages\pythonsoftwarefoundation.python.3.9_qbz5n2kfra8p0\localcache\local-packages\python39\site-packages (from transformers) (1.24.2)
Requirement already satisfied: packaging>=20.0 in c:\users\virad\appdata\local\packages\pythonsoftwarefoundation.python.3.9_qbz5n2kfra8p0\localcache\local-packages\python39\site-packages (from transformers) (23.1)
Requirement already satisfied: pyyaml>=5.1 in c:\users\virad\appdata\local\packages\pythonsoftwarefoundation.python.3.9_qbz5n2kfra8p0\localcache\local-packages\python39\site-packages (from transformers) (6.0)
Requirement already satisfied: regex!=2019.12.17 in c:\users\virad\appdata\local\packages\pythonsoftwarefoundation.python.3.9_qbz5n2kfra8p0\localcache\local-packages\python39\site-packages (from transformers) (2023.6.3)
Requirement already satisfied: requests in c:\users\virad\appdata\local\packages\pythonsoftwarefoundation.python.3.9_qbz5n2kfra8p0\localcache\local-packages\python39\site-packages (from transformers) (2.31.0)
Requirement already satisfied: tokenizers!=0.11.3,<0.14,>=0.11.1 in c:\users\virad\appdata\local\packages\pythonsoftwarefoundation.python.3.9_qbz5n2kfra8p0\localcache\local-packages\python39\site-packages (from transformers) (0.13.3)
Requirement already satisfied: safetensors>=0.3.1 in c:\users\virad\appdata\local\packages\pythonsoftwarefoundation.python.3.9_qbz5n2kfra8p0\localcache\local-packages\python39\site-packages (from transformers) (0.3.1)
Requirement already satisfied: tqdm>=4.27 in c:\users\virad\appdata\local\packages\pythonsoftwarefoundation.python.3.9_qbz5n2kfra8p0\localcache\local-packages\python39\site-packages (from transformers) (4.65.0)
Requirement already satisfied: fsspec in c:\users\virad\appdata\local\packages\pythonsoftwarefoundation.python.3.9_qbz5n2kfra8p0\localcache\local-packages\python39\site-packages (from huggingface-hub<1.0,>=0.14.1->transformers) (2023.6.0)
Requirement already satisfied: typing-extensions>=3.7.4.3 in c:\users\virad\appdata\local\packages\pythonsoftwarefoundation.python.3.9_qbz5n2kfra8p0\localcache\local-packages\python39\site-packages (from huggingface-hub<1.0,>=0.14.1->transformers) (4.6.2)
Requirement already satisfied: colorama in c:\users\virad\appdata\local\packages\pythonsoftwarefoundation.python.3.9_qbz5n2kfra8p0\localcache\local-packages\python39\site-packages (from tqdm>=4.27->transformers) (0.4.6)
Requirement already satisfied: charset-normalizer<4,>=2 in c:\users\virad\appdata\local\packages\pythonsoftwarefoundation.python.3.9_qbz5n2kfra8p0\localcache\local-packages\python39\site-packages (from requests->transformers) (3.1.0)
Requirement already satisfied: idna<4,>=2.5 in c:\users\virad\appdata\local\packages\pythonsoftwarefoundation.python.3.9_qbz5n2kfra8p0\localcache\local-packages\python39\site-packages (from requests->transformers) (3.4)
Requirement already satisfied: urllib3<3,>=1.21.1 in c:\users\virad\appdata\local\packages\pythonsoftwarefoundation.python.3.9_qbz5n2kfra8p0\localcache\local-packages\python39\site-packages (from requests->transformers) (2.0.2)
Requirement already satisfied: certifi=2017.4.17 in c:\users\virad\appdata\local\packages\pythonsoftwarefoundation.python.3.9_qbz5n2kfra8p0\localcache\local-packages\python39\site-packages (from requests->transformers) (2023.5.7)
Installing collected packages: transformers

ERROR: Could not install packages due to an OSError: [Errno 2] No such file or directory: 'C:\\Users\\virad\\AppData\\Local\\Packages\\PythonSoftwareFoundation.Python.3.9_qbz5n2kfra8p0\\LocalCache\\local-packages\\Python39\\site-packages\\transformers\\models\\deprecated\\trajectory_transformer\\convert_trajectory_transformer_original_pytorch_checkpoint_to_pytorch.py'
HINT: This error might have occurred since this system does not have Windows Long Path support enabled. You can find information on how to enable this at https://pip.pyppa.io/warnings/enable-long-paths

[notice] A new release of pip is available: 23.1.2 -> 23.2.1
[notice] To update, run: C:\Users\virad\AppData\Local\Microsoft\WindowsApps\PythonSoftwareFoundation.Python.3.9_qbz5n2kfra8p0\python.exe -m pip install --upgrade pip

In [8]: import pandas as pd
import numpy as np
import seaborn as sns

In [10]: import pandas as pd
# Dataset from - https://archive.ics.uci.edu/ml/datasets/SMS+Spam+Collection
df= pd.read_csv('spam.csv', encoding='ISO-8859-1')

df.head()

Out[10]:
```

	v1	v2	Unnamed: 2	Unnamed: 3	Unnamed: 4
0	ham	Go until jurong point, crazy.. Available only in	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

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In [11]: df['v2'].value_counts()

Out[11]: v2
Sorry, I'll call later                                     30
I cant pick the phone right now. Pls send a message        12
Ok...                                                       10
7 wonders in My WORLD 7th You 6th Ur style 5th.Ur smile 4th Ur Personality 3rd Ur Nature 2nd Ur SMS and 1st \Ur Lovely Friendship"... good morning dear"  4
Say this slowly.? GOD,I LOVE YOU &amp; I NEED YOU,CLEAN MY HEART WITH YOUR BLOOD.Send this to Ten special people &amp; u c miracle tomorrow, do it,pls,pls do it...  4
..
I gotta collect da car at 6 lei.                            1
No. On the way home. So if not for the long dry spell the season would have been over  1
Urgent! Please call 09061743811 from landline. Your ABTA complimentary 4* Tenerife Holiday or â£5000 cash await collection SAE T&Cs Box 326 CW25WX 150ppm  1
Dear 0776xxxxxxx U've been invited to XCHAT. This is our final attempt to contact u! Txt CHAT to 86688 150p/MsgrcvdHG/Suite342/2Lands/Row/W1J6HL LDN 18yrs  1
Rofl. Its true to its name                                  1
Name: count, Length: 5169, dtype: int64

In [12]: df['v1'].value_counts()

Out[12]: v1
ham          4825
spam         747
Name: count, dtype: int64

In [13]: #separate x and y
x=df.v2.values
y=df.v1.values

In [14]: # split train and test
from sklearn.model_selection import train_test_split
xtrain, xtest, ytrain, ytest = train_test_split(x,y, test_size=.25)

In [15]: # Data preprocessing
from sklearn.feature_extraction.text import CountVectorizer
#CountVectorizer used for one-hot encoding
cv = CountVectorizer()
X_train= cv.fit_transform(xtrain)

In [16]: X_train.toarray()

Out[16]: 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]], dtype=int64)

In [17]: from sklearn.naive_bayes import MultinomialNB

In [19]: #Multinomial Naive Bayes algorithm is a probabilistic learning method that is mostly used in Natural Language Processing (NLP)
model = MultinomialNB()
model.fit(X_train,ytrain)

Out[19]: MultinomialNB
MultinomialNB()

In [20]: x_test=cv.transform(xtest)
x_test.toarray()

Out[20]: 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]], dtype=int64)

In [21]: model.score(x_test, ytest)

Out[21]: 0.9899497487437185

In [34]: email=['Free ATM card, with one mobile at free cost','Hello dear customer']

In [44]: cv_email= cv.transform(email)

In [43]: model.predict(x_test[0])

Out[43]: array(['spam'], dtype='<U4')

In [45]: model.predict(cv_email)

Out[45]: array(['spam', 'ham'], dtype='<U4')

In [ ]:
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