Codsoft Internship Aug 23

Task-SPAM SMS DETECTION

Author-Vivek Kumar

In [1]:
```
import numpy as np
import pandas as pd
import nltk
```

In [2]:
```
df_sms = pd.read_csv('spam.csv',encoding='latin-1')
df_sms.head()
```

Out[2]:

	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

In [3]:
```
df_sms = df_sms.drop(["Unnamed: 2", "Unnamed: 3", "Unnamed: 4"], axis=1)
df_sms = df_sms.rename(columns={"v1":"label", "v2":"sms"})
df_sms.head()
```

Out[3]:

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

In [4]:
```
print(len(df_sms))
```

```
5572
```

In [5]:
```
df_sms.label.value_counts()
```

Out[5]:
```
ham     4825
spam     747
Name: label, dtype: int64
```

In [6]:
```
df_sms.describe()
```

Out[6]:

	label	sms
count	5572	5572
unique	2	5169
top	ham	Sorry, I'll call later
freq	4825	30

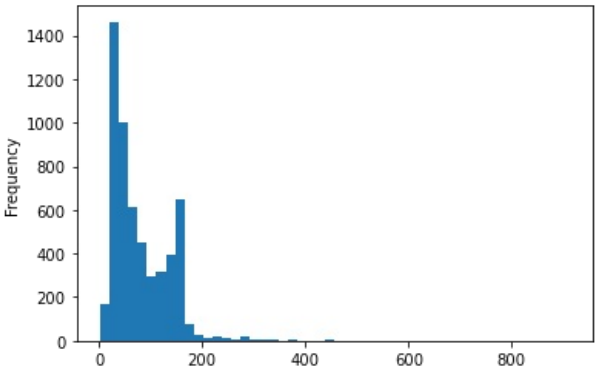
In [7]:
```
df_sms['length'] = df_sms['sms'].apply(len)
df_sms.head()
```

Out[7]:

	label	sms	length
0	ham	Go until jurong point, crazy.. Available only ...	111
1	ham	Ok lar... Joking wif u oni...	29
2	spam	Free entry in 2 a wkly comp to win FA Cup fina...	155
3	ham	U dun say so early hor... U c already then say...	49
4	ham	Nah I don't think he goes to usf, he lives aro...	61

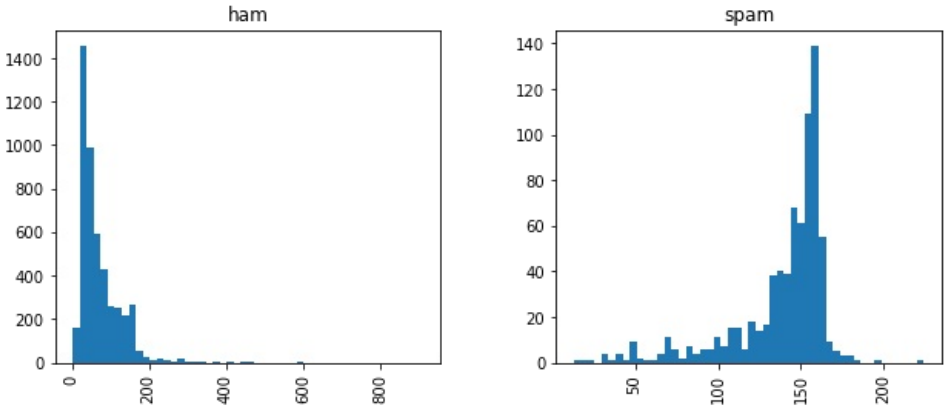
In [8]:
```
import matplotlib.pyplot as plt
import seaborn as sns
%matplotlib inline
df_sms['length'].plot(bins=50, kind='hist')
```

Out[8]:
```
<AxesSubplot:ylabel='Frequency'>
```



In [9]:
```
df_sms.hist(column='length', by='label', bins=50,figsize=(10,4))
```

Out[9]:
```
array([<AxesSubplot:title={'center':'ham'}>,
       <AxesSubplot:title={'center':'spam'}>], dtype=object)
```



In [10]:
```
df_sms.loc[:,'label'] = df_sms.label.map({'ham':0, 'spam':1})
print(df_sms.shape)
df_sms.head()
```

```
(5572, 3)
```

Out[10]:

	label	sms	length
0	0	Go until jurong point, crazy.. Available only ...	111
1	0	Ok lar... Joking wif u oni...	29
2	1	Free entry in 2 a wkly comp to win FA Cup fina...	155
3	0	U dun say so early hor... U c already then say...	49
4	0	Nah I don't think he goes to usf, he lives aro...	61

In [11]:
```
documents = ['Hello, how are you!',
             'Win money, win from home.',
             'Call me now.',
             'Hello, Call hello you tomorrow?']

lower_case_documents = []
lower_case_documents = [d.lower() for d in documents]
print(lower_case_documents)
```

```
['hello, how are you!', 'win money, win from home.', 'call me now.', 'hello, call hello you tomorrow?']
```

In [12]:
```
sans_punctuation_documents = []
import string

for i in lower_case_documents:
    sans_punctuation_documents.append(i.translate(str.maketrans("","", string.punctuation)))

sans_punctuation_documents
```

Out[12]:
```
['hello how are you',
 'win money win from home',
 'call me now',
 'hello call hello you tomorrow']
```

In [13]:
```
preprocessed_documents = [[w for w in d.split()] for d in sans_punctuation_documents]
preprocessed_documents
```

Out[13]:
```
[['hello', 'how', 'are', 'you'],
 ['win', 'money', 'win', 'from', 'home'],
 ['call', 'me', 'now'],
 ['hello', 'call', 'hello', 'you', 'tomorrow']]
```

In [14]:
```
frequency_list = []
```

```
import pprint
from collections import Counter

frequency_list = [Counter(d) for d in preprocessed_documents]
pprint.pprint(frequency_list)
```

```
[Counter({'hello': 1, 'how': 1, 'are': 1, 'you': 1}),
 Counter({'win': 2, 'money': 1, 'from': 1, 'home': 1}),
 Counter({'call': 1, 'me': 1, 'now': 1}),
 Counter({'hello': 2, 'call': 1, 'you': 1, 'tomorrow': 1})]
```

In [15]:
```
from sklearn.feature_extraction.text import CountVectorizer
count_vector = CountVectorizer()
```

In [16]:
```
count_vector.fit(documents)
count_vector.get_feature_names()
```

```
C:\ProgramData\Anaconda3\lib\site-packages\sklearn\utils\deprecation.py:87: FutureWarning: Function get_feature
_names is deprecated; get_feature_names is deprecated in 1.0 and will be removed in 1.2. Please use get_feature
_names_out instead.
  warnings.warn(msg, category=FutureWarning)
```

Out[16]:
```
['are',
 'call',
 'from',
 'hello',
 'home',
 'how',
 'me',
 'money',
 'now',
 'tomorrow',
 'win',
 'you']
```

In [17]:
```
doc_array = count_vector.transform(documents).toarray()
doc_array
```

Out[17]:
```
array([[1, 0, 0, 1, 0, 1, 0, 0, 0, 0, 0, 1],
       [0, 0, 1, 0, 1, 0, 0, 1, 0, 0, 2, 0],
       [0, 1, 0, 0, 0, 0, 1, 0, 1, 0, 0, 0],
       [0, 1, 0, 2, 0, 0, 0, 0, 0, 1, 0, 1]], dtype=int64)
```

In [18]:
```
frequency_matrix = pd.DataFrame(doc_array, columns = count_vector.get_feature_names())
frequency_matrix
```

Out[18]:

	are	call	from	hello	home	how	me	money	now	tomorrow	win	you
0	1	0	0	1	0	1	0	0	0	0	0	1
1	0	0	1	0	1	0	0	1	0	0	2	0
2	0	1	0	0	0	0	1	0	1	0	0	0
3	0	1	0	2	0	0	0	0	0	1	0	1

In [19]:
```
from sklearn.model_selection import train_test_split

X_train, X_test, y_train, y_test = train_test_split(df_sms['sms'],
                                                    df_sms['label'],test_size=0.20,
                                                    random_state=1)
```

In [20]:
```
count_vector = CountVectorizer()
```

In [21]:
```
training_data = count_vector.fit_transform(X_train)
```

In [22]:
```
testing_data = count_vector.transform(X_test)
```

In [23]:
```
from sklearn.naive_bayes import MultinomialNB
naive_bayes = MultinomialNB()
naive_bayes.fit(training_data,y_train)
```

Out[23]:
```
MultinomialNB()
```

In [24]:
```
MultinomialNB(alpha=1.0, class_prior=None, fit_prior=True)
```

Out[24]:
```
MultinomialNB()
```

In [25]:
```
predictions = naive_bayes.predict(testing_data)
```

In [26]:
```
from sklearn.metrics import accuracy_score, precision_score, recall_score, f1_score
print('Accuracy score: {}'.format(accuracy_score(y_test, predictions)))
print('Precision score: {}'.format(precision_score(y_test, predictions)))
print('Recall score: {}'.format(recall_score(y_test, predictions)))
print('F1 score: {}'.format(f1_score(y_test, predictions)))
```

```
Accuracy score: 0.9847533632286996
Precision score: 0.9420289855072463
Recall score: 0.935251798561151
F1 score: 0.9386281588447652
```

In [ ]: