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Fake-News-Classifier / **FakeNewsCount_vectorizer.ipynb**

krishnaik06 Add files via upload

54530cd   on Apr 5

1 contributor

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2466 lines (2466 sloc)   119 KB

Fake News Classifier

Dataset: https://www.kaggle.com/c/fake-news/data# (https://www.kaggle.com/c/fake-news/data#)

```
In [111]: import pandas as pd
```

```
In [112]: df=pd.read_csv('fake-news/train.csv')
```

```
In [113]: df.head()
```

Out[113]:

	id	title	author	text	label
0	0	House Dem Aide: We Didn't Even See Comey's Let...	Darrell Lucus	House Dem Aide: We Didn't Even See Comey's Let...	1
1	1	FLYNN: Hillary Clinton, Big Woman on Campus - ...	Daniel J. Flynn	Ever get the feeling your life circles the rou...	0
2	2	Why the Truth Might Get You Fired	Consortiumnews.com	Why the Truth Might Get You Fired October 29, ...	1
3	3	15 Civilians Killed In Single US Airstrike Hav...	Jessica Purkiss	Videos 15 Civilians Killed In Single US Airstr...	1
4	4	Iranian woman jailed for fictional unpublished...	Howard Portnoy	Print \nAn Iranian woman has been sentenced to...	1

```
In [114]: ## Get the Independent Features

          X=df.drop('label',axis=1)
```

```
In [115]: X.head()
```

Out[115]:

	id	title	author	text
0	0	House Dem Aide: We Didn't Even See Comey's Let...	Darrell Lucus	House Dem Aide: We Didn't Even See Comey's Let...
1	1	FLYNN: Hillary Clinton, Big Woman on Campus - ...	Daniel J. Flynn	Ever get the feeling your life circles the rou...
2	2	Why the Truth Might Get You Fired	Consortiumnews.com	Why the Truth Might Get You Fired October 29, ...
3	3	15 Civilians Killed In Single US Airstrike Hav...	Jessica Purkiss	Videos 15 Civilians Killed In Single US Airstr...
		Iranian woman jailed for fictional		Print \nAn Iranian

| 4 | 4 | Iranian woman jailed for fictional unpublished... | Howard Portnoy | woman has been sentenced to... |

In [116]: `## Get the Dependent features`
`y=df['label']`

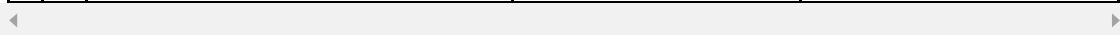In [117]: `y.head()`

Out[117]:
```
0    1
1    0
2    1
3    1
4    1
Name: label, dtype: int64
```

In [122]: `df.shape`

Out[122]: `(18285, 5)`

In [120]: `from sklearn.feature_extraction.text import CountVectorizer, TfidfVectorizer, HashingVectorizer`

In [121]: `df=df.dropna()`

In [123]: `df.head(10)`

Out[123]:

	id	title	author	text	label
0	0	House Dem Aide: We Didn't Even See Comey's Let...	Darrell Lucus	House Dem Aide: We Didn't Even See Comey's Let...	1
1	1	FLYNN: Hillary Clinton, Big Woman on Campus - ...	Daniel J. Flynn	Ever get the feeling your life circles the rou...	0
2	2	Why the Truth Might Get You Fired	Consortiumnews.com	Why the Truth Might Get You Fired October 29, ...	1
3	3	15 Civilians Killed In Single US Airstrike Hav...	Jessica Purkiss	Videos 15 Civilians Killed In Single US Airstr...	1
4	4	Iranian woman jailed for fictional unpublished...	Howard Portnoy	Print \nAn Iranian woman has been sentenced to...	1
5	5	Jackie Mason: Hollywood Would Love Trump if He...	Daniel Nussbaum	In these trying times, Jackie Mason is the Voi...	0
7	7	Benoît Hamon Wins French Socialist Party's Pre...	Alissa J. Rubin	PARIS — France chose an idealistic, traditi...	0
9	9	A Back-Channel Plan for Ukraine and Russia, Co...	Megan Twohey and Scott Shane	A week before Michael T. Flynn resigned as nat...	0
				Organizing for Action	

| | 10 | 10 | Obama's Organizing for Action Partners with So... | Aaron Klein | Organizing for Action, the activist group that... | 0 |
| | 11 | 11 | BBC Comedy Sketch "Real Housewives of ISIS" Ca... | Chris Tomlinson | The BBC produced spoof on the "Real Housewives... | 0 |

In [124]:
```python
messages=df.copy()
```

In [125]:
```python
messages.reset_index(inplace=True)
```

In [126]:
```python
messages.head(10)
```

Out[126]:

	index	id	title	author	text	label
0	0	0	House Dem Aide: We Didn't Even See Comey's Let...	Darrell Lucus	House Dem Aide: We Didn't Even See Comey's Let...	1
1	1	1	FLYNN: Hillary Clinton, Big Woman on Campus - ...	Daniel J. Flynn	Ever get the feeling your life circles the rou...	0
2	2	2	Why the Truth Might Get You Fired	Consortiumnews.com	Why the Truth Might Get You Fired October 29, ...	1
3	3	3	15 Civilians Killed In Single US Airstrike Hav...	Jessica Purkiss	Videos 15 Civilians Killed In Single US Airstr...	1
4	4	4	Iranian woman jailed for fictional unpublished...	Howard Portnoy	Print \nAn Iranian woman has been sentenced to...	1
5	5	5	Jackie Mason: Hollywood Would Love Trump if He...	Daniel Nussbaum	In these trying times, Jackie Mason is the Voi...	0
6	7	7	Benoît Hamon Wins French Socialist Party's Pre...	Alissa J. Rubin	PARIS — France chose an idealistic, traditi...	0
7	9	9	A Back-Channel Plan for Ukraine and Russia, Co...	Megan Twohey and Scott Shane	A week before Michael T. Flynn resigned as nat...	0
8	10	10	Obama's Organizing for Action Partners with So...	Aaron Klein	Organizing for Action, the activist group that...	0
9	11	11	BBC Comedy Sketch "Real Housewives of ISIS" Ca...	Chris Tomlinson	The BBC produced spoof on the "Real Housewives...	0

In [51]:
```python
messages['title'][6]
```

```
Out[51]: 'Benoît Hamon Wins French Socialist Party's Presidential Nomination - Th
         e New York Times'
```

```
In [127]: from nltk.corpus import stopwords
          from nltk.stem.porter import PorterStemmer
          ps = PorterStemmer()
          corpus = []
          for i in range(0, len(messages)):
              review = re.sub('[^a-zA-Z]', ' ', messages['title'][i])
              review = review.lower()
              review = review.split()

              review = [ps.stem(word) for word in review if not word in stopwords
          .words('english')]
              review = ' '.join(review)
              corpus.append(review)
```

```
In [132]: corpus[3]
```

```
Out[132]: 'civilian kill singl us airstrik identifi'
```

```
In [66]: ## Applying Countvectorizer
         # Creating the Bag of Words model
         from sklearn.feature_extraction.text import CountVectorizer
         cv = CountVectorizer(max_features=5000,ngram_range=(1,3))
         X = cv.fit_transform(corpus).toarray()
```

```
In [67]: X.shape
```

```
Out[67]: (18285, 5000)
```

```
In [68]: y=messages['label']
```

```
In [69]: ## Divide the dataset into Train and Test
         from sklearn.model_selection import train_test_split
         X_train, X_test, y_train, y_test = train_test_split(X, y, test_size=0.3
         3, random_state=0)
```

```
In [70]: cv.get_feature_names()[:20]
```

```
Out[70]: ['abandon',
          'abc',
          'abc news',
          'abduct',
          'abe',
          'abedin',
          'abl',
          'abort',
          'abroad',
          'absolut',
          'abstain',
          'absurd',
          'abus',
          'abus new',
          'abus new york',
          'academi',
          'accept',
          'access',
          'access pipelin',
          'access pipelin protest']
```

```
In [110]: cv.get_params()
```

```
Out[110]: {'analyzer': 'word',
           'binary': False,
           'decode_error': 'strict',
           'dtype': numpy.int64,
           'encoding': 'utf-8',
           'input': 'content',
           'lowercase': True,
           'max_df': 1.0,
           'max_features': 5000,
           'min_df': 1,
           'ngram_range': (1, 3),
           'preprocessor': None,
           'stop_words': None,
           'strip_accents': None,
           'token_pattern': '(?u)\\b\\w\\w+\\b',
           'tokenizer': None,
           'vocabulary': None}
```

```
In [71]: count_df = pd.DataFrame(X_train, columns=cv.get_feature_names())
```

```
In [73]: count_df.head()
```

Out[73]:

	abandon	abc	abc news	abduct	abe	abedin	abl	abort	abroad	absolut	...	zero
0	0	0	0	0	0	0	0	0	0	0	...	0
1	0	0	0	0	0	0	0	0	0	0	...	0
2	0	0	0	0	0	0	0	0	0	0	...	0
3	0	0	0	0	0	0	0	0	0	0	...	0
4	0	0	0	0	0	0	0	0	0	1	...	0

5 rows × 5000 columns

```
In [77]: import matplotlib.pyplot as plt
```

```
In [78]: def plot_confusion_matrix(cm, classes,
                                   normalize=False,
                                   title='Confusion matrix',
                                   cmap=plt.cm.Blues):
             """
             See full source and example:
             http://scikit-learn.org/stable/auto_examples/model_selection/plot_c
         onfusion_matrix.html

             This function prints and plots the confusion matrix.
             Normalization can be applied by setting `normalize=True`.
             """
             plt.imshow(cm, interpolation='nearest', cmap=cmap)
             plt.title(title)
             plt.colorbar()
             tick_marks = np.arange(len(classes))
             plt.xticks(tick_marks, classes, rotation=45)
             plt.yticks(tick_marks, classes)

             if normalize:
```

```python
        cm = cm.astype('float') / cm.sum(axis=1)[:, np.newaxis]
        print("Normalized confusion matrix")
    else:
        print('Confusion matrix, without normalization')

    thresh = cm.max() / 2.
    for i, j in itertools.product(range(cm.shape[0]), range(cm.shape[1
])):
        plt.text(j, i, cm[i, j],
                 horizontalalignment="center",
                 color="white" if cm[i, j] > thresh else "black")

    plt.tight_layout()
    plt.ylabel('True label')
    plt.xlabel('Predicted label')
```

MultinomialNB Algorithm

In [79]:
```python
from sklearn.naive_bayes import MultinomialNB
classifier=MultinomialNB()
```

In [96]:
```python
from sklearn import metrics
import numpy as np
import itertools
```
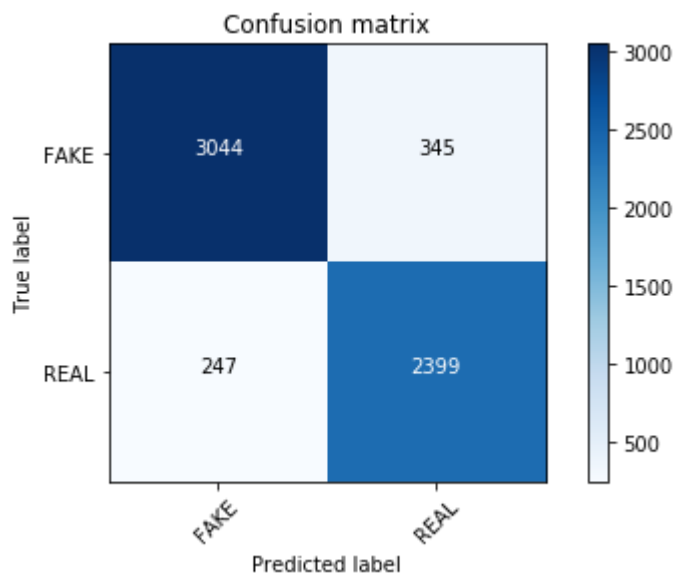
In [97]:
```python
classifier.fit(X_train, y_train)
pred = classifier.predict(X_test)
score = metrics.accuracy_score(y_test, pred)
print("accuracy:   %0.3f" % score)
cm = metrics.confusion_matrix(y_test, pred)
plot_confusion_matrix(cm, classes=['FAKE', 'REAL'])
```

```
accuracy:   0.902
Confusion matrix, without normalization
```


In [88]:
```python
classifier.fit(X_train, y_train)
pred = classifier.predict(X_test)
score = metrics.accuracy_score(y_test, pred)
score
```

Out[88]: 0.9019055509527755

In [91]:
```python
y_train.shape
```

```
Out[91]: (12250,)
```

Passive Aggressive Classifier Algorithm
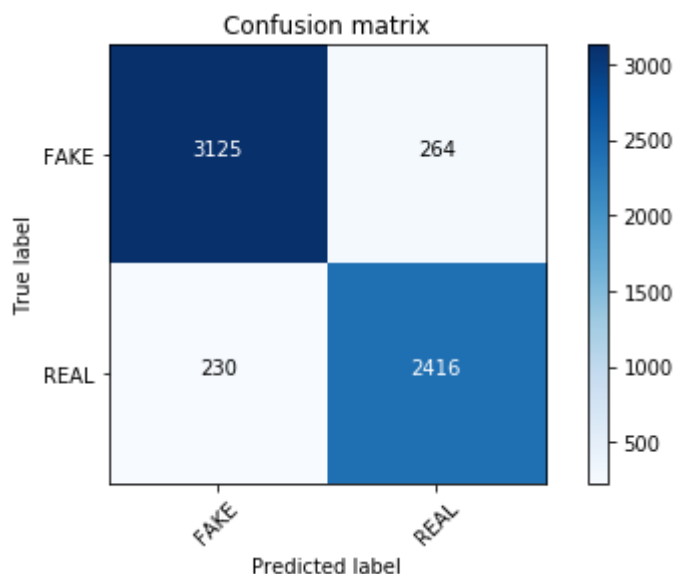
```
In [98]:  from sklearn.linear_model import PassiveAggressiveClassifier
          linear_clf = PassiveAggressiveClassifier(n_iter=50)
```

```
In [99]:  linear_clf.fit(X_train, y_train)
          pred = linear_clf.predict(X_test)
          score = metrics.accuracy_score(y_test, pred)
          print("accuracy:    %0.3f" % score)
          cm = metrics.confusion_matrix(y_test, pred)
          plot_confusion_matrix(cm, classes=['FAKE Data', 'REAL Data'])
```

```
c:\users\krish.naik\appdata\local\continuum\anaconda3\envs\nlp\lib\site-
packages\sklearn\linear_model\stochastic_gradient.py:117: DeprecationWar
ning: n_iter parameter is deprecated in 0.19 and will be removed in 0.2
1. Use max_iter and tol instead.
  DeprecationWarning)
```

```
accuracy:    0.918
Confusion matrix, without normalization
```


Multinomial Classifier with Hyperparameter

```
In [103]:  classifier=MultinomialNB(alpha=0.1)
```

```
In [105]:  previous_score=0
           for alpha in np.arange(0,1,0.1):
               sub_classifier=MultinomialNB(alpha=alpha)
               sub_classifier.fit(X_train,y_train)
               y_pred=sub_classifier.predict(X_test)
               score = metrics.accuracy_score(y_test, y_pred)
               if score>previous_score:
                   classifier=sub_classifier
               print("Alpha: {}, Score : {}".format(alpha,score))
```

```
Alpha: 0.0, Score : 0.8903065451532726
Alpha: 0.1, Score : 0.9020712510356255
Alpha: 0.2, Score : 0.9025683512841757
Alpha: 0.30000000000000004, Score : 0.9024026512013256
Alpha: 0.4, Score : 0.9017398508699255
```

```
Alpha: 0.5, Score : 0.9015741507870754
Alpha: 0.6000000000000001, Score : 0.9022369511184756
Alpha: 0.7000000000000001, Score : 0.9025683512841757
Alpha: 0.8, Score : 0.9015741507870754
Alpha: 0.9, Score : 0.9017398508699255
```

In [106]:
```python
## Get Features names
feature_names = cv.get_feature_names()
```

In [109]:
```python
classifier.coef_[0]
```

Out[109]:
```
array([ -9.10038883,  -8.62276128,  -9.10038883, ..., -10.79498456,
        -8.91467169,  -9.32864749])
```

In [107]:
```python
### Most real
sorted(zip(classifier.coef_[0], feature_names), reverse=True)[:20]
```

Out[107]:
```
[(-4.000149156604985, 'trump'),
 (-4.287872694443541, 'hillari'),
 (-4.396389621061519, 'clinton'),
 (-4.899969726208735, 'elect'),
 (-5.176598600897756, 'new'),
 (-5.234730366348767, 'comment'),
 (-5.273968180973631, 'video'),
 (-5.3868167681180115, 'war'),
 (-5.396821854078974, 'us'),
 (-5.412019714988405, 'hillari clinton'),
 (-5.417137433425386, 'fbi'),
 (-5.48068448454208, 'vote'),
 (-5.566255475855405, 'email'),
 (-5.578238842742501, 'world'),
 (-5.634015380199913, 'obama'),
 (-5.734501455772904, 'donald'),
 (-5.763095255139644, 'donald trump'),
 (-5.785090276725191, 'russia'),
 (-5.846224665218559, 'day'),
 (-5.862110622807369, 'america')]
```

In [135]:
```python
### Most fake
sorted(zip(classifier.coef_[0], feature_names))[:5000]
```

Out[135]:
```
[(-10.794984555596727, 'abe'),
 (-10.794984555596727, 'abroad'),
 (-10.794984555596727, 'abus new'),
 (-10.794984555596727, 'abus new york'),
 (-10.794984555596727, 'act new'),
 (-10.794984555596727, 'act new york'),
 (-10.794984555596727, 'advic'),
 (-10.794984555596727, 'advis new'),
 (-10.794984555596727, 'advis new york'),
 (-10.794984555596727, 'age new'),
 (-10.794984555596727, 'age new york'),
 (-10.794984555596727, 'agenda breitbart'),
 (-10.794984555596727, 'ail'),
 (-10.794984555596727, 'aleppo new'),
 (-10.794984555596727, 'aleppo new york'),
 (-10.794984555596727, 'ali'),
 (-10.794984555596727, 'america breitbart'),
 (-10.794984555596727, 'america new york'),
 (-10.794984555596727, 'american breitbart'),
 (-10.794984555596727, 'american new'),
 (-10.794984555596727, 'american new york'),
 (-10.794984555596727, 'ami'),
 (-10.794984555596727, 'ami schumer'),
```

```
(-10.794984555596727, 'amp'),
(-10.794984555596727, 'ann'),
(-10.794984555596727, 'ann coulter'),
(-10.794984555596727, 'applaud'),
(-10.794984555596727, 'arson'),
(-10.794984555596727, 'asian'),
(-10.794984555596727, 'assail'),
(-10.794984555596727, 'athlet'),
(-10.794984555596727, 'attack breitbart'),
(-10.794984555596727, 'attack new'),
(-10.794984555596727, 'attack new york'),
(-10.794984555596727, 'attack syria'),
(-10.794984555596727, 'attend'),
(-10.794984555596727, 'avert'),
(-10.794984555596727, 'away new'),
(-10.794984555596727, 'away new york'),
(-10.794984555596727, 'back new'),
(-10.794984555596727, 'back new york'),
(-10.794984555596727, 'baltimor'),
(-10.794984555596727, 'ban breitbart'),
(-10.794984555596727, 'ban new'),
(-10.794984555596727, 'ban new york'),
(-10.794984555596727, 'bangladesh'),
(-10.794984555596727, 'barron trump'),
(-10.794984555596727, 'basic'),
(-10.794984555596727, 'basketbal'),
(-10.794984555596727, 'basketbal player'),
(-10.794984555596727, 'baton'),
(-10.794984555596727, 'baton roug'),
(-10.794984555596727, 'battl new'),
(-10.794984555596727, 'battl new york'),
(-10.794984555596727, 'bay'),
(-10.794984555596727, 'beach new'),
(-10.794984555596727, 'beach new york'),
(-10.794984555596727, 'begin new'),
(-10.794984555596727, 'behead photo'),
(-10.794984555596727, 'behind trump'),
(-10.794984555596727, 'berkeley breitbart'),
(-10.794984555596727, 'betsi'),
(-10.794984555596727, 'betsi devo'),
(-10.794984555596727, 'bill breitbart'),
(-10.794984555596727, 'bill new'),
(-10.794984555596727, 'bill new york'),
(-10.794984555596727, 'bill reilli'),
(-10.794984555596727, 'billi'),
(-10.794984555596727, 'blue state'),
(-10.794984555596727, 'blue state blue'),
(-10.794984555596727, 'bolster'),
(-10.794984555596727, 'border patrol'),
(-10.794984555596727, 'border patrol agent'),
(-10.794984555596727, 'border state'),
(-10.794984555596727, 'border wall'),
(-10.794984555596727, 'border wall breitbart'),
(-10.794984555596727, 'bowl'),
(-10.794984555596727, 'box offic'),
(-10.794984555596727, 'bradi'),
(-10.794984555596727, 'breath'),
(-10.794984555596727, 'breitbart news daili'),
(-10.794984555596727, 'brief new'),
(-10.794984555596727, 'brief new york'),
(-10.794984555596727, 'broadway'),
(-10.794984555596727, 'bronx'),
(-10.794984555596727, 'brooklyn'),
(-10.794984555596727, 'brooklyn new'),
```

```
(-10.794984555596727, 'brooklyn new york'),
(-10.794984555596727, 'bureaucrat'),
(-10.794984555596727, 'caitlyn'),
(-10.794984555596727, 'caitlyn jenner'),
(-10.794984555596727, 'cal'),
(-10.794984555596727, 'california today'),
(-10.794984555596727, 'calm'),
(-10.794984555596727, 'campaign breitbart'),
(-10.794984555596727, 'campaign new'),
(-10.794984555596727, 'campaign new york'),
(-10.794984555596727, 'campu breitbart'),
(-10.794984555596727, 'cann'),
(-10.794984555596727, 'car new'),
(-10.794984555596727, 'car new york'),
(-10.794984555596727, 'care act'),
(-10.794984555596727, 'care act new'),
(-10.794984555596727, 'care bill'),
(-10.794984555596727, 'care breitbart'),
(-10.794984555596727, 'carri fisher'),
(-10.794984555596727, 'carson'),
(-10.794984555596727, 'case new'),
(-10.794984555596727, 'case new york'),
(-10.794984555596727, 'castro'),
(-10.794984555596727, 'caucu'),
(-10.794984555596727, 'ceas'),
(-10.794984555596727, 'ceas fire'),
(-10.794984555596727, 'chamber'),
(-10.794984555596727, 'championship'),
(-10.794984555596727, 'championship new'),
(-10.794984555596727, 'championship new york'),
(-10.794984555596727, 'chang new'),
(-10.794984555596727, 'chang new york'),
(-10.794984555596727, 'charg new york'),
(-10.794984555596727, 'charleston'),
(-10.794984555596727, 'charlott'),
(-10.794984555596727, 'cher'),
(-10.794984555596727, 'chief new'),
(-10.794984555596727, 'chief new york'),
(-10.794984555596727, 'china new york'),
(-10.794984555596727, 'chri christi'),
(-10.794984555596727, 'christi'),
(-10.794984555596727, 'christoph'),
(-10.794984555596727, 'chuck'),
(-10.794984555596727, 'chuck todd'),
(-10.794984555596727, 'circuit'),
(-10.794984555596727, 'citi new'),
(-10.794984555596727, 'citi new york'),
(-10.794984555596727, 'citizenship'),
(-10.794984555596727, 'clinton new york'),
(-10.794984555596727, 'clue'),
(-10.794984555596727, 'coach'),
(-10.794984555596727, 'colleg new'),
(-10.794984555596727, 'colleg new york'),
(-10.794984555596727, 'collid'),
(-10.794984555596727, 'collin'),
(-10.794984555596727, 'comedi'),
(-10.794984555596727, 'comedi central'),
(-10.794984555596727, 'comey fire'),
(-10.794984555596727, 'commission'),
(-10.794984555596727, 'common core'),
(-10.794984555596727, 'common ground'),
(-10.794984555596727, 'compet'),
(-10.794984555596727, 'complex'),
(-10.794984555596727, 'conceal'),
```

```
(-10.794984555596727,  conceal ),
(-10.794984555596727, 'confirm hear'),
(-10.794984555596727, 'congress breitbart'),
(-10.794984555596727, 'congress new york'),
(-10.794984555596727, 'control new'),
(-10.794984555596727, 'control new york'),
(-10.794984555596727, 'convent new'),
(-10.794984555596727, 'convent new york'),
(-10.794984555596727, 'corner'),
(-10.794984555596727, 'coulter'),
(-10.794984555596727, 'counsel'),
(-10.794984555596727, 'countri breitbart'),
(-10.794984555596727, 'cours'),
(-10.794984555596727, 'court block'),
(-10.794984555596727, 'court new'),
(-10.794984555596727, 'court new york'),
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