```
%matplotlib inline

import pandas as pd

import matplotlib.pyplot as plt

from textblob import TextBlob

import sklearn

import numpy as np

from sklearn.feature_extraction.text import CountVectorizer

from sklearn.naive_bayes import MultinomialNB

from sklearn.metrics import classification_report, f1_score, accuracy_score, confusion
_matrix


np.random.seed(47)
```

```
reviews = pd.read_csv('DataScienceJobsResumes.csv', encoding = 'unicode_escape')
```

```
print(reviews.head())

print(reviews.tail())
```

```
                            jobOrResumeDescription            role  \
0  : Artificial Intelligence / Machine Learning D...      Developer
1   : Data Scientist/Architect\n: 6+ months + Hig...  Data Scientist
2   : Data Analyst\n: Davidson, NC\n: 04+ Months\...    Data Analyst
3   : Big Data Architect or Data Scientist\n: New...  Data Scientist
4  : Data Engineer\n: Woonsocket, RI\n: 6+ Months...   Data Engineer

      sourceType
0  job recruiter
1  job recruiter
2  job recruiter
3  job recruiter
4  job recruiter
                            jobOrResumeDescription            role  \
196  \n\n and Experience:\n* Ten years of experienc...  Data Scientist
197   \n \n~   and  ~\n \t \n- Python \t- \tMolecula...  Data Scientist
198  M.S. Statistics graduate looking for a full-ti...  Data Scientist
199  \nI'm a data scientist with a background in ne...  Data Scientist
200  \n:\n* Machine learning in R, and other softwa...  Data Scientist

    sourceType
196     resume
197     resume
198     resume
199     resume
200     resume
```

```
print(reviews.shape)
```

```
(201, 3)
```

```
import regex

def preprocessor(text):

    text = regex.sub('<[^>]*>', '', text)

    emoticons = regex.findall('(?::|;|=)(?:-)?(?:\)|\(|D|P)', text)

    text = regex.sub('[\W]+', ' ', text.lower()) +\
        ' '.join(emoticons).replace('-', '')

    return text
```

```
reviews.tail()
```

	jobOrResumeDescription	role	sourceType
196	\n\n and Experience:\n* Ten years of experienc...	Data Scientist	resume
197	\n \n~ and ~\n \t \n- Python \t- \tMolecula...	Data Scientist	resume
198	M.S. Statistics graduate looking for a full-ti...	Data Scientist	resume
199	\nI' m a data scientist with a background in ne...	Data Scientist	resume
200	\n:\n* Machine learning in R, and other softwa...	Data Scientist	resume

```
import numpy as np


reviews = reviews.reindex(np.random.permutation(reviews.index))


print(reviews.head())
print(reviews.tail())
```

```
                              jobOrResumeDescription             role  \
5     PhD or MS with 3 years post MS experience Comp...  Data Scientist
156   * A data scientist  with 7 years of progressiv...  Data Scientist
0     : Artificial Intelligence / Machine Learning D...       Developer
99    Senior Data Scientist\nKareo Inc2 re - Irvine,...  Data Scientist
187   My life  experience has been in assistant mana...  Data Scientist


        sourceType
5     job recruiter
156          resume
0     job recruiter
99         Job post
187          resume
                              jobOrResumeDescription           role   \
```

```
72    Senior Healthcare Data Analyst\nAdvantmed98 re...    Data Analyst
8     Research Computing SME - 19-03563\n \n\n    : ...    Data Scientist
71    Sr Financial Analyst\nApria Healthcare1,853 re...    Data Analyst
134   ? Highly productive and effective Financial An...   Data Scientist
135   Business Data Analyst who maximizes productivi...   Data Scientist

        sourceType
72        Job post
8     job recruiter
71        Job post
134         resume
135         resume
```

In [8]:

```
reviews.groupby('sourceType').describe()
```

Out[8]:

	jobOrResumeDescription				role			
	count	unique	top	freq	count	unique	top	freq
sourceType								
Job post	59	58	Senior Data Analyst\nKelly Services14,506 re -...	2	59	3	Data Analyst	41
job recruiter	42	42	: Data Engineer\n: Woonsocket, RI\n: 6+ Months...	1	42	5	Data Scientist	17
resume	100	100	\n\nExpert in logical and problem-solving wit...	1	100	1	Data Scientist	100

In [9]:

```
reviews.groupby('role').describe()
```

Out[9]:

	jobOrResumeDescription				sourceType			
	count	unique	top	freq	count	unique	top	freq
role								
Data Analyst	49	48	Senior Data Analyst\nKelly Services14,506 re -...	2	49	2	Job post	41
Data Engineer	13	13	: Data Engineer\n: Woonsocket, RI\n: 6+ Months...	1	13	2	job recruiter	8
Data Scientist	130	130	\n\nExpert in logical and problem-solving wit...	1	130	3	resume	100
Developer	8	8	Hive Big Data Developer\n\nPhoenix, AZ\n\n12+ ...	1	8	1	job recruiter	8
Software Engineer	1	1	Ref. : 19-62193\n ...	1	1	1	job recruiter	1

In [10]:

```
reviews['length'] = reviews['jobOrResumeDescription'].map(lambda text: len(text))

print(reviews.head())
```

```
                           jobOrResumeDescription            role  \
5     PhD or MS with 3 years post MS experience Comp...  Data Scientist
156   * A data scientist  with 7 years of progressiv...  Data Scientist
0     : Artificial Intelligence / Machine Learning D...       Developer
```

```
99   Senior Data Scientist\nKareo Inc2 re - Irvine,...   Data Scientist
187  My life  experience has been in assistant mana...   Data Scientist


      sourceType   length
5    job recruiter      801
156         resume    22827
0    job recruiter      909
99        Job post     4129
187         resume     4127
```
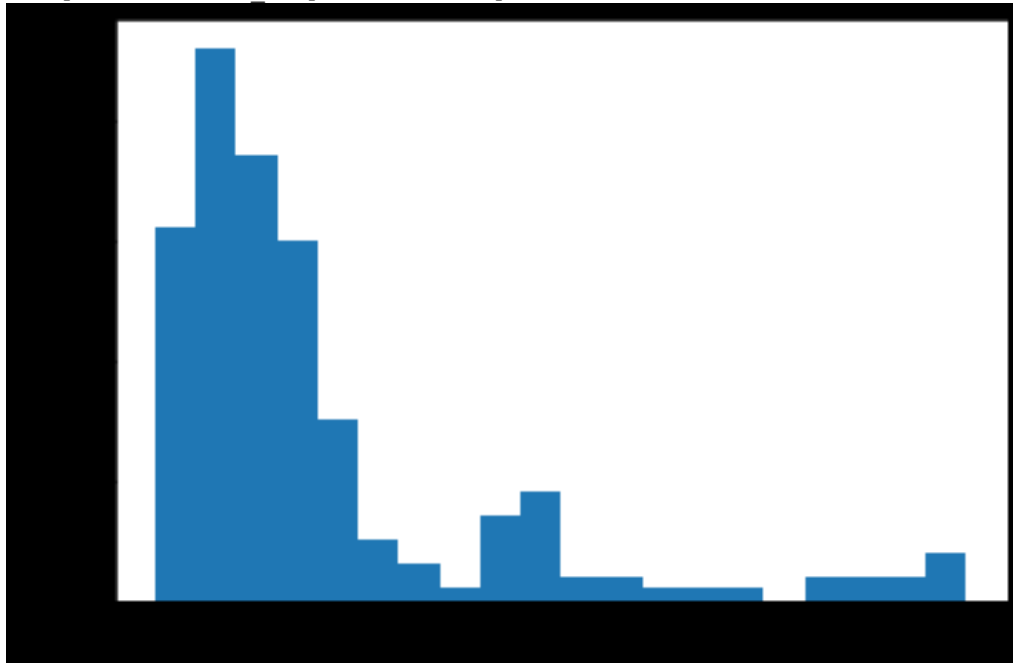
```python
reviews.length.plot(bins=20, kind='hist')
```

```
<matplotlib.axes._subplots.AxesSubplot at 0x16b77c8c048>
```

```python
reviews.length.describe()
```

```
count      201.000000
mean      5694.482587
std       5759.567865
min        303.000000
25%       2202.000000
50%       3873.000000
75%       6120.000000
max      26846.000000
Name: length, dtype: float64
```

```python
print(list(reviews.jobOrResumeDescription[reviews.length > 40].index))
```

```python
print(list(reviews.role[reviews.length > 40]))
```

```
[5, 156, 0, 99, 187, 74, 128, 36, 160, 141, 132, 20, 63, 108, 16, 133, 25, 158, 96, 9,
1, 148, 62, 172, 15, 32, 112, 164, 45, 10, 154, 162, 168, 3, 13, 31, 183, 92, 82, 121,
192, 182, 26, 178, 193, 130, 190, 131, 83, 78, 40, 115, 69, 102, 37, 139, 149, 165, 47
, 85, 189, 35, 106, 42, 81, 46, 18, 107, 6, 155, 39, 64, 76, 77, 61, 188, 151, 70, 24,
111, 38, 91, 195, 67, 94, 54, 44, 11, 127, 119, 33, 170, 150, 200, 143, 145, 136, 117,
57, 29, 19, 116, 22, 126, 104, 58, 177, 171, 122, 197, 60, 88, 129, 191, 174, 110, 98,
105, 43, 49, 14, 194, 118, 103, 97, 167, 93, 30, 95, 181, 41, 152, 142, 17, 109, 120,
157, 138, 28, 100, 56, 12, 140, 185, 186, 146, 199, 124, 89, 176, 153, 175, 166, 144,
2, 75, 52, 84, 51, 90, 159, 86, 68, 125, 147, 21, 27, 161, 79, 137, 101, 163, 4, 66, 3
4, 73, 48, 53, 184, 169, 196, 180, 123, 87, 65, 114, 50, 55, 113, 173, 198, 7, 59, 23,
80, 179, 72, 8, 71, 134, 135]
['Data Scientist', 'Data Scientist', 'Developer', 'Data Scientist', 'Data Scientist',
'Data Analyst', 'Data Scientist', 'Data Scientist', 'Data Scientist', 'Data Scientist'
, 'Data Scientist', 'Data Scientist', 'Data Analyst', 'Data Scientist', 'Data Engineer
', 'Data Scientist', 'Data Engineer', 'Data Scientist', 'Data Scientist', 'Software En
gineer', 'Data Scientist', 'Data Scientist', 'Data Analyst', 'Data Scientist', 'Data A
nalyst', 'Data Analyst', 'Data Scientist', 'Data Scientist', 'Data Analyst', 'Develope
r', 'Data Scientist', 'Data Scientist', 'Data Scientist', 'Data Scientist', 'Data Engi
neer', 'Developer', 'Data Scientist', 'Data Engineer', 'Data Analyst', 'Data Scientist
', 'Data Scientist', 'Data Scientist', 'Developer', 'Data Scientist', 'Data Scientist'
, 'Data Scientist', 'Data Scientist', 'Data Scientist', 'Data Analyst', 'Data Analyst'
, 'Data Engineer', 'Data Scientist', 'Data Analyst', 'Data Scientist', 'Data Engineer'
, 'Data Scientist', 'Data Scientist', 'Data Scientist', 'Data Analyst', 'Data Scientis
t', 'Data Scientist', 'Data Scientist', 'Data Scientist', 'Developer', 'Data Analyst',
'Data Analyst', 'Developer', 'Data Scientist', 'Data Scientist', 'Data Scientist', 'Da
ta Scientist', 'Data Analyst', 'Data Analyst', 'Data Analyst', 'Data Analyst', 'Data S
cientist', 'Data Scientist', 'Data Analyst', 'Data Scientist', 'Data Scientist', 'Data
Analyst', 'Data Scientist', 'Data Scientist', 'Data Analyst', 'Data Engineer', 'Data A
nalyst', 'Data Analyst', 'Data Analyst', 'Data Scientist', 'Data Scientist', 'Data Sci
entist', 'Data Scientist', 'Data Scientist', 'Data Scientist', 'Data Scientist', 'Data
Scientist', 'Data Scientist', 'Data Scientist', 'Data Analyst', 'Data Analyst', 'Data
Scientist', 'Data Scientist', 'Developer', 'Data Scientist', 'Data Scientist', 'Data A
nalyst', 'Data Scientist', 'Data Scientist', 'Data Scientist', 'Data Scientist', 'Data
Analyst', 'Data Scientist', 'Data Scientist', 'Data Scientist', 'Data Scientist', 'Dat
a Scientist', 'Data Engineer', 'Data Scientist', 'Data Analyst', 'Data Scientist', 'Da
ta Scientist', 'Data Scientist', 'Data Scientist', 'Data Scientist', 'Data Scientist',
'Data Scientist', 'Data Scientist', 'Data Scientist', 'Data Engineer', 'Data Scientist
', 'Data Scientist', 'Data Scientist', 'Data Scientist', 'Data Analyst', 'Data Scienti
st', 'Data Scientist', 'Data Scientist', 'Data Scientist', 'Data Engineer', 'Data Scie
ntist', 'Data Analyst', 'Data Engineer', 'Data Scientist', 'Data Scientist', 'Data Sci
entist', 'Data Scientist', 'Data Scientist', 'Data Scientist', 'Data Scientist', 'Data
Scientist', 'Data Scientist', 'Data Scientist', 'Data Scientist', 'Data Scientist', 'D
ata Analyst', 'Data Analyst', 'Data Analyst', 'Data Analyst', 'Data Analyst', 'Data En
gineer', 'Data Scientist', 'Data Scientist', 'Data Analyst', 'Data Scientist', 'Data S
cientist', 'Developer', 'Data Scientist', 'Data Scientist', 'Data Analyst', 'Data Scie
ntist', 'Data Scientist', 'Data Scientist', 'Data Engineer', 'Data Analyst', 'Data Sci
entist', 'Data Analyst', 'Data Analyst', 'Data Analyst', 'Data Scientist', 'Data Scien
tist', 'Data Scientist', 'Data Scientist', 'Data Scientist', 'Data Scientist', 'Data A
nalyst', 'Data Scientist', 'Data Analyst', 'Data Analyst', 'Data Scientist', 'Data Sci
entist', 'Data Scientist', 'Data Scientist', 'Data Analyst', 'Data Analyst', 'Data Ana
lyst', 'Data Scientist', 'Data Analyst', 'Data Scientist', 'Data Analyst', 'Data Scien
tist', 'Data Scientist']
```
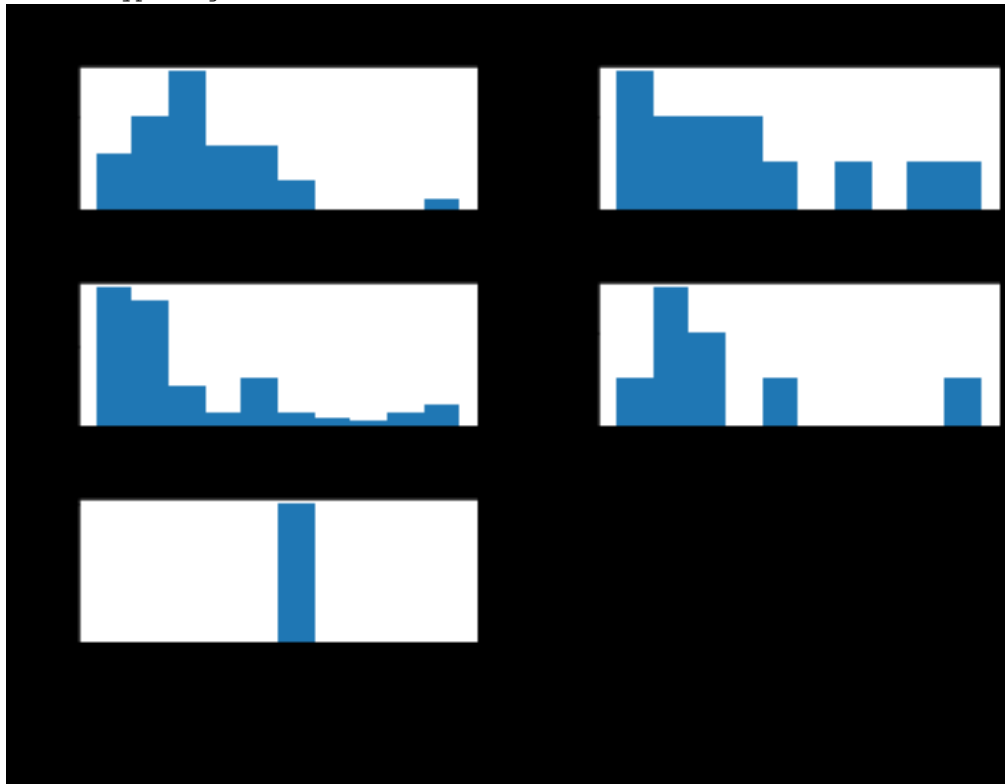
In [14]:

```python
%%time

reviews.hist(column='length', by='role', bins=10)
```

```
Wall time: 375 ms
```

```
array([[<matplotlib.axes._subplots.AxesSubplot object at 0x0000016B77D4E358>,
        <matplotlib.axes._subplots.AxesSubplot object at 0x0000016B77DAD160>],
       [<matplotlib.axes._subplots.AxesSubplot object at 0x0000016B77DD9710>,
        <matplotlib.axes._subplots.AxesSubplot object at 0x0000016B77E0BCC0>],
       [<matplotlib.axes._subplots.AxesSubplot object at 0x0000016B77E4A2B0>,
        <matplotlib.axes._subplots.AxesSubplot object at 0x0000016B77E7A860>]],
      dtype=object)
```

```python
def split_into_tokens(review):


    #review = unicode(review, 'iso-8859-1')# in python 3 the default of str() previous
ly python2 as unicode() is utf-8
    return TextBlob(review).words
```

```python
reviews.jobOrResumeDescription.head().apply(split_into_tokens)
```

```
5      [PhD, or, MS, with, 3, years, post, MS, experi...
156    [A, data, scientist, with, 7, years, of, progr...
0      [Artificial, Intelligence, Machine, Learning, ...
99     [Senior, Data, Scientist, Kareo, Inc2, re, Irv...
187    [My, life, experience, has, been, in, assistan...
Name: jobOrResumeDescription, dtype: object
```

```python
TextBlob("hello world, how is it going?").tags  # list of (word, POS) pairs
```

```
[('hello', 'JJ'),
 ('world', 'NN'),
 ('how', 'WRB'),
 ('is', 'VBZ'),
 ('it', 'PRP'),
 ('going', 'VBG')]
```

```python
import nltk

nltk.download('stopwords')
```

```
[nltk_data] Downloading package stopwords to
[nltk_data]     C:\Users\m\AppData\Roaming\nltk_data...
[nltk_data]   Package stopwords is already up-to-date!
```

```
True
```

```python
from nltk.corpus import stopwords


stop = stopwords.words('english')

stop = stop + [u'a',u'b',u'c',u'd',u'e',u'f',u'g',u'h',u'i',u'j',u'k',u'l',u'm',u'n',u'o',u'p',u'q',u'r',u's',u't',u'v',u'w',u'x',u'y',u'z']
```

```python
def split_into_lemmas(review):
    #review = unicode(review, 'iso-8859-1')
    review = review.lower()
    #review = unicode(review, 'utf8').lower()
    #review = str(review).lower()
    words = TextBlob(review).words
    # for each word, take its "base form" = lemma
    return [word.lemma for word in words if word not in stop]


reviews.jobOrResumeDescription.head().apply(split_into_lemmas)
```

```
5      [phd, m, 3, year, post, m, experience, compute...
156    [data, scientist, 7, year, progressive, experi...
0      [artificial, intelligence, machine, learning, ...
99     [senior, data, scientist, kareo, inc2, irvine,...
187    [life, experience, assistant, manager, managem...
```

```
Name: jobOrResumeDescription, dtype: object
```

```python
%%time

bow_transformer = CountVectorizer(analyzer=split_into_lemmas).fit(reviews['jobOrResume
Description'])

print(len(bow_transformer.vocabulary_))
```

```
10625
Wall time: 6.29 s
```

```python
review4 = reviews['jobOrResumeDescription'][42]

print(review4)
```

```
At TGS, data is a core part of our business and our data focused software developers a
re among our most valued resources. This  is mission critical, so we?re  for an uncomm
only reliable professional who enjoys coding, ing with and analyzing data, and providi
ng support for production systems. In addition to programming and data analysis, this
is likely to involve interaction with external resources such as data providers, broke
rs, dealers, and software vendors.

Successful candis will have experience in a number of the following general areas:

    Programming: strong experience with Python, Java, SQL, and/or similar languages
    Large data sets: experience developing programs to parse, process, clean, organize
, and analyze large data sets
    Applications: experience designing, developing, and maintaining software applicati
ons
    Vendor interaction: ing with external resources to solve problems, acquire data, a
nd improve relationships.
    System : experience with scripting languages (Perl, Python, shell scripts, etc.),
and Unix-based operating systems (especially Linux)

Indeed Hire and TGS Management Company, LLC are ing together to find the best candi fo
r this .

By ing, you agree to be contacted by our agent, Indeed Hire, and receive ups via text
and phone about your application.

 Type: Full-time

Experience:

    Python, Java, SQL, and/or similar languages: 1 year ()
    designing, developing, and maintaining software applications: 1 year ()
    Large data sets: 2 years ()

 distance:

    Irvine, CA: Between 31 and 40 miles ()
```

```python
bow4 = bow_transformer.transform([review4])

print(bow4)
```

```
  (0, 38)        2
  (0, 152)       1
  (0, 311)       1
  (0, 345)       1
  (0, 651)       1
  (0, 698)       1
  (0, 791)       1
  (0, 809)       1
  (0, 934)       1
  (0, 945)       1
  (0, 970)       1
  (0, 977)       1
  (0, 982)       2
  (0, 1136)      4
  (0, 1195)      1
  (0, 1548)      1
  (0, 1742)      1
  (0, 1785)      1
  (0, 1827)      1
  (0, 1873)      1
  (0, 1875)      1
  (0, 2137)      1
  (0, 2224)      1
  (0, 2302)      1
  (0, 2478)      1
  :        :
  (0, 8047)      1
  (0, 8149)      3
  (0, 8515)      1
  (0, 8518)      1
  (0, 8668)      3
  (0, 8718)      1
  (0, 8767)      2
  (0, 8878)      4
  (0, 8900)      1
  (0, 9017)      2
  (0, 9207)      1
  (0, 9265)      1
  (0, 9323)      1
  (0, 9389)      3
  (0, 9563)      1
  (0, 9576)      2
  (0, 9734)      1
  (0, 9940)      1
  (0, 9983)      1
  (0, 10035)     1
  (0, 10084)     1
  (0, 10180)     1
  (0, 10219)     2
  (0, 10251)     1
  (0, 10561)     3
```

```python
%%time

reviews_bow = bow_transformer.transform(reviews['jobOrResumeDescription'])

print('sparse matrix shape:', reviews_bow.shape)

print('number of non-zeros:', reviews_bow.nnz)

print('sparsity: %.2f%%' % (100.0 * reviews_bow.nnz / (reviews_bow.shape[0] * reviews_
bow.shape[1])))
```

```
sparse matrix shape: (201, 10625)
number of non-zeros: 61674
sparsity: 2.89%
Wall time: 6.02 s
```

```
# Split/splice into training ~ 80% and testing ~ 20%

reviews_bow_train = reviews_bow[:155]

reviews_bow_test = reviews_bow[155:]

reviews_sentiment_train = reviews['role'][:155]

reviews_sentiment_test = reviews['role'][155:]


print(reviews_bow_train.shape)

print(reviews_bow_test.shape)
```

```
(155, 10625)
(46, 10625)
```

```
%time review_sentiment = MultinomialNB().fit(reviews_bow_train, reviews_sentiment_trai
n)
```

```
Wall time: 734 ms
```

```
print('predicted:', review_sentiment.predict(bow4)[0])

print('expected:', reviews.role[42])
```

```
predicted: Data Analyst
expected: Developer
```

```
predictions = review_sentiment.predict(reviews_bow_test)

print(predictions)
```

```
['Data Analyst' 'Data Analyst' 'Data Analyst' 'Data Analyst'
 'Data Analyst' 'Data Scientist' 'Data Scientist' 'Data Analyst'
 'Data Scientist' 'Data Scientist' 'Data Scientist' 'Data Scientist'
 'Data Scientist' 'Data Analyst' 'Data Scientist' 'Data Scientist'
 'Data Scientist' 'Data Scientist' 'Data Analyst' 'Data Scientist'
 'Data Analyst' 'Data Analyst' 'Data Analyst' 'Data Scientist'
 'Data Scientist' 'Data Scientist' 'Data Scientist' 'Data Scientist'
 'Data Scientist' 'Data Analyst' 'Data Scientist' 'Data Analyst'
 'Data Analyst' 'Data Scientist' 'Data Scientist' 'Data Scientist'
 'Data Scientist' 'Data Analyst' 'Data Analyst' 'Data Analyst'
 'Data Scientist' 'Data Analyst' 'Data Scientist' 'Data Analyst'
 'Data Scientist' 'Data Scientist']
```

```
print('accuracy', accuracy_score(reviews_sentiment_test, predictions))
```

```
print('confusion matrix\n', confusion_matrix(reviews_sentiment_test, predictions))

print('(row=expected, col=predicted)')
```

```
accuracy 0.9347826086956522
confusion matrix
 [[18  0  0  0]
 [ 1  0  1  0]
 [ 0  0 25  0]
 [ 0  0  1  0]]
(row=expected, col=predicted)
```

In [30]:

```
print(classification_report(reviews_sentiment_test, predictions))

#The F1 score can be interpreted as a weighted average of the precision and recall,

#where an F1 score reaches its best value at 1 and worst score at 0.
```

```
              precision    recall  f1-score   support

  Data Analyst      0.95      1.00      0.97        18
 Data Engineer      0.00      0.00      0.00         2
Data Scientist      0.93      1.00      0.96        25
     Developer      0.00      0.00      0.00         1

      accuracy                          0.93        46
     macro avg      0.47      0.50      0.48        46
  weighted avg      0.87      0.93      0.90        46

c:\users\m\anaconda2\envs\python36\lib\site-packages\sklearn\metrics\classification.py
:1437: UndefinedMetricWarning: Precision and F-score are ill-defined and being set to
0.0 in labels with no predicted samples.
  'precision', 'predicted', average, warn_for)
```

In [31]:

```
def predict_review(new_review):

    new_sample = bow_transformer.transform([new_review])

    print(new_review, '\nThe respective order new or pro probabilities:\n',np.around(r
eview_sentiment.predict_proba(new_sample), decimals=2),'\n')
```

In [32]:

```
reviews.role.unique()

#These will be alphabatized in the probabilities returned for the 5 categories.

#1-data analyst, 2-data engineer, 3-data scientist, 4-developer, 5-software engineer
```

Out[32]:

```
array(['Data Scientist', 'Developer', 'Data Analyst', 'Data Engineer',
       'Software Engineer'], dtype=object)
```

In [33]:

```
predict_review('R. programming. years. RDD. Python. Spark.')
```

```python
predict_review('AWS. Azure. php. excel')


predict_review('access. microsoft. MS. office. sharepoint')

predict_review('analyst. tutoring. teaching. Assistant.')
```

```
R. programming. years. RDD. Python. Spark.
The respective order new or pro probabilities:
 [[0. 0. 1. 0. 0.]]

AWS. Azure. php. excel
The respective order new or pro probabilities:
 [[0. 0. 1. 0. 0.]]

access. microsoft. MS. office. sharepoint
The respective order new or pro probabilities:
 [[0.01 0.   0.99 0.   0.  ]]

analyst. tutoring. teaching. Assistant.
The respective order new or pro probabilities:
 [[0.02 0.01 0.96 0.   0.  ]]
```

Most of the above are Data Scientists, but there are some percentage probabilties of being a job posting or resume for data analyst and data engineer.

In [35]:

```python
predict_review('Are you a Data Scientist with NLP, AI, ML and text extraction expertis
e, ')
```

```
Are you a Data Scientist with NLP, AI, ML and text extraction expertise,
The respective order new or pro probabilities:
 [[0. 0. 1. 0. 0.]]
```

In [36]:

```python
predict_review("Master's degree from an accredited college/university in Computer Scie
nce, Engineering, or related fields. PhD from an accredited college/university is pref
erred")
```

```
Master's degree from an accredited college/university in Computer Science, Engineering
, or related fields. PhD from an accredited college/university is preferred
The respective order new or pro probabilities:
 [[0.93 0.01 0.07 0.   0.  ]]
```

In [40]:

```python
predict_review('We need someone with Deep Computer Vision knowledge thats worked with
Cameras and Calibrating Colors, but also has some Object Detection Machine Learning ex
perience')
```

```
We need someone with Deep Computer Vision knowledge thats worked with Cameras and Cali
brating Colors, but also has some Object Detection Machine Learning experience
The respective order new or pro probabilities:
 [[0. 0. 1. 0. 0.]]
```

```
predict_review(''' 5+ years of experience and knowledge of Web Application Development
:


    Java, J2EE software development, Spring Framework (Java i18n is a huge plus)


- Web services - SOAP, SOA, XSL, XML


    Strong knowledge of Machine Learning, Algorithm Development, and/or Natural Langua
ge Processing

    Tomcat, JBoss, MongoDB, SQL

    Knowledge or experience with Agile or Scrum


If you think you'd be a great fit, please get in touch with me and apply today!''')
```

```
 5+ years of experience and knowledge of Web Application Development:

    Java, J2EE software development, Spring Framework (Java i18n is a huge plus)

- Web services - SOAP, SOA, XSL, XML

    Strong knowledge of Machine Learning, Algorithm Development, and/or Natural Langua
ge Processing
    Tomcat, JBoss, MongoDB, SQL
    Knowledge or experience with Agile or Scrum

If you think you'd be a great fit, please get in touch with me and apply today!
The respective order new or pro probabilities:
 [[0. 0. 1. 0. 0.]]
```