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Course:	CS 5402
Semester Project	Author Identification of Frankenstein Book
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In [1]:
```
#Importing necessary libraries
import pandas as pd
import numpy as np
import random
import seaborn as sns
import itertools
import string

# Imported to allow for the display of word clouds
import matplotlib.pyplot as plt

# Imported to create train/test partitioning of the data.
from sklearn.model_selection import train_test_split

# Imported to get frequency counts
import collections

# Imported to use confusion matrix
from sklearn.metrics import confusion_matrix
from sklearn.metrics import accuracy_score
from sklearn.metrics import classification_report

from nltk import tokenize

from nltk.corpus import stopwords
from nltk.stem import WordNetLemmatizer
from sklearn.preprocessing import LabelEncoder
```

Concept Description:

To create three datamining models to determine the authorship of Frankenstein.

Data Collection:

I have collected data from "gutenberg.org" source.

In [2]:
```
#Convert text file to a list of sentences
def split(filepath, min_char):

    # Load data into string variable and remove new line characters
    f = open(filepath, "r", encoding="utf8")
    text = f.read().replace('\n', ' ')
    text = text.replace('.”', '”.').replace('."', '".').replace('?”', '”?').r
    text = text.replace('--', ' ').replace('. . .', '').replace('_', '')
    f.close()

    # Split text, tokenize into a list of sentences
    sentences = tokenize.sent_tokenize(text)
    #remove sentences that are less than min_char long
    sentences = [sent for sent in sentences if len(sent) >= min_char]

    return list(sentences)
```

Created lists for authors:

In [3]:
```
min_char = 7

pollidori = split('JohnPollidori.txt', min_char = min_char)\
          + split('JohnPollidori2.txt', min_char = min_char)
byron = split('Byron_vol1.txt', min_char = min_char)\
          + split('Byron_vol2.txt', min_char = min_char)
percy = split('Percy_shelley.txt', min_char = min_char)
mary = split('maryshelley_lastman.txt', min_char = min_char)\
          + split('frankenstein_maryshelly.txt', min_char = min_char)
```

Printing the length of each lists:

In [4]:
```
text_dict = {'Byron': byron, 'Pollidori': pollidori, 'Percy': percy, 'Mary':

for key in text_dict.keys():
    print(key, ':', len(text_dict[key]))
```

```
Byron : 15156
Pollidori : 3350
Percy : 16427
Mary : 10463
```

In [5]:
```
# Set random seed
np.random.seed(1)
max_len = 1000

names = [byron, pollidori, percy, mary]
list1 = []

for name in names:
    name = np.random.choice(name, max_len, replace = False)
    list1 += list(name)

print('The len is:', len(list1))
```

```
The len is: 4000
```

In [6]:
```
authors =  ['Pollidori']*max_len + ['Byron']*max_len + ['Percy']*max_len + ['
print('Authors are:', len(authors))
```

```
Authors are: 4000
```

In [7]:
```
author_names = ['pollidori','byron','percy','mary']
```

In [8]:
```
random.seed(3)

# Randomly shuffle data
zipped = list(zip(list1, authors))
random.shuffle(zipped)
list1, authors = zip(*zipped)
```

OUTPUT DATA:

In [9]:
```
output_auth = pd.DataFrame()
#output_auth['id']
output_auth['text'] = list1
output_auth['author'] = authors

print(output_auth.head())
```

```
                                                text author
0  "You cherish dreary thoughts, my dear Perdita,...   Mary
1  START: FULL LICENSE  THE FULL PROJECT GUTENBER...  Byron
2  Let not England be so far disgraced, as to hav...   Mary
3  79 rightly Wise manuscript; nightly Hunt manus...  Percy
4            See Mrs. S[oane], and write how she is.  Byron
```

Exporting the data to CSV file:

In [10]:
```
output_auth.to_csv('authors_train_data.csv', index=False)
```

Example Description:

Text

This is a nominal attribute that contains texts written by author.

Author

This is a nominal attribute that contains names of the author.

Data Import and Wrangling:

The results of each search is read from the respective excel into separate dataframes. Careful attention is paid to make sure the data is read in as character strings.

In [11]:
```
df_author = pd.read_csv('authors_train_data.csv')
df_author.head()
```

Out[11]:

	text	author
0	"You cherish dreary thoughts, my dear Perdita,...	Mary
1	START: FULL LICENSE THE FULL PROJECT GUTENBER...	Byron
2	Let not England be so far disgraced, as to hav...	Mary
3	79 rightly Wise manuscript; nightly Hunt manus...	Percy
4	See Mrs. S[oane], and write how she is.	Byron

In [12]:
```
df_author.columns
```

Out[12]:
```
Index(['text', 'author'], dtype='object')
```

In [13]:
```
lemmatiser = WordNetLemmatizer()

#Text Processing
def text_process(tex):
    # 1. Removal of Punctuation Marks
    nopunct=[char for char in tex if char not in string.punctuation]
    nopunct=''.join(nopunct)
    # 2. Lemmatisation
    a=''
    i=0
    for i in range(len(nopunct.split())):
        b=lemmatiser.lemmatize(nopunct.split()[i], pos="v")
        a=a+b+' '
    # 3. Removal of Stopwords
    return [word for word in a.split() if word.lower() not
            in stopwords.words('english')]
```

In [14]:
```
y = df_author['author']
labelencoder = LabelEncoder()
y = labelencoder.fit_transform(y)
```

Exploratory Data Analysis:

Looking into what type of measure the attributes are.

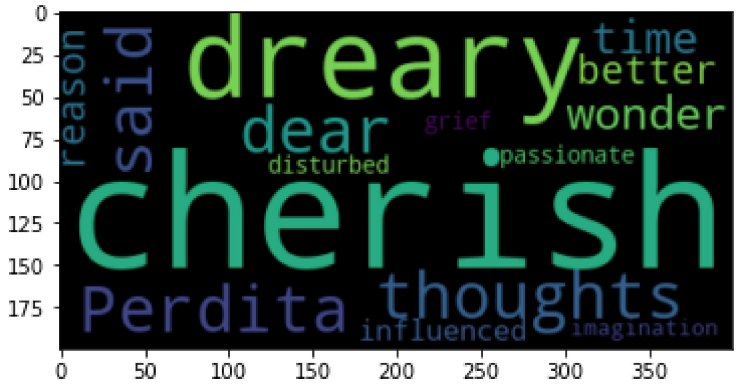
In [15]:
```
df_author.describe()
```

Out[15]:

	text	author
count	4000	4000
unique	3950	4
top	erased.]	Mary
freq	13	1000

In [16]:
```
# Importing necessary libraries
from PIL import Image
from wordcloud import WordCloud
import matplotlib.pyplot as plt
X = df_author['text']

wordcloud1 = WordCloud().generate(X[0])
wordcloud2 = WordCloud().generate(X[1])
wordcloud3 = WordCloud().generate(X[3])
wordcloud4 = WordCloud().generate(X[6])


print(X[0])
print(df_author['author'][0])
plt.imshow(wordcloud1, interpolation='bilinear')
plt.show()

print(X[1])
print(df_author['author'][1])
plt.imshow(wordcloud2, interpolation='bilinear')
plt.show()

print(X[3])
print(df_author['author'][3])
plt.imshow(wordcloud3, interpolation='bilinear')
plt.show()

print(X[6])
print(df_author['author'][6])
plt.imshow(wordcloud4, interpolation='bilinear')
plt.show()
```

```
"You cherish dreary thoughts, my dear Perdita," I said, "nor do I wonder th
at for a time your better reason should be influenced by passionate grief a
nd a disturbed imagination.
Mary
```




```
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tm mission of promoting the free distribution of electronic works, by usi
ng or distributing this work (or any other work associated in any way wit
h the phrase "Project Gutenberg"), you agree to comply with all the terms
of the Full Project Gutenberg-tm License available with this file or onli
```
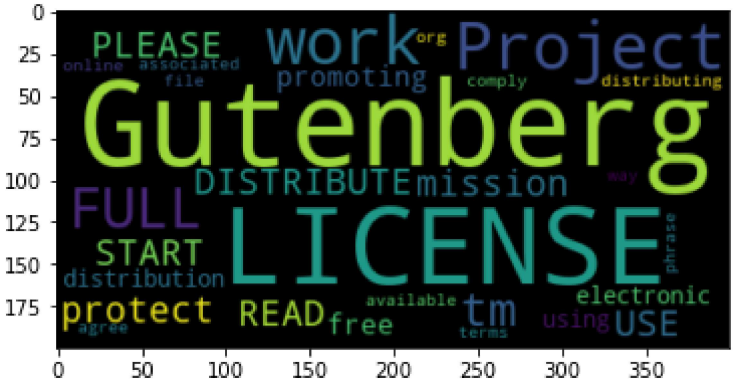
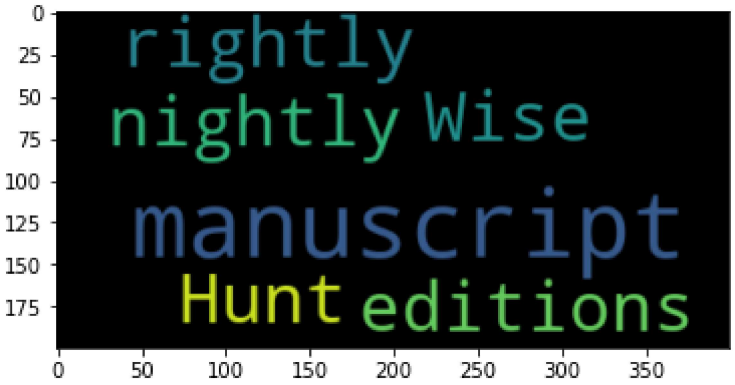
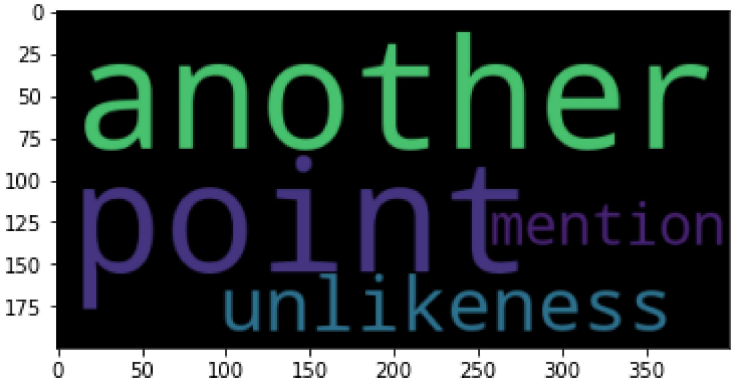

```
ne at www.gutenberg.org/license.
Byron
```




```
79 rightly Wise manuscript; nightly Hunt manuscript, editions 1832, 1839.
Percy
```




```
There was another point of unlikeness, which he does not mention.
Pollidori
```



Word Tokenization

Here, I have taken a text from Percy's book and tried to tokenize.

In [17]:
```
from nltk.tokenize import sent_tokenize
text='79 rightly Wise manuscript; nightly Hunt manuscript, editions 1832, 183
tokenized_text=sent_tokenize(text)
print(tokenized_text)
```

```
['79 rightly Wise manuscript; nightly Hunt manuscript, editions 1832, 183
9.']
```

Frequency Distribution

In [18]:
```
from nltk.tokenize import word_tokenize
tokenized_word=word_tokenize(text)
print(tokenized_word)
```

```
['79', 'rightly', 'Wise', 'manuscript', ';', 'nightly', 'Hunt', 'manuscrip
t', ',', 'editions', '1832', ',', '1839', '.']
```

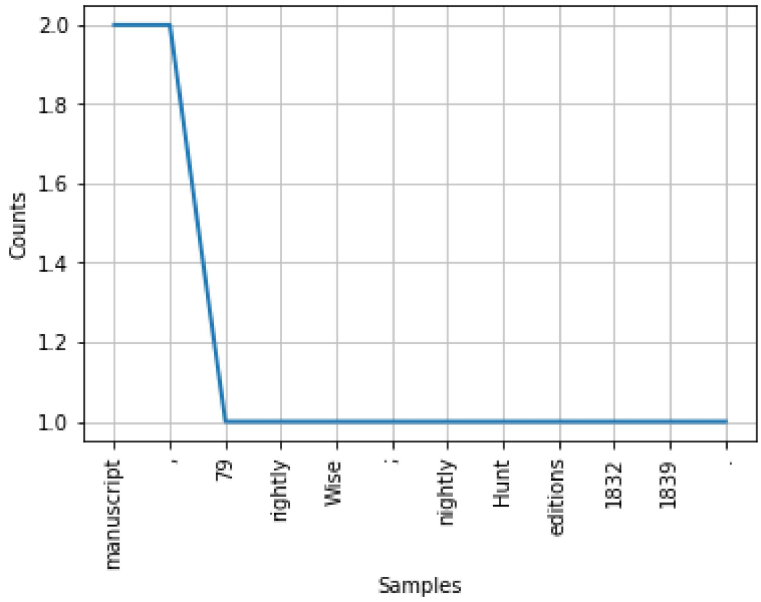
In [19]:
```
from nltk.probability import FreqDist
fdist = FreqDist(tokenized_word)
print(fdist)
```

```
<FreqDist with 12 samples and 14 outcomes>
```

In [20]:
```
fdist.most_common(2)
```

Out[20]:
```
[('manuscript', 2), (',', 2)]
```

In [21]:
```
fdist.plot(30,cumulative=False)
plt.show()
```



Note:

- word_count: number of words in the average sentence
- sentence_length: number of word characters in each sentence

- text_length: pure number of characters, including spaces and punctuation
- punctuation_per_char: how often an author uses punctuation marks per character written
- unique_ration: ratio of unique words to total words
- avg_word_length: how many characters is in the average word written

In [22]:
```
import string
import nltk
no_punct_translator=str.maketrans('','',string.punctuation)

df_author['words'] = df_author['text'].apply(lambda t: nltk.word_tokenize(t.t
```

In [23]:
```
df_author['word_count'] = df_author['words'].apply(lambda words: len(words))

# for normalization, how many characters per sentence w/o punctuation
df_author['sentence_length'] = df_author['words'].apply(lambda w: sum(map(ler

# for future calculations, let's keep around the full text length, including
df_author['text_length'] = df_author['text'].apply(lambda t: len(t))

df_author['punctuation_count'] = df_author['text'].apply(lambda t: len(list(f

df_author['punctuation_per_char'] = df_author['punctuation_count'] / df_autho
```

In [24]:
```
def unique_words(words):
    word_count = len(words)
    unique_count = len(set(words)) # creating a set from the list 'words' rem
    return unique_count / word_count

df_author['unique_ratio'] = df_author['words'].apply(unique_words)
df_author.groupby(['author'])['unique_ratio'].describe()
```

Out[24]:

author	count	mean	std	min	25%	50%	75%	max
Byron	1000.0	0.919422	0.088319	0.333333	0.866667	0.937500	1.0	1.0
Mary	1000.0	0.899321	0.084494	0.625000	0.840000	0.907670	1.0	1.0
Percy	1000.0	0.923223	0.089986	0.333333	0.857143	0.952935	1.0	1.0
Pollidori	1000.0	0.942685	0.080219	0.500000	0.894267	1.000000	1.0	1.0

In [25]:
```
avg_length = lambda words: sum(map(len, words)) / len(words)

df_author['avg_word_length'] = df_author['words'].apply(avg_length)
df_author.groupby(['author'])['avg_word_length'].describe()
```

Out[25]:

author	count	mean	std	min	25%	50%	75%	max
Byron	1000.0	4.640578	0.822026	2.200000	4.166667	4.565942	5.000000	11.000000
Mary	1000.0	4.458873	0.619607	2.428571	4.090404	4.445906	4.785714	8.333333
Percy	1000.0	4.436970	0.930967	1.250000	4.000000	4.371966	4.833333	10.000000
Pollidori	1000.0	4.436485	1.056769	1.000000	4.000000	4.438750	4.857143	11.000000

In [26]:
```
from nltk.sentiment.vader import SentimentIntensityAnalyzer
sid = SentimentIntensityAnalyzer()

# Let's test how this works
print(sid.polarity_scores('Vader text analysis is my favorite thing ever'))
print(sid.polarity_scores('I hate vader and everything it stands for'))
```

```
{'neg': 0.0, 'neu': 0.7, 'pos': 0.3, 'compound': 0.4588}
{'neg': 0.381, 'neu': 0.619, 'pos': 0.0, 'compound': -0.5719}
```

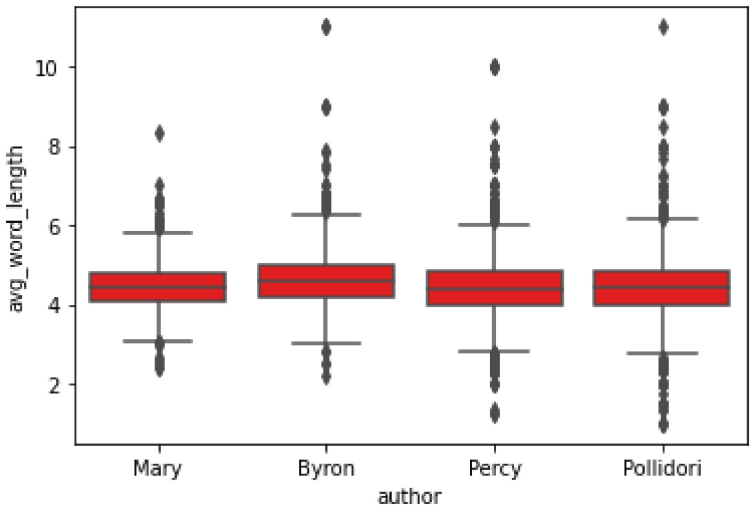
In [27]:
```
df_author['sentiment'] = df_author['text'].apply(lambda t: sid.polarity_score
df_author.groupby('author')['sentiment'].describe()
```

Out[27]:

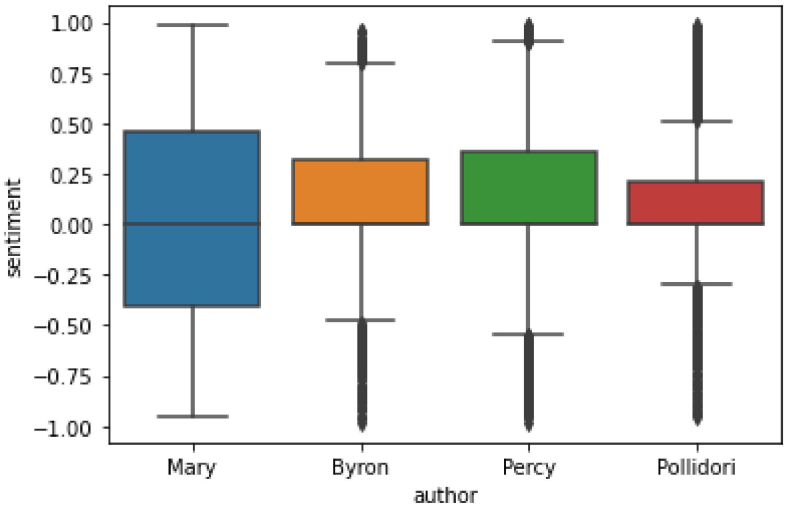
author	count	mean	std	min	25%	50%	75%	max
Byron	1000.0	0.057492	0.389249	-0.9808	0.000000	0.0	0.318575	0.9548
Mary	1000.0	0.037330	0.508767	-0.9531	-0.401900	0.0	0.458800	0.9836
Percy	1000.0	0.054742	0.447564	-0.9823	-0.003225	0.0	0.361200	0.9816
Pollidori	1000.0	0.057751	0.378863	-0.9571	0.000000	0.0	0.206775	0.9829

In [78]:
```
#boxplot for word length
sns.boxplot(x = "author", y = "avg_word_length", data=df_author, color = "red
```

Out[78]: <AxesSubplot:xlabel='author', ylabel='avg_word_length'>

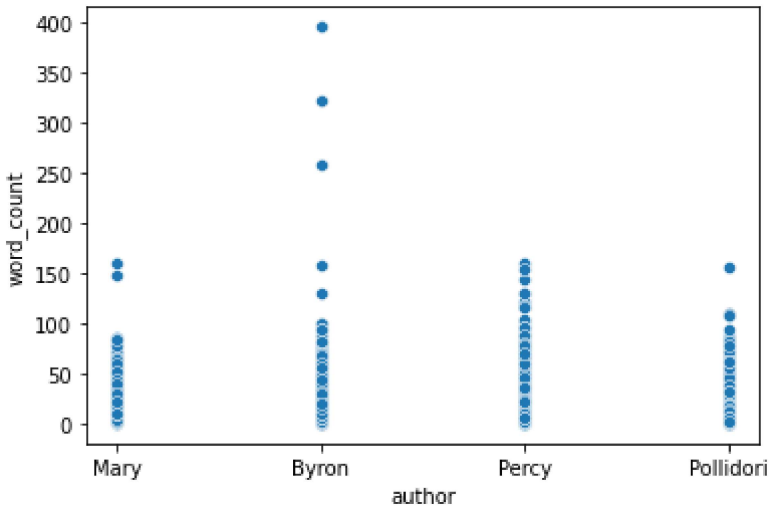


In [76]:
```
sns.boxplot(x="author", y="sentiment", data=df_author);
```



In [77]:
```
#Scatterplot for Wordcount
sns.scatterplot(data=df_author, x="author", y="word_count")
```

Out[77]: <AxesSubplot:xlabel='author', ylabel='word_count'>



Mining and Analytics:

The following has data mining models to determine the authorship of Frankenstein

Partioning the dataset as 80% for Training and 20% for Validation

In [46]:
```
# Importing necessary libraries
from sklearn.feature_extraction.text import CountVectorizer
from sklearn.model_selection import train_test_split

X_train, X_test, y_train, y_test = train_test_split(X, y,test_size=0.2, randc

bow_transformer=CountVectorizer(analyzer=text_process).fit(X_train)

text_bow_train=bow_transformer.transform(X_train)

text_bow_test=bow_transformer.transform(X_test)
```

DataMining Model 1: Multinomial Naive Bayes - Classifier

In [47]:
```
# Importing necessary libraries
from sklearn.naive_bayes import MultinomialNB

model = MultinomialNB()

model = model.fit(text_bow_train, y_train)
```

In [48]:
```
model.score(text_bow_train, y_train)
```

Out[48]: 0.925

In [49]:
```
model.score(text_bow_test, y_test)
```

Out[49]: 0.66375

In [50]:
```
from sklearn.metrics import classification_report

# getting the predictions of the Validation Set...
predictions = model.predict(text_bow_test)
# getting the Precision, Recall, F1-Score
print(classification_report(y_test,predictions,target_names=author_names))
```

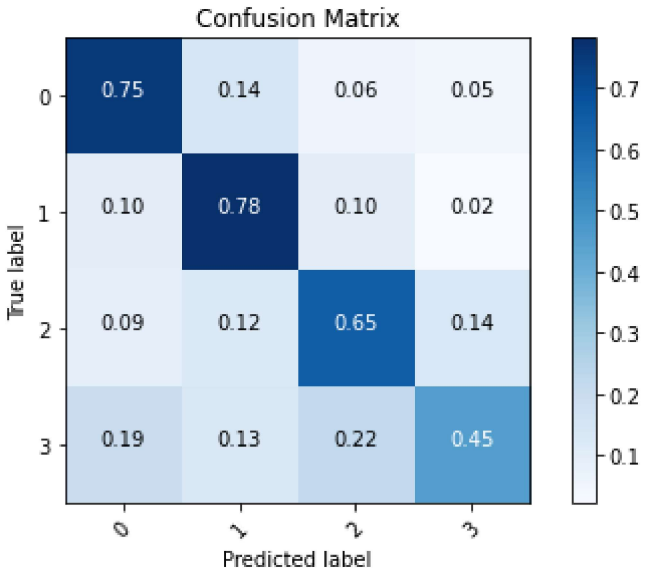
```
              precision    recall  f1-score   support

   pollidori       0.65      0.75      0.70       188
       byron       0.70      0.78      0.74       225
       percy       0.64      0.65      0.64       200
        mary       0.67      0.45      0.54       187

    accuracy                           0.66       800
   macro avg       0.66      0.66      0.65       800
weighted avg       0.66      0.66      0.66       800
```

Confusion Matrix

In [51]:

```
from sklearn.metrics import confusion_matrix
import numpy as np
import itertools
import matplotlib.pyplot as plt
# Defining a module for Confusion Matrix...
def plot_confusion_matrix(cm, classes,
                          normalize=False,
                          title='Confusion matrix',
                          cmap=plt.cm.Blues):
    """
    This function prints and plots the confusion matrix.
    Normalization can be applied by setting `normalize=True`.
    """
    if normalize:
        cm = cm.astype('float') / cm.sum(axis=1)[:, np.newaxis]
        print("Normalized confusion matrix")
    else:
        print('Confusion matrix, without normalization')
    print(cm)
    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)
    fmt = '.2f' if normalize else 'd'
    thresh = cm.max() / 2.
    for i, j in itertools.product(range(cm.shape[0])
                                  , range(cm.shape[1])):
        plt.text(j, i, format(cm[i, j], fmt),
                 horizontalalignment="center",
                 color="white" if cm[i, j] > thresh else "black")
    plt.tight_layout()
    plt.ylabel('True label')
    plt.xlabel('Predicted label')
cm = confusion_matrix(y_test,predictions)
plt.figure()
plot_confusion_matrix(cm, classes=[0,1,2,3], normalize=True,
                      title='Confusion Matrix')
```

```
Normalized confusion matrix
[[0.75       0.14361702 0.05851064 0.04787234]
 [0.09777778 0.78222222 0.09777778 0.02222222]
 [0.09       0.125      0.645      0.14      ]
 [0.19251337 0.13368984 0.21925134 0.45454545]]
```



From confusion matrix, we can note that author Lord Byron has a predicted score of 78%.

DataMining Model 2: TensorFlow

In [52]:
```
feature_columns = ['author', 'word_count', 'text_length', 'punctuation_per_ch
df_features = df_author[feature_columns]
```

Using Nltk for stop words:

In [53]:
```
df_words = pd.concat([pd.DataFrame(data={'author': [row['author'] for _ in ro
           for _, row in df_author.iterrows()], ignore_index=True)

df_words = df_words[~df_words['word'].isin(nltk.corpus.stopwords.words('engli

df_words.shape
```

Out[53]: (45569, 2)

In [54]:
```
df_train=df_features.sample(frac=0.8,random_state=1)
df_dev=df_features.drop(df_train.index)
```

In [55]:
```
df_train.head()
```

Out[55]:

	author	word_count	text_length	punctuation_per_char	unique_ratio	avg_word_length
200	Pollidori	8	38	0.026316	1.000000	3.750000
1078	Percy	5	27	0.111111	1.000000	4.000000
610	Mary	42	217	0.013825	0.857143	4.119048
2159	Pollidori	10	65	0.061538	1.000000	4.900000
1169	Pollidori	2	11	0.181818	1.000000	4.000000

In [56]:
```
import tensorflow as tf

feature_word_count = tf.feature_column.numeric_column("word_count")
feature_text_length = tf.feature_column.numeric_column("text_length")
feature_punctuation_per_char = tf.feature_column.numeric_column("punctuation_
feature_unique_ratio = tf.feature_column.numeric_column("unique_ratio")
feature_avg_word_length = tf.feature_column.numeric_column("avg_word_length")
feature_sentiment = tf.feature_column.numeric_column("sentiment")

base_columns = [
    feature_word_count, feature_text_length, feature_punctuation_per_char, fe
]
```

A training function for estimators and a simple linear classifier:

In [57]:
```
import tempfile

model_dir = tempfile.mkdtemp()

labels_train = df_train['author']

train_fn = tf.compat.v1.estimator.inputs.pandas_input_fn(
    x=df_train,
    y=labels_train,
    batch_size=100,
    num_epochs=None,
    shuffle=True,
    num_threads=5)

linear_model = tf.estimator.LinearClassifier(
    model_dir=model_dir,
    feature_columns=base_columns,
    n_classes=len(author_names),
    label_vocabulary=author_names)
```

```
WARNING:tensorflow:From C:\Users\aishw\anaconda3\lib\site-packages\tensorfl
ow\python\util\lazy_loader.py:63: The name tf.estimator.inputs is deprecate
d. Please use tf.compat.v1.estimator.inputs instead.

INFO:tensorflow:Using default config.
INFO:tensorflow:Using config: {'_model_dir': 'C:\\Users\\aishw\\AppData\\Lo
cal\\Temp\\tmpbbm_6hlc', '_tf_random_seed': None, '_save_summary_steps': 10
0, '_save_checkpoints_steps': None, '_save_checkpoints_secs': 600, '_sessio
n_config': allow_soft_placement: true
graph_options {
  rewrite_options {
    meta_optimizer_iterations: ONE
  }
}
, '_keep_checkpoint_max': 5, '_keep_checkpoint_every_n_hours': 10000, '_log
_step_count_steps': 100, '_train_distribute': None, '_device_fn': None, '_p
rotocol': None, '_eval_distribute': None, '_experimental_distribute': None,
'_experimental_max_worker_delay_secs': None, '_session_creation_timeout_sec
s': 7200, '_checkpoint_save_graph_def': True, '_service': None, '_cluster_s
pec': ClusterSpec({}), '_task_type': 'worker', '_task_id': 0, '_global_id_i
n_cluster': 0, '_master': '', '_evaluation_master': '', '_is_chief': True,
'_num_ps_replicas': 0, '_num_worker_replicas': 1}
```

Training the model: While re-running the code for train model I encountered error however I got the accuracy rate when I initially ran. Apologies for inconvenience

Code:

train_steps = 5000

linear_model.train(input_fn=train_fn, steps=train_steps)

dev_test_fn = tf.estimator.inputs.pandas_input_fn(

```
    x=df_dev,

    y=df_dev['author'],

    batch_size=100,

    num_epochs=1,

    shuffle=False,

    num_threads=5)
```

linear_model.evaluate(input_fn=dev_test_fn)["accuracy"]

From the tensorflow model, the accuracy is 36% however the authorship cannot be determined from it.

DataMining Model 3: Logistic Regression

In [61]:
```
from sklearn.feature_extraction.text import CountVectorizer,TfidfVectorizer,T
from sklearn.linear_model import LogisticRegression
from sklearn.pipeline import Pipeline
```

In [62]:
```
model_logic=Pipeline([('vect',CountVectorizer()),
 ('tfidf',TfidfTransformer()),
 ('clf',LogisticRegression(n_jobs=1,C=1e5))])
model_logic.fit(X_train,y_train)
y_pred=model_logic.predict(X_test)
print("accuracy %s" % accuracy_score(y_pred,y_test))
print(classification_report(y_test,y_pred,target_names=author_names))
```

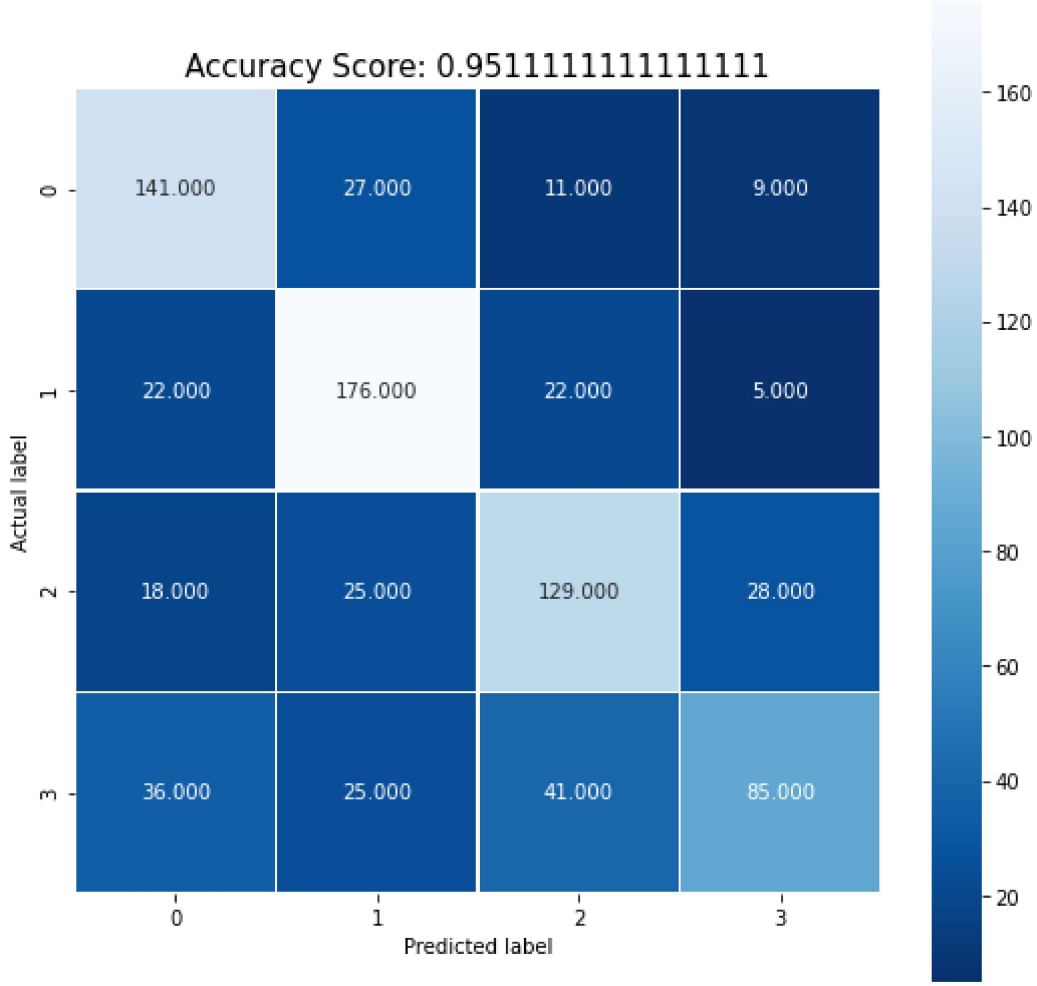
```
accuracy 0.645
              precision    recall  f1-score   support

   pollidori       0.70      0.70      0.70       188
       byron       0.70      0.72      0.71       225
       percy       0.61      0.54      0.57       200
        mary       0.57      0.61      0.59       187

    accuracy                           0.65       800
   macro avg       0.64      0.64      0.64       800
weighted avg       0.64      0.65      0.64       800


C:\Users\aishw\anaconda3\lib\site-packages\sklearn\linear_model\_logistic.p
y:762: ConvergenceWarning: lbfgs failed to converge (status=1):
STOP: TOTAL NO. of ITERATIONS REACHED LIMIT.

Increase the number of iterations (max_iter) or scale the data as shown in:
    https://scikit-learn.org/stable/modules/preprocessing.html (https://sci
kit-learn.org/stable/modules/preprocessing.html)
Please also refer to the documentation for alternative solver options:
    https://scikit-learn.org/stable/modules/linear_model.html#logistic-regr
ession (https://scikit-learn.org/stable/modules/linear_model.html#logistic-
regression)
  n_iter_i = _check_optimize_result(
```

Confusion Matrix

In [67]:
```
from sklearn import metrics
cm = metrics.confusion_matrix(y_test, predictions)
print(cm)
```

```
[[141  27  11   9]
 [ 22 176  22   5]
 [ 18  25 129  28]
 [ 36  25  41  85]]
```

In [68]:
```
plt.figure(figsize=(9,9))
sns.heatmap(cm, annot=True, fmt=".3f", linewidths=.5, square = True, cmap = '
plt.ylabel('Actual label');
plt.xlabel('Predicted label');
all_sample_title = 'Accuracy Score: {0}'.format(score)
plt.title(all_sample_title, size = 15);
```



The Logistic regression model has an accuracy rate of 65%.

Linear SVC classification on the data

In [63]:
```
from sklearn.svm import LinearSVC
model_svm=Pipeline([('vect',CountVectorizer()),
 ('tfidf',TfidfTransformer()),
 ('clf',LinearSVC(C=1.0,loss='squared_hinge',penalty='l2',dual=False))])
model_svm.fit(X_train,y_train)
y_pred=model_svm.predict(X_test)
print("accuracy %s" % accuracy_score(y_pred,y_test))
print(classification_report(y_test,y_pred,target_names=author_names))
```

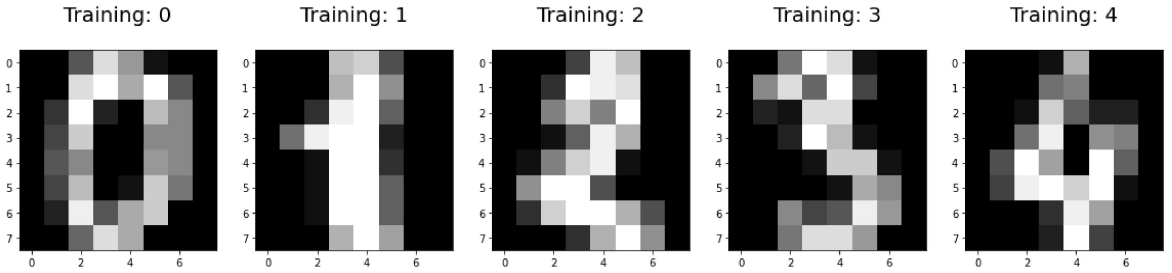
```
accuracy 0.6625
              precision    recall  f1-score   support

   pollidori       0.69      0.72      0.70       188
       byron       0.71      0.77      0.74       225
       percy       0.64      0.59      0.61       200
        mary       0.60      0.55      0.57       187

    accuracy                           0.66       800
   macro avg       0.66      0.66      0.66       800
weighted avg       0.66      0.66      0.66       800
```

We can see that the logistic regression model has an accuracy score of 65% and Linear SVC has an accuracy score of 66%

Evaluation:

In [64]:
```
from sklearn.datasets import load_digits
digits = load_digits()
```

In [65]:
```
#Visualizing the labels in the dataset

plt.figure(figsize=(20,4))
for index, (image, label) in enumerate(zip(digits.data[0:5], digits.target[0:
    plt.subplot(1, 5, index + 1)
    plt.imshow(np.reshape(image, (8,8)), cmap=plt.cm.gray)
    plt.title('Training: %i\n' % label, fontsize = 20)
```



Results:

The following are the results from the above analysis:

Out of 3 models used, we could see that author, Lord Byron has the maximum F1 score ie; the weighted average of Precision and Recall. This score takes both false positives and false negatives into account and it is more useful than the accuracy rate.

DATAMINING MODELS	F1 Score for Author : Lord Byron
Multinomial Naïve Bayes Classifier	74%
TensorFlow	Could not predict the author
Logistic Regression	71%

References:

https://towardsdatascience.com/a-machine-learning-approach-to-author-identification-of-horror-novels-from-text-snippets-3f1ef5dba634 (https://towardsdatascience.com/a-machine-learning-approach-to-author-identification-of-horror-novels-from-text-snippets-3f1ef5dba634)

https://www.kaggle.com/sachynk/text-classification-using-svm (https://www.kaggle.com/sachynk/text-classification-using-svm)

https://github.com/suewoon/author-identification/blob/master/modelling-explained.ipynb (https://github.com/suewoon/author-identification/blob/master/modelling-explained.ipynb)

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