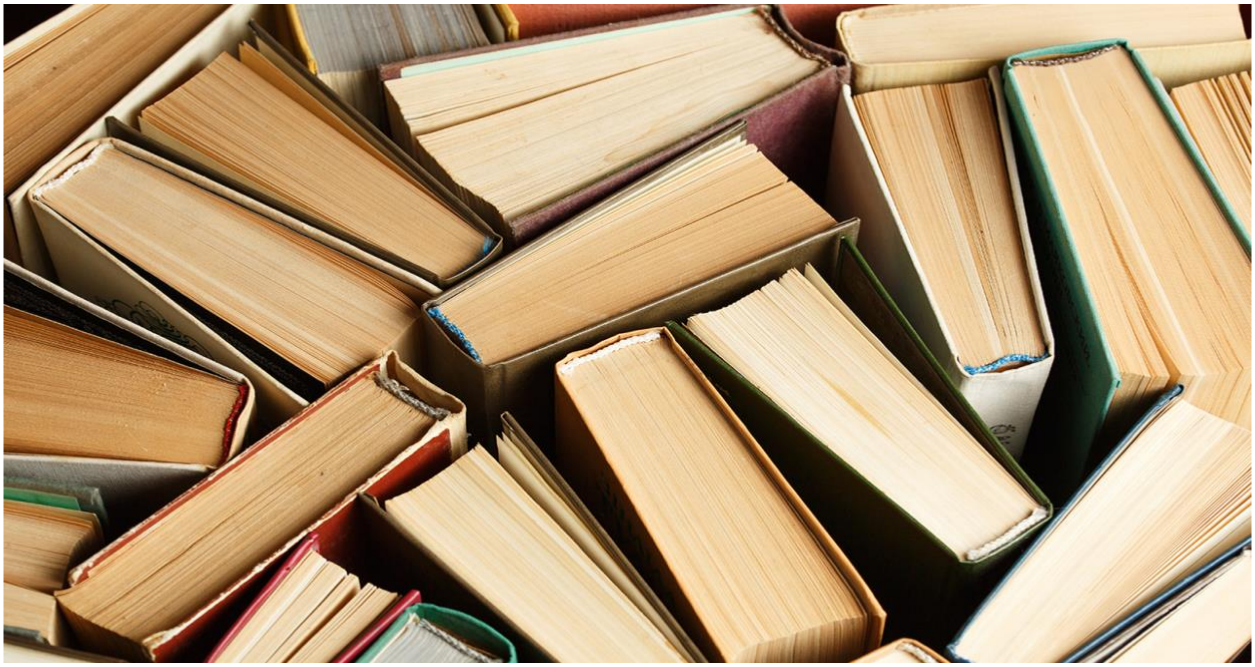


Text clustering model for categorizing books

Project Proposal by: Himani Kaushik

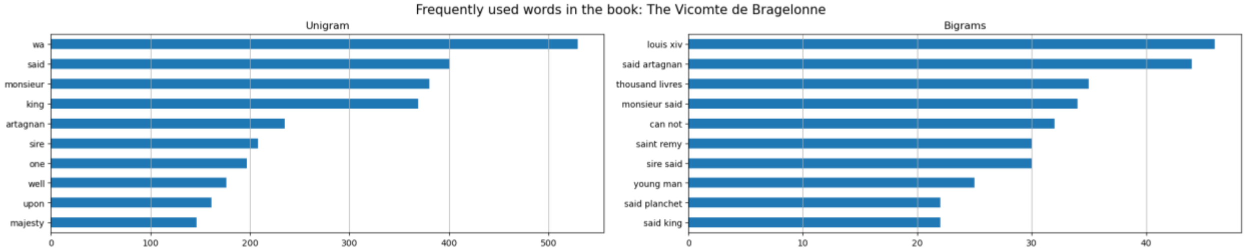
The main objective of the model is to use text clustering techniques to assign books into similar groups or clusters. This unsupervised learning model will apply various transformation and clustering techniques to choose the best algorithm to assign the correct labels to the books.

The data was obtained from the Project Gutenberg website - https://www.gutenberg.org. The following books were extracted from this website using python library – requests:

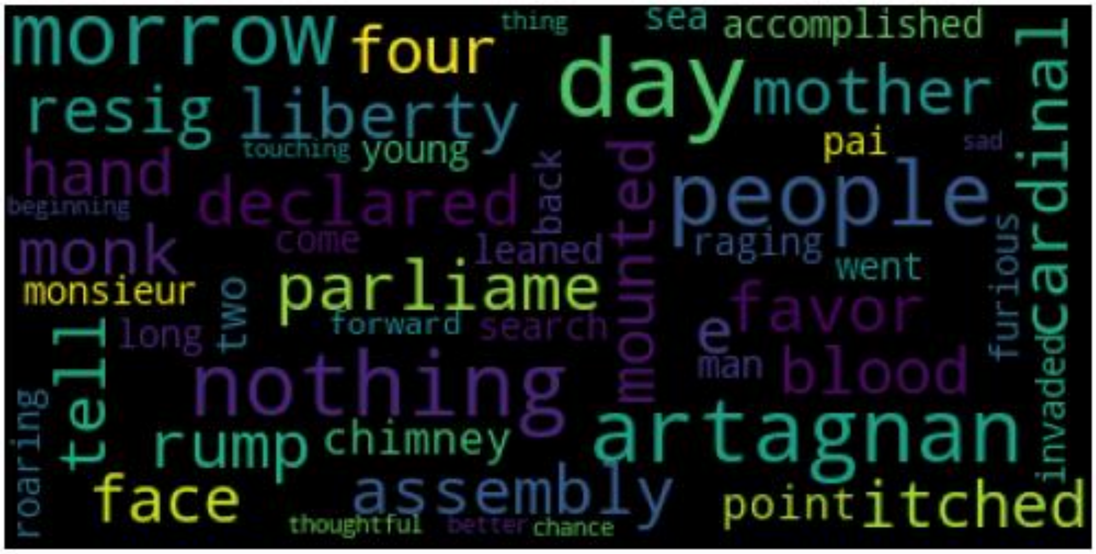
1. Chaldea
2. A Book About Lawyers
3. EBook of Darwinism
4. The Vicomte de Bragelonne
5. A Popular History of Astronomy During the Nineteenth Century

All the books are by different authors and from different genres.

The data was preprocessed using NLTK. The stop words and garbage characters were removed, all the words were converted to lower case and lemmatization was performed to return every word to its origin. The books were randomly partitioned into 200 partitions and each partition consisted of 150 words. The books were labelled as [a,b,c,d,e].
Unigram and bigram techniques were used to show frequently used words in all the five books. One example is shown below:

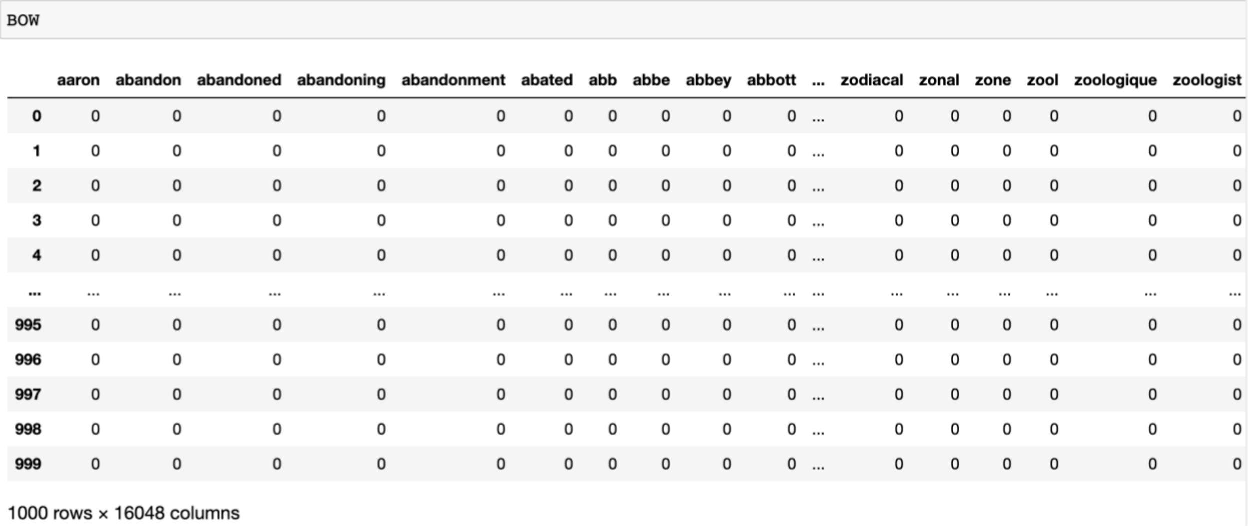


Wordcloud was used to show 50 frequently used words in all five books. One example is:



Feature engineering was performed using following techniques:

1. BOW transformation



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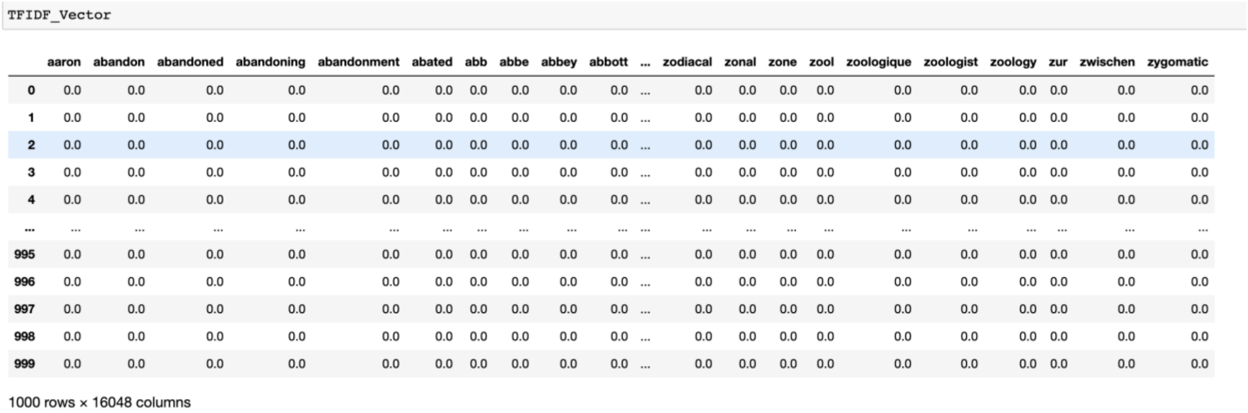
BOW
```

	aaron	abandon	abandoned	abandoning	abandonment	abated	abb	abbe	abbey	abbott	...	zodiacal	zonal	zone	zool	zoologique	zoologist
0	0	0	0	0	0	0	0	0	0	0	...	0	0	0	0	0	0
1	0	0	0	0	0	0	0	0	0	0	...	0	0	0	0	0	0
2	0	0	0	0	0	0	0	0	0	0	...	0	0	0	0	0	0
3	0	0	0	0	0	0	0	0	0	0	...	0	0	0	0	0	0
4	0	0	0	0	0	0	0	0	0	0	...	0	0	0	0	0	0
...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
995	0	0	0	0	0	0	0	0	0	0	...	0	0	0	0	0	0
996	0	0	0	0	0	0	0	0	0	0	...	0	0	0	0	0	0
997	0	0	0	0	0	0	0	0	0	0	...	0	0	0	0	0	0
998	0	0	0	0	0	0	0	0	0	0	...	0	0	0	0	0	0
999	0	0	0	0	0	0	0	0	0	0	...	0	0	0	0	0	0

1000 rows × 16048 columns

2. TF-IDF transformation

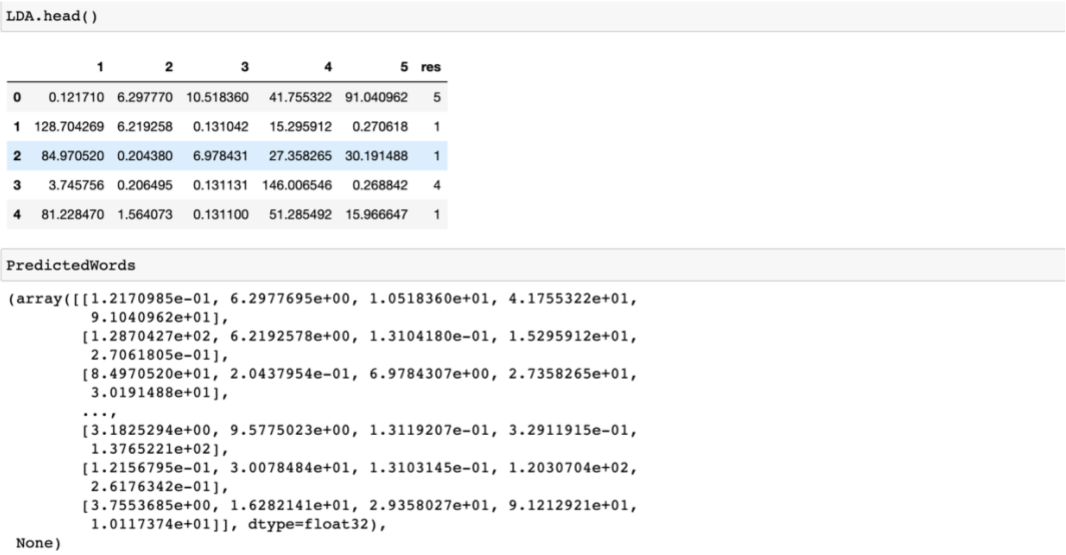


```
TFIDF_Vector
```

	aaron	abandon	abandoned	abandoning	abandonment	abated	abb	abbe	abbey	abbott	...	zodiacal	zonal	zone	zool	zoologique	zoologist	zoology	zur	zwischen	zygomatic
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	0.0	0.0	0.0
1	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	0.0	0.0
2	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	0.0	0.0
3	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	0.0	0.0
4	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	0.0	0.0
...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
995	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	0.0	0.0
996	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	0.0	0.0
997	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	0.0	0.0
998	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	0.0	0.0
999	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	0.0	0.0

1000 rows × 16048 columns

3. LDA transformation



```
LDA.head()
```

	1	2	3	4	5	res
0	0.121710	6.297770	10.518360	41.755322	91.040962	5
1	128.704269	6.219258	0.131042	15.295912	0.270618	1
2	84.970520	0.204380	6.978431	27.358265	30.191488	1
3	3.745756	0.206495	0.131131	146.006546	0.268842	4
4	81.228470	1.564073	0.131100	51.285492	15.966647	1

```
PredictedWords
```

```
(array([[1.2170985e-01, 6.2977695e+00, 1.0518360e+01, 4.1755322e+01,
         9.1040962e+01],
        [1.2870427e+02, 6.2192578e+00, 1.3104180e-01, 1.5295912e+01,
         2.7061805e-01],
        [8.4970520e+01, 2.0437954e-01, 6.9784307e+00, 2.7358265e+01,
         3.0191488e+01],
        ...,
        [3.1825294e+00, 9.5775023e+00, 1.3119207e-01, 3.2911915e-01,
         1.3765221e+02],
        [1.2156795e-01, 3.0078484e+01, 1.3103145e-01, 1.2030704e+02,
         2.6176342e-01],
        [3.7553685e+00, 1.6282141e+01, 2.9358027e+01, 9.1212921e+01,
         1.0117374e+01]], dtype=float32),
 None)
```