# Literary Landscapes

## Through the Lens of Text Mining

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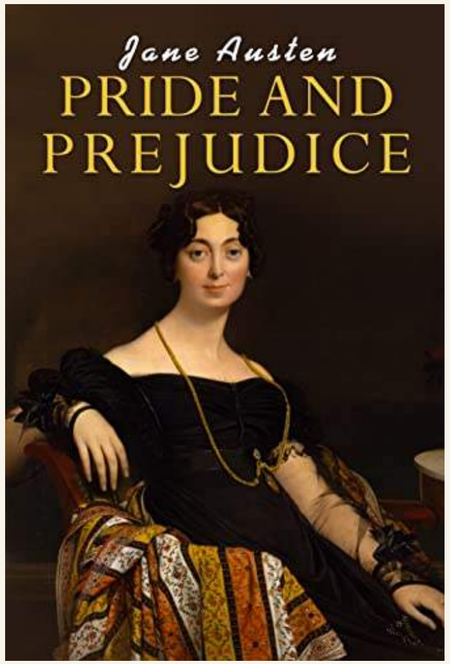
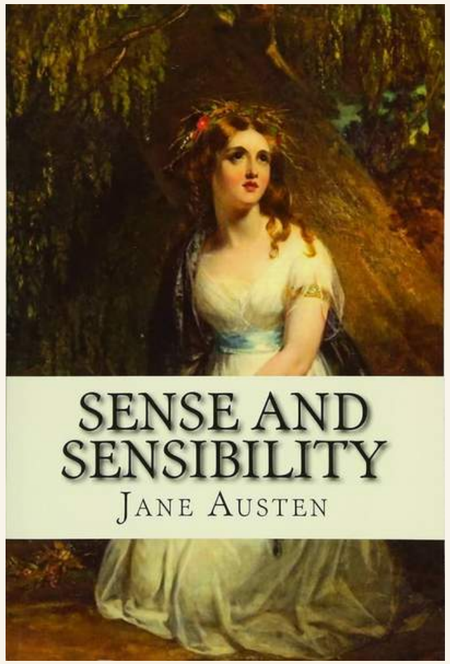
# Documents




“Pride and Prejudice”

by Jane Austen




“Sense and Sensibility”

by Jane Austen

# Text Cleaning Steps

Step 1: Extracting the relevant text from the novel

Step 2: Removing any extra white spaces

Step 3: Removing non-alphabetical characters

Step 4: Lowercasing all characters

Step 5: Removing stop words

# Text Cleaning

## Step 1: Extracting the relevant text from the novel

```
The Project Gutenberg eBook of Pride and Prejudice

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Title: Pride and Prejudice


Author: Jane Austen

Release date: June 1, 1998 [eBook #1342]
                Most recently updated: April 14, 2023

Language: English
```

```
pp_start = re.search("It is a truth universally acknowledged", pp)
pp_end = re.search("had been the means of uniting them.", pp)
pp_content = pp[pp_start.start():pp_end.end()]
print ('Start of content:', pp_content[:50])
print ('End of content:',pp_content[-50:])
```

✓ 0.0s

```
Start of content: It is a truth universally acknowledged, that a sin
End of content: to Derbyshire, had been the means of uniting them.
```

# Text Cleaning

## Step 2: Removing any extra white spaces

```
pp_content[95:200]
```

✓ 0.0s

```
'be in want of a wife.\n\nHowever little known the feelings or views of such a man may be on his\nfirst enter'
```

```
pp_content = re.sub('\s+', ' ', pp_content).strip()
pp_content[95:200]
```

✓ 0.0s

```
'be in want of a wife. However little known the feelings or views of such a man may be on his first enteri'
```

# Text Cleaning

## Step 3: Removing non-alphabetical characters

```
pp_content[5120:5210]
```

✓ 0.0s

```
'h,-- “I hope Mr. Bingley will like it, Lizzy.” “We are not in a way to know _what_ Mr. Bingley likes'
```

```
pp_content = re.sub(r'[^a-zA-Z\s]', '', pp_content)
pp_content[4825:4930]
```

✓ 0.0s

```
' with I hope Mr Bingley will like it Lizzy We are not in a way to know what Mr Bingley likes said her
```

*only retain alphabetical characters

# Text Cleaning

## Step 4: Lowercasing all characters

```
pp_content[380:450]
```

✓ 0.0s

```
' Mr Bennet said his lady to him one day have you heard that Netherfiel'
```

```
pp_content = pp_content.lower()
pp_content[380:450]
```

✓ 0.0s

```
' mr bennet said his lady to him one day have you heard that netherfiel'
```

# Text Cleaning

## Step 5: Removing stop words

```
pp_content[:100]
```

✓ 0.0s

```
'it is a truth universally acknowledged that a single man in possession of a good fortune must be in '
```

```
stop_words = set(stopwords.words('english'))
```

✓ 0.0s

```
pp_content_tokens = pp_content.split() # split the text into words for stopwords removal
pp_content_tokens = [word for word in pp_content_tokens if word not in stop_words] # remove stopwords
pp_content = ' '.join(pp_content_tokens) # join the words back into a single string
pp_content[:100]
```

✓ 0.0s

```
'truth universally acknowledged single man possession good fortune must want wife however little know'
```

# Text Cleaning

Compare number of unique words before and after clean

```
print (f"pandp before cleaning: {count_unique_words(pp)}, after cleaning: {count_unique_words(pp_content)}")
print (f"sands before cleaning: {count_unique_words(ss)}, after cleaning: {count_unique_words(ss_content)}")
```

✓ 0.0s

```
pandp before cleaning: 14705, after cleaning: 6603
sands before cleaning: 14247, after cleaning: 6985
```

# Tokenization

```
pp_content[:100]
```

✓ 0.0s

```
'truth universally acknowledged single man possession good fortune must want wife however little
```

```
pandp_content_tokens = word_tokenize(pp_content)
pandp_content_tokens
```

✓ 0.0s

```
['truth',
 'universally',
 'acknowledged',
 'single',
 'man',
 'possession',
 'good',
 'fortune',
 'must',
 'want',
 'wife',
 'however',
 'little',
```

Using nltk's word tokenizer to tokenize each novel

# Text Exploration

## Word Clouds

Allows us to visualize the most dominant words in each novel.

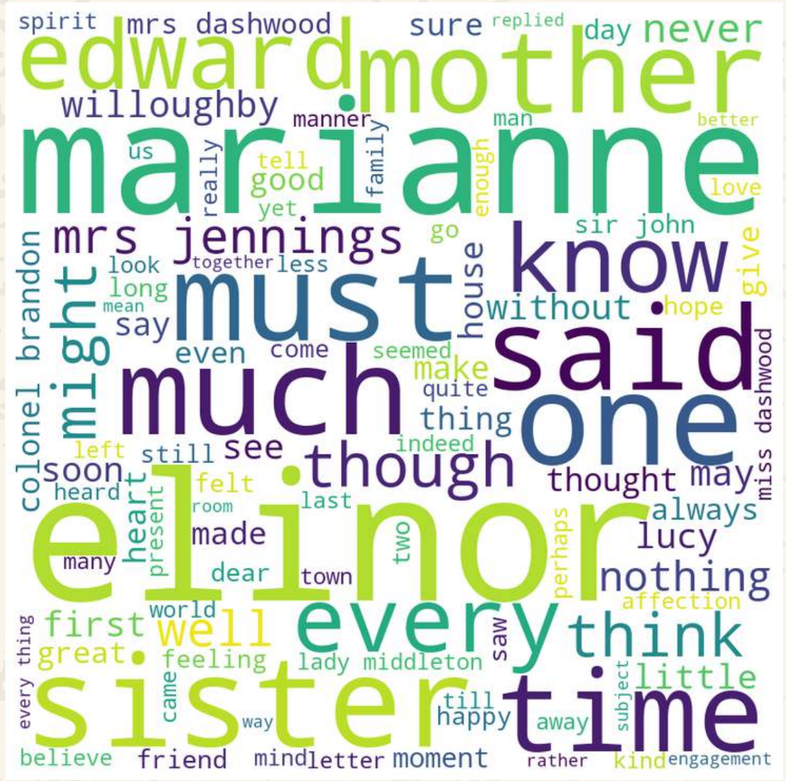
## Dispersion Plot

Shows us the distribution of a word throughout the document.

# Text Exploration

## Word Clouds

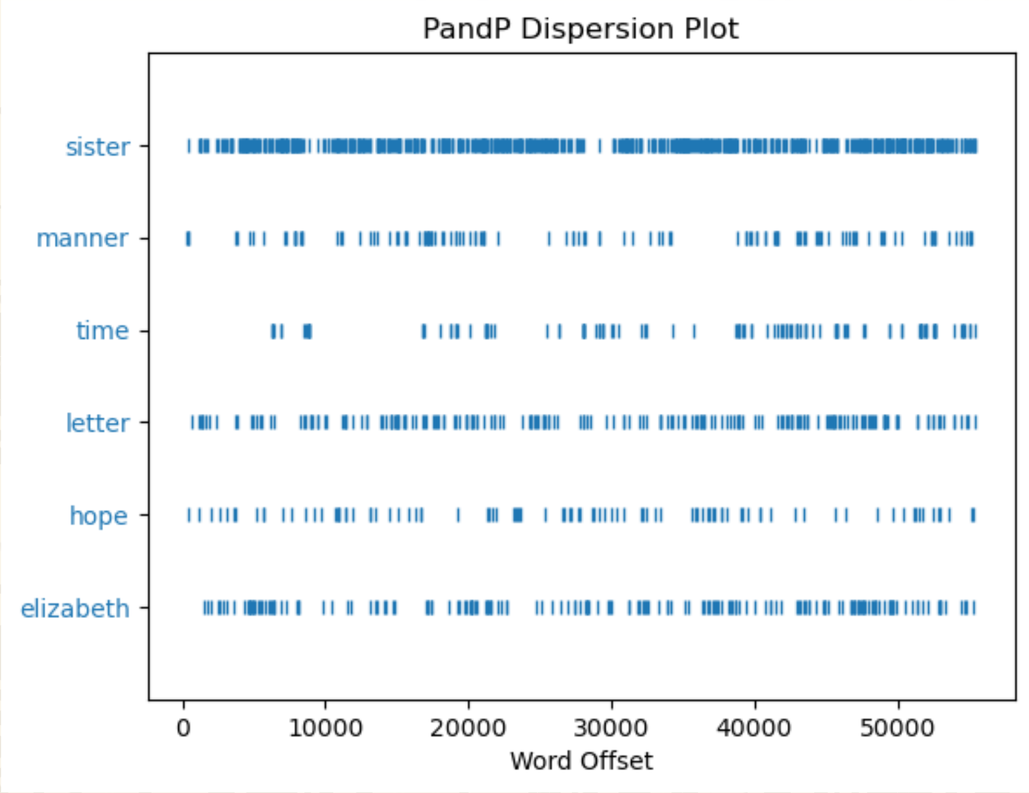

"Pride and Prejudice"



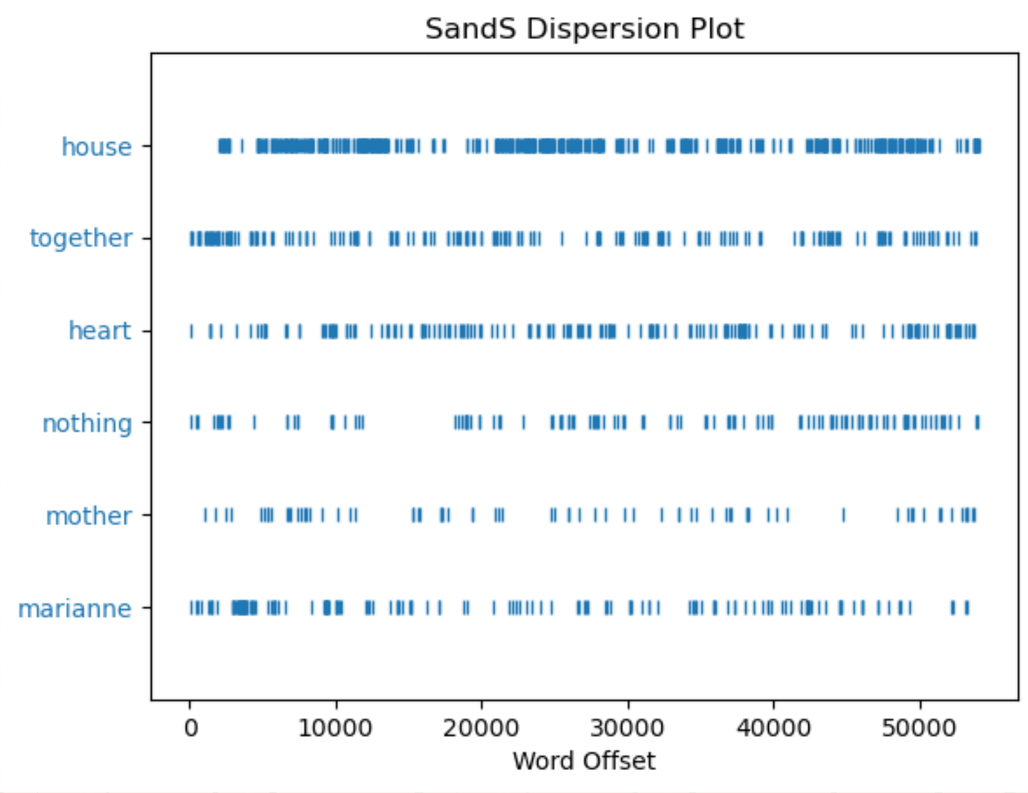

"Sense and Sensibility"

# Text Exploration

## Dispersion Plot




“Pride and Prejudice”




“Sense and Sensibility”

# Feature Engineering

## POS and Lemmatization

To standardize each word to its root form.

## N-grams (Bi-grams)

To retain the sequential order by concatenating two consecutive words.

# Feature Engineering

## POS and Lemmatization

```
pp_content_tokens[15:20]
```

✓ 0.0s

```
['views', 'man', 'may', 'first', 'entering']
```

```
pos_map = {
    'J': wordnet.ADJ,
    'V': wordnet.VERB,
    'N': wordnet.NOUN,
    'R': wordnet.ADV
}
tagged_tokens = pos_tag(pp_content_tokens)

lemmatizer = WordNetLemmatizer()
lemmatized_pp_content_tokens = [
    lemmatizer.lemmatize(word, pos=pos_map.get(tag[0], wordnet.NOUN)) for word, tag in tagged_tokens
]
lemmatized_pp_content_tokens[15:20]
```

✓ 2.2s

```
['view', 'man', 'may', 'first', 'enter']
```

# Feature Engineering

## N-grams (Bi-grams)

```
pp_content_tokens[:7]
```

✓ 0.0s

```
['truth', 'universally', 'acknowledged', 'single', 'man', 'possession', 'good']
```

```
n = 2 # bi-grams
pp_ngrams = []

for i in range(len(pp_content_tokens) - n + 1):
    # select n words starting from the current index
    ngram = pp_content_tokens[i:i+n]

    # join the words to create a single n-gram string
    ngram_string = '-'.join(ngram)

    pp_ngrams.append(ngram_string)

pp_ngrams[:3]
```

✓ 0.0s

```
['truth-universally', 'universally-acknowledged', 'acknowledged-single']
```

# Vectorization

We have 02 versions of each document.

We vectorize each version of each book with TF-IDF from sklearn.

## TD-IDF for Lemmatization (A)

```
tfidf = TfidfVectorizer()
tfidfmatrix_feature_a = tfidf.fit_transform([
    ' '.join(lemmatized_pp_content_tokens),
    ' '.join(lemmatized_ss_content_tokens)
])
tfidfmatrix_feature_a.shape
```

✓ 0.0s

```
(2, 7698)
```

## TD-IDF for N-grams (B)

```
tfidf = TfidfVectorizer()
tfidfmatrix_feature_b = tfidf.fit_transform([
    ' '.join(pp_ngrams),
    ' '.join(ss_ngrams)
])
tfidfmatrix_feature_b.shape
```

✓ 0.0s

```
(2, 9390)
```

# Comparison

The cosine similarity between two features A (lemmatization) is 0.70.

```
consine_sim_feature_a = cosine_similarity(tfidfmatrix_feature_a[0], tfidfmatrix_feature_a[1])
consine_sim_feature_a
```

✓ 0.0s

```
array([[0.69651372]])
```

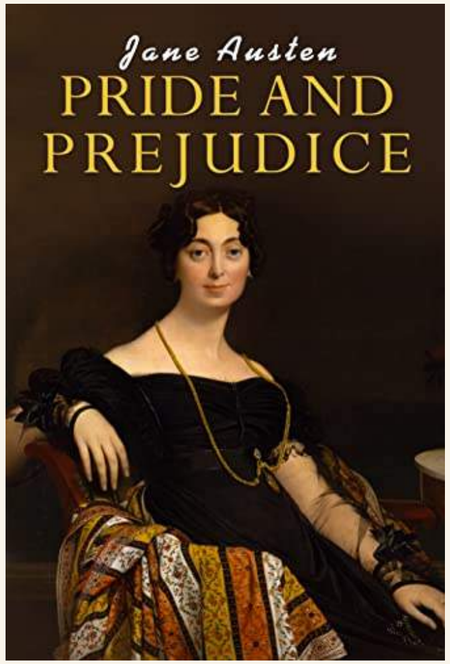
The cosine similarity between two features B (Bi-grams) is 0.63.

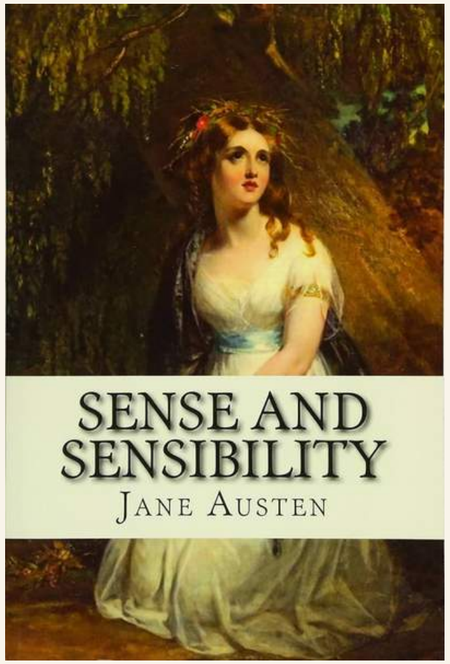
```
consine_sim_feature_b = cosine_similarity(tfidfmatrix_feature_b[0], tfidfmatrix_feature_b[1])
consine_sim_feature_b
```

✓ 0.0s

```
array([[0.62867521]])
```

# Insights




- High similarity between 02 novels (0.70 & 0.63).
- Shared vocabulary and themes: reflective of Austen's focus on morality, courtship, and the social standing of women.
- Shows consistency in Austen's writing styles across works.

# Insights

## Lemmatization

- Focus on the meaning of words.
- More effective for understanding thematic similarities (shared themes, vocabulary, and overarching narrative elements).

Main themes and ideas

## N-grams

- Take into account the context in which words appear.
- Provide richer insights about the narrative style, sentence construction, and the specific use of language.

Writing style

# Thank you!