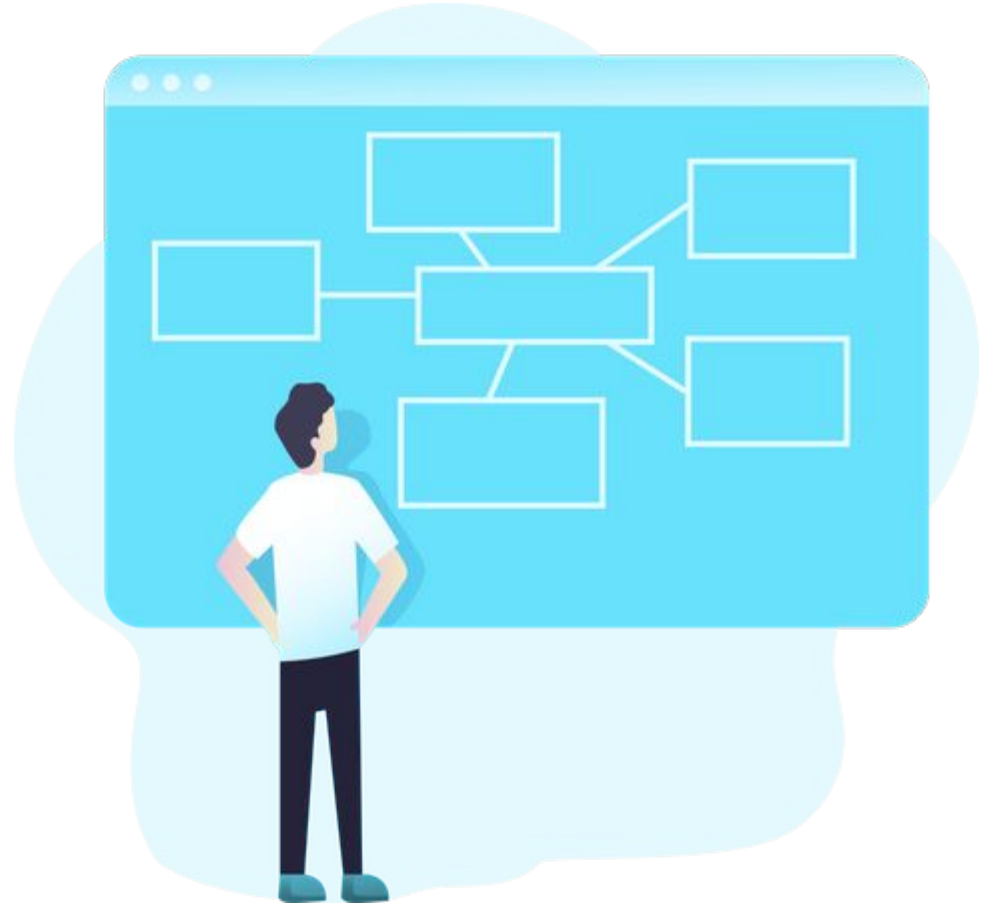


A Study in Natural Language Processing

Text Summarization

Introduction

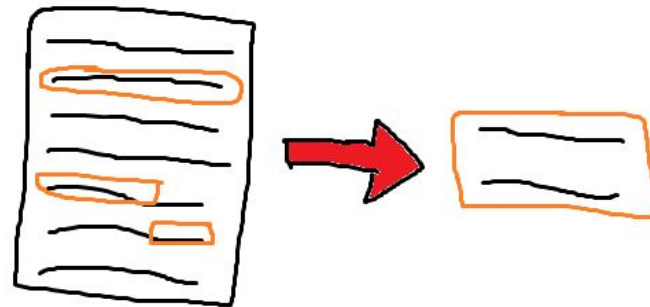
- What's the Problem?
 - Age of Information
 - Online media
 - News
 - Articles
 - Excerpts from Books
 - Competition for Our Attention



Text Summarization

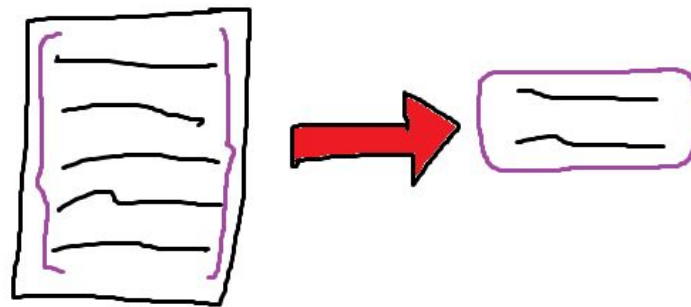
- Extractive

- Highlighting
- Selects sentences from text
- Summary from Ranked Sentences



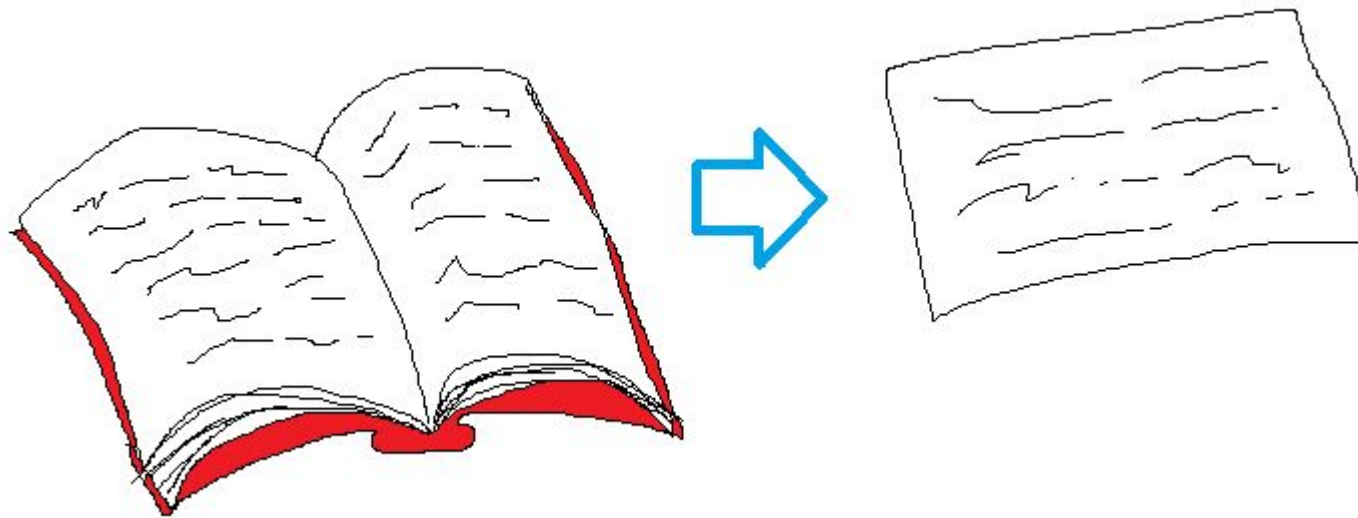
- Abstractive

- Read whole document
- Generate summary from ideas in source
- Deep Learning



Hypothesis

- Can I create a text summarizer that usefully summarizes text, such as in an article or passage?



Dataset: Universal Declaration of Human Rights

- Drafted by representatives from all over the world
- Common standard for all nations
- Translated into > 500 languages
- Articles: 30
- Word Count: 1833



Text Preprocessing

- Tokenization

- 1,723 tokens long

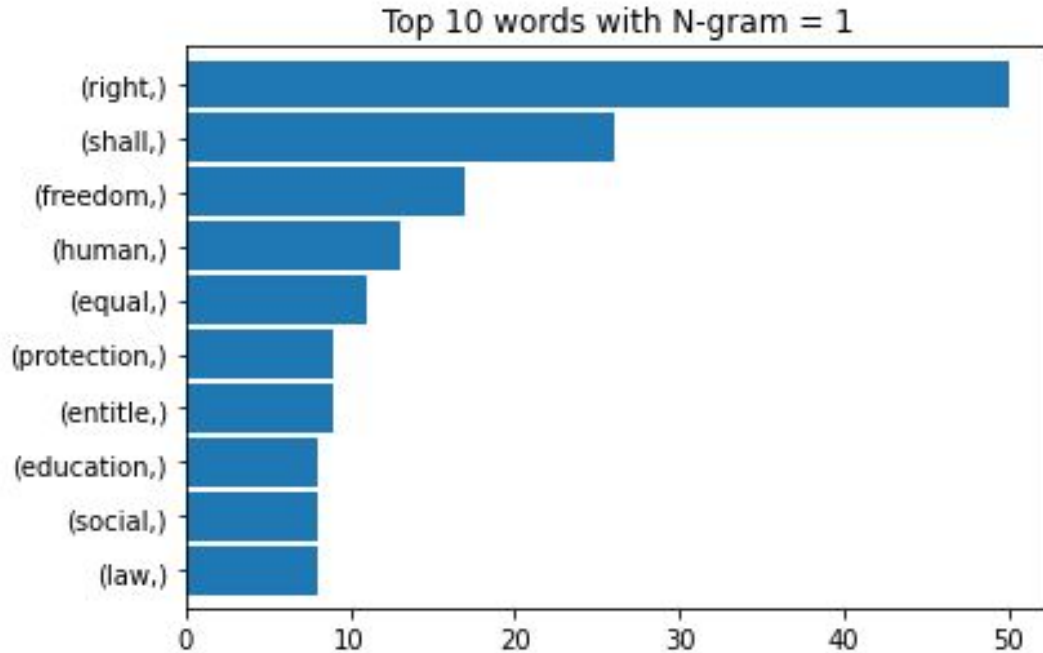
- Remove Stopwords

- Universal Declaration of Human Rights: `[('right', 32), ('shall', 26), ('rights', 16), ('equal', 11), ('human', 11), ('freedom', 11), ('entitled', 9), ('protection', 9), ('law', 8), ('social', 8)]`

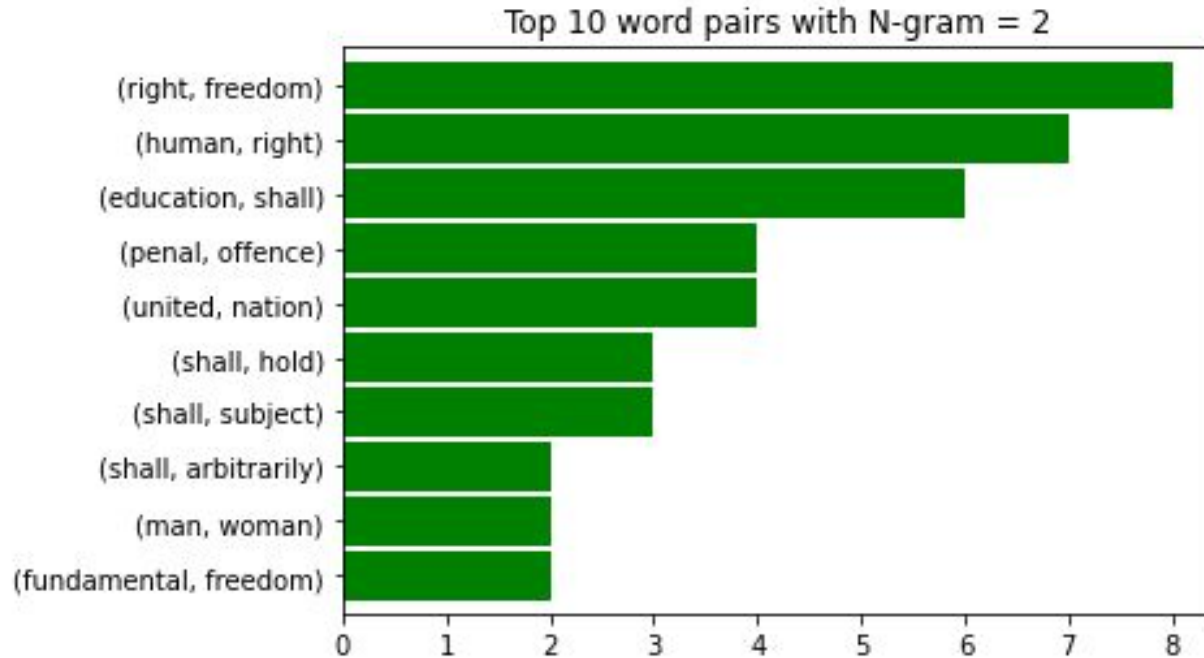
- Lemmatization

- UDHR: `[('right', 48), ('shall', 26), ('freedom', 17), ('equal', 11), ('human', 11), ('entitle', 9), ('protection', 9), ('law', 8), ('social', 8), ('education', 8)]`

Visualizations: Unigram



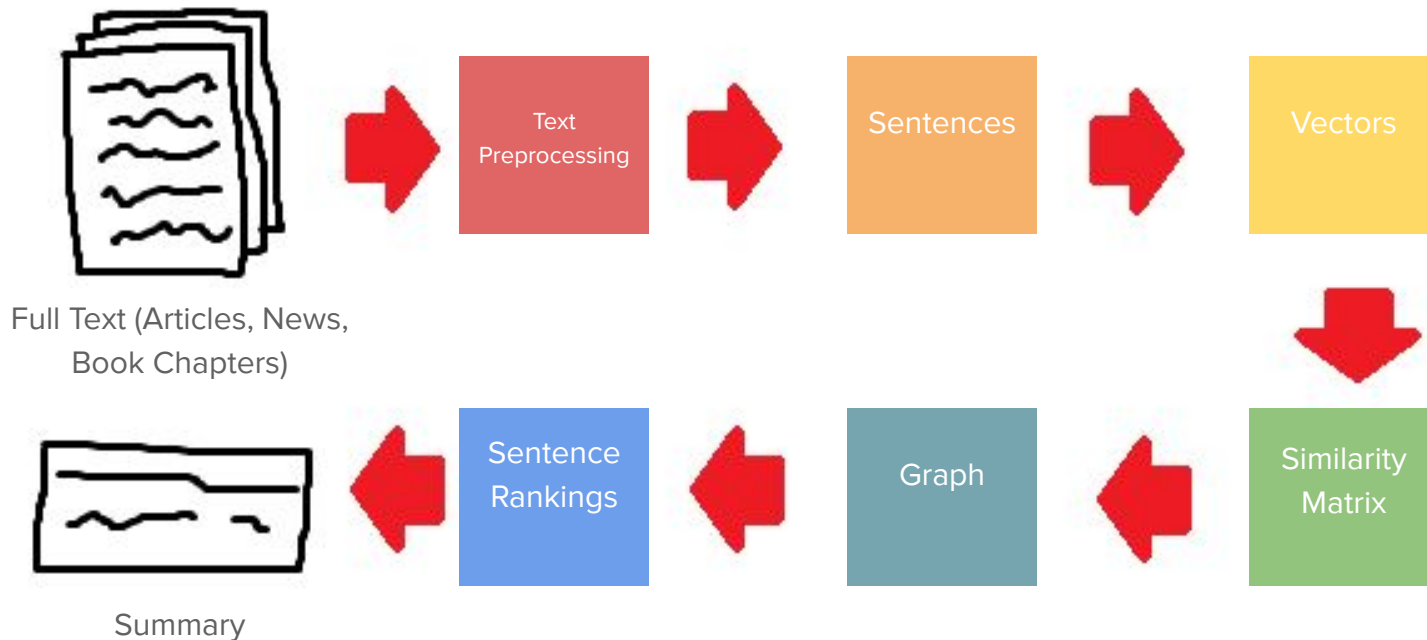
Visualizations: Bigram



Visualizations: WordCloud



Text Summarization with GloVe



Summary Extraction with GloVe

- I. Everyone has duties to the community.
- II. Everyone is entitled to a social and international order in which the rights and freedoms set forth in this Declaration can be fully realized.
- III. Everyone has the right to the protection of the moral and material interests resulting from any scientific, literary or artistic production of which he is the author.
- IV. Everyone has the right freely to participate in the cultural life of the community, to enjoy the arts and to share in scientific advancement and its benefits.
- V. Parents have a prior right to choose the kind of education that shall be given to their children.
- VI. It shall promote understanding, tolerance and friendship among all nations, racial or religious groups, and shall further the activities of the United Nations for the maintenance of peace.
- VII. Education shall be directed to the full development of the human personality and to the strengthening of respect for human rights and fundamental freedoms.
- VIII. Technical and professional education shall be made generally available and higher education shall be equally accessible to all on the basis of merit.
- IX. Elementary education shall be compulsory.
- X. Education shall be free, at least in the elementary and fundamental stages.

Gensim Summarizer

- Automatic
- TextRank
- Good at producing short and long summaries



Towards a More Perfect User Interface

Choose the model you want to use

Model

'Enter the Link'

'Enter the Shrink Ratio'

Run



```
('Whereas the peoples of the United Nations have in the Charter reaffirmed '
'their faith in fundamental human rights, in the dignity and worth of the '
'human person and in the equal rights of men and women and have determined to '
'promote social progress and better standards of life in larger freedom,\r\n'
'Whereas Member States have pledged themselves to achieve, in co-operation '
'with the United Nations, the promotion of universal respect for and '
'observance of human rights and fundamental freedoms,\r\n'
'Proclaims this Universal Declaration of Human Rights as a common standard of '
'achievement for all peoples and all nations, to the end that every '
'individual and every organ of society, keeping this Declaration constantly '
'in mind, shall strive by teaching and education to promote respect for these '
'rights and freedoms and by progressive measures, national and international, '
'to secure their universal and effective recognition and observance, both '
'among the peoples of Member States themselves and among the peoples of '
'territories under their jurisdiction.\n'
'Everyone is entitled to all the rights and freedoms set forth in this '
'Declaration, without distinction of any kind, such as race, colour, sex, '
'language, religion, political or other opinion, national or social origin, '
'property, birth or other status.\n'
'Education shall be directed to the full development of the human personality '
'and to the strengthening of respect for human rights and fundamental '
'freedom.')

```

Conclusion

- Extractive method generates good summaries
- Created a basic UI for text summarization
- Text Summarization is viable
 - Quick glance at important points in a passage
 - Optimizes time
 - Determine worth of further exploration

I just need
the main ideas



Future Work

- Qualitative summary evaluation
 - ROUGE score
- Combine or implement manual method into my automatic summarizer
- Deep learning
- Abstractive methods
 - BERT

