Applied Data Analysis – Le Temps Dataset Word Frequency Prediction

ÉCOLE POLYTECHNIQUE FÉDÉRALE DE LAUSANNE

Extract Transfom Pipeline

The Dataset

200 years of daily articles from:

Gazette de Lausanne ET JOURNAL SUISSE FONDÉE EN 1798 — Publication dates: 1798 – 1998

JOURNAL DE GENÈVE — Publication dates: 1826 – 1998

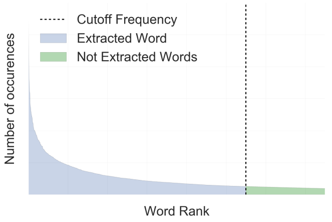
Extraction: Counting the 3000+ most frequent words per month

Data Extraction

1. Removal of punctuation
2. Removal of French stop words
3. Custom NLTK processing:
    - Singular / Plural
    - Masculin / Féminin
    - Verbs and their conjugations
    - Adverbs + Noun
4. Cutoff Frequency: Removal of words that were not present enough

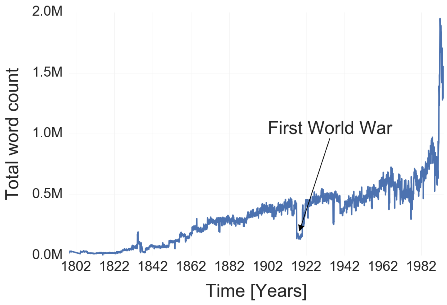
Result: Time serie of the frequency of each word

Long Tail Distribution of words:
Due to our cutoff, we miss a part of the data:



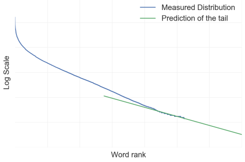
Data Visualization

Total word count over the years



How much of the data was not extracted?

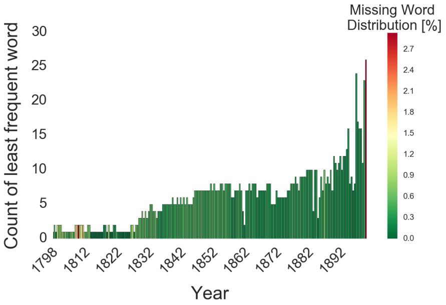
- Power Law distribution is linear in log-lin scale
- Linear Regression of the distribution to predict the non extracted part



We can predict the percentage of the distribution thst we did not extract.

We can see that in theory we did not miss an important part of the word distribution (graph on the right)

Number of occurences of least frequent word with percentage of the data that was missed

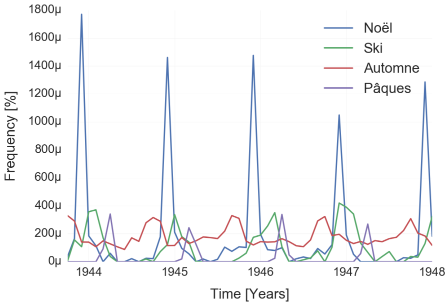


Words with interesting time series

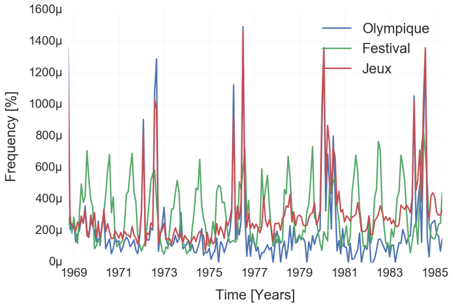
To find relevant time series, several methods were used:

- Pearson Correlation : computing similarity between word
- Fourier Transform : Finding words with periodicity
- Gradient : Finding decreasing and increasing time series
- Dendogram clustering
- Frequency ranking
- Manual Search
- Search of the smoothed out series (rolling mean)

Words with monthly periodicity



Words with multi year periodicity


1600μ
1400μ
1200μ
1000μ
800μ
600μ
400μ
200μ
0μ
Frequency [%]
Olympique
Festival
Jeux
Time [Years]