Concordanciers : Thème et variations
Bénédicte Pincemin, Fabrice Issac, Marc Chanove, Michel Mathieu-Colas

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Concordancers: Theme & Variations
B. Pincemin, F. Issac,
M. Chanove, M. Mathieu-Colas

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What is a Concordancer ? Or what should it be ?

1) Generalization
   – Key features – summary from existing KWIC tools

2) Extension
   1. Emphasis on meaningful specificity of concordancers

3) Specialization
   1. Case of use in a distributional semantics approach
      (Classes d’objets theory, Gaston Gross)
What is a (true) Concordancer ?

- **Definition** (and *parameters*)
  - For a given *corpus*
  - A list of *all occurrences* of a word (or *linguistic item*)
  - Vertically aligned (column), « *stacked* »
  - Surrounded by their left and right *contexts* (of a given *size*)
  - And *sorted* by a relevant criteria
Parameter #1 : Search object

- Word
- Phrase
- List of items (topic,..)
- Stem
- Annotations (lemma, part-of-speech,..)
- Mixed (as a complex regular expression)
  - Example : CQP (Christ, 1994)

Parameter #2 : Context’s size

- A line
  - Visual stack effect : the contexts are vertically aligned and immediately superposed
- Different focus
  - shorter => lexical phrases, syntactic constructs
  - longer => for some semantic considerations
- Centered or not
Parameter #3 : Sorting order

• Not incidental, but really mandatory feature
  – Visual stack effect :
    • Convergences (and their extent : massive convergences)
    • Divergences

• Classical sorting keys
  – Textual linearity (chronologic order)
  – The search expression (if varying)
  – L1, L2… and R1, R2… (words around the search object, on the left and/or on the right)

• Multiple sort
  – In practical, Contextual key = last key

The best of the concordance : visual effects

• Why ? Heuristic guiding for efficient reading
  – convergences and divergences
  – extent (singularity or repetition)

• How ? Stack effect
  – Vertical alignement
  – Sort that groups similar items together
Consequences on the classical definition -
towards a new (but tradition grounded) definition

• Parameter #2 (Context’s size) is undesirable
  – Illusory power
  – Fixed (default) and adjusted to
    • page / window size (corresponding itself to a good look span)
    • reasonable size of characters for a comfortable reading
  – Possibility of a horizontal curser (for screen output)

• New ways to enhance and refine grouping and
  contrasting visual effects : the zones

Zones : definition

• The search object is detailed into adjacent zones

• Each zone is qualified by :
  1) A stack column (or not)
  2) A possibly typographical emphasis (bold characters, choice of a colour)
  3) An eventual sort (and which one :
    alphabetical, textual, canonical….)
## Zones : example of query

<table>
<thead>
<tr>
<th>Left context</th>
<th>shall</th>
<th>MOT{0,3}</th>
<th>be .+ed</th>
<th>Right context</th>
</tr>
</thead>
<tbody>
<tr>
<td>No column</td>
<td>No column</td>
<td>column</td>
<td>column</td>
<td>No column</td>
</tr>
<tr>
<td>Normal</td>
<td>Normal</td>
<td><strong>Red +</strong></td>
<td><strong>Green</strong></td>
<td>Normal</td>
</tr>
<tr>
<td>No sort</td>
<td>No sort</td>
<td>2, Alphabetical</td>
<td>1, Frequence</td>
<td>3, Alphabetical</td>
</tr>
</tbody>
</table>

## Zones : example of output

| … Such declarations shall | be deposited | by the St… |
| … equally authentic , shall | be deposited | in the ar… |
| … … | … | … |
| … Such gratis personnel shall | be employed | in accorda.. |
| … under 18 years of age shall | **not** | be employed | in night w.. |
| subject to compulsory education shall | **not** | be employed | in such wo. |
| … | … | … | … |
| … nor life imprisonment […] shall | be imposed | for offence. |
| … was committed . Nor shall | an heavier penalty | be imposed | than the on |
| … was committed . Nor shall | an heavier penalty | be imposed | than the on |
| … Sentence of death shall | **not** | be imposed | for crimes |
Benefits from Zones

- Zones are especially efficient to (visually) group and sort tokens selected by a pattern with contextual conditions and (very) variable realizations
- Compared to the state-of-art:
  - As powerful as every kind of sort in existing KWIC concordancers
  - Allows sorting on distant words, with better control (not only the number of words)
- Multiplied and characterized visual stack effects

A concordancer for distributional semantics

- Context: *Classes d’objets* theory
- Goal: efficient use of corpora in order to build, complete or correct the linguistic description
- Concordancers are already used (and useful) for these tasks, but:
  - Massive outputs
  - Difficulty to focus on contextual dependancies (variability)
Classes d’objets Theory (1/3) : arguments => predicate

- Language (and especially semantics) is described through the predicate – argument dependencies.
- Predicates are defined by their argumental pattern, syntactically and semantically:
  - Conduire$_1$ (hum, hum, loc) : *Pat conduit son petit frère à l’école*
  - Conduire$_2$ (hum, transport) : *Pat conduit une décapotable*
  - Conduire$_3$ (voie, locatif) : *Ce sentier conduit à la mer*
- Linguistical vs ontological approach of semantic.

Classes d’objets Theory (2/3) : arguments are structured in classes

An argument’s value is taken from a set called Classe d’objets.
Classes d’objets Theory (3/3) :
(appropriate) predicates => arguments’ classes

A few appropriate predicates (faisceau de prédicats appropriés) can select all the elements of a class, and only them

Arguments of METTRE :

Arguments of ÊTRE EN :

Arguments of ALLER BIEN À :

Four ways of exploring a corpus

<table>
<thead>
<tr>
<th>Looking for</th>
<th>Syntactic characterization</th>
<th>Class composition</th>
</tr>
</thead>
<tbody>
<tr>
<td>Building classes of arguments</td>
<td>Given = classe d’objets Looking for = appropriate predicates</td>
<td>Given = class of predicates Looking for = elements of the classe d’objets</td>
</tr>
<tr>
<td>predicates</td>
<td>Given = class of predicates Looking for = classes d’objets as defining arguments</td>
<td>Given = argumental pattern (with classes d’objets) Looking for = class of predicates</td>
</tr>
</tbody>
</table>
The KWAC-LLI prototype

- Corpus = Newspaper (Le Monde), morphosyntactically tagged (Cordial)
- Classe d’objets = communication routes (voies de communication, Mathieu-Colas, 1998)
- Goal = to find new appropriate predicates
Specificities of the concordancer

- Synthetic table
  - Plus some results as lists, when more suited
  - Avoids the output overflow: mediates and organizes the results

- Results are ordered according to the linguistic principle (in the *classes d’objets* theory):
  - A relevant predicate can be used with all the elements of the *classe d’objets*

- Visual stack effect

---

<table>
<thead>
<tr>
<th>Freq totale</th>
<th>rue</th>
<th>route</th>
<th>autoroute</th>
<th>avenue</th>
<th>impasse</th>
<th>allée</th>
<th>chemin</th>
<th>sentier</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>2209</td>
<td>3004</td>
<td>405</td>
<td>231</td>
<td>905</td>
<td>193</td>
<td>3455</td>
<td>357</td>
</tr>
<tr>
<td>Freq tab 1</td>
<td>2105</td>
<td>2905</td>
<td>372</td>
<td>213</td>
<td>884</td>
<td>184</td>
<td>3360</td>
<td>336</td>
</tr>
<tr>
<td>Nb Total</td>
<td>487</td>
<td>455</td>
<td>160</td>
<td>115</td>
<td>108</td>
<td>93</td>
<td>397</td>
<td>116</td>
</tr>
<tr>
<td>Nb tab 1</td>
<td>394</td>
<td>373</td>
<td>131</td>
<td>97</td>
<td>90</td>
<td>84</td>
<td>313</td>
<td>96</td>
</tr>
<tr>
<td>Freq corpus</td>
<td>7179</td>
<td>6691</td>
<td>1513</td>
<td>1032</td>
<td>1395</td>
<td>464</td>
<td>6112</td>
<td>879</td>
</tr>
</tbody>
</table>

| prendre     | 888  | 5833  | 34       | 310    | 21      | 4     | 2      | 1       |
| emprunter   | 346  | 1867  | 25       | 92     | 25      | 8     | 1      | 4       |
| ouvrir      | 263  | 4424  | 33       | 103    | 5       | 5     | 1      | 5       |
| trouver      | 89   | 1283  | 5        | 18     | 2       | 2     | 6      | 1       |
| circuler    | 83   | 731   | 26       | 35     | 10      | 3     | 1      | 6       |
| éviter      | 32   | 1282  | 3        | 5      | 1       | 2     | 15     | 1       |
| aménager    | 13   | 405   | 1        | 4      | 1       | 1     | 1      | 2       |
| sortir      | 696  | 2433  | 51       | 10     | 8       | 501   | 2      | 6       |
| suivre      | 430  | 3418  | 16       | 91     | 2       | 2     | 1      | 294     |
| parcourir   | 228  | 1519  | 97       | 31     | 5       | 6     | 12     | 115     |
| aller       | 195  | 6474  | 34       | 33     | 4       | 1     | 6      | 115     |
| traverser   | 176  | 1766  | 96       | 44     | 12      | 13    | 5      | 5       |
Lists (out of table) : predicates found with only one argument

KWAC-LLI : concordance lines with zones (1)
Main ideas

- A concordance is more than a set of contexts, because of its heuristic visual effects: vertical alignment and sort order
- Zones to develop and refine querying possibilities
- KWAC-LLI for distributional semantics, with a synthetic table