NeoVisual

DiCoEnviro
Le dictionnaire fondamental de l'environnement

USER'S GUIDE

A user guide for browsing through NeoVisual

Observatoire de Linguistique Sens-Texte
(OLST)

Document prepared by
Nathalie Prévil
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NeoVisual Team

Here are the people behind the *NeoVisual*:

- Marie-Claude L'Homme (terminological descriptions);
- Nathalie Prévil (terminological descriptions);
- Benoît Robichaud (programming).

What Is the NeoVisual?

NeoVisual (available at: http://olst.ling.umontreal.ca/dicoenviro/neovisual/) is a Graphical user interface (GUI) that displays an explicit and intuitive representation of a wide variety of terminological relations in the form of graphs. It is designed to help users discover the terminological structure of the domain of the environment. *NeoVisual* complements some of the textual information found in *DiCoEnviro*, so users can look up terms listed in the *DiCoEnviro* and visualize graphs to find information about the relations terms hold with other units.

About the DiCoEnviro

DiCoEnviro (Dictionnaire fondamental de l'environnement) is a specialized dictionary which contains basic terms in the field of the environment. The resource describes and encodes relations between terms viewed as lexical units rather than labels for concepts. *DiCoEnviro* describes paradigmatic relations such hypernymy, meronymy, exact synonymy as well as syntagmatic relations, i.e. collocations. The following terminological information is found both in *DiCoEnviro* and *NeoVisual*: the headword, the argument structure, exact synonyms, lexical relations, and illustrations. Figure 1 is a reproduction of the entry on *erosion*, where users may see the terminological information mentioned earlier.

erosion $_1$, n
erosion: ~ of *soil* $_1$ ⊕   Status : 2

__Contexts__
__Lexical relations__

Explanation	Related term
Related Meanings	
Related meaning	weathering
Other Parts of Speech and Derivatives	
Verb	erode $_{1a}$
Verb with related meaning	erode $_{1b}$
A *soil* that undergoes an e.	eroding $_1$
A *soil* that underwent an e.	eroded $_1$
A *soil* that can undergo e.	erodible $_1$
Types of	
That concerns a large area	extensive $_1$ ~

French : érosion $_1$

Written by : ALS MG MCLH GC
Last update : 26/02/2013

Source: Robin Stott

Figure 1: The entry on *erosion* in the DiCoEnviro

From the DiCoEnviro to the NeoVisual

NeoVisual automatically generates graphs that display the terminological information mentioned in the previous section from entries contained in the *DiCoEnviro*. Figure 2 shows the graph generated from the entry *erosion*.
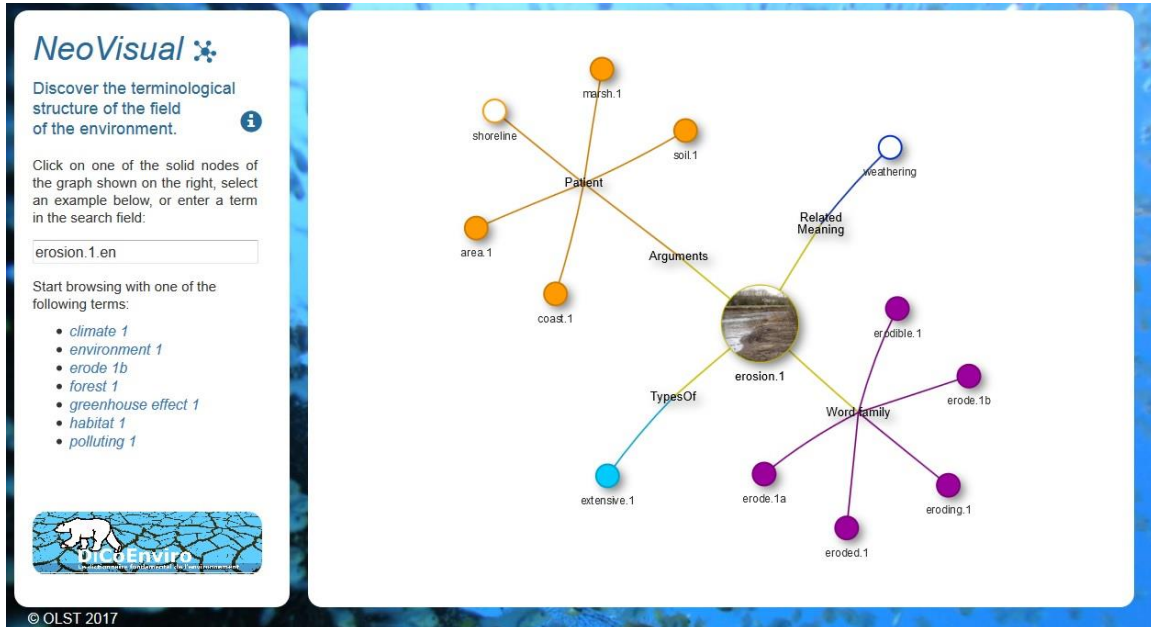

Figure 2: Graph for the term *erosion* in the NeoVisual

Visualization and browsing are noticeably facilitated in a graph structure, as will be seen in the following sections.

Browsing through the NeoVisual

Users may browse through this terminological structure to find information on term relations.

Figure 3: Using the search field

Term Lookup

Users can enter terms in the search field located at the left of the screen. The system suggests terms from the *DiCoEnviro* based on the letters entered in the search field (see Figure 3). A graph is generated once a term is selected from the list.

If users are uncertain about the term they want to look up, they may select one of the examples below the search field (see Figure 2: *climate$_1$*, *environment$_1$*, *erode$_{1b}$*, etc.)

Graph Visualization

The relations that terms hold with other units are grouped in distinctive families (paradigmatic or syntagmatic). The entry search term itself (a disambiguated term) appears in the middle of

the graph and is represented by a (yellow) star or by the picture found in the *DiCoEnviro* entry. The following families with their corresponding color stem from the middle node: Synonyms, Related Meaning, Types of, Opposites, Combinations, Others, Arguments, Word Family. Families that are not described in the selected *DiCoEnviro* entry will not appear in the related *NeoVisual* graph.

Units are clustered according to the family in which they are encoded and are shown as outer nodes.
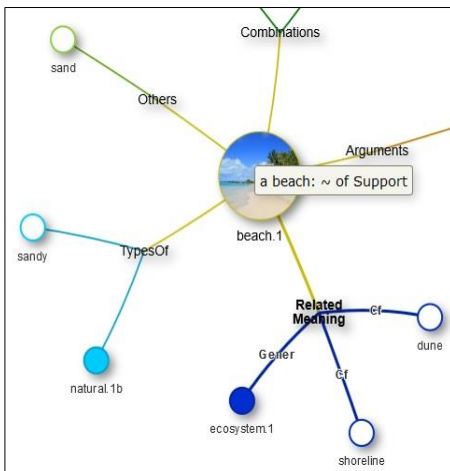
Browsing Graphs

Figure 4: Argument structure and family selection

The argument structure is used to disambiguate terms that have the same graphical form. The argument structure appears when the cursor is placed over the central node (yellow star or picture). Clicking on the central node will open a new tab with the article of the corresponding entry in *DiCoEnviro*.

Clicking on a family node will highlight the selected family: the edge that stems from the central node to the family node and the ones that stem from a family node to the outer nodes will thicken (see Figure 4).

Clicking on a solid outer node generates the graph for that term. When the node is hollow, there is no corresponding entry in the *DiCoEnviro*. The *DiCoEnviro* is still under construction and some terms have not been completely disambiguated yet. When they are, the corresponding nodes will be presented as solid ones and users will be able to generate new graphs from them.

Some terms have exact synonyms. When users click on one of the synonyms, the central edges that connect the border of the central node to the family nodes turn red and the edges connecting the synonyms to the central node thicken (see Figure 5). This indicates that all relations that were established for the central term are also valid for exact synonyms.
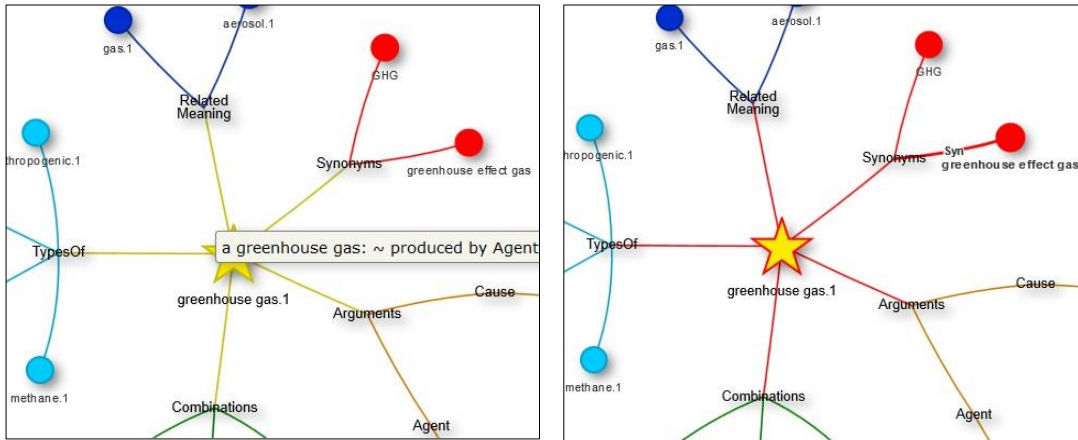
Figure 5: Clicking on exact synonyms

Some related terms are both semantically and morphologically related to the central one. Most of these appear in the Word Family grouping of nodes. However, others are encoded in different families (for instance, *unsustainable* is encoded in the Opposites family for *sustainable*. Although units that are morphologically related to the search term can be encoded in a family other than 'Word family', a feature was implemented in the *NeoVisual* to highlight all morphologically related units. As shown in Figure 6, when users click on the 'Word family' node, relevant nodes and edges become purple.
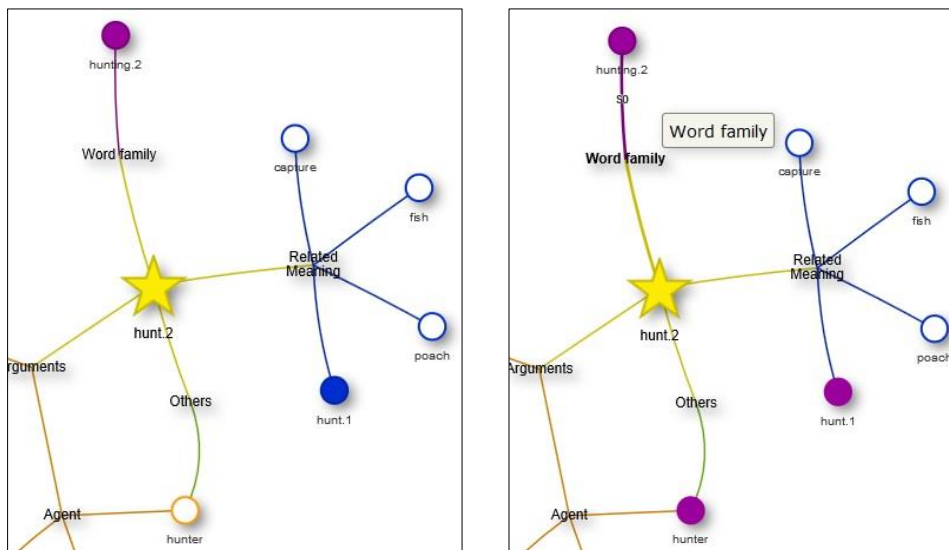

Figure 6: Clicking on the 'Word family' node

To display the lexical function describing the relation between an outer node unit and the entry, users have to click on the outer edges. Because lexical functions can be difficult to understand (when the cursor is over an edge) the lexical function itself as well as a natural language explanation are shown in a pop-up. Arguments have no corresponding lexical function since the name of the family of self-explanatory.
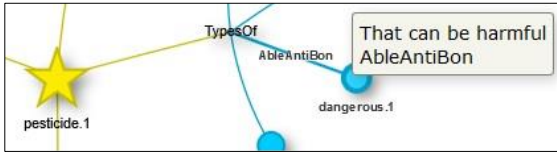
Figure 7: Lexical function for 'dangerous pesticide'

An example of a relation query is illustrated in Figure 7. If users want to know the frequent collocates for the term *pesticide*, they will look at the Types of family. To know the specific relation between *pesticide₁* and *dangerous₁*, they click on the edge and both the lexical function and the natural language explanation will appear. For example, the collocation *dangerous pesticide* (given the meaning of the specific terms) is encoded by the lexical function 'AbleAntiBon'.
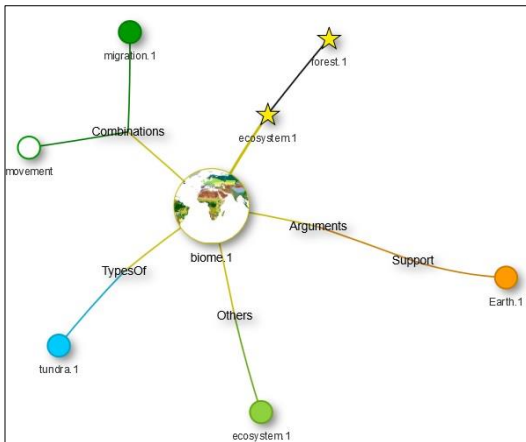

Figure 8: Generating a search history

Another interesting feature of the *NeoVisual* is that it saves the history of users' searches when they generate new graphs by clicking on the end nodes. Every time a new graph is generated a little star node representing the entry of the previous query is attached to the central node of the new query. In Figure 8, the user first looked up the term *forest₁*, then *ecosystem₁* before clicking on *biome₁* to have the corresponding graph displayed. This feature does not account for graphs generated when users type up terms in the search field or when they click on the examples on the left of the page.

Lexical Functions

Most relations are represented using lexical functions that are defined in Mel'čuk et al. (1995), but some adaptations were made to describe environment-specific relations. Table 1 shows example of lexical functions for every families. An example of lexical relation is shown in Figure 7; the collocation *dangerous pesticide* is in fact made of three lexical functions: *Able* "that can be", *Anti* "opposite of" and *Bon* "good". As explained in the natural language pop-up, this means that a *dangerous pesticide* is "a pesticide that can be harmful".

Relation	Example(s)	LF
Same meaning		
Exact synonymy, variants, symbols	*carbon dioxide → carbonic acid gas*	Syn
Related meaning		
Near synonymy	*agriculture → farming*	QSyn
Generic	*carbon dioxide → gas*	Gener
Opposites		
Antonymy	*sustainable → unsustainable*	Anti1, Anti2, Rev1, Rev2
Contrastiveness	*fauna → flora*	Contr
Conversiveness	*propel → run*	$Conv_{ij}$
Word families		
Same meaning, different POS	*abundant → abundance* *warm → warming*	A_0, S_0, V_0, Adv_0
Adjective with added meaning	*erode → eroding* *erode → erodible*	A_1, A_2, $Able_1$, $Able_2$, etc.
Linguistic realizations of arguments		
Role label (e.g. Agent, Patient)	*Warm →* (Patient) *climate, atmosphere, temperature, ocean*	Encoded in lists with role labels
Types of		
Intensification	*Toxicity → high ~*	Magn
According to a location	*habitat → ~ terrestrial ~*	Hypo – Lieu
Combinations		
Typical use	*Habitat → inhabit in a ~*	$Real_i$, $Fact_i$, $Labreal_{12}$
Existence	*Species → ~ survives*	$Func_i$
Creation	*Territory → establish a ~*	$Caus_iFunc_0$
Others		
Meronymy	*Earth → continent*	[Part], [Tot]. Mult, Sing
Quantity	*Greenhouse gas → concentration*	Quant

Table 1: Terminological relations in the DiCoEnviro

Bibliological References

L'Homme, M.C., B. Robichaud, and N. Prévil (2017). Browsing the Terminological Structure of a Specialized Domain: A Method Based on Lexical Functions and their Classification.

L'Homme, M.C. and Z. Jia (2015). Classement des combinaisons lexicales spécialisées à base nominale dans un dictionnaire d'informatique. *Cahiers de lexicologie* 106, pp. 229-251.

L'Homme, M.C., B. Robichaud, and P. Leroyer (2012). Encoding collocations in DiCoInfo: from formal to user-friendly representations, In Granger, S. and M Paquot (eds.). *Electronic Lexicography*, Oxford: Oxford University Press, pp.

Mel'čuk, I., A. Clas, and A. Polguère (1995). Introduction à la lexicologie explicative et combinatoire, Duculot : Louvain-la-Neuve.

Language Resource References

NeoVisual: http://olst.ling.umontreal.ca/dicoenviro/neovisual/

DiCoEnviro: http://olst.ling.umontreal.ca/cgi-bin/dicoenviro/search.cgi