NeoVisual

USER GUIDE

A user guide for browsing through NeoVisual

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NeoVisual Team

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What is the NeoVisual?

NeoVisual (available at: http://olst.ling.umontreal.ca/dicoenviro/neovisual/) is a Graphical user interface (GUI) to the DiCoEnviro database that displays an explicit and intuitive representation of a terminological relations (both paradigmatic and syntagmatic) 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 lexical units.

About DiCoEnviro

> **The *DiCoEnviro* (Dictionnaire fondamental de l'environnement) is a specialized dictionary that records 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, antonymy, 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, illustrations, and equivalents.**

Figure 1 is a screenshot of the entry *erosion*, which contains the terminological information mentioned earlier.

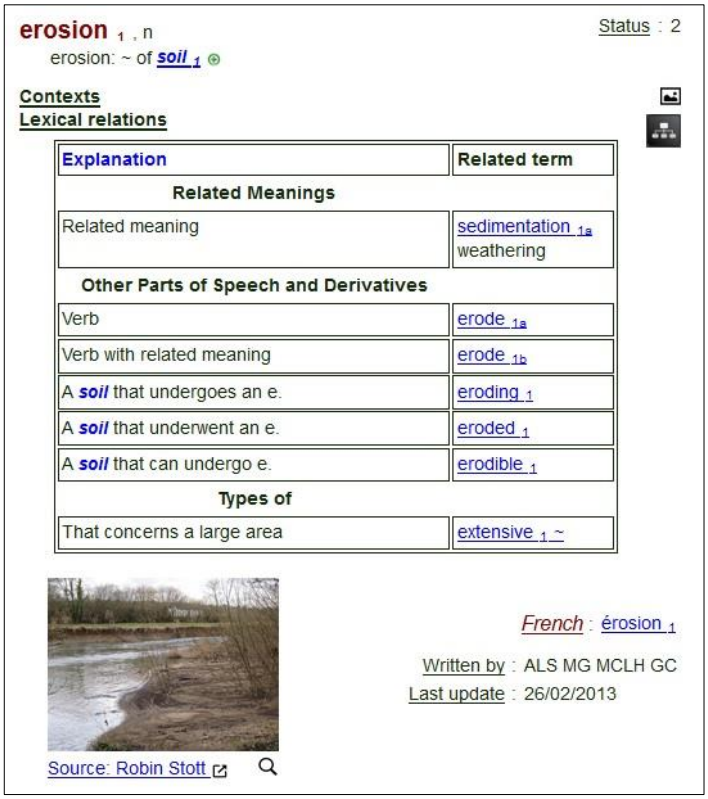

Figure 1: The entry *erosion 1* in the DiCoEnviro

From the DiCoEnviro to the NeoVisual

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

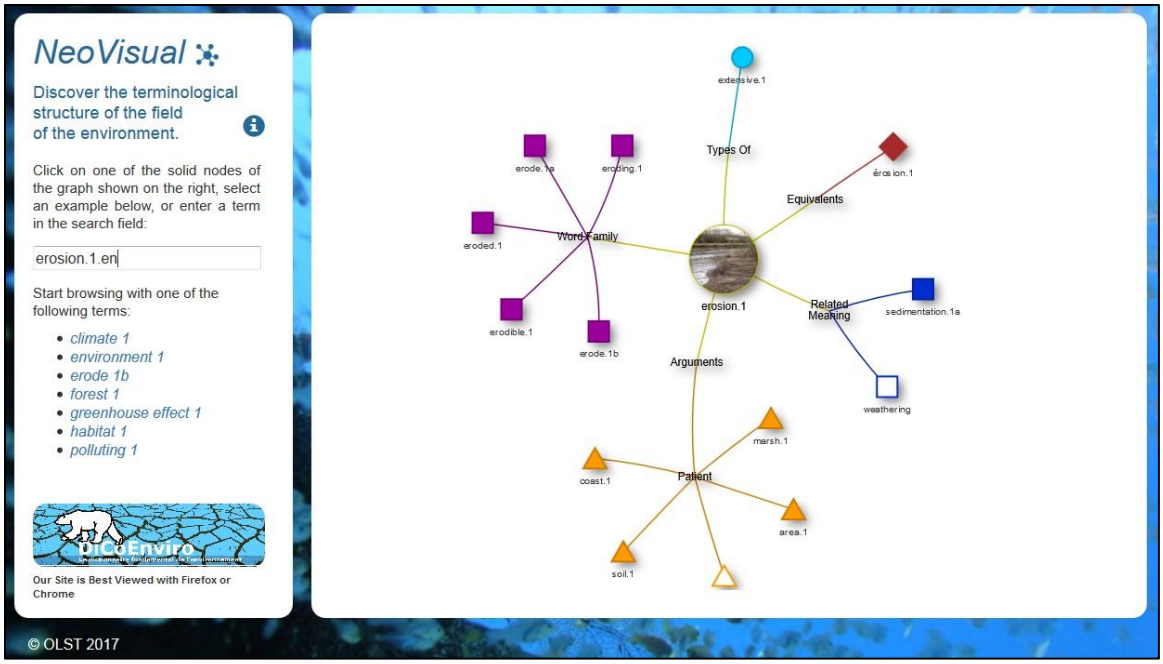

Figure 2: Graph for the term *erosion* $_1$ in the Neo Visual

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

Browsing 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 in the panel 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). As it is possible to generate graphs for Chinese, English, French, Italian or Portuguese terms, entries in these languages are all displayed in a list below the search field. 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 separate families (paradigmatic or syntagmatic). The headword itself (a disambiguated term, i.e. a term with a sense number) appears at the center of the graph and is represented by a yellow star or by the picture found in the *DiCoEnviro* entry. Different families having each their distinct color are connected to the center node: Synonyms, Related Meaning, Types of, Opposites, Combinations, Others, Arguments, Word Family, and Equivalents. 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 then shown as outer nodes. Circular outer nodes denote a syntagmatic relation between the unit and the term, rectangular outer nodes denote a paradigmatic relation, triangular outer nodes denote an argument relation, and finally diamond-shaped outer nodes represent equivalents.

Browsing graphs

The argument structure is used to disambiguate terms that have the same written form. A snippet containing 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 and load the article of the corresponding entry from *DiCoEnviro* itself. As said earlier, users can lookup Chinese, English, French, Italian and Portuguese terms in *NeoVisual*. The Spanish equivalent, when available, is displayed in the generated graph, but navigation in relations is not yet permitted in Spanish.

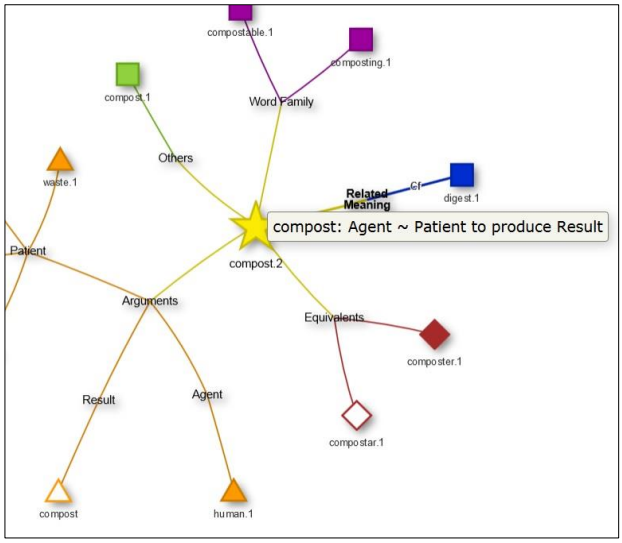

Figure 4: Argument structure and family selection

Clicking on a family node highlights the selected family: the edge that stems from the central node to the family node and the edges that stem from the family node to the outer nodes will thicken (see **Erreur ! Source du renvoi introuvable.**).

Clicking on a solid outer node generates a new 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. The moment they will be, 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.

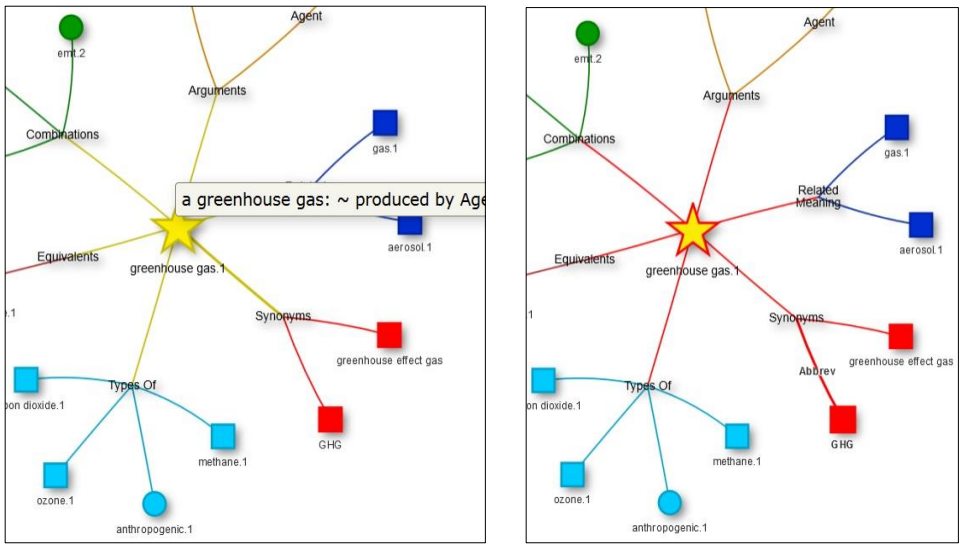

Figure 5: Clicking on exact synonyms

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*$_1$ is encoded in the Opposites family of *sustainable*$_1$). 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* so that the outline of morphologically related units that are not in the Word family are colored as shown in **Erreur ! Source du renvoi introuvable.**.

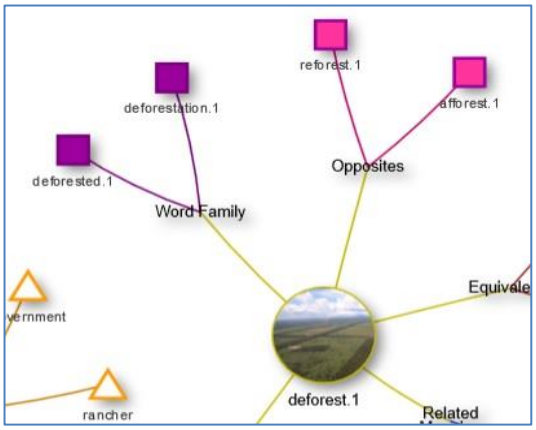

Figure 6 : Semantically related units

To display the lexical function describing the relation between an outer node unit and the entry, users must click on the outer edges. Because lexical functions may be difficult to decipher, a natural language explanation is shown with lexical functions (in a snipet) when the cursor is over the edges. Arguments have no corresponding lexical function since the name of the family is self-explanatory.

An example of a relation query is illustrated in Figure 8. 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 *pesticide*$_1$ and *dangerous*$_1$, they click on the edge and both the lexical function and the natural language explanation are shown. For example, the collocation *dangerous pesticide* (given the meaning of the specific terms) is encoded by the lexical function 'AbleAntiBon'.

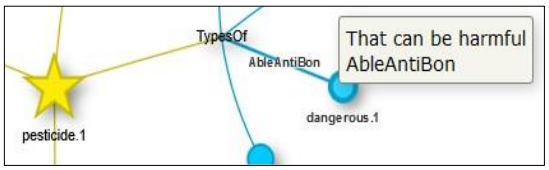

Figure 7: Lexical function for 'dangerous pesticide'

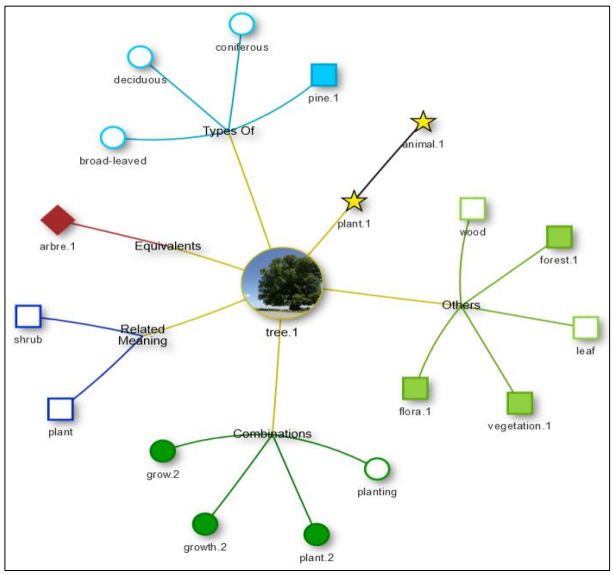

Figure 8: Generating a search history

Another interesting feature of the *NeoVisual* is that it saves the history of users' navigation paths when they generate new graphs by clicking on end nodes. Every time a new graph is generated, a little star node representing the entry of the previous query is attached to the end of the new query's central node's history queue. In Figure 8, the user first looked up the term *animal*$_1$, then *plant*$_1$ before clicking on *tree*$_1$ to have the corresponding graph displayed. When users type up terms in the search field or when they click on the examples on the left of the page, the history queue is reinitialized.

Lexical functions

Most relations in the NeoVisual 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 in each family. An example of lexical relation is shown in Figure 8; 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

References

L'Homme, M.C., B. Robichaud, and N. Prévil. 2018. Browsing the Terminological Structure of a Specialized Domain: A Method Based on Lexical Functions and their Classification. In *Language Resources and Evaluation* (LREC 2018). Miyasaki, Japon.

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