

An IEML dictionary powered semantic navigation widget

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Context

The software widget presented in this paper is a first attempt at providing end-users with a means to navigate an IEML space both for content annotation (USL notation) and for content navigation through their semantics. It was first presented at IEML's international seminar in Ottawa on May 2d, 2009.

Main characteristics of the device

The IEML project sofar has been mainly focused on the creation of the IEML language itself and its associated core instrumentation from a proof-of-concept perspective. At this point in time however, the core IEML team feels that the project is mature enough to be exposed to a broader audience. To this end, there is a need for a compact, practical software artifact that would let end-users interact with IEML-powered (multimedia) resource bases with minimal awareness of the underlying technology.

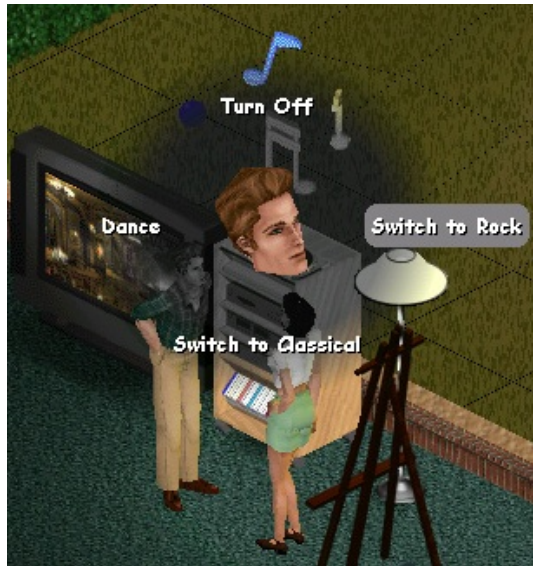
Reusability To optimize both the development costs and learning curve of IEML end-users, a very desirable attribute of such a device is for it to be reusable in many contexts: navigating the IEML dictionary, searching, edition of USLs.

Navigation in all semantic relationships The device has to allow for navigation in all 4 types of semantic relationships rendered possible by IEML: hierarchic, etymologic, symmetric and linear order

SOA The IEML project is thriving to develop components in as much of a loosely connected way as possible; to be compatible with this SOA vision, the widget has to be designed to consume existing services that have been or are going to be developed in the general IEML ecosystem.

A general description of the device

Pie menu the device is really about utilizing the idea of “pie menus”: “directional selection of pie slice-shaped targets”; this type of widget extremely efficient for experienced users while being particularly intuitive for beginners. They were first developed for the Sims computer game (fig 1.)



A very basic editor the general idea for a “widget” is to assist the user in editing a specific type of data: comboboxes for choices, date editor for time data, etc... in this case we want to help the user in visualizing (and possibly edit) IEML *tags.

A USL editor Since USL are really made of *tags, provided some instrumentation, this widget can also be used to help in the edition and maintenance of IEML USLs

Online demo an online demo of some basic pie menus can be found here.

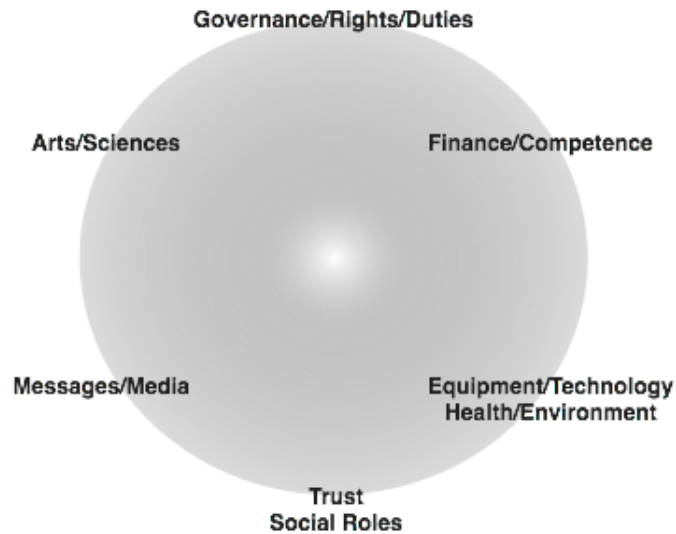
Detailed examples of the device for IEML *tags of layers 0, 1 and 2+

3 types of IEML pie menus to allow the specification of a full USL:

- Very simple for layer 0
- Double pie menu, static, for layer 1
- More advanced widgets for layers 2+

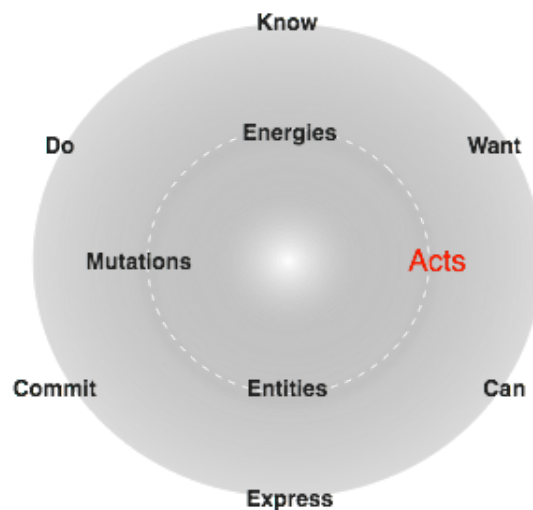
Layer 0: the networks of Collective Intelligence

This very simple pie menu just lets the user choose the appropriate network of CI to which to restrict his search/USL.



Layer 1: a double pie menu

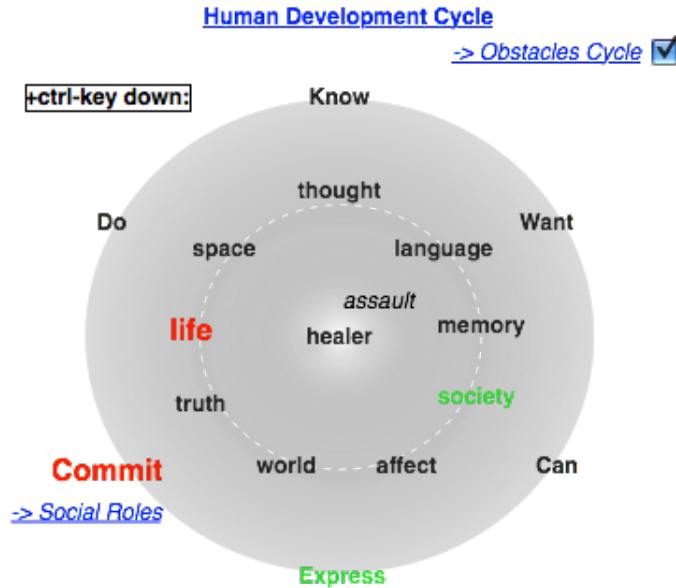
This is an example of a slightly more advanced pie menu where the selection of slices of the first pie would trigger different sets of elements to display on the “outer” pie.



A variation of this idea is to dynamically display a second simple pie menu

upon selection of a slice in the first pie menu.

Layer 2: more complex interactions



This is the most complex type of IEML pie menu. There are two variants of it, whose renditions are triggered by holding the control key down or not. When the control key is down (see figure above), the emphasis is on the etymological relationship of the *tag shown in the center. When it is up (figure below), we see the substance and attribute symmetric relationships for the *tag at the center.

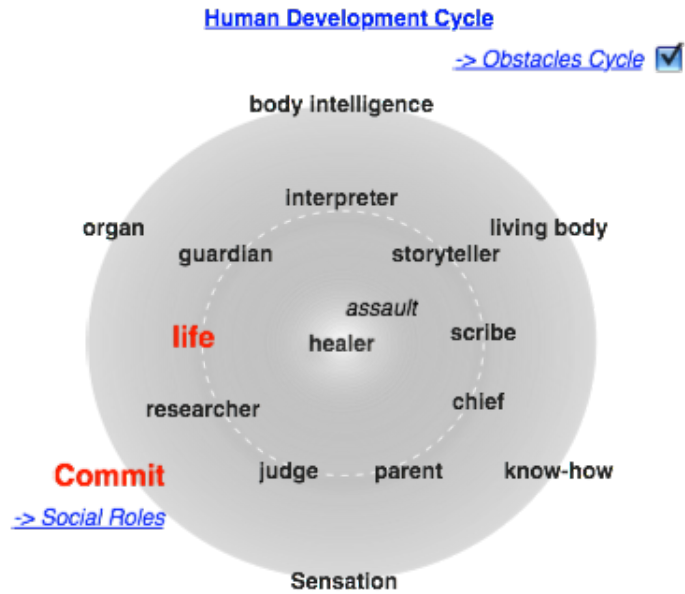
The set/subset relationship is obviously demonstrated by indicating the natural language descriptor of the enclosing category of the current *tag.

Just below the category descriptor, in italic, we can read the name of another category that has a symmetric semantic relationship with the current one (Human Development Cycle <-> Obstacles Cycle).

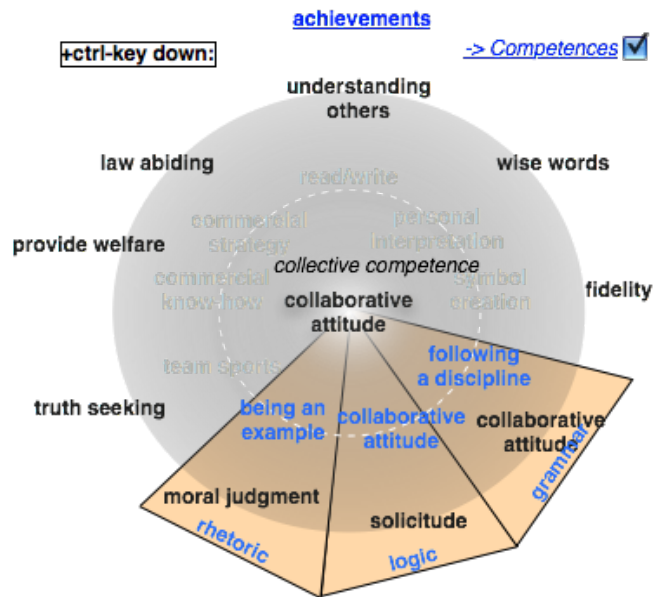
Because of the semantic soundness of the dictionary, it is expected that each concept from the current category (Human Development Cycle) entertains a symmetric semantic relationship with a member of its category's semantically related category (Obstacles Cycle): this is shown with the assault *tag. Since the enclosing category is potentially linked with multiple categories, checkboxes should allow for choosing between them.

Because the current *tag's etymology is life as substance and commit as attribute, we are also interested in categories that are associated with either its source or substance. Here, the "social roles" is indicated, because it has commit both as source and as substance. This particular relationship might not be obviously computed and there might be different depths of exploration to a *tag depending on the semantic distance involved.

Finally, in the figure above, society and express are highlighted in green, but in this case it is only for illustration purposes as it is not really semantically relevant for the example at hand. It is however how one could indicate a symmetric relationship inside of the same category. One could imagine that hovering over these *tags would display the targeted *tag in lieu of the one that is shown here in italic, i.e. “assault”.



partitions Partitions in IEML are a convenient way to convey a progression in degree, a cycle or some other kind of conceptual complementarity.



An IEML web services consumer

The whole IEML project is meant to be a collection of loosely connected components. The pie menu widget will of course have to comply to this philosophy. However, the web services needed for the widget to be fed with appropriate data do not exist yet and we can only anticipate to some of the basic requests that it is going to make; the widget will need to know:

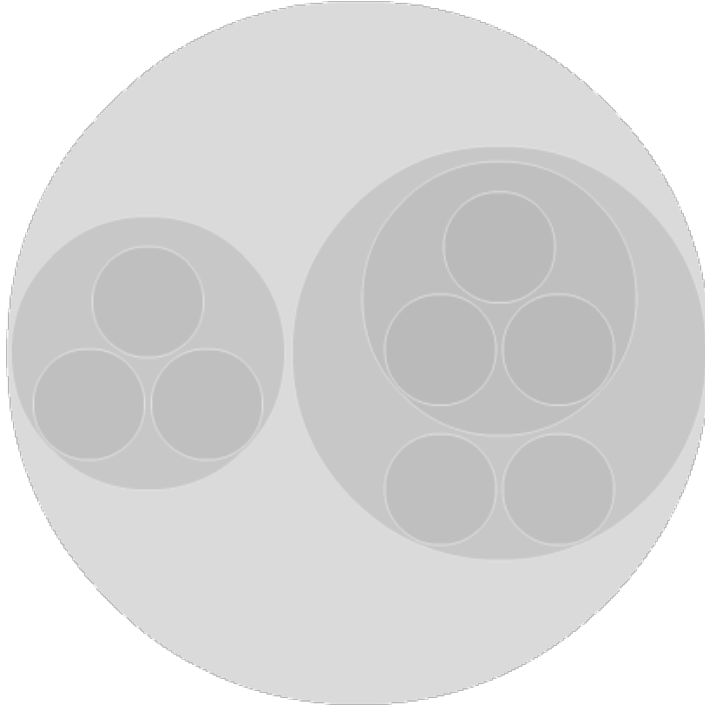
- the category of its current sequence
- the row and column it belongs to
- the categories to which its category are semantically related
- the sequences in its own category to which it is semantically related

Use of the widget in a search interface

A simple search interface can be constructed where *tags would be edited, added and removed with AND/OR composition rules.

Ideally search results should be shown as the *tag is being explored, in real-time (each sequence is a real “search term” as opposed to typed terms where the user decides when he’s finished typing)

Use of the widget in the composition of more complex *tags (expressions of layer 4 and 5)



With the help of some tree-rendition widget, pie menus can be used to edit IEMML expressions of layers 4 and 5. In the above figure, the smallest circles (on the right) represent a category of layer 2 (“relation”).¹

Use of the widget for USL creation

An edition tool could be created that would utilize this widget to compose the successive layers of a USL. Examples of appropriate pie widgets for the different layers have been demonstrated above.

Explicitation of IEMML microformat

Following wikipedia:

“A microformat is a web-based[1] approach to semantic markup that seeks to re-use existing XHTML and HTML tags to convey metadata[2] and other attributes. This approach allows information intended for end-users (such as

¹this depiction isn't accurate, since the tree is not balanced.

contact information, geographic coordinates, calendar events, and the like) to also be automatically processed by software.”

The IEML pie menu widget can be implemented in such a way as to make it easily embeddable in arbitrary HTML pages. An ad hoc icon would inform the user that a given *tag is indeed navigable and that clicking it would trigger display of the widget.

Conclusion

The widget presented in this paper gives a first approximation of what IEML-enabled navigation could look like. It is a very basic widget, however, that only applies to one-dimensional semantic relationships. In most cases, navigation will have to occur between USLs and will most likely leverage some quantitative approach and take into account the notion of semantic proximity, which would not only apply to a couple of concepts but for a whole network of them.