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Title of this paper:

Context Graphs, Concepts,
Knowledge and the Semantic Web

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Context Graphs

A context graph is a set of edges and nodes which depict the structure and relationship of the fine elements comprising a context.

- XGMML is used as an XML-based means of producing a data set which reflects the concepts to be captured.
- They are logical information and do not require a visual depiction per se.

XGMML differs from SVG

- XGMML captures logical graph description
- Decouples content from appearance.
- It provides an attribute feature in both graph nodes and links (edges).
- The attribute may be used in consonance with XLINK to include or reference other XML technologies (name spaces).

Example1 graph

- Contains the following XML technologies:
- XGMML, SVG (*), XTM (*) & HML (*)
- (*) encoded via XGMML's ATT feature
- XSLT can easily transform the ATT versions of SVG, XTM, and HML into their respective XML forms, if needed. (also SAX)
- Graph used to tie SVG animation, XML Topic Map, & HML terms together

- These provide the computer understandable semantics corresponding to both the visual content in the SVG animation and the diagrammatic intention (“understanding of the meaning” conveyed by the diagram).
- The SVG animation is a deBono diagram with animation of some aspects that would need to be inferred by the observer in a still rendition.
- The XML topic map relates various SVG visual object animation components to points of semantic intent.

HML

- The Human Markup Language (HML) structured vocabulary provides a standardized reference for the representation of socio-cultural information conveyed and implied in the deBono diagram.

deBono Diagram

- Visually the deBono diagram shows that the progress of a group is halted by an obstruction, and the HML terms referenced depict that there is a concomitant socio-cultural aspect to such deliberate deflection or blockage.

Graphs show what?

- The edges of the graph are, more or less, simply a concrete way of depicting the relationships of the nodes. Otherwise we have a very large bag of marbles.
- The nodes are a means of specifying values and symbols which are separated from each other.
- The relationships are dynamic and hence change with time.

Damasio elements & XGMML

- The graph structures are used to depict multiple levels, of conceptual activity. The most basic level is atoms of description of low-level system instances, such as properties of the self through time and also properties of external-to-self objects, in time.
- Collections of such properties constitute contexts. There are many simultaneous contexts. Their relationships are dynamic and so change with time.

Neural net comparison

- Neural activation in neural networks also change dynamically and with time and it is this dynamic that the graph structure models, although the nodes do not model neurons.

Example Damasio element

- In example1 graph structure node 36 is the locus for tying-in the XML topic map element which provides the semantics for the obstruction in the SVG animation. Also tied to that SVG element is a collection of particular HML terms. The XGMML graph unifies the content and intent of the SVG animation, its XTM topic map, & relevant DAML HML terms. It provides a means of identifying a situated self and modifications to that self via contextualized interactions with external objects.

Damasio elements

- In Damasio terms the system detects its own state (the “proto-self”), external object’s properties, & creates a graph representation of both. The “post-object self” is represented as well. A second-order view is possible which can be reflected back on external objects to provide further illumination of them.

Concepts and Knowledge

- Concepts are dynamic and are subgraphs which reference various contexts (themselves subgraphs) and indicate the contextual constituents of the concept.
- Knowledge is the creation of a knowledge subgraph which references the members of the concepts which constitute it. The creation is dynamic with time varying relationships. Thus, in effect, knowledge is an experience of the “self”, but only during the reference or identification period, because membership changes dynamically.

OpenCYC and SUMO

- DAML is used in OpenCYC & SUMO to express taxonomic interrelationships, amongst the general physical, cultural and social knowledge coded there. Terms like `#$PurposefulAction` and `#$performedBy` are related to other CYC concepts represented, in such a way that a reasoner can perceive “connections” not directly stated in input.