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The Principle of Sensible Disbelief

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Description: The principle of sensible disbelief provides useful research-modeling and disagreement-moderating properties to CFPS 4 that are absent from CFPS 77.

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The Principle of Sensible Disbelief

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Abstract

An exploration of the principle used to determine what concepts should be their own nodes in CFPS 4. This principle of sensible disbelief is violated by the adjustment in CFPS 77, weakening its research-modeling characteristics.

Richard Smith pointed out [1] that all portions of my proposed research-process data model [2] could be represented by a set of (id, name, value) tuples. This observation is accurate, though not unique to my proposed model; the fields of any struct can stored as either internal attributes within the struct or as external properties pointing to the struct, the latter being what Smith proposes.

However, Smith's unified encoding obscures some of the meaning that I intended to communicate by the particular distinction between attributes and properties that I proposed. I write this document to make that meaning more explicit.

Principle of Sensible Disbelief

My design was based on what I call the "principle of sensible disbelief" which I developed to render actionable the more abstract goal of modeling each "atomic portion of the research process" as its own node.

The principle of sensible disbelief states "every thing which might be sensibly disbelieved should be its own node, and it should be sensible to disbelieve and node." Breaking this down further, and considering the requirement that pointers be consistent, we have the following three subprinciples:

1. Disbelieving a node but not the nodes it points to should be sensible.
2. Believing part of a node but not another part should not be sensible.
3. Believing a node but not a node to which it points should not be sensible.

Given a node A with attributes $a_1, a_2, \ldots, a_n$, where some a_i is a reference to node B, we can express the same subprinciples mathematically:

1. $B \not\Rightarrow A$ (or $B \wedge \neg A \not\vdash \bot$)
2. $a_i \Leftrightarrow a_j$ (or $A \setminus a_i \vdash \bot$)
3. $A \Rightarrow B$ (or $A \wedge \neg B \vdash \bot$)

Examples

A few examples may illustrate this principle better than further description could:

- It is not sensible to believe a thing without believing its type; hence type is an attribute, not a separate node.
- It is not sensible to believe something without having some source for that belief; hence citation is an attribute, not a separate node.
- It is sensible to believe in a source without believing in nodes that cite it, so citation attributes are pointers to external source nodes.
- It is sensible to believe in a person without believing their name is "Mary", so name is a separate node from the person to whom the name belongs.
- It is not sensible to believe in a name without believing in some person (or other thing) to whom the name belongs, so a name and its pointer to a thing are part of the same node (a property) and not separated as a thing and a connection.
- It is sensible to believe in a person and a birth without believing the person participated in the birth, so participation is a separate node (a connection) pointing to both the event and the person, not an attribute of either the person node or the birth node.

Similar examples can be generated be considering each portion of the data model proposed in CFPS 4: matches can be disbelieved without disbelieving the things they match; you can't disbelieve and inference without disbelieving that which cites it; etc.

There are other principles in play in creating nodes. As an example, information should not be duplicated, implying that (e.g.) an inference is a separate node from the nodes that cite it. But I assume these other principles are well understood, as they are discussed in most undergraduate computing curricula.

Why Use the Principle?

If the principle of sensible disbelief has been correctly realized in my proposal then any disagreement between two users of a CFPS 4-like data model can be expressed as non-identical belief sets. Similarly, every set of nodes is a sensible (though not necessarily defensible) belief set provided that it contains all of the nodes reachable by following its pointers.

If all attributes are stored as properties or connections then it is still true that every disagreement is expressible as distinct belief sets, but no longer that case that every set of nodes is a sensible belief set. In particular, some (but not all) of the nodes that point *to* a node are also needed for the set to make sense. Additionally, it becomes possible to encode things that skip research steps; for example, adding

two citation connections to a single node skips recording the matching research step that asserts the two citations refer to the same thing.

Thus, while CFPS 77 does increase the generality of CFPS 4, it does so at the loss of the structural assurance that individual research steps are explicitly encoded in the data. It also adds in a level of generality that allows various nonsensical and incomplete data to be encoded without any null or broken pointers or other data-structure-level inconsistencies.

References

[1] Smith, Richard. "A Unified Formalism for Genealogical Statemnts." *FHISO Open Call for Papers* CFPS 77. http://fhiso.org/files/cfp/cfps77.pdf Retrieved 2013-06-12.

[2] Tychonievich, Luther. "Modeling Research, not Conclusions." *FHISO Open Call for Papers* CFPS 4. http://fhiso.org/files/cfp/cfps4.pdf Retrieved 2013-06-12.