Semantic Distance

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Some ICEIMT History

1992
Monolithic Frameworks
Object Orientation
Business Case

1997
Ontologies
Virtual Enterprises
Uncertainties

2002
Semantic Distance
Humanized Functions
TransStandards
Semantic “Federation”

Integration is always a game of:
- Homogenize where you can
- Develop methods for handling the rest
- On beyond zero, by definition
- No standards, by definition
- Formal methods usually lacking here

All we are doing is handling the problem of imperfect semantic conveyance
Semantic Distance

We mean in the limited case, a measure of the imperfection of *semantic conveyance*...
but could more generally be seen as a measure of *similarity* between two meanings.
Based on the openness of application...
Many Applications

Enterprise Integration
- Context-specific tool certification
- Learning vector for self-annealing enterprises

Concept indexing (library, semantic web)
Biochemical “intent”
We Propose

A multidisciplinary solution, rooted in the EI semantic conveyance problem for Virtual Enterprises

- but tools applicable to the other domains
- necessary for “intuitive development” and broad acceptance
The Virtual Enterprise

Change Processes in Operation

Join with Changed Processes

Distributed State Control

Temporary Possibilities

Not Premodularized

Small and Medium-sized Partners

Distributed Partners

Monolithic Enterprises

Mundane case

Monolithic Enterprises

Distributed Partners

Small and Medium-sized Partners

Mundane case
An International Workshop

Thirty experts, heavy European engagement
Dialog with another twenty since
Plus a Joint Experimentation Command task
Wiki at: <http://interop.cim3.net/cgi-bin/wiki.pl?IntroDuction>
Some Observations

Some very tentative ideas, sensitive to the larger application spread.
Measure Semantic Intent

- Motive
- Communication
- Process
- Outcome
- Sending Actor
- Receiving Actor
- Effective Actor

Diagram showing the flow from Motive to Communication, then to Process, and finally to Outcome, with actors involved in each stage.
Condition 1

1. Perfect Conveyance – with context scope

Assumes standards are:
- done
- comprehensive
- coordinated
- perfect
- apt
- cheap
- competitive-friendly
- employed
Condition 2

2. Good Enough For Use – with context scope

“Send me 1000 gizmos”
Condition 3

3. Close Enough To Fix Once
   – with cost and context

“Send me 1000 gizmitas”
“What do is a gizmita?”
Condition 4

4. Close Enough To Change – with cost and context

“Send me 1000 gizmos by which I mean...”
Condition 5

5. Too Far Off To Fix
But Effect Manageable/Recoverable
– with cost and context

“I’m making 1000 cars, send me 1,000,000 steering wheels”
Condition 6

6. Too Far Off To Fix But Effect Could Be Tolerable – with cost and context

“I’m making 1000 cars...”
“I’ll send that many steering wheels”
Condition 7

7. Too Far Off to Fix And Effect Is Intolerable – with cost of catastrophe

“Send me 1,000,000 steering wheels”
A Semantic Interoperability Language
- A metalanguage with metalogic which formally covers the territory
- Used for queries and dialog among actors and concerning the nature of conveyance
- Based on Situation Theory?
Need #1

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Essential for communications about communications (including encryption)
Need #2

A Theory for General Context Characterization

- Very tricky because large portions of the context need to be imputed
- Probably the thing that changes most with application domain
- Must involve various probabilists
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Known Message
Other Message Factors
Modeled Process (context)
Unmodeled Process Components
Unknown Linkages and Effects In Other Processes

Essential for “modeling” (imputing) the unmodeled (including encryption)
Need #3

A Calculus for Semantic Metrics
- Not necessary for many users
- Needed for zooming and calculation in abstraction space
- Probably Group Theoretic
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Used only for native calculus,
... but essential for reasoning among conditions and building a reference base
Need #4

Accessible Metaphors for User Interface
- A means for local generation of scalars
- A graphical notion of fittedness
- Ontology difference trees/graphs
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Intuitive Abstractions
- Scalars
- Trees, “Closeness” Graphs
- Film-derived introspection

Metrics (Metamodels)

Models

Outliners?

UEML?
Last Slide

Agenda still forming
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