Integrating Argumentation, Text and Community: Toward an ontology and services

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Vision within our tradition

- Ontology-driven document enrichment (cf. ScholOnto project & Semantic Web stuff)
Overview of talk

- Research Focus
- The Ontology
- Opening a conversation
- Example
- Conclusion
Analytical Lens on Digital Lib.

• What is being debated about this topic?
• Who are the experts on this research topic?
• What is this particular author's theoretical framework (underlying philosophy)?
• What are the main philosophical camps in the field, and is there anyone that subscribes to more than one competing camp?

• These kinds of questions "support students' access and entry into the conversation of their chosen discipline"

So, above this we can place...
...a layer of analysis

Extract from Robert Horn’s Turing Debate Map
Research Question

- What is the nature of a suitable formalisation for representing academic debate and enabling analysis of an academic domain?
Ontology behind the wheel

- Kinds of objects, attributes of objects, and relations between objects that make up an academic domain

- Textual (within publications); Contextual (surrounding publication production)
Tri-partite Ontology

- Contextual Knowledge
  - Community of Practice

- Textual Knowledge
  - Lexical Knowledge (Field-specific Content)
  - Argumentation Knowledge
### Community of Practice Concepts

<table>
<thead>
<tr>
<th>Concept</th>
<th>Attributes</th>
<th>Typical relations</th>
</tr>
</thead>
<tbody>
<tr>
<td>Person</td>
<td>Name, Gender</td>
<td>researcher-at → [Institution]</td>
</tr>
<tr>
<td></td>
<td></td>
<td>author-of → [Publication]</td>
</tr>
<tr>
<td></td>
<td></td>
<td>collaborates with → [Person]</td>
</tr>
<tr>
<td></td>
<td></td>
<td>believes → [Statement]</td>
</tr>
<tr>
<td>Project</td>
<td>Name, Start Date, End Date</td>
<td>has-member → [Person] or [Institution]</td>
</tr>
</tbody>
</table>

- Concepts from AKT Reference ontology
- E.g.

  [Neil Benn] student-at [Knowledge Media Institute]
  [Neil Benn] author-of [benn2005integrating]
  [AKT Project] has-end-date [01-06-2005]
  [AKT Project] has-member [Knowledge Media Institute]
Lexical Concepts

<table>
<thead>
<tr>
<th>Concept</th>
<th>Attributes</th>
<th>Typical relations</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lexical-Term</td>
<td>Gloss, Definition</td>
<td>{broader-term, narrower-term, equivalent-term, opposite-term, part-of, has-part} → [Lexical-Term]</td>
</tr>
</tbody>
</table>

- ‘Conceptual’ system of the field – the content
- Classic Thesauri relations
- E.g. (in Bioethics research domain)
  
  [Life: “Any form of living animal or vegetable...”] has-narrower-term [Human Life: “Any living entity which has human DNA...”] has-associated-term [Human Personhood: “This is a form of human life which is considered to be a person whose life and health should be protected. No consensus exists about when this begins.”]
Argumentation Concepts

- Natural Argumentation focus:
  - The kinds of moves in publications
  - As an aid to structuring a mass of information in academic fields
  - Two levels of Argument Structure (Individual & Collective Argument)
### Argumentation Concepts (2)

<table>
<thead>
<tr>
<th>Concept</th>
<th>Attributes</th>
<th>Typical relations</th>
</tr>
</thead>
<tbody>
<tr>
<td>Issue</td>
<td>Text</td>
<td>generates-issue → [Issue]</td>
</tr>
<tr>
<td>Statement</td>
<td>Text</td>
<td>{supports, disputes} → [Statement/Argument]</td>
</tr>
<tr>
<td></td>
<td></td>
<td>{cohere, incohere} → [Statement/Argument]</td>
</tr>
<tr>
<td></td>
<td></td>
<td>relates-to-term → [Lexical Term]</td>
</tr>
<tr>
<td></td>
<td></td>
<td>addresses → [Issue]</td>
</tr>
<tr>
<td>Argument</td>
<td>Premises, Conclusion</td>
<td>(same as above)</td>
</tr>
<tr>
<td>Toulmin</td>
<td>Grounds, Warrant, etc</td>
<td>(same as above)</td>
</tr>
</tbody>
</table>

- **E.g.**
  
  [Iss1: “When is abortion morally acceptable?”] generates-issue
  
  [Iss2: “When does human personhood start?”]
  
  [S1: “Human personhood begins at conception”] addresses [Iss2]
  
  [S2: “Human personhood begins at birth”] addresses [Iss2]
  
  [S1] disputes [S2]
More ingredients in the pot?

- Starting conversation with you, the experts
Revisit...
...vision within our tradition (2)
Example Walkthrough

- Simplified Debate in Bioethics Research Domain

Diagram:

- Question: When does human personhood start?
  - Addresses: $Human Personhood
  - Related to: $Human Personhood

- Human personhood begins at conception
- Human personhood begins at birth

- Disputes: Has-belief
- School of thought: Pro-Life
- School of thought: Pro-Choice
• Publication by Dennis Sullivan

When does human personhood start?

addresses

$\text{Human Personhood}$

Human personhood begins at conception

School of thought: Pro-Life

• has-belief

Human personhood begins at birth

School of thought: Pro-Choice

• has-belief

Dennis Sullivan

author-of

sullivan2003thirty
Example Walkthrough (3)

- What philosophy informs his views? To what Schools of thought does he subscribe?
Example Walkthrough (4)

When does human personhood start? relates to-term $Human Personhood

addresses

Human personhood begins at conception
disputes

School of thought: Pro-Life

has-belief

School of thought: Pro-Choice

A

has-belief

A

A

Natural rights are not derivative or conferred, but intrinsic.

has-statement

John Locke

has-premise

has-claim

Personhood, thus defined, would become an ontological principle that adheres to the fetus by definition.

Dennis Sullivan

author-of sullivan2003thiry

has-claim

has-termination

has-conclusion
Example Walkthrough (5)

Human personhood begins at conception

Human personhood begins at birth

School of thought: Pro-Life

School of thought: Pro-Choice

Natural rights are not derivative or conferred, but intrinsic.

Personhood, thus defined, would become an ontological principle that adheres to the fetus by definition.
Example Walkthrough (6)

When does human personhood start?

Human personhood begins at conception

School of thought: Pro-Life

has-belief

Dennis Sullivan

author-of

sullivan2003

has-premise

has-claim

has-conclusion

Personhood, thus defined, would become an ontological principle that adheres to the fetus by definition.

School of thought: Pro-Choice

has-belief

John Locke

has-member

Natural rights are not derivative or conferred, but intrinsic.
Example Walkthrough (7)

When does human personhood start? relates-to-term Human Personhood
addresses
addresses

Human personhood begins at conception disputes Human personhood begins at birth

School of thought: Pro-Life
School of thought: Pro-Choice

School of thought: Natural Rights

Dennis Sullivan
Example Walkthrough (10)

What makes something morally right or wrong?

addresses

addresses

In place of the morality of natural rights, the principle of utility provides the foundation for a scientifically provable system of morality.

disputes

The equality of men by nature is the foundation of our moral obligations to one another.

has-belief

has-belief

School of thought: Utilitarianism

School of thought: Natural Rights

competes-with
Example Walkthrough (11)

School of Thought: Utilitarianism

Human personhood begins at conception

School of Thought: Pro-Life

School of Thought: Natural Rights

When does human personhood start?

addresses

human personhood begins at birth

has-belief

Human personhood begins at conception

disputes

has-belief

$Human Personhood

$Human Personhood

Dennis Sullivan
Conclusion

• Conceptual Framework:
  – For integrating the different kinds of knowledge in an academic domain
  – To support useful kinds of browsing and filtering over digital libraries

• Fine-print – the modelling isn’t for free:
  – Human (librarians, information scientists)
  – Need technical architecture (right interface, tools, training, etc.) for scaling up
  – Could be cave-man drawing/early sketches of things we might be seeing in the future