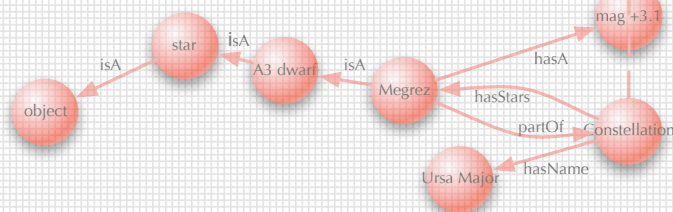


Philosophical languages in the 21st century

By Matthew J. Graham (Caltech)



What is a philosophical language?

- "A philosophical language is any constructed language that is built from first principles but may entail a strong claim of absolute perfection or transcendent or even mystical truth rather than satisfaction of pragmatic goals."
- The meaning of words is inherent in their structure – constructed from a limited set of morphemes that are considered fundamental
- Implies taxonomic/conceptual



What is this?

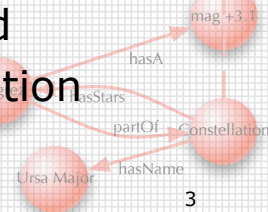


- Zi•t•a

- beast
- clawed rapacious oblong-headed
- land-dwelling with docile disposition

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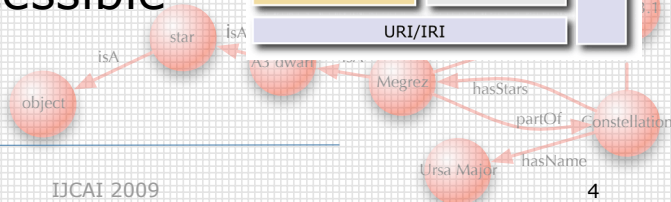
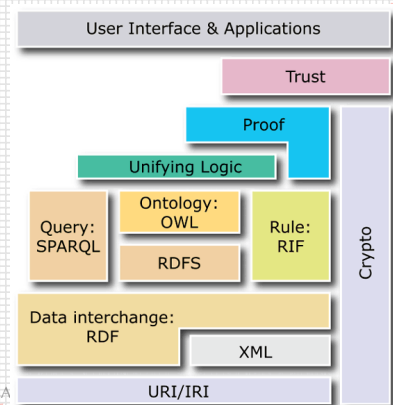
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What has this to do with astrophysics or cosmology?

- Semantics
- Formally represent our bases of knowledge
- Express the patterns and trends that data mining produces in machine-processible fashion



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Vi(s/rt)ualization

- Plagued by hyperdimensional data
- Techniques to reduce complexity to make data easier to render
 - Parallel coordinates
 - PCA, ICA
- Virtual environments to view data:
 - SL, OpenSIM, WoW
 - Datascapes
 - Virtual museums – NaturalOWL
- Meta-Institute for Computational Astrophysics (<http://www.mica-vw.org>)

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Smart virtual museums

Welcome to the ground floor!

- What the robot says about the exhibits is not written in advance! The robot uses natural language generation technology to produce texts automatically from knowledge stored in logical form and small pieces of text. This allows the robot to tailor what it says, for example by including comparisons to previous exhibits. It also allows it to generate texts in multiple languages from the same knowledge representation. The robot currently speaks English and Greek.



"This is a prochous. A prochous is a vessel that was used to pour liquids. It has one handle, a large body, and a nib-like neck. This particular prochous was created during the Classical period. The Classical period is characterised by the initial political supremacy of Athens (its "golden age"), which was followed by the expansion of the Greek world under the rule of Alexander the Great of Macedonia. It covers the time between 480 and 323 B.C. This prochous dates from the second quarter of the 5th century B.C. It depicts a Greek hunting a Persian. Currently it is exhibited in the Museum für Kunst in Hamburg."

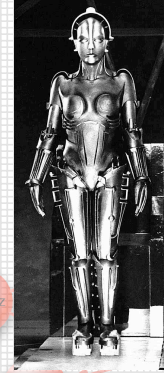
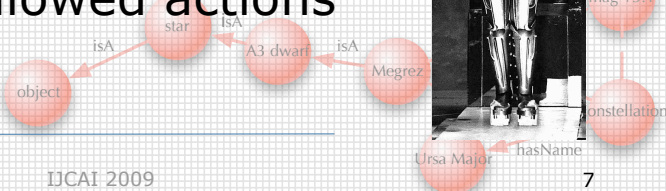
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Immersion not visualization

- “I don’t just want to view my data, I want to party with it”
- Data = conceptual model + instances
- What about services?
 - Robotic avatars
 - Intelligent agents
- Ontology of allowed actions in the world



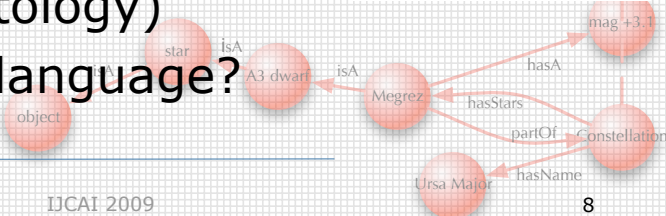
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Virtual semantics

- Tagging of objects to tie to an ontology, e.g. SemSL
- Controlled vocabulary to interact (\expand, \rotate)
- Techniques for hierarchical clustering -> concept hierarchy (ontology)
- Philosophical language?



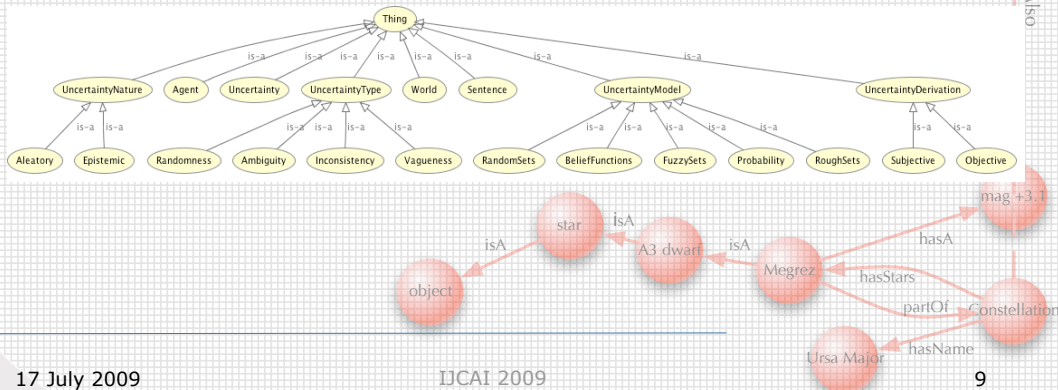
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The world is an uncertain place

- Formally treat uncertainty:
 - probabilistic (Bayesian) – PR-OWL
 - fuzzy logic – Fuzzy OWL
 - belief functions - BOWL

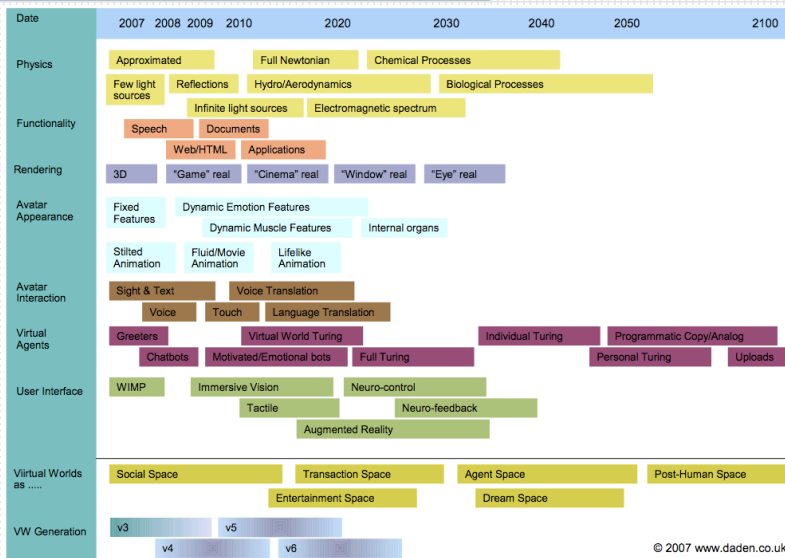


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Virtual roadmap



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The folly of conceptual systems

"These ambiguities, redundancies and deficiencies remind us of those which Doctor Franz Kuhn attributes to a certain Chinese encyclopedia entitled 'Celestial Empire of benevolent knowledge'. In its remote pages it is written that the animals are divided into: (a) belonging to the emperor, (b) embalmed, (c) tame, (d) suckling pigs, (e) sirens, (f) fabulous, (g) stray dogs, (h) included in the present classification, (i) frenzied, (j) innumerable, (k) drawn with a very fine camelhair brush, (l) et cetera, (m) having just broken the water pitcher, (n) that from a long way off look like flies."

- The Analytical Language of John Wilkins, J. L. Borges

