http://inpho.cogs.indiana.edu/

InPhO

the Indiana Philosophy Ontology project

Working the Crowd: Design Principles and Early Lessons from the Social-Semantic Web

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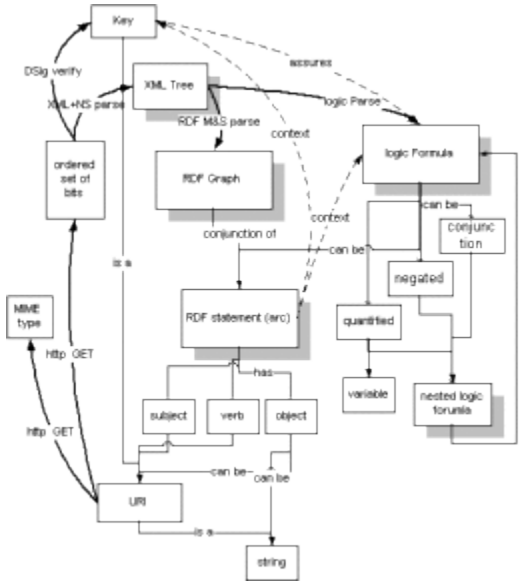
Social Web

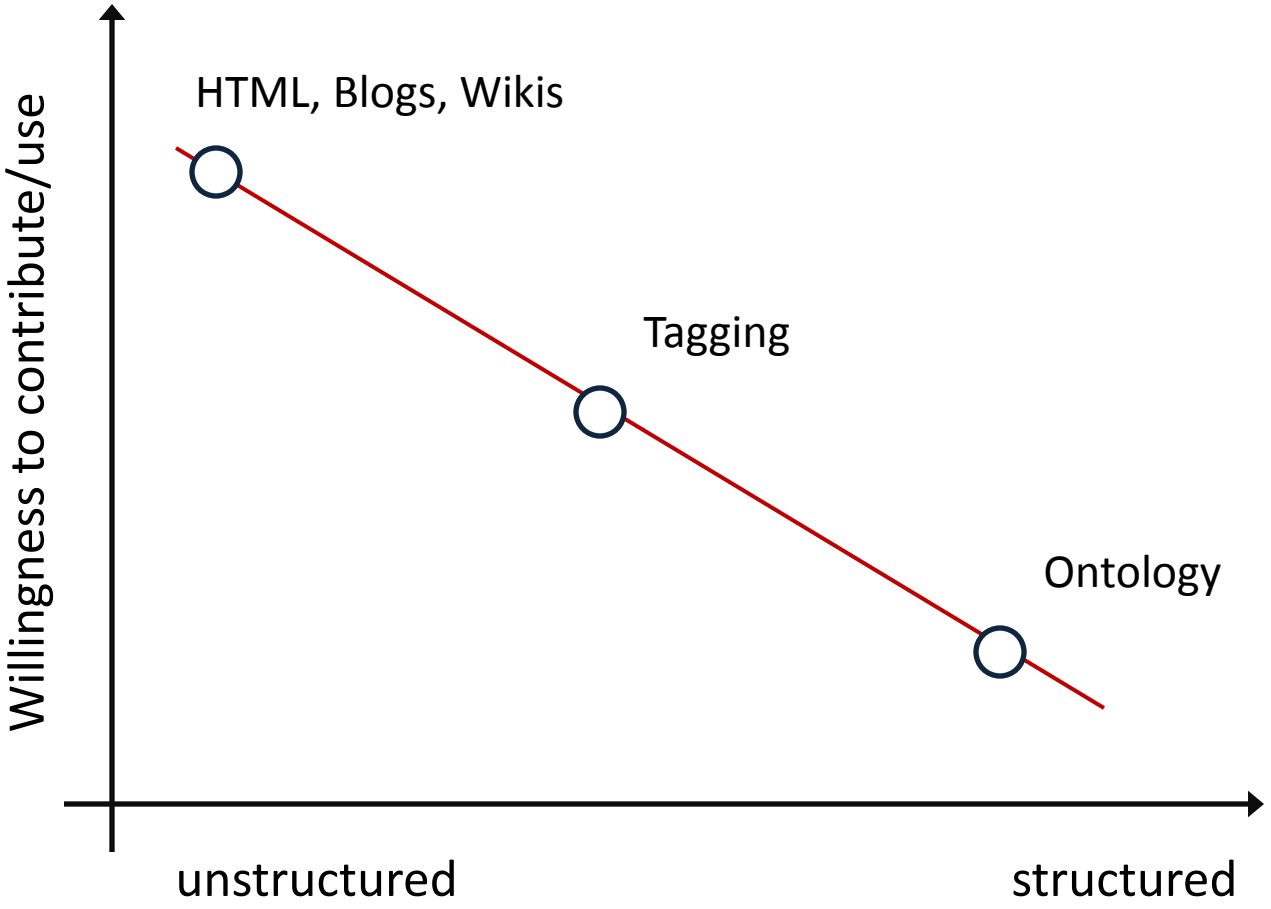
- Leverages “Wisdom of the crowds”
- Plain text, tagging, folksonomies, collaborative filtering, “social search”, …
- Many successful projects (e.g., Wikipedia and Flickr)
- Problems:
  - Noisy
  - Term ambiguity
  - Lack of structural depth, reasoning capabilities

Semantic Web

- Based on formal conceptualizations of a domain (ontologies, taxonomies, thesauri)
- Success in biomedical and business domains (e.g., the Gene Ontology)
- Reasoning and matching capabilities, interoperability, semantic search
- Problems:
  - Need for double experts
  - Lack of user participation
  - Too complex



Social and Semantic Web



Basic Ideas and Insights

- Pragmatic ontology design
  - Various specialized and dynamic ontologies that utilize semi-automated tools for information integration
  - simple in the initial design phase; not top-down and static
- Ontology Extension as Iterative Relation Addition and Refinement
  - incremental and driven by user participation
  - “influenced-by”: in which area of philosophy? (RDF reification)

Basic Ideas and Insights

- Ontology Population as Iterative Data Addition, Validation, and Data Integration
  - Tagging of pairs of individuals
  - Simple validation of recommendations from text processing algorithms
- Stratified Participation; Provenance and Trust
  - Wisdom of the crowds, but…
  - Some users should be considered more trustworthy and reliable than others
  - Nevertheless, open community is important

The InPhO Project

- Statistical text processing to extract candidate instances for relations
- Design interfaces that allow users to “tag” not only individual entities but also pairs of things
- Collect these bits of information in a knowledge base
- Use logic programming (ASP) to put the pieces together to a populated ontology

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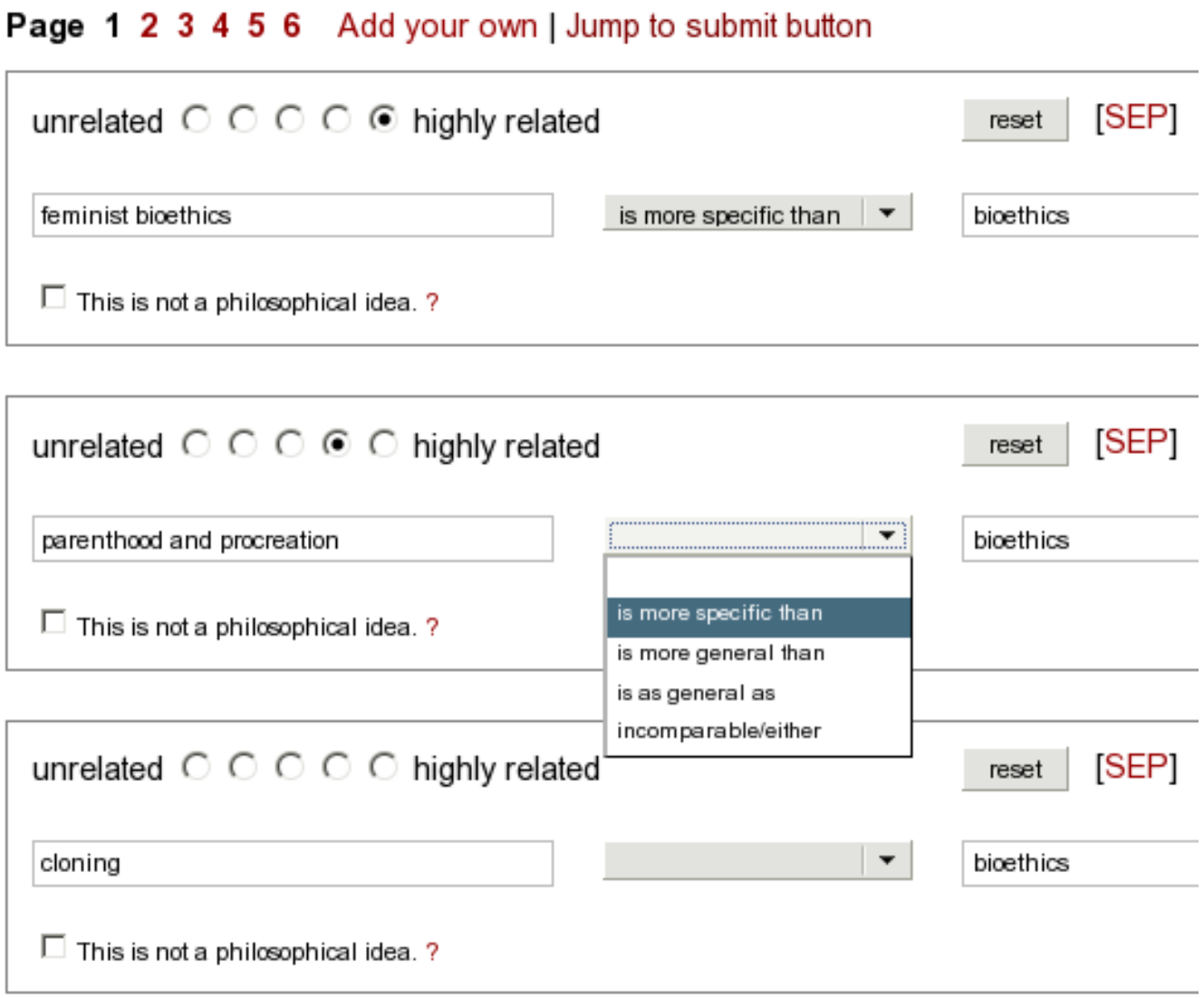
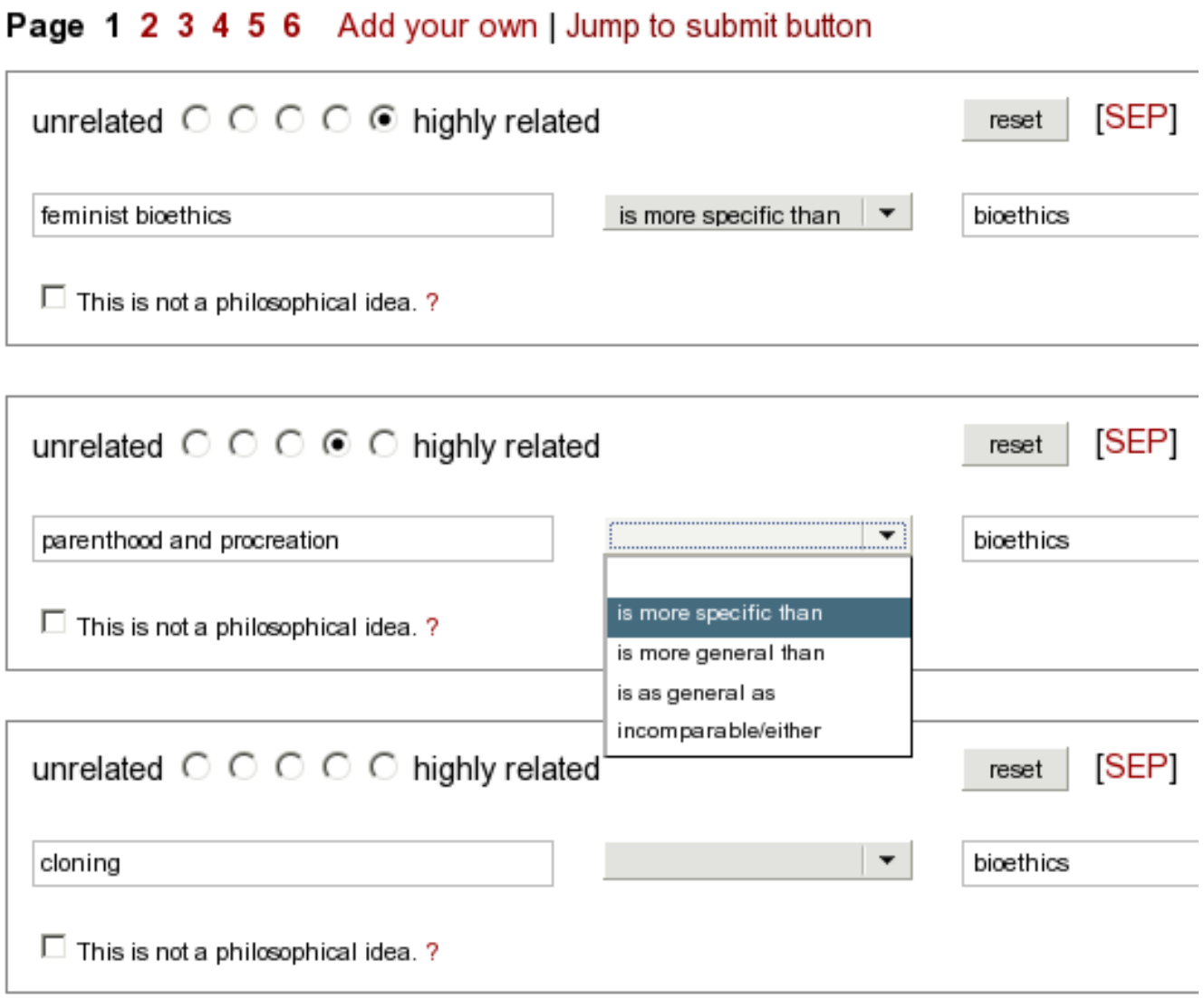
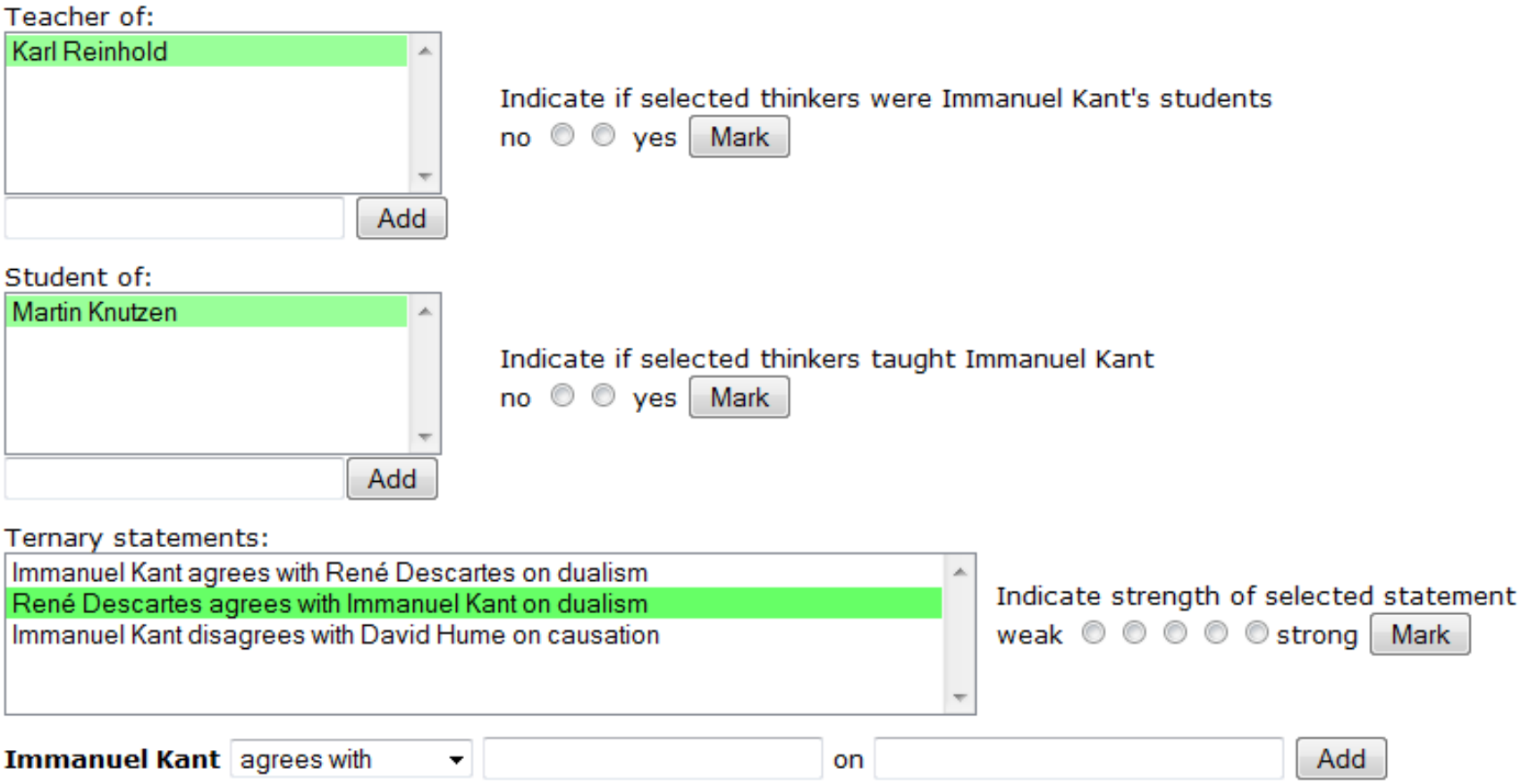


The InPhO Project



The InPhO Project



Logic Programming

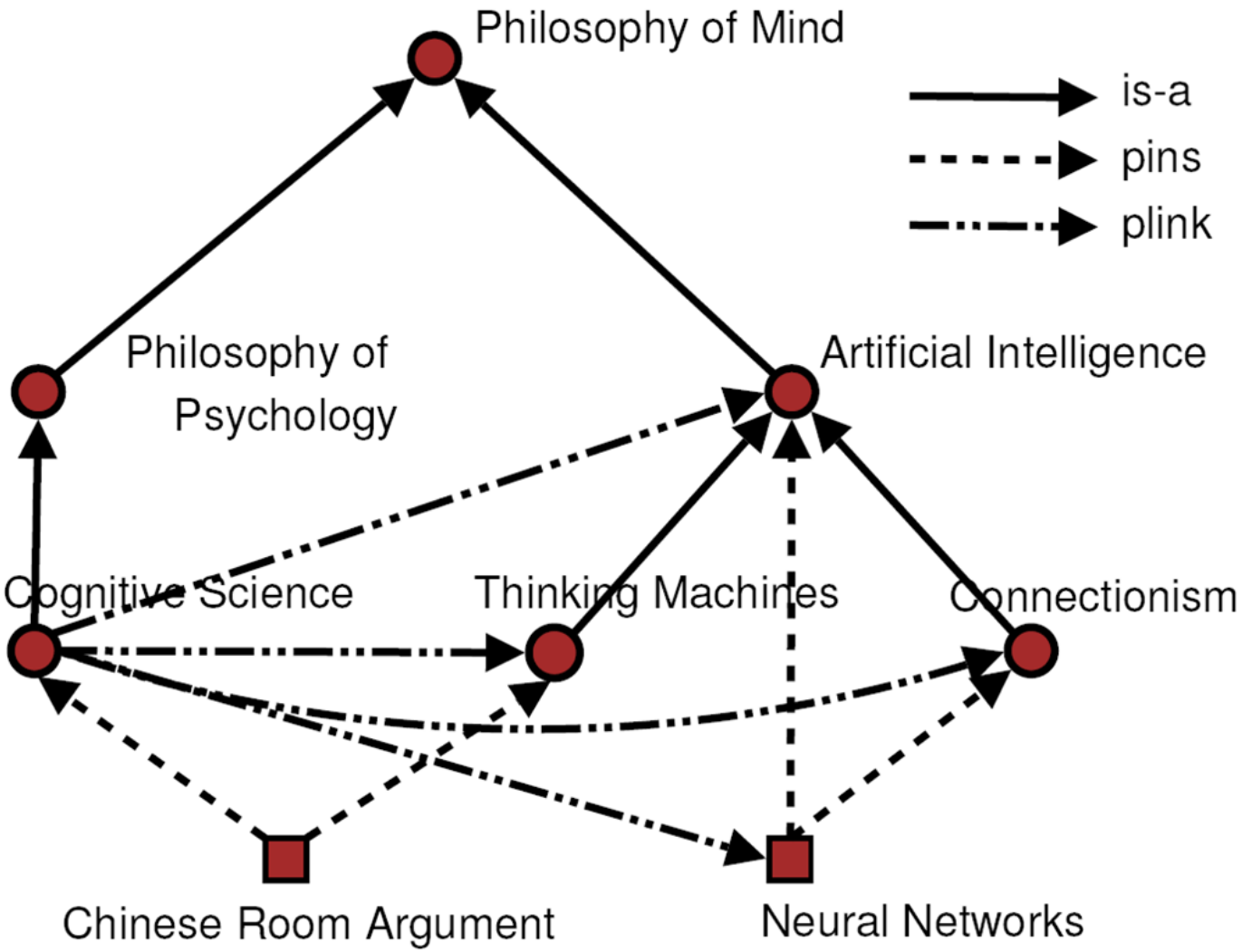
ms(idea about neural network, idea about connectionism).
s4(idea about neural network, idea about connectionism).
class(idea about connectionism).
…

pins(X, Y) ← s4(X, Y), ms(X, Y), class(Y), not class(X).

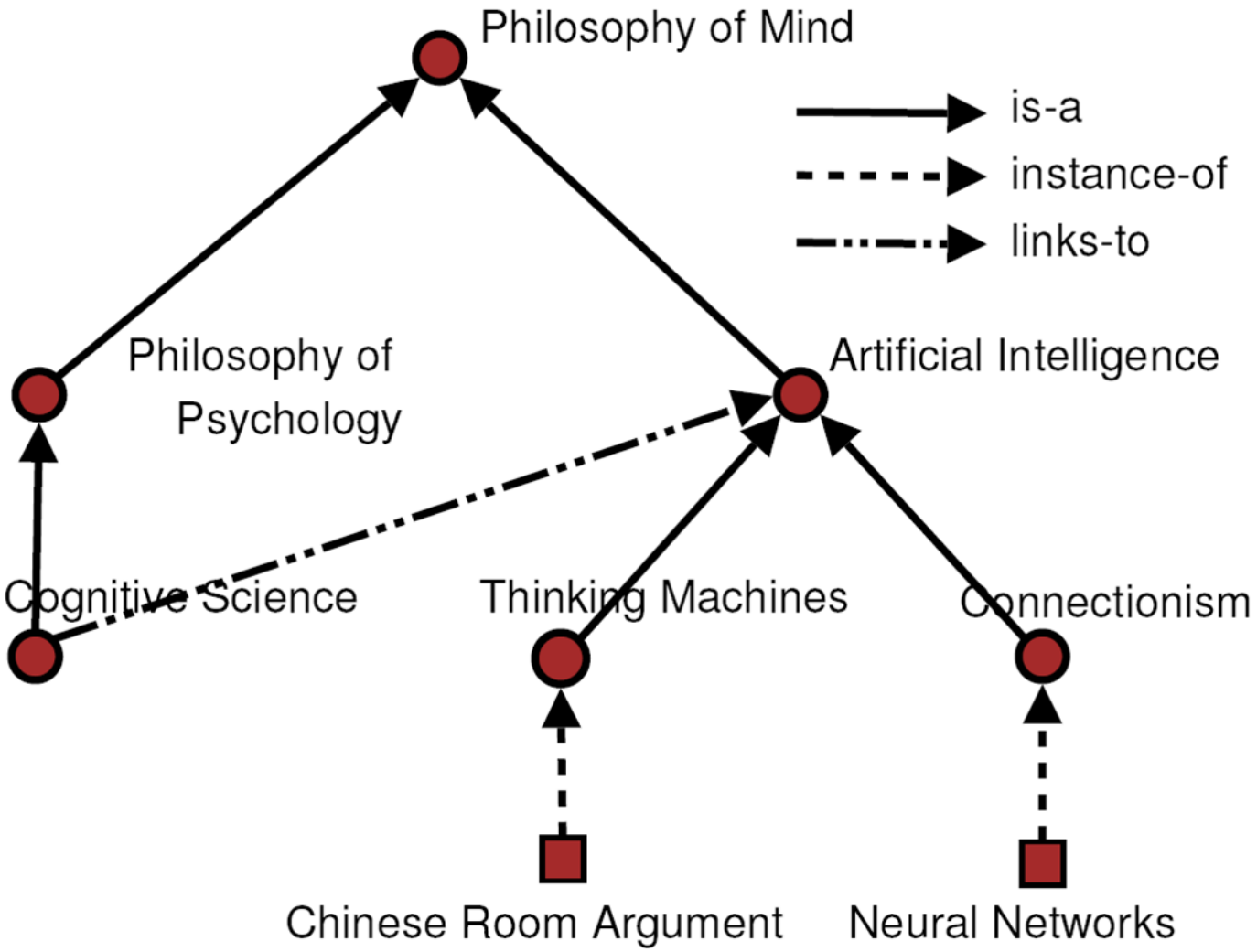
nins(X, Y)) ← pins(X, Z), desc(Z, Y), class(Y), class(Z), not class(X).

instance-of(X, Y) ← pins(X, Y), not nins(X, Y).

Logic Programming



Logic Programming



Experiments

- Is there agreement among expert users?
- Framework for trust measures
- Measures “deviation” of user evaluations

$$D(u) = \frac{1}{|N(u)|} \sum_{(a,b,\ell,u)\in E} \sum_{(a,b,\ell',u')\in E \text{ with } u\neq u'} dist(\ell,\ell')$$

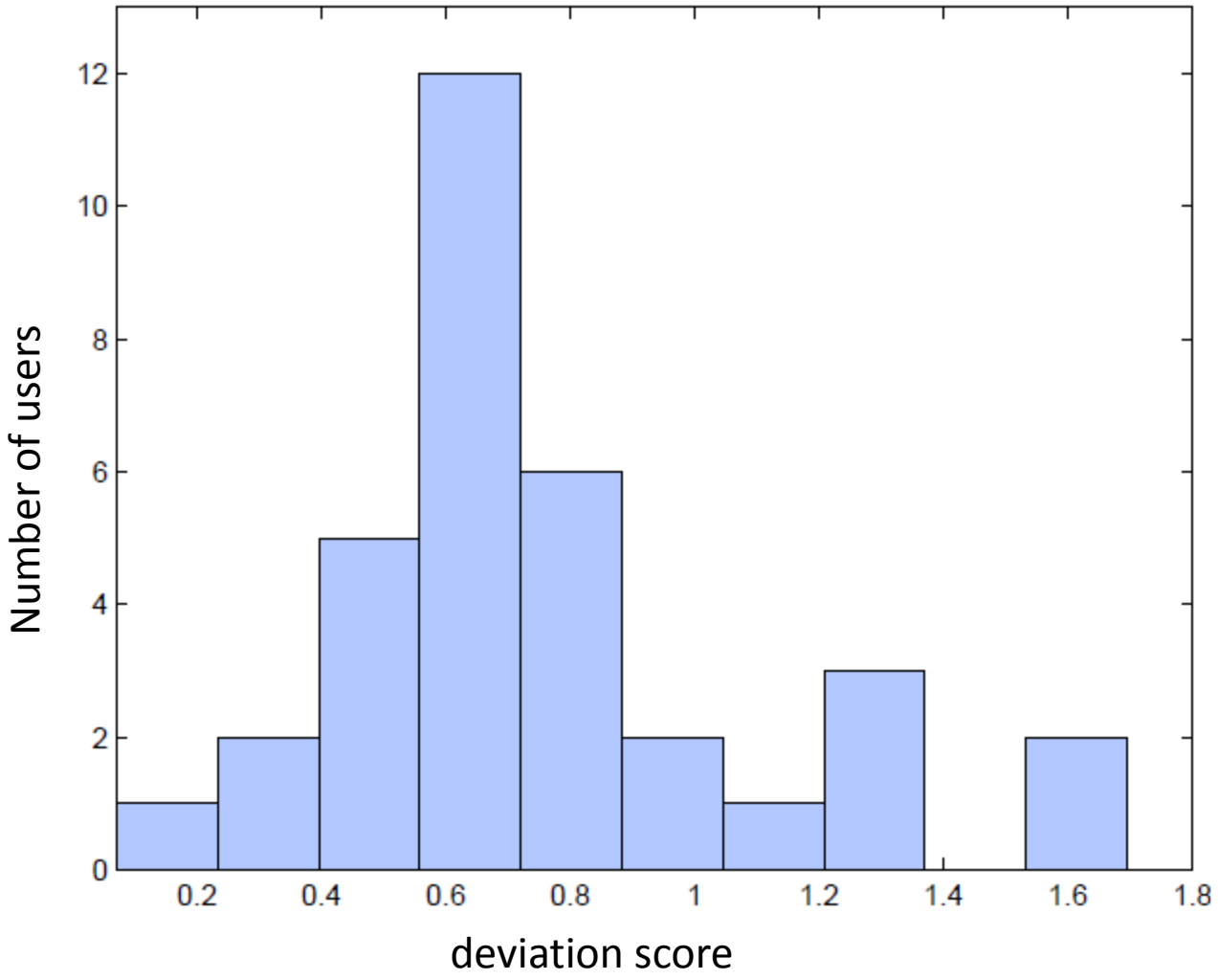
Evaluation: a and b are individuals, l is the label, and u the user id

“Label distance” of evaluations of same pairs of individuals

Experiments

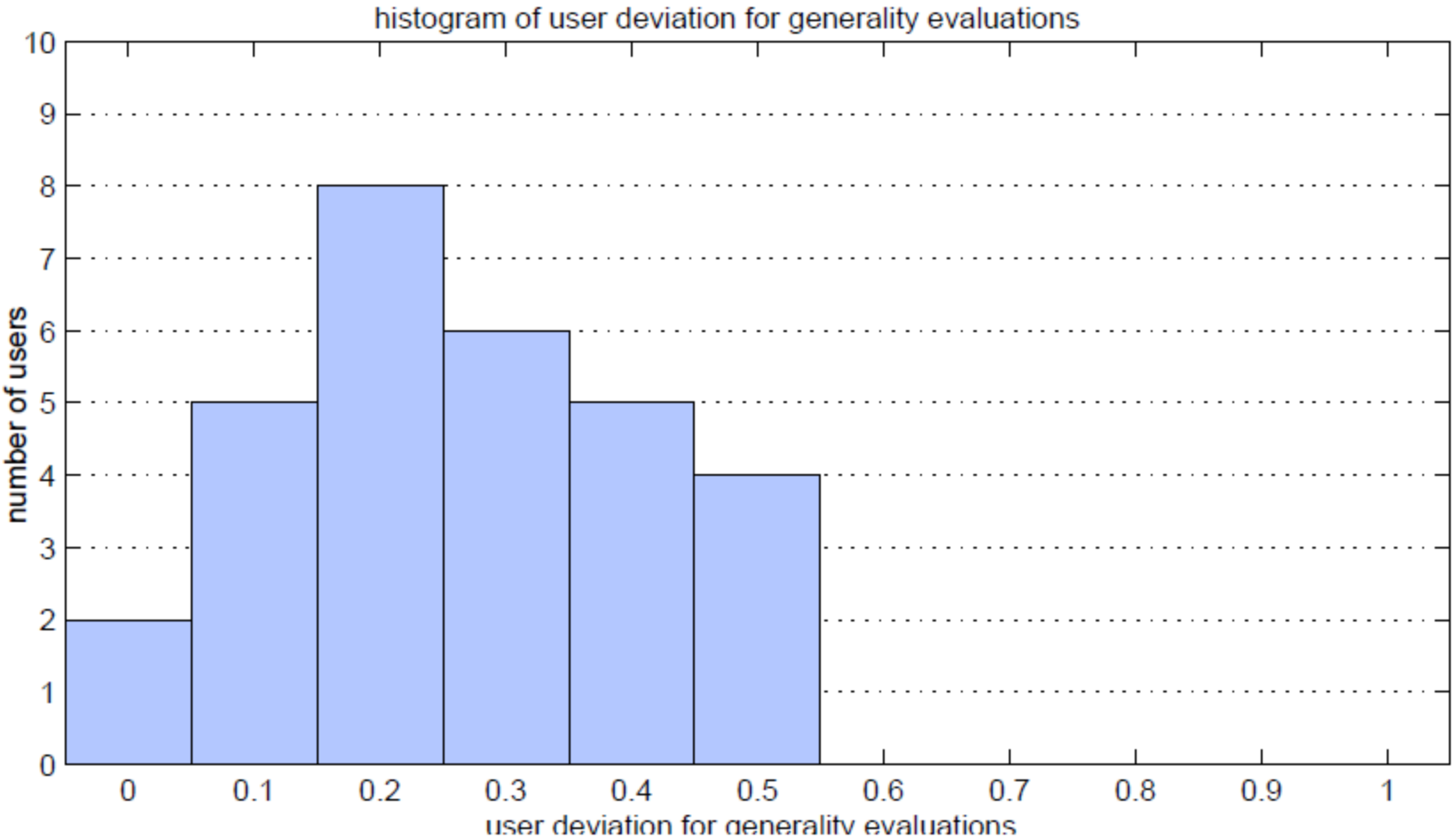
- 92 registered users as of March 2009
- 4,653 evaluations of 2,969 distinct pairs of ideas
- Volunteers from experts in the field to interested amateurs
- Will soon be joined by the authors and editors of the Stanford Encyclopedia of Philosophy

Initial Results



9 out of 1405 overlapping evaluations (0.6%) have a label distance of 4

Initial Results



33 Out of 917 overlapping evaluations (3.6%) with
34 disagreeing labels “more specific” and “more general.”

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in

Search

artificial intelligence
confirmation and induction
ethics and information technology
feminist interventions
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continental philosophy
epistemology
ethics
feminist philosophy
history of philosophy
japanese philosophy
judaic philosophy
latin american and iberian philosophy
logic
metaphysics
philosophy of action
philosophy of language
philosophy of law
philosophy of mathematics
philosophy of mind
artificial intelligence
computation and representation
computationalism
connectionism
dynamic system
thinking machine
consciousness
mental content
metaphysics of mind
perception
philosophy of psychology
philosophy of religion
philosophy of science and the sciences
social and political philosophy

InPhO Taxonomy (β version)

This is the page for the node **artificial intelligence**

This taxonomy of ideas is the outcome of the first iteration of our cycle of expert-provided structure, statistical analysis of the articles in the Stanford Encyclopedia of Philosophy, and a small amount of human feedback. Iterations of this cycle will be used to develop the taxonomy. The approach is explained in more detail here.

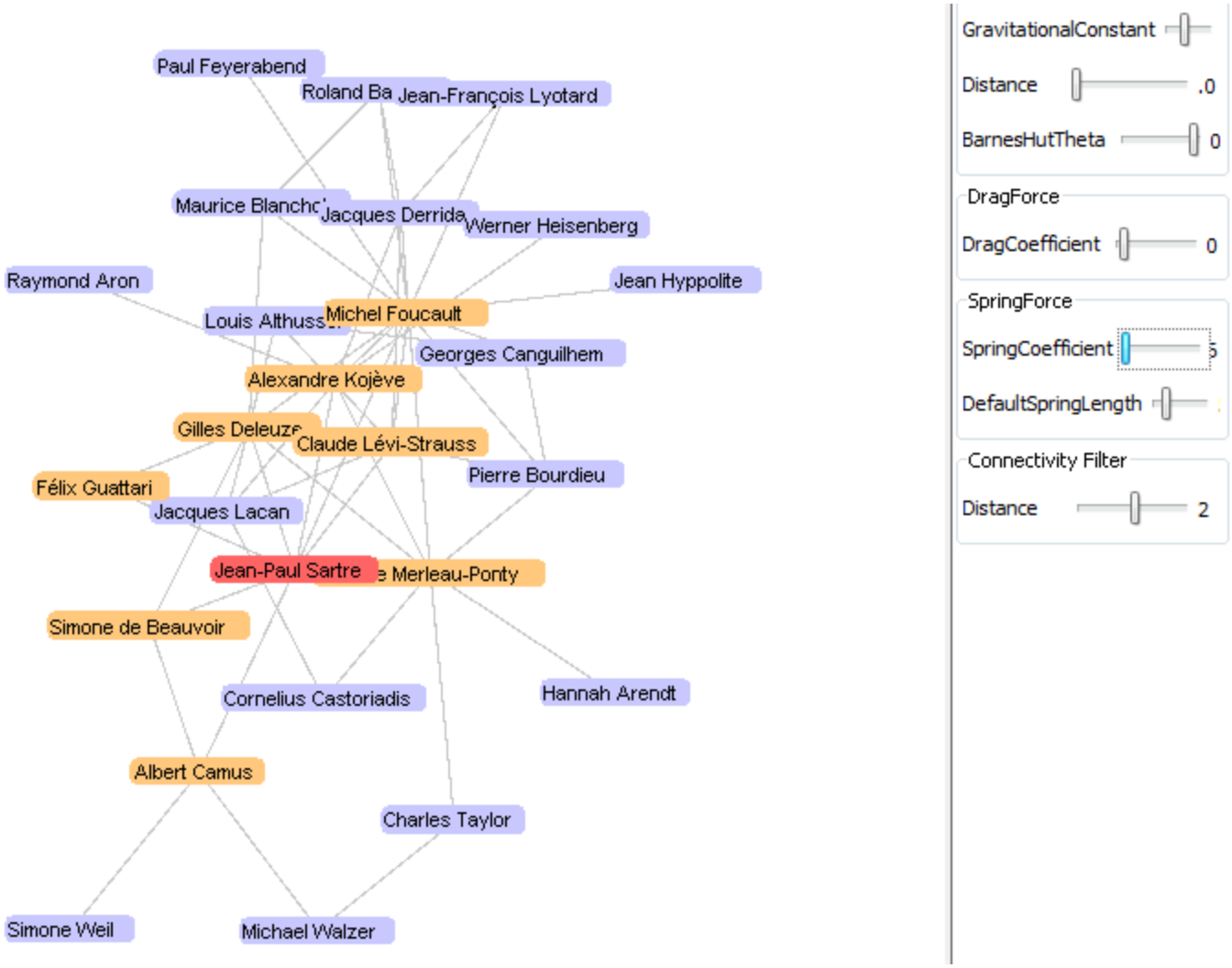
Click on any of the links on the left to explore the topics in the taxonomy. Click icon to open SEP article on the adjacent term.

	Subclasses:	*Searches*
	computation ∩ representation	SEP noesis SEP Google Scholar
	computationalism	SEP noesis SEP Google Scholar
	connectionism	SEP noesis SEP Google Scholar
	dynamical system	SEP noesis SEP Google Scholar
	thinking machine	SEP noesis SEP Google Scholar

	Instances:	*Searches*
	turing test	SEP noesis SEP Google Scholar
	replication	SEP noesis SEP Google Scholar
	cartesian dualism	SEP noesis SEP Google Scholar
	defeasible reasoning	SEP noesis SEP Google Scholar
	common knowledge	SEP noesis SEP Google Scholar
	scientific explanation	SEP noesis SEP Google Scholar
	non-monotonic logic	SEP noesis SEP Google Scholar
	logic of conditionals	SEP noesis SEP Google Scholar
	moral psychology	SEP noesis SEP Google Scholar
	speech act	SEP noesis SEP Google Scholar
	denotation	SEP noesis SEP Google Scholar
	multiple realizability	SEP noesis SEP Google Scholar
	frame problem	SEP noesis SEP Google Scholar
	logical behaviorism	SEP noesis SEP Google Scholar
	explanatory gap	SEP noesis SEP Google Scholar

	Links:	*Searches*
	@qualia	SEP noesis SEP Google Scholar

Influences among Philosophers



Faceted Search

6 Person filtered from 1323 originally (Reset All Filters)

name	Date of Birth	Date of Death	Profession	Nationality
Archytas	428 BC	347 BC	Astronomer, Mathematician, Philosopher, and Statesman	Greece and Ancient Greece
Pythagoras	580 BC	500 BC	Mathematician, Philosopher, and Scientist	Greece and Ancient Greece
Eudoxus of Cnidus	410	355	Astronomer, Mathematician, Physician, and Scholar	Greece
Archimedes	287 BC	212 BC	Astronomer, Engineer, Mathematician, Philosopher, and Physicist	Greece
Polyaenus of Lampsacus	340 BC	278 BC	Mathematician	Greece
Ptolemy	90	168	Astrologer, Astronomer, and Geographer	Greece and Egypt

Date of Birth

-650 - 550

Ideas

1 (missing this field)
3 alchemy
3 motion and time
1 arabic and islamic philosophy
1 cosmology

Profession 2☑

52 (missing this field) ☐
39 Philosopher ☐
5 **Mathematician** ☑
4 **Astronomer** ☑
4 Physician ☐
4 Statesman ☐

Nationality

6 Greece
2 Ancient Greece
1 Egypt

Future Work

- How can we detect and throw out the bad responses?
- What measures are there to assess the quality of feedback and the trust of individual contributors?
- What methods (in addition to ASP) can we use to assemble the taxonomies?

Thank you!