MODELING MEANING AT MULTIPLE SCALES
“In the beginning was the word.”

AUTHOR UNKNOWN

λόγος
“You shall know a word by the company it keeps.”

–J.R. FIRTH 1957, 11
THENCE CAME WORDNET

WordNet Search - 3.1
- WordNet home page - Glossary - Help

Word to search for: meaning Search WordNet

Display Options: (Select option to change) Change

Key: "S." = Show Synset (semantic) relations, "W." = Show Word (lexical) relations
Display options for sense: (gloss) "an example sentence"

Noun
- S: (n) meaning, significance, signification, import (the message that is intended or expressed or signified) "what is the meaning of this sentence"; "the significance of a red traffic light"; "the signification of Chinese characters"; "the import of his announcement was ambiguous"
- S: (n) meaning, substance (the idea that is intended) "What is the meaning of this proverb?"

Verb
- S: (v) mean, intend (mean or intend to express or convey) "You never understand what I mean!"; "what do his words intend?"
- S: (v) entail, imply, mean (have as a logical consequence) "The water shortage means that we have to stop taking long showers"
- S: (v) mean, intend, signify, stand for (denote or connote) "`maison' means `house' in French"; "An example sentence would show what this word means"
- S: (v) intend, mean, think (have in mind as a purpose) "I mean no harm"; "I only meant to help you"; "She didn't think to harm me"; "We thought to return early that night"
- S: (v) mean (have a specified degree of importance) "My ex–husband means nothing to me"; "Happiness means everything"
- S: (v) think of, have in mind, mean (intend to refer to) "I'm thinking of good food when I talk about France"; "Yes, I meant you when I complained about people who gossip!"
- S: (v) mean (destine or designate for a certain purpose) "These flowers were
AND VISUAL THESAURUS
...AND A TALE OF TWO ENCYCLOPEDIAS
“In the beginning there was logocentrism.”
BUT WHAT IF LOGOCENTRISM IS WRONG?

Impossible!

CHAPTER 3

Pragmatics and the domain of pragmatic principles

There is a point where too much information and too much information processing can hurt. Cognition is the art of focusing on the relevant and deliberately ignoring the rest.

(Gigerenzer and Todd 1999, p. 21)

RELEVANCE THEORY AND THE SHOWING–MEANING CONTINUUM

In his William James Lectures on ‘Logic and Conversation’, delivered at Harvard in 1967, Grice proposed that human verbal communication is a cooperative activity driven by the mutual expectation that, in general, participants will obey a Cooperative Principle and Conversational Maxims of Quantity, Quality, Relation and Manner. In outlining his theory of conversation, one of Grice’s main aims was to cast light on some of what he regarded as ‘illegitimate applications’ (1989, p. 3) of certain philosophical ‘manoeuvres’ by members of the ordinary language philosophy movement. This movement had influenced him greatly at Oxford in the nineteen-forties and fifties; in opposing the central tenets of the ‘idealised’ language philosophy of Frege, Russell and Carnap, it was instrumental in the birth and development of modern pragmatics.

Jerry Fodor’s chief objection to modern pragmatic programmes (an objection shared by Chomsky) is that the processes involved in utterance interpretation are ‘global’ rather than ‘local’: any type of information, drawn from any domain, may make a difference to the outcome of the interpretation process, and in Fodor’s view such processes are not amenable to scientific study (Fodor 1983).
MEANING AT MULTIPLE SCALES
PHILOSOPHY: THE BIG PICTURE

SEP citation patterns
FROM MACRO TO MICRO
LATENT DIRICHLET ALLOCATION (LDA) TOPIC MODEL (Blei et al 2003)

Parameter of Dirichlet prior on per-document topic distributions

Parameter of Dirichlet prior on per-topic word distributions

Topic distribution per document \(i\)

Topic for \(j\)-th word of \(i\)-th document \((wij)\)
LDA Results on a 1315-volume selection from the HTRC with books as documents

In [8]:
# Loading the corpus and model tools
c1 = Corpus.load('/var/inphosemantics/data/20130101/htrc-anthropomorphism-1315/vsm-data/hathi-1315-nltk-fasttext-corpus.npz')

# here we select a 60 topic model
ml = LDA.load('/var/inphosemantics/data/20130101/htrc-anthropomorphism-1315/vsm-data/hathi-1315-nltk-fasttext-models.npz')
v1 = LDAViewer(c1, ml)

Loading corpus from /var/inphosemantics/data/20130101/htrc-anthropomorphism-1315/vsm-data/hathi-1315-nltk-fasttext-corpus.npz
Loading LDA-Gibbs data from /var/inphosemantics/data/20130101/htrc-anthropomorphism-1315/vsm-data/hathi-1315-nltk-fasttext-models.npz

Selection of topics most similar to term 'anthropomorphism'

We can identify topics using single terms or combinations of terms, and then use one or more topics to select among the documents.

In [28]:
v1.sim_word_top('anthropomorphism', print_len=25)

Out[28]:

<table>
<thead>
<tr>
<th>Sorted by Word Similarity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Topic</td>
</tr>
<tr>
<td>---</td>
</tr>
<tr>
<td>38 god, religion, life, man, religious, spirit, world, nature, spiritual, divine, human, must, men, faith, soul, development, power, moral, us, love, christian, consciousness, true, history, conception</td>
</tr>
<tr>
<td>16 animals, evolution, life, animal, development, man, species, cells, living, theory, cell, organism, natural, phenomena, plants, human, organisms, darwin, organic, higher, individual, many, forms, p, organs</td>
</tr>
<tr>
<td>51 philosophy, nature, knowledge, world, thought, idea, things, reason, truth, science, theory, us, existence, universe,</td>
</tr>
</tbody>
</table>
Table 1. K=20,160 LDA models

| T10 | among, also, name, gods, people |
| T14 | religion, church, christian, spirit, christ |

0  shall, said, lesous, seven, earth
19  sacrifice, magic, religion, among, gods
53  jesus, christian, paul, christ, testament
63  also, practical, demy, press, university
94  among, people, also, races, tribes
101 name, gods, called, also, ancient
120 religion, religious, world, life, human
128 lord, thou, shall, good, world
135 israel, jewish, spirit, jews, people
151 church, catholic, century, roman, england
159 bible, christ, divine, church, revelation
117 social, primitive, among, group, culture
...AND DOWN...

Selection of topics by multiple terms

<table>
<thead>
<tr>
<th>Topic</th>
<th>Words</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>animal, animals, may, stimulus, experience, would, instinct, reaction, one, stimuli</td>
</tr>
<tr>
<td>47</td>
<td>animals, animal, upon, wild, man, many, one, among, food, elephant</td>
</tr>
<tr>
<td>19</td>
<td>life, animal, nature, animals, living, may, one, every, form, forms</td>
</tr>
<tr>
<td>37</td>
<td>water, body, food, animal, mouth, surface, may, small, eggs, fish</td>
</tr>
<tr>
<td>59</td>
<td>animals, man, dog, language, certain, animal, dogs, may, lower, many</td>
</tr>
<tr>
<td>34</td>
<td>light, eyes, animal, eye, one, movements, sense, food, smell, reaction</td>
</tr>
<tr>
<td>49</td>
<td>mind, mental, consciousness, soul, psychology, states, intellect, life, pp, p</td>
</tr>
<tr>
<td>42</td>
<td>animals, organs, hydra, fig, one, animal, class, worms, different, body</td>
</tr>
<tr>
<td>52</td>
<td>theory, evolution, man, development, life, great, history, soul, first, century</td>
</tr>
<tr>
<td>20</td>
<td>nervous, brain, nerve, system, organs, movements, action, matter, nerves, cells</td>
</tr>
<tr>
<td>45</td>
<td>science, study, physiology, work, upon, may, one, knowledge, many, anatomy</td>
</tr>
<tr>
<td>3</td>
<td>mind, man, facts, life, evolution, instinct, subjective, instincts, organic, development</td>
</tr>
<tr>
<td>53</td>
<td>laws, phenomena, nature, law, science, mind, cause, causes, knowledge, principles</td>
</tr>
</tbody>
</table>

Selection of pages by topic

<table>
<thead>
<tr>
<th>Topics: 1</th>
<th>Document</th>
<th>Prob</th>
</tr>
</thead>
<tbody>
<tr>
<td>The animal mind, uc2.ark+13960-t5w66bs1v/00000043.txt</td>
<td>1.00000</td>
<td></td>
</tr>
<tr>
<td>The animal mind, uc2.ark+13960-t7gg6ol77/00000047.txt</td>
<td>1.00000</td>
<td></td>
</tr>
<tr>
<td>The animal mind, uc2.ark+13960-t7gg6ol77/00000016.txt</td>
<td>0.99999</td>
<td></td>
</tr>
<tr>
<td>The animal mind, uc2.ark+13960-t7gg6ol77/000000283.txt</td>
<td>0.99993</td>
<td></td>
</tr>
<tr>
<td>Mind in the low, uc2.ark+13960-t59c6mb7v/00000179.txt</td>
<td>0.99988</td>
<td></td>
</tr>
<tr>
<td>The animal mind, uc2.ark+13960-t5w66bs1v/00000219.txt</td>
<td>0.99937</td>
<td></td>
</tr>
<tr>
<td>The animal mind, uc2.ark+13960-t7gg6ol77/00000071.txt</td>
<td>0.99893</td>
<td></td>
</tr>
<tr>
<td>The animal mind, uc2.ark+13960-t5w66bs1v/00000232.txt</td>
<td>0.99887</td>
<td></td>
</tr>
<tr>
<td>The animal mind, uc2.ark+13960-t5w66bs1v/00000057.txt</td>
<td>0.99778</td>
<td></td>
</tr>
<tr>
<td>The animal mind, uc2.ark+13960-t7gg6ol77/00000048.txt</td>
<td>0.99700</td>
<td></td>
</tr>
</tbody>
</table>
...TO ARGUMENTS
**AND SENTENCES**

<table>
<thead>
<tr>
<th>JSD</th>
<th>Text</th>
</tr>
</thead>
</table>
| 1.0000 | EVERY STATEMENT THAT ANOTHER BEING POSSESSES PSYCHIC QUALITIES IS A CONCLUSION FROM ANALOGY, NOT A CERTAINTY; IT IS A MATTER OF FAITH.

IF ANY CONSCIOUSNESS ACCOMPANIES IT, THEN THE NEAREST HUMAN ANALOGY TO SUCH CONSCIOUSNESS IS TO BE FOUND IN ORGANIC SENSATIONS, AND THESE, AS HAS JUST BEEN SAID, MUST NECESSARILY BE IN THE HUMAN MIND WHOLLY DIFFERENT IN QUALITY FROM ANYTHING TO BE FOUND IN AN ANIMAL WHOSE STRUCTURE IS AS SIMPLE AS THE AMOEBA'S.

FANCY, FOR EXAMPLE, ONE OF US ENTERING A ROOM IN THE DARK AND GROPING ABOUT AMONG THE FURNITURE.

THIS, OF COURSE, DOES NOT REFER TO THE POWER TO JUDGE DISTANCE.

AGAIN, A BODILY STRUCTURE ENTIRELY UNLIKE OUR OWN MUST CREATE A BACKGROUND OF ORGANIC SENSATION WHICH RENDERS THE WHOLE MENTAL LIFE OF AN ANIMAL FOREIGN AND UNFAMILIAR TO US.

SHE DISPOSES OF THE PSYCHIC LEARNING BY EXPERIENCE THEORY OF NAGEL BY SAYING THAT THE ONLY EXPERIENCE UPON WHICH THE ANIMAL COULD REJECT THE FILTER PAPER

WE SPEAK, FOR EXAMPLE, OF AN "ANGRY" WASP.

She disposed of the psychic learning by experience theory of Nagel by saying that the only experience upon which the animal could reject the filter paper.

**Digging by Debating**
INTERROGATING ARGUMENTS ACROSS EDITIONS

- the tendency to make purely biological concepts suffice as far as possible for the explanation of animal behavior

- to assume the presence even of consciousness in animals only when it is absolutely necessary to do so

- the greater part of the experiments on animals even until the last ten or fifteen years performed by physiologists

- has given rise to an opposite tendency in interpreting the animal mind

- such special pleading has become unnecessary

- they distinctly "held a brief for animal intelligence,"

- In more recent times interest in both the positive and the negative sides of the objection drawn from man's superiority has died out

- While this argument against evolution was being pressed, the evolutionary writers were very uncritical guides in the field of animal psychology
DEMONSTRATING UNDERSTANDING

- describing appropriately
- paraphrasing
- giving examples
- acting appropriately
CAN THIS BE MADE MORE ACCESSIBLE?
This interactive visualization displays information from the LDA topic models generated using the InPhO VSM module. Live demos trained on the Stanford Encyclopedia of Philosophy, a selection of books from the HathiTrust Digital Library, and the original LDA training set of Associated Press articles are available below for several different numbers of topics.

See Wikipedia: Latent Dirichlet Allocation for more on the LDA topic modeling approach or "Probabilistic Topic Models" (Blei, 2012) for a recent review.

Contact Jaimie Murdock (jammurdo@indiana.edu) with further comments. Source code and issue tracking for this page available at GitHub.

**SEP Demo**

Document  Visualize  

The Stanford Encyclopedia of Philosophy (SEP) is the leading digital philosophy authority with over 1.2 million weekly article downloads of the more than 1,200 articles written by 1,600 authors and editors. It provides a comprehensive view of philosophy, and is ripe for topic exploration at a variety of levels. Clicking the button will populate the box with a random SEP article.

**HTRC-1315 Demo**

Document  Visualize  

The HTRC-1315 collection comprises 1,315 full text volumes retrieved from HathiTrust Research Collection in 2013 with a search for the terms "anthropomorphism", "comparative psychology", and "Darwin". This corpus is meant to show how topic modeling can be used to improve corpus curation and is guided by real-world research practice for the history of comparative psychology. Use the search box to select a volume or click the button to populate the box with a random volume.

**AP Demo**

Document  Visualize  

This corpus of 2,246 Associated Press articles is the original sample dataset for LDA, released by Blei (2003). It consists of short news stories from 1988-1990. Clicking the button will populate the box with a random AP article.
InPhO Topic Explorer

This interactive visualization displays information from the LDA topic models generated using the InPhO VSM module. Live demos trained on the Stanford Encyclopedia of Philosophy, a selection of books from the HathiTrust Digital Library, and the original LDA training set of Associated Press articles are available below for several different numbers of topics.

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AP Demo

Document

Visualize

Document

Visualize
THANKS TO...

- InPhO Group Members
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