



**Ontology and Rules provide  
rapid Natural Language  
Understanding**

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27Jan2011

overcoming limits

# Background

- Parsing Natural Language is complex.
- There are many ways to say the same thing (i.e. have the same meaning)
- Opportunities for ambiguity abound.
- Current approaches to Natural Language Processing (NLP) employ statistical methods to avoid combinatorics of syntax and semantics inherent in Natural Language text.
- In Natural Language each term can have many senses with each sense having a different set of synonyms...

# Challenge

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- Identify specific text within a large set of documents that contains the same or similar meaning as a given natural language description of interest.
- How do we use and grow Ontologies?
- How do we map Natural Language to Ontology?

# Solution Overview

- Given some Natural Language text (one or more sentences or questions), parse and map the various valid constructs to semantic items in an Ontology (we call this mapping the “meaning” of the text)
- Generate (non-statistical) “reader rules” to recognize all combinatorics of language constructs that represent the mapping as having an equivalent “meaning map”
- Apply the high speed “reader rules” to a large corpus of text to identify possible meaning matches
- Verify text identified as having the same “meaning map”
- Generate a report showing the information found and how it relates to the original text along with hyperlinks

# Solution Ontology

- Language-independent Ontology
  - Semantic Items may have a language equivalent but that is a choice of the application
  - Designed to semantically represent smell, sound, pictures, video, et.
- The Ontology represents concepts, instances, relationships, roles, generalizations, instantiations, characteristics, attributes, and units of measure

# Solution Rules Engine

- Rules Engine is invisible to users
  - A “Language Lab” is used to define combinatorics and “meaning maps” – rules are generated for initial parsing and high speed “reading”
- Fast Rules Engine
  - Fast scalable rules engine – recently patented (2008) – Not based on RETE; Much better memory profile
  - Massively Parallel “Reading”

# Benefits

- Changing the Dictionary has immediate effect
- Changing the Ontology has immediate effect
- Ontology grows with use
- Ontology curation is widely leveraged
- Sifts through a large amount of text to find and return just what you are looking for without the need to read the individual files yourself.

# Summary

- Ontology-driven Natural Language Processing is available today
- Rules-based technologies exists today to flexibly and rapidly leverage Ontologies to handle massive amounts of information
- Ontologies and Rules can be used to hold and manage previously human-only knowledge assets.