

Thinknowlogy in a nutshell

Parsing:

- Thinknowlogy is a kind of Controlled Natural Language reasoner. It means that the grammar of the input as well as the output sentences are very limited. It only accepts sentences of which the meaning can be processed — whereas solutions accepting full sentences are unable to process the full meaning;
- The definitions of this very limited grammar are found in sub folder: data\grammar\. They are described in a kind of [Extended Backus-Naur Form](#) (EBNF);
- After a sentence is entered by the user, the sentence is mapped onto a fitting definition in the grammar file of the corresponding language. The definitions contain lexical categories like numbers, adjectives, conjunctions, nouns and proper nouns, which are crucial in advanced automated reasoning. In case a read word is unknown to the system, a new word is created in the system with the corresponding lexical category of the definition. This process works for any language, without the use of extensive words lists. Only a few basic words are defined in the grammar file;
- After parsing, the sentence is stored in a complex — language-independent — knowledge structure — without losing any meaning. But the system also checks — the sentence entered against the current knowledge — for conflicts.

Reasoning:

- The reasoning system then performs all kinds of logical operations on the knowledge structure, such as drawing conclusions, making assumptions, and asking choice questions. These logical operations — which I call *natural reasoning constructs* — are similar to the one described by Aristotle, almost 2400 years ago:
 - *All philosophers are mortal;*
 - *Socrates is a philosopher;*
 - Logical conclusion: *Socrates is mortal.*

The simplest of these natural reasoning constructs are described in my [Scientific Challenge](#) document. I defy anyone to implement their own system with similar results;

- The system checks — and notifies the user — whether self-generated question are answered by the user, and whether self-generated knowledge has been confirmed by the user;
- The implementation of the *Laws of Intelligence that are naturally found in the Human Language* — see paragraph 2.3 of my fundamental document [Logic of Language](#) — provides the system with self-organizing properties: it groups what belongs together, and it separates what doesn't belong together, at a deeper level than can be achieved by semantic techniques;
- During the reasoning process, a justification structure is constructed for every self-generated conclusion, assumption or question. It justifies the logical operations performed on the knowledge structure. This justification structure is kept up-to-date with each change. A justification report for the self-generated knowledge can be requested at any time. This justification structure results for example in a self-adjusting level of uncertainty for the self-generated assumptions. If the level of uncertainty of a self-generated assumption changes, the user will be notified.

Writing:

- Once the reasoning process is completed, the changes of the knowledge structure are presented to the user, written as readable sentences;
- The writing process follows the opposite path as the reading process, by mapping the changes of the knowledge structure onto the definitions in the grammar file, then constructing the sentences word-by-word according to the found grammar definition;
- And because no meaning is lost during the storage and reasoning process, the written sentences have the same quality as the input sentences.

Fundamental science:

So, Thinknowlogy converts readable sentences to logic — and converts derived logic back to readable sentences — without losing meaning. And without human intervention, whereas many ‘scientific’ approaches require the hand of an expert to complete this circle:

- from a readable sentence to natural logic,
- and from derived logic back to readable sentences again.

This defines a fundamental science: If a natural phenomenon is scientifically understood, this natural phenomenon can have multiple appearances, like *electromagnetism*. Electromagnetism is scientifically understood, because we are able:

- to convert light into electricity, and electricity back to light,
- and to convert motion — via magnetism — into electricity, and electricity — via magnetism — back to motion.

Apparently, the logic of language — natural intelligence and natural language — is not scientifically understood. Hence, this Thinknowlogy project.