Karlsruhe Institute of Technology

Division II – Informatics, Economics and Society

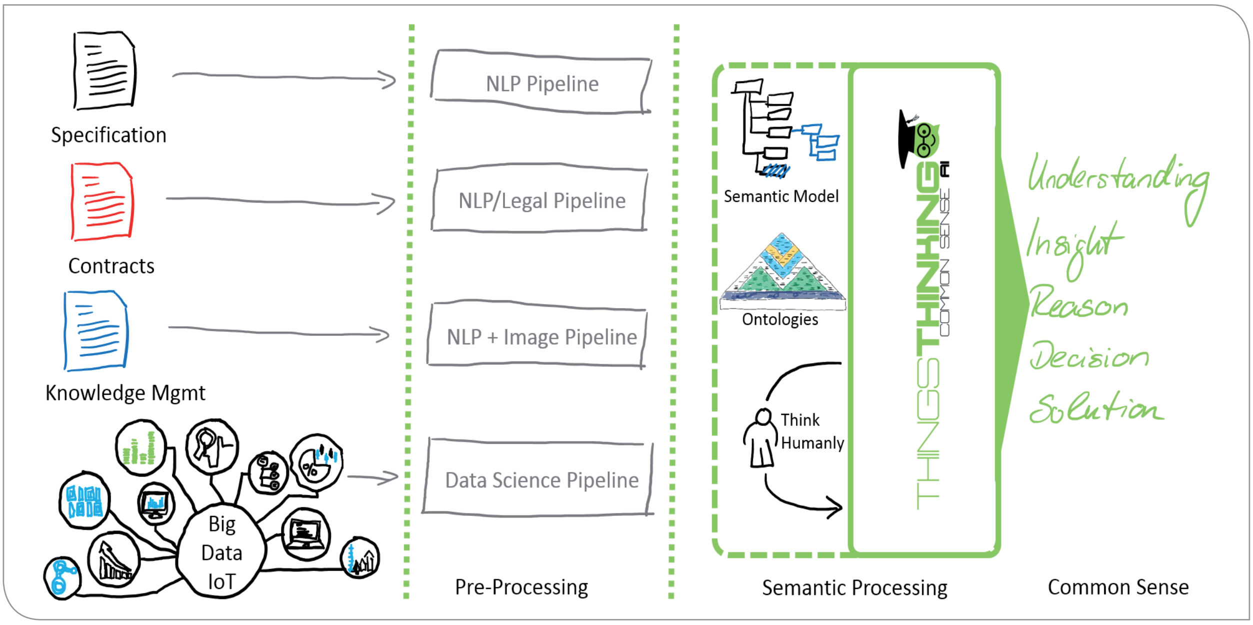
Institute for Program Structures and Data Organization

thingsTHINKING – Common Sense. For Computers.

Natural language is the new revolution in human interaction with machines. Machine learning, statistics, and other long-existing approaches will not close the gaps in man-computer interaction as long as machines do not comprehend the meaning of natural language but instead give mathematical explanations and generate statistics to understand. thingsTHINKING is different from conventional methods, since it seizes the meaning of concepts (semantics) in a language and hence can be applied to a wide range of uses. The presented software detects linguistic deficiencies in technical documents and helps authors to remove them.

Inspection of Technical Documents – A Tedious Necessity

Specification processes in technical domains, among others, rely on the respective author's technically correct and professional presentation of the relevant requirements. Technical deficiencies in specifications may lead to undesirable results. The later the detection, the more expensive the correction of such deficiencies. The same applies to linguistic deficiencies: As a matter of fact, even technically correct specifications may be ambiguous or linguistically incomplete. Whereas the author is able to infer missing information from the context or based on specific background knowledge, a third party may not be familiar with this context and may have to ask explicit questions. In the best case, this is realized and a further inquiry is made. In the worst case, the contractor fills in missing information and it turns out, at a later stage, that the specification was not well understood and was thus interpreted incorrectly. For this reason, specifications are drawn up by means of



writing rules and templates and are inspected for errors before order placement. This process is tedious and error-prone: The quality of the document depends on the authors' and inspectors' skills.

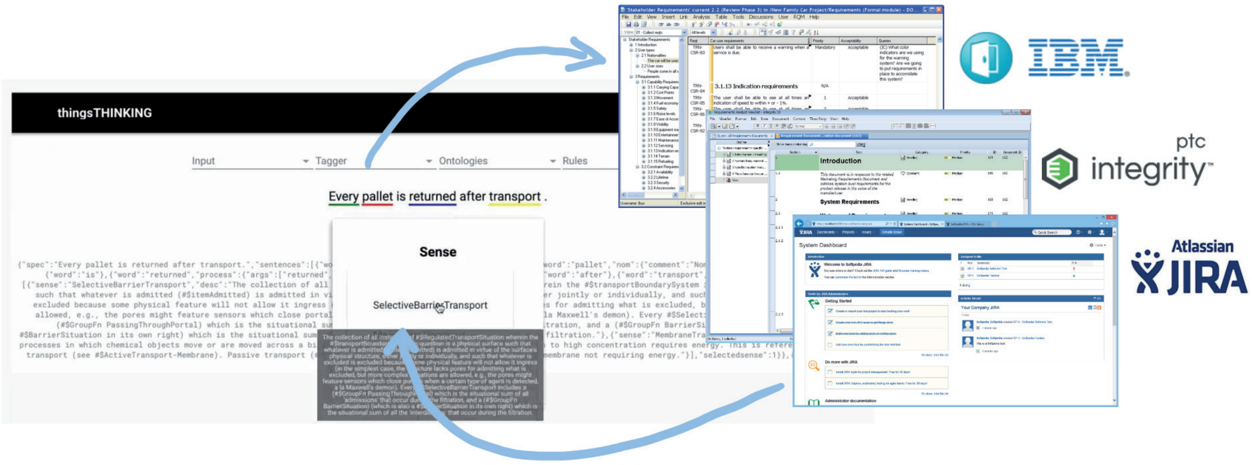
Semantic Understanding – Added Value from Knowledge

The presented method supports authors and inspectors in their work: The analysis of texts is based on the (mostly) statistical tools of computational linguistics. These break down the text into its components and thus lay the foundation for further processing. In a subsequent step, the (semantic) interrelationships of the words between each other are determined as to e.g., who the acting person in the sentence is or what the action is. The semantic model thus created is enhanced by means of knowledge databases. Analyzing the semantic model in the domain of quality assurance are writing rules automatically checked by the system. thingsTHINKING makes this repeatable and independent of the inspector.

Programming Systems – For Everyone

For more than a decade, the Chair for Programming Systems that is headed by Professor Walter F. Tichy at Institute for Program Structures and Data Organization has been investigating how the results of computational linguistics, knowledge management, and software engineering can be combined to increase the ability of computers to understand. Research, in this context, is focused on avoiding to design systems that can be operated by (computer) experts only. Instead, one intends to give computers as much language skills and knowledge as to make them comprehend what humans want from them. Computers must learn to understand us, not vice versa.

(Interactively) Checking for Flaws in Requirements



thingsTHINKING interacts with the user when situations are unclear or when there are linguistic problems.

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