Cognitive computing leads to the next level of answering questions on the Web

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ABSTRACT

Web search engines are powerful tools for information retrieval. However, they do not have the capability to synthesize answers to natural language queries by drawing on information stored in diverse parts of knowledge bases. In large parts they lack world knowledge (perception-based information deduced from natural language as "icy roads are slippery" or "traveling from A to B takes an hour") that humans adopt by experience and education. Yet, exactly this knowledge plays an essential role in judging relevance, summarization, search and reasoning.

Since perception-based knowledge is intrinsically fuzzy, I propose that it should preferably be represented in f-granular fuzzy ontologies. Thereby, an aggregated ontology's propositions can be stored as generalized constraints [3]. Fuzzy ontologies comprise aggregated knowledge structures, which originate from distinct domains: in simple domains, a taxonomy (as DMOZ) can be considered, in complicated domains a thesauri (as WordNet) mapping different terminologies, as well as a typology (as Google's Knowledge Graph) can be taken into account. Right at the start these structures may be crisp, but often complex domains, where uncertainty, imprecision and partiality of truth prevail, cry out for constant changing approximate ontologies [1].

Knowing that it is freezing outside and based on the ontology-stored world knowledge in the form of generalized constraints, a restricted-centered theory of reasoning and computation allows future Web search engines-to-be to synthesize an appropriate answer [2]. Following the principle of minimum specificity, the search engine finally answers the question about travel time with "around an hour at the present icy road conditions."

BODY

From Search Engines to Question Answering Systems or [1]+[2]=[3].

REFERENCES

[1] E. Portmann. Towards an emergent semantic web. *Tiny Transactions on Computer Science, Vol. 1*, 2012.

[2] E. Portmann. A restriction-centered theory of reasoning and computation to materialize a web 3.0. *Tiny Transactions on Computer Science, Vol. 2*, 2013.

[3] L. A. Zadeh. From search engines to question-answering systems: The problems of world knowledge, relevance, deduction, and precisiation. *Fuzzy Logic and the Semantic Web*, 2006.

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