A Framework of Cognition and Conceptual Structures Based on Deep Semantics

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ABSTRACT

The argument is made that artificial intelligence (AI) systems which simulate cognition fail to reach significant goals because they rely on inadequate frameworks of cognition and conceptual structures that are based on shallow semantics. Shallow semantics examines only the surface meanings of expressions and words while deep semantics incorporates the meanings of the phonetic substructures of words. Shallow semantics is like chemistry that studies molecules (such as sugar) but never looks at elements (carbon, hydrogen, and oxygen). This paper briefly reviews three decades of deep semantics research by the author which produced a new framework of cognition and a new kind of conceptual structures. These have been validated by large-scale smart text retrieval and by constructing a theory of emotions and a consumer choice theory. Deep semantics is used to develop an ontology of cognition itself which is then contrasted with the cognitive frameworks and conceptual structures of AI systems.

Keywords: Abstract, Cognition, Conceptual Structure, Concrete, Deep Semantics, Framework of Cognition, Ontology, Shallow Semantics

INTRODUCTION AND OUTLINE

Artificial intelligence (AI) systems seek to simulate some aspects of human cognition (Sowa, 2011). Since cognition appears to rely heavily on the use of words, researchers are trying to understand the relationship between word meanings and cognitive processes (Sowa, 2011). There is evidence that the meanings of words and expressions are connected with cognitive mental structures that can be represented as graphs (Sowa, 2011). These cognitive structures are commonly known as conceptual structures (Sowa, 2011). Some refer to them as frames (Petrucc, 1996; Fillmore, 1982).

Unfortunately, in their search for cognitive structures, researchers have only been relying on the study of the meanings of whole morphemes (the smallest grammatical units: word roots, pronouns, articles, prepositions, etc.), without examining the semantic contribution of the indi-
This approach to semantics is based on the doctrine that individual sounds don’t contribute to the meanings of morphemes at all, a doctrine that was established by the linguist Saussure after his extended search for sound meanings ended in failure (Saussure, 1916).

Figure 1. *How the abstract symbol table was found*

![Diagram showing the abstract symbol table]

**Abstract Symbol Table (Table 1)**
(Single Abstract Meaning Per Sound):
- Q = closed-self containment
- M = closed-self manifestation

Figure 2. *Readware’s best performance at TREC 8*

![Graph showing Readware's performance at TREC 8]
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Li-Wei Kang, Chia-Mu Yu, Chih-Yang Lin and Chia-Hung Yeh (2016). Emerging Technologies in Intelligent Applications for Image and Video Processing (pp. 1-28). www.igi-global.com/chapter/image-and-video-restoration-and-enhancement-via-sparse-representation/143553?camid=4v1a

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