A NEURAL NETWORK MODEL FOR THE REPRESENTATION OF NATURAL LANGUAGE: THE CASE OF CONCEPTUAL METAPHOR

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This study focuses on a biologically faithful neural network simulation, the Cognitive Linguistic Adaptive Resonant Network (CLAR-NET) model of online and real-time associations among concepts with input from everyday English. Specifically, conceptual linguistic associations are now (Loritz 1999) analyzed as dynamic resonant patterns represented in this study in terms of neuronal activation. The CLAR-NET model extends this line of research to various linguistic phenomena in the realm of conceptual analysis: homonymy, polysemy, constructional polysemy (Goldberg 1995), ambiguity, reseamblance and primary metaphor (Grady et al. 1996), neologism, contextual coreference, subject-object control, event-structure metaphor (Lakoff 1980), negation. Investigating the representation of natural language in biologically faithful neural networks is a prelude to a new line of research and holds implications for language learning, neurolinguistics, metaphor theory, information retrieval, knowledge engineering, case-based reasoning, knowledge-based machine translation systems and related ontologies. In this talk I present the cognitive underpinnings of the CLAR-NET model for NL. I discuss the CLAR-NET foundations in ART and AG. I then present an illustrative example of metaphorical discourse which I analyze within this model. The output is then discussed. The CLAR-NET network models natural language semantics and meaning as resonance. It is capable of learning to satisfactory resolve ambiguity and perform conceptual discrimination. It plausibly and with biological faithfulness represents both STM activation and LTM learning in a unified fashion (i.e. within the same model), and achieves better results due to LTM modeling. In sum, this is a promising, biologically-faithful blueprint for natural language processing and conceptual representation.

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