Abstract

Traditional view of natural language semantics conceives meanings of expressions as being constant from speaker to speaker. This idealistic hypothesis has often been considered as an explanation of how language users are able to communicate. The traditional paradigm to learning semantics (which we refer to as learning by recognizing) shows how such a uniformity may be achieved, provided that there is an externally imposed semantic standard which does not change during learning. These paradigms have resulted in plethora of interesting approaches and practical applications. It seems, however, that the uniform view of semantics does not always correspond to facts. To illustrate this, we mention some evidence of within-language synchronic semantic variation. This sort of variation consists in co-existence of non-equivalent semantics within the same language community at a given time. On these grounds we abandon both the uniform approach to semantics and learning by recognizing which is tightly connected to the static view of meaning. Learning by recognizing is also considered as inappropriate for the analysis of communication phenomena which defy description in terms of the traditional teacher-learner distinction.

To explain how communication is possible within a semantically non-uniform community of speakers connected by various social relations of authority, we consider a more general mechanism of learning which we call learning by coordination. We give our solution to the problem and define the coordination mechanism which is capable of handling inconsistent samples of language use and various social influences between communicating speakers. We apply this algorithm to learning the semantics of upward monotone proportional quantifiers. We consider simple models of symmetrically communicating dyads and show how to analyse coordination of such processes in terms of Markov chains. We observe various mathematical connections between the possibility of convergence, specific levels of agents authority and complexity of communication patterns.

Moreover, we study some natural language constructions which are deemed to express the existence of certain kinds of similarities between partial orderings. Specifically, we provide examples of natural language sentences and their plausible logical forms that express the existence of homomorphism, embedding and variations of those. Semantically, we interpret the constructions as polyadic generalized quantifiers. We examine some of the quantifiers in question with respect to their FO-definability over appropriate finite models. Since they are definable in the existential fragment of SO, we investigate their completeness in the class NP. We prove that among the quantifiers under investigation, only the homomorphism quantifier is tractable. We stress potential importance of our results for linguistics and discuss some connections between computational complexity, human comprehension and language evolution.