Graphical vs. Spatial Models of Distributional Semantics

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Abstract

Semantic space models based on distributional information and semantic network (graphical) models are two of the most popular models of semantic representation. Both types of models succeed at modeling or explaining various tasks. Both types of models also have limitations. Spatial models have difficulties representing indirect semantic relations, while graphical models have lacked a theoretical account for the construction of their semantic network. In this article, we develop the Distributional Graph Model. The new model resembles semantic space models in the way that it is a representation of semantic memory obtained from statistical learning on a linguistic corpus. But like other graphical models, it is able to capture indirect semantic relatedness as well. Using an artificial language specifically designed to test different types of syntagmatic and paradigmatic relationships, we show that the Distributional Graph Model demonstrates the benefits of both graphical and spatial distributional models.