
Probabilistic priming for situated interaction

Tag
Datum
Zeit
Raum

The rich type system of probabilistic Type Theory with Records (TTR) (Cooper et al. 2015)) provides a lot of flexibility in modelling natural language semantics. Types can form dependencies and are *intensional* which means that a situation may be assigned more than one type. However, this flexibility (which is required for computational modelling of human language and cognition) comes with a cost when considering the assignment of types to records of situations. Each type assignment involves a probabilistic classification (yes/no) which means that an agent with n types must make n judgements/classifications of each situation. Agents have limited processing and memory resources and therefore an optimisation mechanism is required that allows them to prioritise what classifications to try first. This problem has been investigated in psychology as *attention*. The Load Theory (LT) (Lavie et al. 2004) distinguishes between *perceptual selection* or bottom-up attention (no conscious control and task independent) and *cognitive control* or top-down attention (conscious control and primed). Attention is a shared resource bound by the available resources and attention policy. We propose a probabilistic model for attentional priming of types/classifiers within the TTR framework that consists of two parts: (i) creation of thematic relations between cognitive types (locations, objects, relations and actions perceived visually or linguistically) as their probabilistic associations with states; (ii) priming mechanism for cognitive types based on perceptual and linguistic contexts. Important features of states and types include: (a) an agent may be in several states at the same time (making tea and talking about music), and (b) a type may be associated with more than one state. While an agent is in a state or states performing any additional type judgements associated with one of the states incrementally reduces its ambiguity of being in several states.

References: • R. Cooper, S. Dobnik, S. Lappin, and S. Larsson. Probabilistic type theory and natural language semantics. *Linguistic Issues in Language Technology – LiLT*, 10(4):1–43, November 2015. • N. Lavie, A. Hirst, J. W. de Fockert, and E. Vidring. Load theory of selective attention and cognitive control. *Journal of Experimental Psychology: General*, 133(3):339–354, 2004.