The evolution of grounded spatial language

Spatial language and cognition have fascinated linguists, psychologists and robotics researchers for a long time. Spatial language is central to all human languages and has provided a rich background and source of extensions into other parts of language. For instance, it is often assumed that spatial language provides a source of structure for temporal language but also more abstracts domains. Importantly, spatial language is incredibly diverse across cultures. Different solutions for the spatial reference problem at the heart of spatial language range from using purely geocentric features to body parts to projective terms familiar from English.

This book presents groundbreaking robotic experiments on how and why spatial language evolves. It provides detailed explanations of the origins of spatial conceptualization strategies, spatial categories, landmark systems and spatial grammar by tracing the interplay of environmental conditions, communicative and cognitive pressures. The experiments discussed in this book go far beyond previous approaches in grounded language evolution. For the first time, agents can evolve not only particular lexical systems but also evolve complex conceptualization strategies underlying the emergence of category systems and compositional semantics. Moreover, many issues in cognitive science, ranging from perception and conceptualization to language processing, had to be dealt with to instantiate these experiments, so that this book contributes not only to the study of language evolution but to the investigation of the cognitive bases of spatial language as well.

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