

## **Distributed Spaces in Concurrent Epistemic Systems**

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### **Abstract**

Epistemic, mobile and spatial behavior are common place in today's distributed systems. The intrinsic epistemic nature of these systems arises from social behavior. Spatial and mobile behavior is exhibited by programs and data moving across (possibly nested) spaces defined by, for example, friend circles, groups, and shared folders. In this talk I shall give a brief description of spatial constraint systems (scs) as semantic structures for specifying spatially distributed mobile multi-agent systems.

Roughly speaking scs can be seen as Scott's information systems with additional structure for specifying agents and their spaces. From a computational point of view scs can be used to specify partial information holding in a given agent's space (local information). From an epistemic point of view scs can be used to specify information that a given agent considers true (beliefs). Spatial constraint system can also specify the mobility of information/processes from one space to another. Ccs provide for process/information extrusion, a central concept in formalisms for mobile communication from concurrency theory. From an epistemic point of view extrusion corresponds to a notion we shall call utterance; a piece of information that an agent communicates to others but that may be inconsistent with the agent's beliefs. Finally, scs can also also distributed information, understood as information that agents may conclude if they were to combine their local information.

Spatial constraint systems have been used as semantic structures for spatial concurrent programming (sccp) and to reason about modal logics. In this talk I shall focus on the issue of distributed information, and briefly describe the applications of sccp.