Formal View on Agents and Multi-Agent Systems

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The word agent has found its way into a number of technologies. It has been applied to aspects of artificial intelligence research and to constructs developed for improving the experience provided by collaborative online social environments. As a result of scientific effort to simulate real world events there was invented unique type of artificial entity called agent. For purposes of this work we will always consider the rational agent. Agent can represent anything capable of decision making towards its goals depending on surrounding environment. We use them as a basic entity in distributed systems because of their unique properties which will be the main focus of this presentation. That is also why we try to formally describe them.

In real world we rarely find systems consisting of one entity. More often real world systems consist of high numbers of entities who compete or cooperate with each other for their own goals. This is main reason for us to extend agent formalism to the definition of multi-agent system (MAS), which allow us to simulate behavior of individual agents and at the same time study observed system as a whole. These simulations found its praxis among many research branches - analysis of electrical net, technological processes, military simulations and also in biology, technology, economy, social studies, etc.